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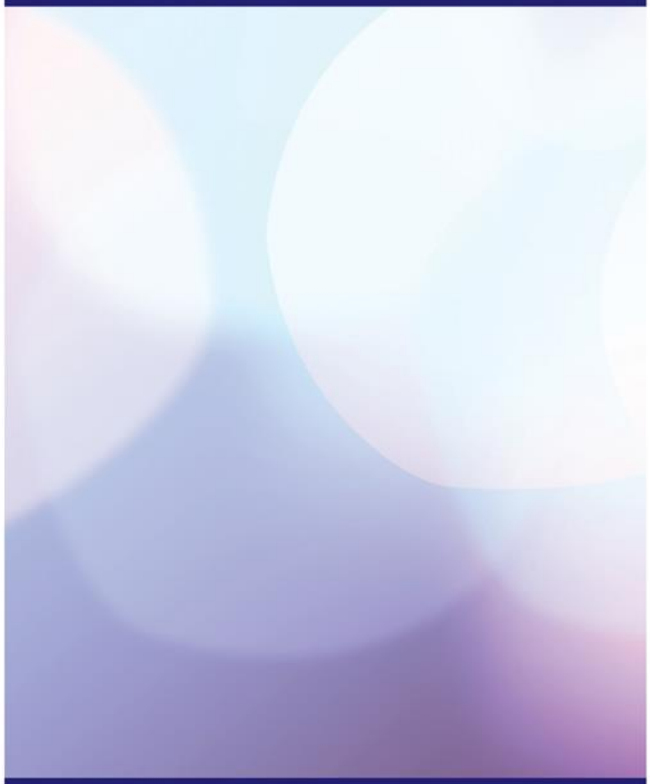

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Report for Chorus

Building Block model IAV model documentation: IAV model v314_135 v14

8 June 2022

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Ref: 677279899-243

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1 Introduction

1.1 Context

The New Zealand Commerce Commission is moving to a Regulatory Asset Base (RAB) based regime for Fibre fixed line access services (FFLAS) from 1 January 2022. Chorus wishes to be able to calculate the RAB outcomes so as to be able to engage with the Commission during this process.

Analysys Mason has been commissioned by Chorus to construct a model to calculate the Maximum Allowable Revenue (MAR) and Initial Asset Valuation (IAV) related to fibre to the premises (FTTP) services in New Zealand (so-called "Fibre Fixed Line Access Services", or FFLAS).

This document only relates to the Initial Asset Valuation part of the modelling system. MAR aspects are not covered in this document.

The remainder of this document is laid out as follows:

- Section 2 provides an overview of the model aims
- Section 3 provides an overview of the main calculations
- Section 4 describes how the allocation factors have been calculated
- Section 5 gives brief details of model installation and how to run the model
- Section 6 includes a brief description of the worksheets for the IAV model
- Further detail is provided in Annexes.

2 Overview of the model

2.1 General

2.1.1 Outputs

The IAV model is required to produce the following main output:

IAV — The initial asset valuation for Chorus's assets which will form the regulatory asset base (RAB) at the implementation date. The IAV must include three components:

- Assets which are dedicated to FFLAS services
- Assets which are shared between FFLAS and non-FFLAS services: and
- An asset representing the Unrecovered losses (UL)[1]. The Commission calls this the "Financial Loss Asset" or FLA.

For the post-implementation period (i.e. after 1 January 2022), the Commission has specified distinct FFLAS classes:

- The ID-only FFLAS class is subject only to Information disclosure regulation, ("ID")),
- The PQ FFLAS class is subject to both Price Quality regulation ("PQ") and ID regulation,
- The ID FFLAS class is subject to ID regulation. It is in effect the union of the ID-only and PQ FFLAS classes.
- It is possible that additional FFLAS classes may be defined in future. As no additional FFLAS classes have been specified, these are not calculated in the model.

The IAV model is built to calculate the UL, the initial allocated PQ FFLAS RAB, and the allocated ID-only FFLAS RAB.

Model structure

The structure of the IAV model is as follows:

- there are a variety of input workbooks which process data from a number of sources including the Chorus FAR and General Ledger
- there is a combined workbook that consists of both the common inputs (various model control and scenario definition parameters) and the IAV model

[1] Unrecovered losses relate to losses (revenues less than required revenues) made on the Ultra-Fast Broadband (UFB) programme up to the establishment of the RAB, cumulated up taking the cost of money into account.

This document only covers the IAV model workbook: "CONF Chorus NZL Core BBM v314_135 CRM IAV CC (Commission links) clean - Commission July WACC v14 - 50 combined S17 O10.xlsb".

The various input workbooks are discussed in separate documents (qv).

2.2 Styles

The model uses Analysys Mason house style for cell formatting throughout to aid understanding and audit/review of the calculations.

For ease of readability, the model makes heavy use of array formulae with large named ranges, often representing all asset classes/geographies/asset purchase timeframes and all years. We note that array formulas are not used ubiquitously as there are some circumstances where it is easier and simpler to use a normal Excel formula (e.g. summing a row).

In this model we use old-style Excel array formulas ("curly brackets").

Inter-workbook links all use named ranges.

2.3 Main Inputs

The model has six sources of supporting input data. Two of these are linked in from separate files:

NBV, depreciation and historic capex	An analysis of Chorus's current fixed asset register (FAR) forms the basis of the historical capex, depreciation, tax depreciation, asset book valuation and asset tax book valuation calculations in the model. This data is pasted from the Aggregation file into the SFARInputPost2012 and SFARInputPre2012 worksheets.
Capex forecast	An analysis of Chorus's capex forecast, which is allocated to the asset classes used in the model. This data is pasted in to the SCapexInput worksheet.
Opex	An analysis of Chorus's opex expenditure forms the basis of the opex calculations in the model. This includes historical data plus forecasts. This data is linked from the opex file into the SOpexInput worksheet.
Revenue and Demand	An analysis of the revenue attributable and the demand for various types of FFLAS and non-FFLAS services (historical and forecast). This data is linked from the demand and revenue file into the SControlSheet and SRevenue worksheets.
Asset class allocation factor	Various analyses of Chorus network and cost data have been used to create suitable asset class allocation factors ("sharing factors") or inputs to the calculations of such factors. This data has been pasted into the SSharingInputs

(sharing factor) inputs	worksheet (and in the case of the traffic ratios, pasted into the control worksheet).

2.4 Cost and asset lifetimes

For assets that are deployed from 2012 onwards, we use Chorus's history and forecast of capex expenditure from 2012 onwards.

For the assets which were in place before 2012 (e.g. ducts, manholes and poles) we use the accounting net replacement cost (net book value, NBV) at the start of FY12 and an estimate of the remaining asset lifetime derived from the FAR.

2.5 Depreciation method

For asset classes and in timeframes where it is feasible to do so we use the actual depreciation and tax depreciation values recorded in Chorus' accounts Fixed Asset Register (FAR). This is because we are aiming for the Initial Asset Value (IAV) of these assets (i.e. the RAB of these assets at the date of implementation) to be identical to the book value of those assets.

For the avoidance of doubt, we note that Chorus accounts do in principle depreciate assets in the year of purchase; the extent of this depreciation in the year of purchase depends on the date at which the asset was capitalised.

Where it is necessary to calculate depreciation because it is not available from the Chorus FAR, we use straight line depreciation. This is necessary for:

- Timeframes where actual depreciation is not available as the accounts are not yet available (future periods such as FY23)
- Asset classes that do not exist within Chorus' accounts. This includes test asset classes (included for test purposes, but which do not contribute to the IAV) and the asset classes we use to represent capital contributions (see section 3.6.11).

In a similar way to the actual accounting practice of Chorus, in our calculated depreciation we include depreciation in the year of purchase, depending on the date at which the asset has been capitalised.

2.6 Scope and dimensions of the model

2.6.1 Scope of services of interest and assets dedicated to supporting those services

Services of interest

As noted above, we divide the services into the following categories:

- Contracted FFLAS services
- Voluntary FFLAS services (i.e. those not provided under the terms of the UFB contract)
- Non-FFLAS fibre services
- Copper services

From the demand and revenue model we have values for the end of period demand and period revenues for each of these groups of services.

Asset classes supporting these services

Asset classes can be:

- Attributed to the RAB (because they are only used by relevant FFLAS services),
- excluded from the RAB (for example, because they are only used by non-FFLAS services)
- allocated in part to the RAB.

The required flexibility in allocation is achieved in the model by the use of allocation factors (100% if wholly included; 0% if wholly excluded); where an allocation factor is 100% across all periods then that asset class is directly attributable to a particular service. At different times, and in different geographies (Won, Lost, Non, and National), a given asset class may have different allocation factors. So, for example: in calculating the unrecovered loss pre-implementation, we only consider the assets in the "Won" area and a share of the "National" assets.

The FFLAS services share many assets with other services (e.g. copper services also use the same building). An important element of the modelling is therefore to allocate the correct value from the shared assets to the FFLAS services. This allocation can be different depending on the context:

- In the pre-implementation period, we are concerned with the calculation of the unrecovered loss ("UL"), thus we include the assets used by Chorus' contracted UFB services in the "Won" area (as well as a share of the "National" assets used to support these services). Where an allocation factor is 100% during this period it means that the asset class is directly attributable to UFB FFLAS. Where the allocation factor is 0%-100% the asset class is partly allocated to UFB FFLAS using ABAA, with the remainder allocated to other services.
- At (and after) implementation date, the relevant scope of assets is different as it may include assets used to support FFLAS offered in the "Non" area and the part of the "Lost" area that overlaps with the RONZ ("Lost/RONZ"). The rest of the "Lost" area (Lost/LFC) is assumed to be outside the scope of the initial PQ FFLAS RAB due to a decision of MBIE (it will be "ID-only"). The allocation (sharing) factors are discussed in more detail in Sections 6.5 and 6.17.

2.6.2 Assets

We consider Chorus's assets in terms of 'asset classes'[2]. This allows a large degree of aggregation and simplification from the highly granular data held in the fixed asset register (FAR). All financial data including historical asset values are taken from the FAR (via an intermediate processing step).

Each asset class has similar asset lifetimes and replacement cost trends. Each asset class is also shared between the different services in a similar way.

The model has space for 100 asset classes, though 4 are reserved for special purposes. However, there is a need for multiple versions of each asset class, as discussed in section 3.1 below.

2.6.3 Time

There are two time-related dimensions: the periods over which results are calculated, and the date at which assets are acquired.

Periods over which results are calculated

The model makes calculations over time. The range of time covered by the model is from FY12 through to FY57 (though in practice there is only input data for fewer periods e.g. to FY39 or earlier). Where possible, we work in Chorus financial years. As noted above, "FY12" refers to the financial year ending 30 June 2012.

FY22 is split into two six-month (half-year) periods; 2021H2 (from 01 July 2021 to 31 Dec 2021) and 2022H1 (from 01 Jan 2022 and 30 June 2022). The point in time at which the RAB is brought into operation by the Commission is not at the end of a financial year. This means that the final period of the IAV calculation is a part-year.

Note that FY12 is only 7 months in duration as it started 1 Dec 2011 and thus is also a part-year.

Start of period / average over period / end of period

Throughout the model, labels refer to the point in each year a calculation refers, e.g.:

- Start of period (SOP)
- Average over period (AOP)
- End of period (EOP)

So, for example, RABSOP refers to the RAB at the start of the current period.

[2] Note: that the asset classes may include spares.

Timeframes

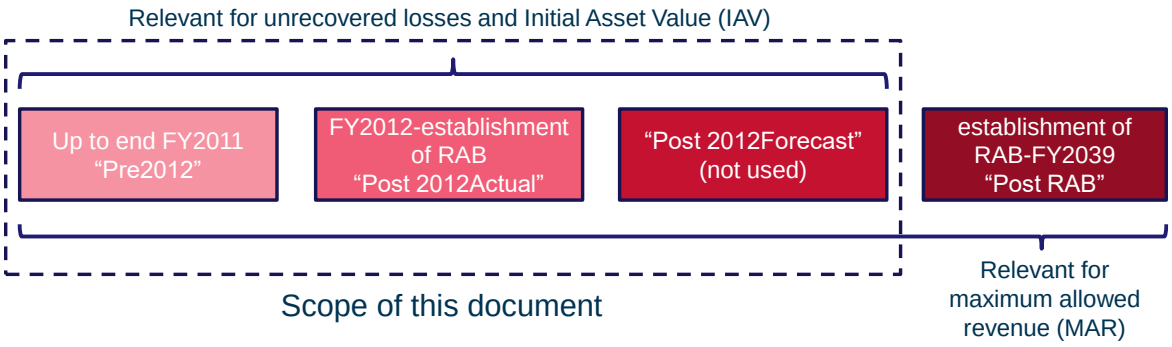
We model four distinct timeframes in the model as follows:

- Pre-2012
- Post2012Actuals (Note: this is now up to the implementation date, but previously ended in FY20)
- Post2012Forecasts. Note that in practice, now that we have actual data to 31 Dec 2021, this timeframe is not used any more
- PostRAB (from implementation date i.e. 1 Jan 2022)

It should be noted that the date of establishment of the RAB (i.e. the boundary between Post2012actuals and PostRAB, 1 Jan 2022) is fixed in the model.

This division of time into these timeframes is shown in Figure 1. The 2 timeframes "Pre2012" and "Post2012Actuals", make up the asset purchase timeframes which contribute to the financial loss calculation[3].

Figure 1: Timeframes included in the model [Source: Analysys Mason, 2022]



These timeframes are used in two distinct ways in this document.

Date at which assets in asset classes were acquired

A second way in which it is necessary to consider time is the timeframe at which the assets were acquired. In particular, we distinguish between assets bought in each of these "asset purchase timeframes", as follows:

- Asset classes whose assets were acquired before 2012 are labelled as "Pre2012"
- Asset classes whose assets were/are acquired in the part of the pre-implementation period where actual data on depreciation and NBV is available from Chorus' accounts are labelled Post2012Actuals (i.e. up to and including 2021H2)

[3] The period considered for the financial loss calculation is from the start of FY12 (from 1 Dec 2011) to FY22 (up until 31 Dec 2021), consistent with the financial loss period in the IMs.

- Assets classes whose assets are forecast to be acquired in the pre-implementation period but not yet covered by Chorus' accounts are labelled as Post2012Forecasts. Note that as we now have actual data to end of 2021H2, this timeframe is not used any more.

- Asset classes whose assets are expected to be acquired after the establishment of the RAB are labelled "PostRAB"

When we refer to such a grouping of asset classes, we refer to "asset purchase timeframes". The relevant range of years for each of these asset purchase timeframes is the same as for the "timeframes" discussed above, but we distinguish the asset purchase timeframes because assets bought at different times may need to be treated differently in any given timeframe (e.g. as regards how we calculate their depreciation).

Asset classes bought in different asset purchase timeframes are therefore treated separately, on different lines of the model.

2.6.4 Geographies

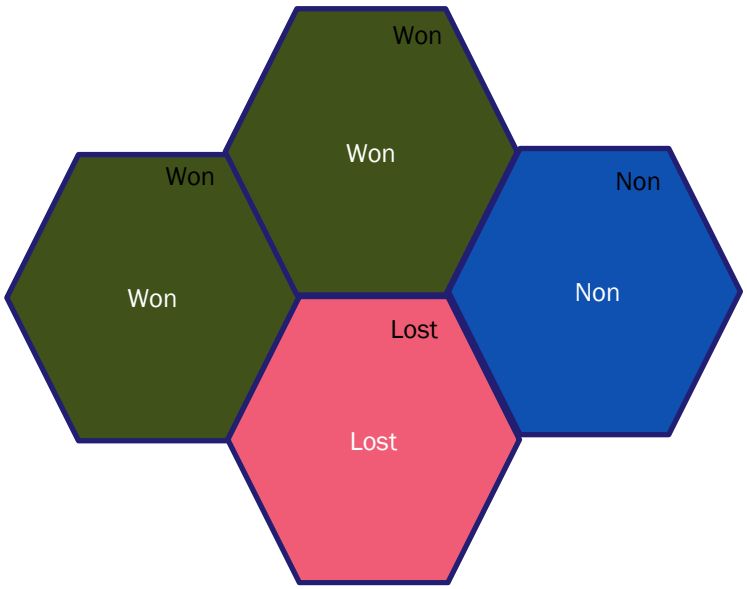
The model considers 4 geographies:

- ESA areas where Chorus is the LFC (i.e. it won the contract to deliver UFB, "Won")
- ESA areas where Chorus is not the LFC ("Lost")
- ESA areas where there is no LFC (i.e. no UFB deployment) ("Non")
- A final geography for central and core assets which are used by all the other geographies ("National"). This class also includes some assets with unknown location

Areas where there are Chorus and non-Chorus LFCs in a single ESA area (this is usually UFB2 related) are treated as a special case in processing the FAR data; there is no such geography within the BBM IAV model. Assets within such areas are allocated to either "Won" or "Lost", depending on the nature of the asset. See the FAR processing documentation for further details.

Almost all of the geographic calculations in the IAV model use the four geographies described above. They are illustrated schematically in Figure 2 below.

Figure 2: Illustrative division of four hypothetical hexagonal Exchange service areas (ESA) into "Won", "Lost" and "Non" areas [Source: Analysys Mason, 2021]



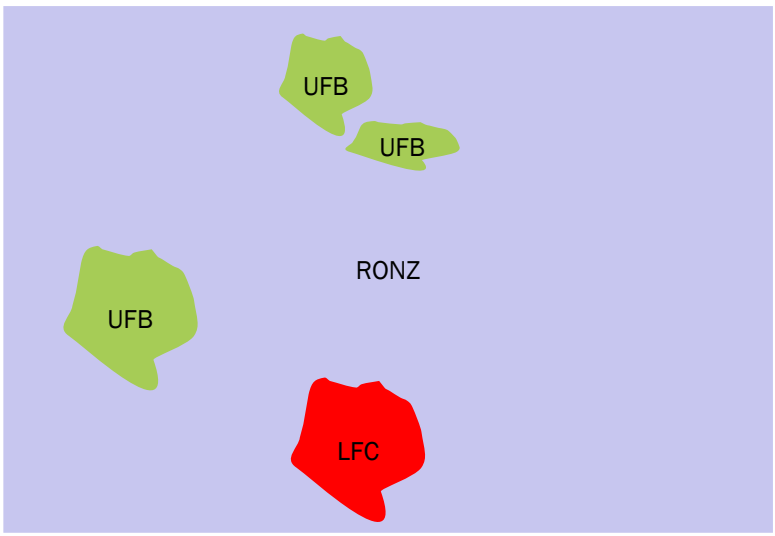
Within the Demand and Revenue model, a different view of geography is used, based on the actual network extent[4]. This is divided as

- UFB: the (detailed) area within which Chorus has UFB network and provide contracted FFLAS services
- LFC: the area within which the non-Chorus LFCs have UFB network
- RONZ: the Rest of New Zealand (in which there is no UFB network). Areas without UFB but towards the edges of ESA with some UFB presence are in the RONZ, for example.

This breakdown is illustrated in Figure 3 below; unlike the Won/Lost/Non view, the boundaries of the UFB area are restricted to only those areas where UFB services are (or will be) available; islands of UFB capable networks (where most of the population lives) sit in a sea of non-UFB (i.e. RONZ) areas.

4 For further details, see the demand and revenue model documentation

Figure 3: Illustration of hypothetical UFB/LFC/RONZ areas in the hexagonal exchanges noted above [Source: Analysys Mason, 2021]

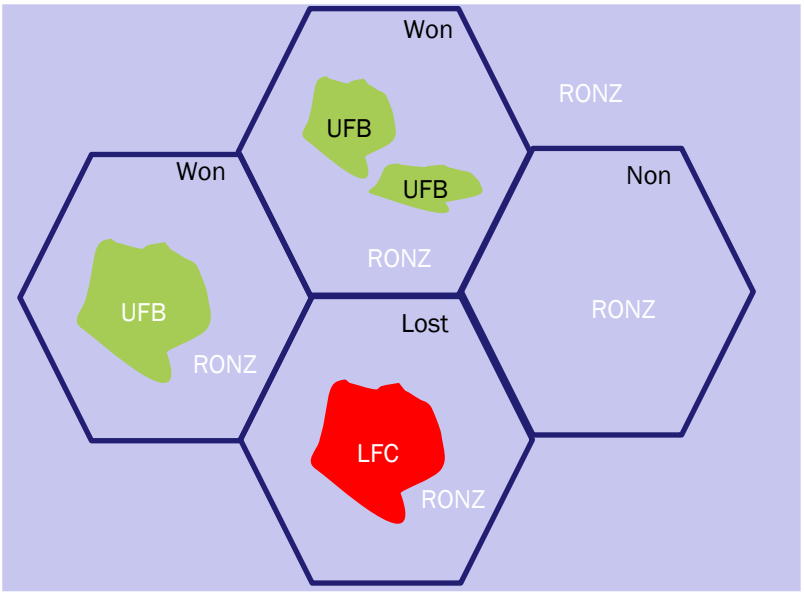


The output demand and revenue data supplied by the demand and revenue model (linked to by the BBM IAV model) has a higher geographic granularity that combines these two views. This is as follows:

- Won/UFB – "Won" that overlaps with the Chorus UFB area (100% Chorus UFB is in "Won")
- Won/RONZ – "Won" that overlaps with the RONZ area
- Lost/LFC – "Lost" that overlaps with the LFC UFB area (100% LFC UFB is in "Lost")
- Lost/RONZ – "Won" that overlaps with the RONZ area
- Non/RONZ – "Non" that overlaps with the RONZ (100% of "Non" is in the RONZ)

This higher granularity is illustrated in Figure 4.

Figure 4: Illustration of higher granularity from combining two different views of geography [Source: Analysys Mason, 2021]



The demand and revenues by services have been distributed across these 5 geographies (from UFB/LFC/RONZ actuals and forecasts for the different types of services (Contracted FFLAS, Voluntary FFLAS, Copper and other) in the Demand and Revenue model.

In the IAV model, demand and revenues (from the Demand and Revenue model) are mapped from the extended geotypes (the five categories above) to the set of geotypes used for most of the calculations in the BBM. This mapping is included in Figure 5 .

However, the additional granularity is used in calculating some of the asset allocation factors as discussed in more detail in section 4.2.

Figure 5: Overview of the mapping of extended geotypes (Demand and Revenue model) to the BBM geotypes [Source: Analysys Mason, 2021]

Extended Geotypes	BBM Geotypes
Won/UFB	Won
Won/RONZ	Won
Lost/LFC	Lost
Lost/RONZ	Lost
Non/RONZ	Non

2.6.5 Operating costs

Opex is linked into the model from the opex allocation model, allocated into 24 service categories, across time (actuals and forecasts extending to FY39). For more information on the details of opex allocation, please refer to the Opex allocation workbook documentation.

Some of these operating costs categories are allocated to in-scope FFLAS within the BBM. The allocation factors used are described in section 0 below.

There are four additional service categories

- Some operating costs related to leases are considered to be capitalised under IFRS16 for accounting purposes. Within the IAV model we consider these assets to be capitalised. However, because the tax treatment of such assets is that the asset has no tax depreciation but the lease opex is treated as opex, we use a similar treatment in calculating the tax allowances in the BBM calculation (and in the DCF calculation of the unrecovered loss / FLA). Opex related to the relevant lease items is obtained from a separate workbook (data provided by Chorus), allocated into two additional service categories across time.
- There are also two tax adjustment service categories – see section 3.6.17.

The opex time series including the IFRS16 lease payments and the tax adjustments as opex is called TaxOpex because it is only used within calculation of the tax allowances.

There are also 10 spare opex service classes within the IAV model, in case the number in the opex model were to increase in the future.

2.6.6 Scenario controls

The model supports scenarios, which allow a variety of parameters to be set to reflect different ways in which the Commission could perform its calculation.

Five scenarios are provided in the current version.

- Scenario 1 is the original proposed by Chorus
- Scenario 2 is equivalent to the "Causal" scenario which Chorus proposed to the Commission in May 2021, and is compliant with the IMs.
- Scenario 14 is the modified version consistent with the Commission's December 2021 final decision.
- Scenario 17 is the "True up" version retaining the Commission's draft decision regarding the property space allocation factors (ie retaining the 50% cut). This needs to be linked to a version of the opex model also making a similar assumption about property allocation factors.
- Scenario 18 is the "True up" version applying Chorus' original property space allocators (i.e. removing the effect of the Commission's 50% cut to the FFLAS allocation of property space). Again this needs to be linked to a version of the opex model also making a similar assumption about property allocation factors.

Scenario parameters

Parameters which vary between scenarios are as follows:

Figure 6: List of parameters which vary between different scenarios in the IAV model [Source: Analysys Mason, 2021]

Parameter	Explanation
Principal.Sharing.factors.set	This controls which set of allocation factors to use; each set defines an allocation factor to use for each asset class in each geography and asset purchase timeframe.
WACC.assumption	This controls which set of values to use for the various inputs to the WACC calculation (e.g. cost of debt and cost of equity)
totex.excludes.passthrough.costs	This controls whether or not the calculation of the totex allocation factor considers passthrough costs to be part of totex
pre2012.duct.allocation.factor.ceiling.values	This controls which set of values should be applied as a ceiling to the allocation factor for the shared pre2012 L1 Duct (used in certain scenarios)
CPI.assumption	This controls which set of assumptions for CPI over time should be used (this affects indexation (revaluation) in the MAR model, although in practice these assumptions can be overridden in the MAR model, where they can be more conveniently specified in calendar year (CY) terms)
space.sharing.option	This controls which set of input values to use to calculate the space allocation factors (ie how much of the costs of the space inside buildings should be allocated to FFLAS)
modify.FY22.half.year.calculations.for.closer.reconciliation	This controls whether a small number of specific formulas in the IAV model are adjusted such that the use of explicit periods for the two halves of FY22 (ie 2021H2 and 2022H1) either use the original formula (which may allow the result to vary slightly from the previous calculation due to different data in that half year compared to FY22 as a whole) or an adjusted approach such that the result is unchanged from the previous calculation (e.g. based on half of FY22, or an FY22 average over period calculation) Note that the impact of these changes on the result is immaterial; we include the option only to assist in showing how the IAV model can achieve a high degree of reconciliation to the previous decision if using identical inputs.

Parameter	Explanation
use.true.up.data.for.allocation.factors	This controls whether the new "true-up" data for FY21 and 2021H2 (On the SSharingInputs sheet) is used for the inputs to the allocation factors.
use.true.up.data.capital.contributions	This controls whether the "true up" data for 2021 and 2021H2 is used on the SCapitalContributionInput sheet.
use.true.up.data.CIP.Funding	This controls whether the revised "true up" data for 2021 and 2021H2 is used on the SCIPFunding sheet.

Figure 7 below shows the values of the parameters used in the two scenarios of interest for True-up:

- the "True-up with 50% property space cut retained" (scenario 17)
- and the "True-up with no property space cut applied" (Scenario 18):

Figure 7: Parameter values used in the Commission final decision scenario, scenario 17 and scenario 18 [Source: Analysys Mason, 2021]

Parameter name	Value in scenario 17	Value in scenario 18
Principal.Sharing.factors.set	"Use alternate UFB allocator for pre-2012 L1 Duct"; this is as per scenario 2, but pre-2012 L1 Duct has a ceiling imposed on it as used in December 2021	"Use alternate UFB allocator for pre-2012 L1 Duct"; this is as per scenario 2, but pre-2012 L1 Duct has a ceiling imposed on it as used in December 2021
WACC.assumption	"Final decision WACC" as used in December 2021	"Final decision WACC" as used in December 2021
scenariocommon.totex.excludes.passthrough.costs	0 (ie passthrough is included in the totex allocator calculation) as used in December 2021	0 (ie passthrough is included in the totex allocator calculation) as used in December 2021
pre2012.duct.allocation.factor.ceiling.values	"Alternative" (ie the higher value to the ceiling as used in December 2021)	"Alternative" (ie the higher value to the ceiling as used in December 2021)
CPI.assumption	"final decision CPI" as applied in December 2021	"final decision CPI" as applied in December 2021
space.sharing.option	"Alternative" (ie lower value, 50% cut, as applied in December 2021)	"Original" (ie higher value, no cut applied)[5]
modify.FY22.half.year.calculations.for.closer.reconciliation	FALSE	FALSE

5 Note that as noted above, to change the model assumptions about the way in which the property space allocation factors are calculated it is also necessary to link to a version of the opex model that makes a consistent assumption.

Parameter name	Value in scenario 17	Value in scenario 18
use.true.up.data.for.allocation.factors	TRUE.	TRUE.
use.true.up.data.capital.contributions	TRUE	TRUE
use.true.up.data.CIP.Funding	TRUE	TRUE

2.7 Terminology used in the BBM IAV model

Figure 8: Terms used in the model [Source: Analysys Mason, 2021]

Term/abbreviation	Meaning in this model and this document
Asset class (or "Specific asset class")	An aggregate of many similar assets. An asset class is assumed to have a specific lifetime; assets making up an asset class are assumed to be shared between services in similar ways. The various capital-related quantities within the model such as NBV, lifetime, depreciation, Tax NBV etc are calculated for these asset classes.
Asset purchase timeframe	A group of years. More specifically, for each of the asset class and geography combinations we track metrics for each of 4 particular asset purchase timeframes, which are groups of years as follows: • Pre-2012 • Post2012Actuals (i.e. the period for which we have actual data from the accounts: the FAR and the GL) • Post2012Forecasts • PostRAB Assets (in asset classes) purchased in a specific asset purchase timeframe form a block of rows on the vertical axis of the many arrays within the model.
BBM	Building Block Model. A means of calculating the annual required revenue for a utility, such that it has the expectation of capital maintenance. It consists of a series of "building blocks" – including depreciation, operating cost, return on capital employed, and (if using a "vanilla WACC", as here) tax allowance.
Capital Contribution (also abbreviated as CC)	A payment to Chorus required by the Commerce Commission to be netted off from the initial capex associated with an asset purchase.
DCF	Discounted Cash Flow. A means of calculating the present value of a series of cash flows.
EOP	End Of Period (usually end of financial year)
ESA	A (Chorus) Exchange Service Area. An area served by copper network from one building.
FFLAS	Fibre Fixed Line Access Services as defined by the Commerce Commission. These are divided into Contracted FFLAS provided under the UFB contract and Voluntary FFLAS (not provided under the UFB contract)..
FLA	Financial Loss Asset. Synonymous with Unrecovered Loss (qv).
FY	Chorus Financial Year. Financial year 2012-2013 is abbreviated to "FY13". Chorus financial years end 30 June. FY12 started on 1 December 2011. The final pre-implementation period ends 31 December 2021. Thus, the duration applicable for financial year FY22 depends on whether the calculation relates to pre-implementation (1July 2021-31 December 2021) or post-implementation (1

Term/abbreviation	Meaning in this model and this document
	Jan 2022-31 June 2022). For the pre-implementation period (i.e. the financial loss period) this is consistent with the definition of financial loss year in the IMs.
GBV	Gross book value (in this context, initial purchase cost)
IAV	Initial Asset Value. The starting value of the RAB at implementation date.
IFRS16	International Financial Reporting Standard 16. This relates to capitalisation of certain leases.
IM	Input Methodology. The Commerce Commission rules applying to the calculation of the BBM results and the FLA.
LFC	Local Fibre Company – a provider of FFLAS wholesale services, whose network rollout was originally part funded by the Crown under the UFB programme. Chorus is one such LFC. However, the term is often used to refer to non-Chorus LFCs or (more widely) the areas they serve.
MAR	Maximum Allowable Revenue. The revenue allowed under a BBM. In the model, some named ranges are tagged “MAR” when they refer to the values which are appropriate to use post-implementation.
Non-FFLAS fibre services	Fibre services which do not meet the definition of FFLAS..
“Lost” area	The area of New Zealand which is the aggregation of the ESA areas in which the main provider of UFB services is a non-Chorus LFC (i.e. there is UFB present within the ESA but Chorus is not the LFC). Not all premises in the ESA are necessarily passed by FFLAS. We call this “unpassed” part of the Lost the “Lost/RONZ” and the LFC part “Lost/LFC”.
“National” geography	A geography within the model; a notional location of the assets in some asset classes. Assets whose location is unknown are reported under this “National” geography. Also, assets whose use supports services on a national basis (e.g. core fibre, aggregation electronics) are not recorded as being in one of the other three geographies (“Won”, “Lost”, ”Non”) on the basis of their location, but are reported under this “National” geography.
“Non” area	The area of New Zealand which is the aggregation of the ESA areas in which there is no provider of UFB services (i.e. there is no UFB within the ESA). There may be FFLAS but not via the UFB programme.
Pseudo-GBV	In the discussion of some of the calculations of the model we sometimes refer to “Pseudo-GBV” by which we mean the GBV of assets bought in that timeframe and the NBV for assets which already existed at the start of that timeframe. For example, in the Post2012Actual timeframe, the GBV of Post-2012 actual assets is depreciated over their full lifetime; the NBV as at the start of the Post2012actual timeframe of pre-2012 assets is depreciated over their remaining lifetime.
RAB	Regulatory asset base
RONZ	Rest Of New Zealand. A term used in other contexts to represent the area within which there are no UFB services. This is not a synonym for the “Non” area. it is used within the demand and revenue forecast model, which is an input to the BBM IAV model, to indicate a specific geography. Part of the RONZ is in the Non, but part is in the Lost (Lost/RONZ) and part is in the Won (which we call Won/RONZ).
SLD	Straight Line Depreciation

Term/abbreviation	Meaning in this model and this document
SOP	Start of Period (In this context, usually a Chorus Financial Year); these periods are not always 12 months in length)
Timeframe	A group of years, more specifically a range of years or **columns** on the horizontal axis of many of the arrays within the model, for which the means of calculation of various parameters (such as depreciation) is similar. Not to be confused with "asset purchase timeframe" which is a range of **rows** in these same arrays..
UFB	Ultrafast Fibre Broadband. The name of a NZ governmental programme under which Crown financing was provided to Local Fibre Companies to build and operate wholesale-only FTTH networks in discrete areas covering approximately 75% of the population of New Zealand
UL	Unrecovered Loss. Also known as "Financial Loss Asset". The cumulated sum of the annual shortfall in UFB revenues (relative to that which would have provided capital maintenance for the UFB business) in the pre-implementation period, taking the cost of funding that loss into account. Within the model, some named ranges are tagged "UL" if these are the values that apply pre-implementation when we re calculating the UL. Similar post-implementation ranges are tagged "MAR".
"Won" area	The area of New Zealand which is the aggregation of the ESA areas in which the main provider of UFB services is Chorus (i.e. there is UFB present within the ESA and Chorus is the LFC). Not all premises in the ESA are necessarily passed by FFLAS. The Won area is subdivided into Won/UFB and Won/RONZ areas. The Won/UFB is the area served with UFB; the Won/RONZ is the area not served by UFB.

2.8 Comparison of model terminology to Commission Input Methodology terminology

2.8.1 General

In this section we discuss some of the terminology used in the BBM IAV model and relate it to the equivalent terminology used by the IMs.

2.8.2 Financial Loss Year / Period

Within the BBM IAV model we model "periods" which are Chorus financial years (FY) or, in the case of 2021H2 and 2022H1, a part-financial year. These are the same as the "financial loss years" in the IMs.

Note that not all of these periods are 12 months in length (e.g. FY12 is 7 months).

2.8.3 Assets / Asset classes

The IMs discuss assets.

The BBM IAV model works with asset classes which are aggregates of many individual assets from the FAR, grouping together those which perform similar roles (e.g. ducts) and in similar geographies (e.g. Won).

There are some provisions of the IMs that require slightly different approaches when dealing with aggregated asset classes. For examples see section D.1

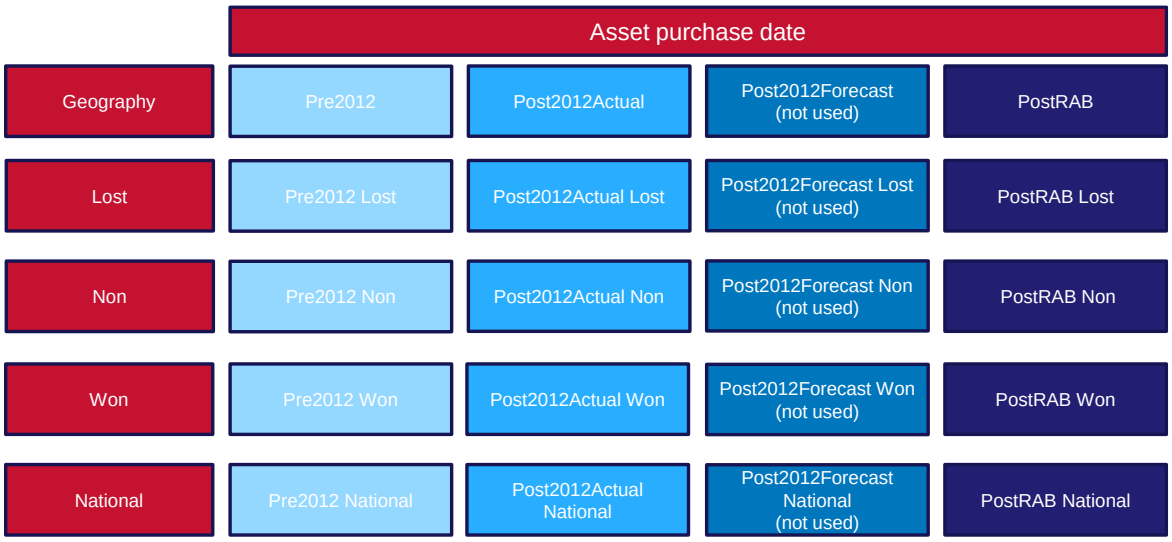
3 How the calculations are structured

In the following subsections we outline some of the key principles of the calculations in the model.

3.1 Grouping of assets into asset classes and overall format of each calculation block

The combination of asset purchase timeframe (based on original asset purchase date) and geography creates several combinations, as shown in Figure 9.

Figure 9: Overview of combinations of asset purchase date and geography [Source: Analysys Mason, 2022]



However, to be able to model the results over time in a spreadsheet, we must combine the asset classes, asset purchase timeframes and geographies into a single vertical list or column. This list represents the row labels that are used in most of the model, as shown in Figure 10.

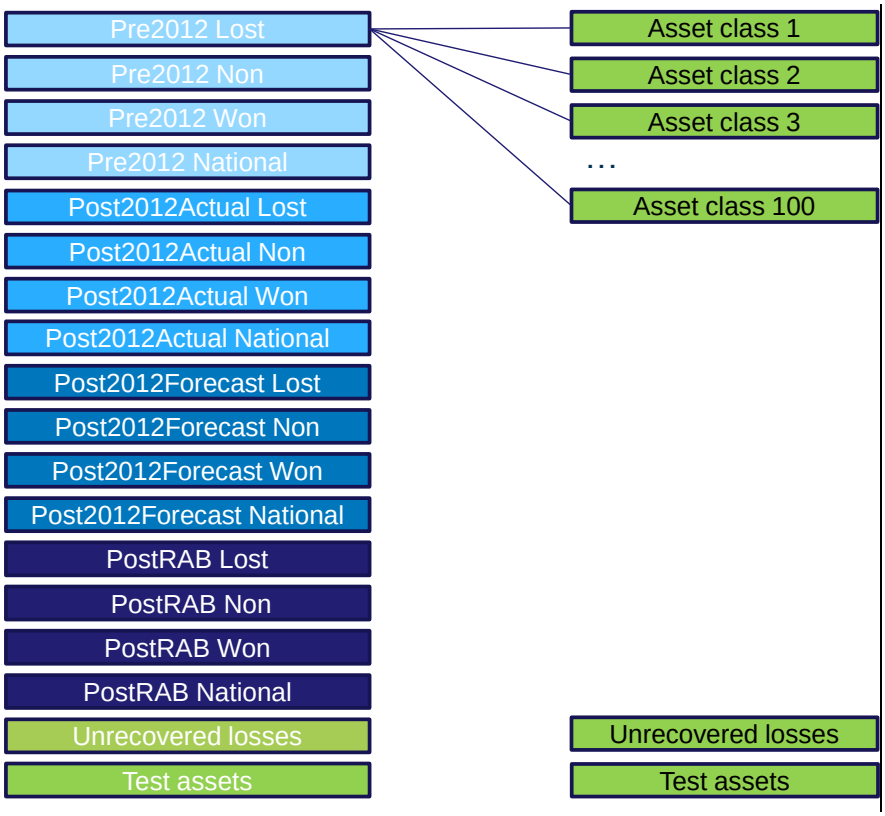


Figure 10: Structure of lists of row labels in the model [Source: Analysys Mason, 2022]

As can be seen in the figure above, various special case asset classes are at the bottom of the list. These include:

- four test asset classes (one for each asset purchase time period)
- the "unrecovered loss" asset class (this asset class is a placeholder that is not used as an asset within the IAV model[6])
- a washup asset class (not used in the IAV model and not discussed further here)
- a post implementation tax adjustment asset class (not used in the IAV model and not discussed further here)
- post implementation depreciation adjustment and repayment asset classes (not used in the IAV model and not discussed further here)

Combining the above requirements, each block of the main calculation of the asset-related elements contributing to the RAB rollover in the BBM IAV model (RABSOP, Capex, Depreciation, etc) is an array which is:

- 47 columns across (showing periods from FY12 to FY57); and
- 1612 rows down (configured as 100 asset classes x 4 geographies x 4 asset purchase timeframes, plus special cases).

6 The unrecovered loss value at the implementation date is calculated within this model, but it is not converted into an asset until post-implementation.

3.2 RAB calculation flow

This section outlines the methodology used to:

- calculate the initial value of a fibre asset as required by section 177(1)(i) and in accordance with the IM clause 2.2.5. [7]
- calculate the initial value of a fibre asset as recorded in Chorus financial statements as of 1 December 2011 as required by section 177(1)(ii) and in accordance with the IM clause 2.2.4.
- calculate adjustments for depreciation as required by section 177(1)(b) and in accordance with the IM clause 2.2.6.

As explained in section D.3 below, within the BBM IAV model we maintain a RAB for all assets. This is larger than the UFB assets RAB or the Fibre Assets RAB, because it includes all assets.

An overview of the flow of the RAB calculation is as follows:

$$In\ a\ given\ period\ e.g.\ FY12$$
$$Calculated\ RABEOP = RABSOP + Capex - Depreciation + Indexation - Disposals$$

$$NBV\ Corrections = if\ the\ asset\ is\ in\ Chorus\ accounts^{8},$$
$$(Closing\ Book\ value - Calculated\ RABEOP)$$
$$else\ 0$$

$$RABEOP = Calculated\ RABEOP + NBVCorrections$$

$$Where$$
$$RABSOP = RAB\ at\ start\ of\ period$$
$$RABEOP = RAB\ at\ end\ of\ period$$
$$Capex = Capital\ expenditure\ in\ period\ (Value\ of\ Commissioned\ Assets)$$
$$Depreciation = Accounting\ depreciation\ in\ period\ (in\ this\ model, straight\ line\ is\ used).$$
$$Indexation = Indexation\ applied\ (always\ zero\ in\ this\ model)$$
$$Disposals = Disposals\ in\ the\ period$$
$$(we\ set\ Disposals\ as\ zero\ and\ treat\ Disposals\ as\ a\ type\ of\ (negative)NBV\ correction\ instead)$$

$$RABSOP\ of\ period\ n + 1 = RABEOP\ of\ period\ n$$

The initial RABSOP of pre-existing asset classes at the start of FY12 is the initial book value of those asset classes in the Chorus FAR. Using this, and including the NBV Corrections terms, means that we stay in line with the Chorus NBV for the assets in the Chorus FAR, as required by the Act.

7 Section 3.6.11 addresses the requirement to account for capital contributions.

8 Asset classes where there is no corresponding asset in Chorus accounts are: test assets; special assets such as the unrecovered loss placeholder, and capital contribution assets (see section 3.6.14)

The sign convention we have chosen for Depreciation means a typical capital asset will have a positive depreciation. For example, an asset with a lifetime of 5 years and a purchase price of NZD100 bought on the last day of year 1 will have depreciation in year 2 of +NZD20. We note that figures coming from Chorus accounts use the opposite sign convention for depreciation values. Depreciation data in the Aggregation file which come from the Chorus FAR is therefore usually negative and this is converted into a positive value in the IAV model.

The net effect of this RAB rollover equation is as follows:

- There is "Capital maintenance"
- The NBV Corrections represent adjustments applied in the Chorus FAR that are not provided as inputs to our model (e.g. Transfers, Disposals, Writeups to either book value or tax book value). The net effect of applying these corrections is that, in the Post 2012 actuals timeframe, the model RABEOP will stay perfectly aligned to the Chorus FAR closing NBV for all assets that are in the FAR.

We carry out this calculation for each period and for each asset class, geography and asset purchase timeframe.

As noted above, each of the items in the calculation (such as RABEOP) is therefore a large block of 1612 rows and 47 columns, typically on its own sheet, with a named range.

3.3 Tax RAB calculation flow

The TaxRABEOP rollover is calculated in a similar way, as follows:

$$In\ a\ given\ period\ e.g.\ FY12$$
$$Calculated\ TaxRABEOP = TaxRABSOP + TaxCapex - TaxDepreciation$$

$$TaxNBV\ adjustments = if\ the\ asset\ is\ in\ Chorus\ accounts^{9},$$
$$(Closing\ Tax\ Book\ value - Calculated\ TaxRABEOP)$$
$$else\ 0$$

$$RABEOP = Calculated\ TaxRABEOP + TaxNBVAdjustments$$

$$Where$$
$$TaxRABSOP = TaxRAB\ at\ start\ of\ period$$
$$TaxRABEOP = TaxRAB\ at\ end\ of\ period$$
$$TaxCapex = Capital\ expenditure\ in\ period\ (Value\ of\ Commissioned\ Assets)^{10}$$

9 Asset classes where there is no corresponding asset in Chorus accounts are: test assets; special assets such as the unrecovered loss placeholder, and capital contribution assets (see section 3.6.14)

10 Certain assets have no tax book value but are capitalised for RAB purposes; capex on these causes a difference between Capex (VCA) and TaxCapex (Tax VCA)

$$Tax\ Depreciation = Tax\ depreciation\ in\ period\ (in\ this\ model, declining\ balance\ is\ used).$$

$$TaxRABSOP\ of\ period\ n+1 = \text{Tax}RABEOP\ of\ period\ n$$

The initial TaxRABSOP of pre-existing assets at the start of FY12 is the initial tax book value of those assets in the Chorus FAR.

Again this approach means that we stay in line with the Tax book value in Chorus' accounts, consistent with the Act.

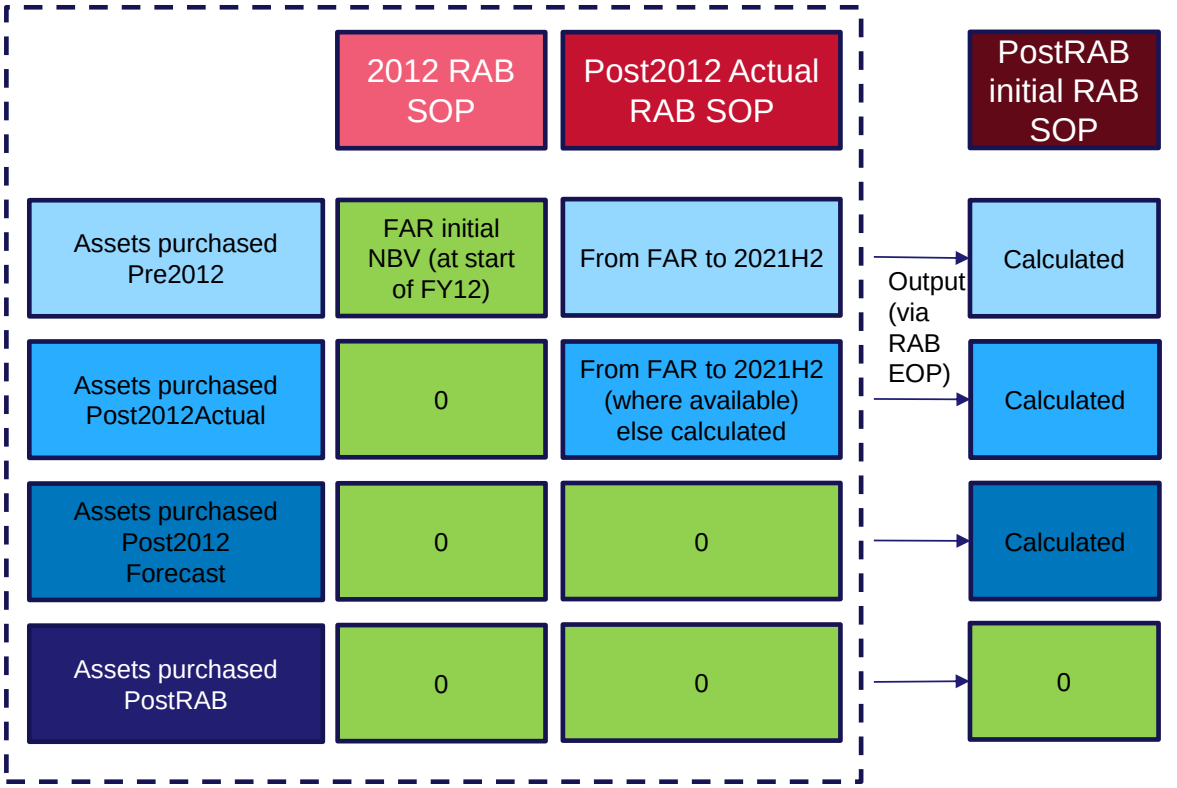
Again our sign convention is that a normal asset has positive tax depreciation.

3.4 Capex in each year

Note: In this document we use the term "capex" rather loosely, and for data from the FAR we strictly mean "Value of Commissioned Assets" (VCA).

Capex is specified entirely by input data, either from the FAR (via the Aggregation workbook) or from the capex forecast[11] workbook as shown in Figure 11.

Figure 11: Principle of calculation for capex [Source: Analysys Mason, 2022]



11 A separate document produced by Chorus talks about the process by which the capex forecasts have been produced. "Modelling and cost allocation report", Chorus, 2020.

The capex timeseries is created from a combination of the historical data from the FAR and the Chorus capex forecast. Within the IAV calculation, i.e. before the establishment of the RAB, this capex gives rise to the assets in the Post2012Actual and Post2012Forecast assets purchase timeframes. Note that as the actual data is now available to implementation date, the Post2012Forecast asset purchase timeframe is not currently used.

The data we have on capex (VCA) from the FAR is broken down by asset number and subnumber. Within the FAR, Chorus will sometimes record additional capex in a given year on a pre-existing asset with the same "subnumber" as the original purchase, and it will then be reported on as part of that asset number and subnumber in terms of depreciation etc. In order to keep aligned with the Chorus reporting, we therefore need to distinguish between capex in a given year on assets originally purchased in different asset purchase periods (e.g. FY13 capex can be either additional capex on pre-2012 assets, or new capex on post-2012Actual assets (such as assets that are first booked in FY13)). In other words, even though FY13 is in the post2012Actuals timeframe (the red part of the x axis on the diagram above), not all FY13 capex will be booked against Post2012Actual asset purchase timeframe assets (the mid-blue box in the diagram above) – some of it will be on pre2012 assets (the pale blue box).

3.5 Calculation of depreciation

3.5.1 Use of actual depreciation where available

We use actual depreciation figures from the Chorus FAR wherever this is possible. This means that for the asset classes included in the FAR, and for the time period for which these depreciation values are available (ie to end 2021H2), we use the FAR depreciation data.

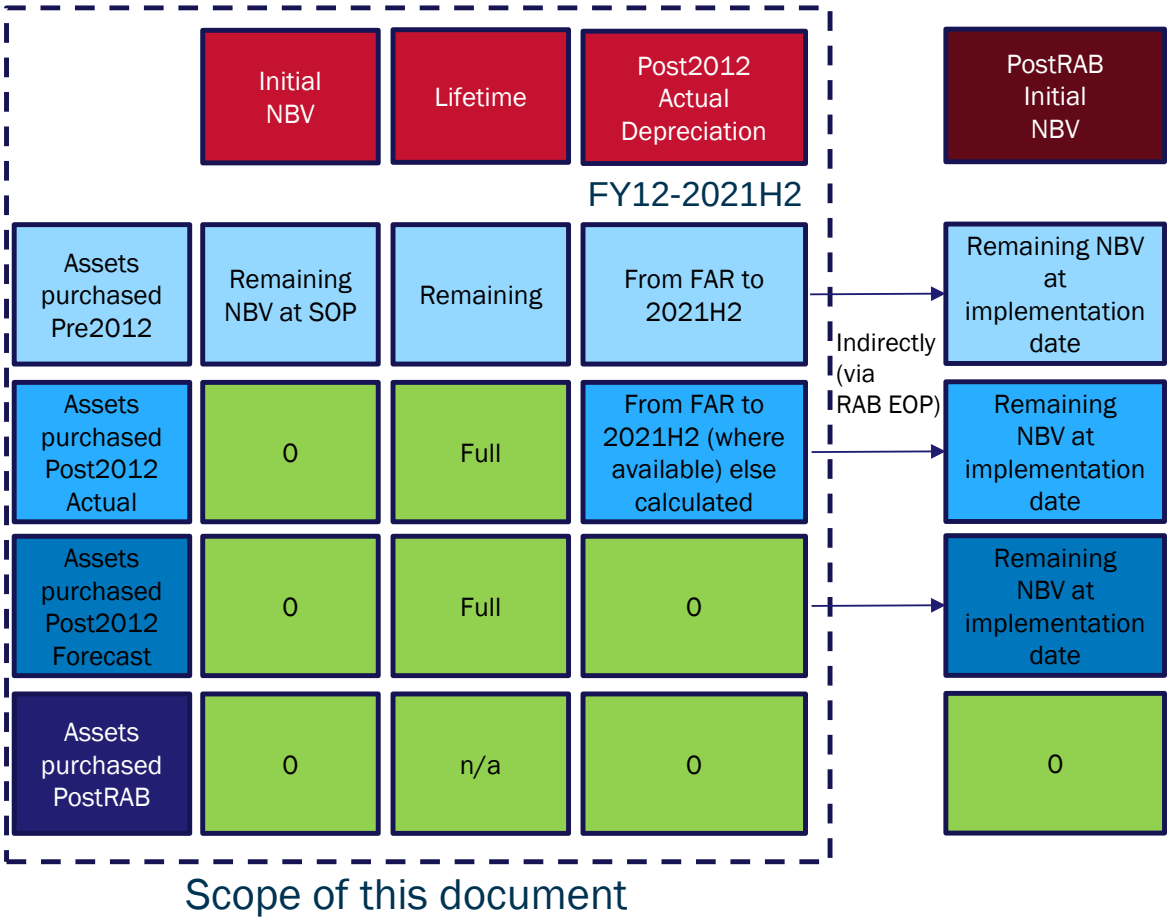
3.5.2 Calculated depreciation

Calculated depreciation is used for:

- asset classes which are not present in the FAR, such as "Capital Contribution" asset classes and test assets.
- timeframes where the FAR does not contain actual depreciation values (i.e. for all asset classes in FY21 and later we use calculated values for the depreciation).

This is shown in Figure 12.

Figure 12: Principle of calculation for depreciation [Source: Analysys Mason, 2022]



These calculations use a VBA function described in A.4, which implements a straight-line depreciation calculation, considering:

- some assets do not depreciate
- asset lifetimes do not need to be integers
- non-12-month periods exist (notably FY12)

This depreciation calculation is based on a combination of input data notably

- Either the starting book value (RABSOP) and a remaining lifetime or capex since a specific start date at which the book value was zero, and a "full" lifetime
- The relevant "timing factor" (i.e. when in the year the capex took place)
  - timing factor 0 means the asset was purchased at the end of the period and there is no depreciation in period (usually financial year) of purchase
  - timing factor 0.5 means a half period (usually 6 months) depreciation in the period of purchase. For those asset classes and timeframes where we do not know the timing we assume a timing factor of 0.5 i.e. on average, mid-year expenditure.

  - timing factor 1 means there is a full period of depreciation in the year of purchase. Values brought in at SOP (such as book value) are depreciated for a full year.

- Whether the asset depreciates

For assets not present in the FAR, we calculate the depreciation from the full time series of capex.

For assets which are present in the FAR, we use the FAR actual depreciation data up until the end of the Post2012Actuals timeframe. After this date, we transition to using a calculated depreciation in the post2012forecast timeframe; this forecast needs to be consistent with the previous closing book value. In order to do this, we assume that the "pre-2012" and "post2012actual" asset purchase timeframe assets each have a remaining lifetime[12] and use that closing book value as the opening book value (RABSOP) in the new calculation. This means that, for example, an asset with a closing book value (RABEOP) of 60 and depreciation in the previous year of 20 would have a remaining lifetime of 3 years. The remaining 60 of RABSOP will be depreciated over the next three years using straight line depreciation.

This is an approximation; the actual depreciation that will be booked in Chorus' accounts in future years will vary according to the actual purchase history of the assets within that asset class and their respective lifetimes.

Asset class lifetime assumptions

When the depreciation is being calculated, in each of the modelled asset purchase timeframes, a given row in the list of 1612 asset class/geography/timeframe calculations has a single lifetime assumption which applies to all capital expenditure on that row within that asset purchase timeframe (e.g. "post2012actual").

Assets whose depreciation is calculated from a RABSOP figure in a given timeframe use a "remaining lifetime" at the date at which the RABSOP was set. For example, an asset with a purchase price of 100, purchase at the end of year 1, and a lifetime of 5 years has a series of depreciation values of 0,20,20,20,20,20,0 in years 1,2,3,4,5,6,7 respectively. At the start of year 4 it has a RABSOP of 60 and a remaining lifetime of 3 years. The depreciation in year 4 will be 20 which is the same whether calculated as 100/5 (capex/full lifetime) or as 60/3 (remaining RABSOP/remaining lifetime).

So for example an asset previously bought in the post2012actual timeframe has a "remaining lifetime" in the post2012forecast timeframe, but an asset bought in that post2012forecast timeframe has a "full lifetime".

12 The remaining lifetime is calculated on the SLifetimes sheet as the closing book value for the last year in the "post2012actuals" period (currently FY20) of that asset class and asset purchase timeframe, divided by the depreciation in that year for that asset class and asset purchase timeframe. This is an approximation that is further discussed in section 3.6.19

3.5.3 Tax depreciation

The tax depreciation calculation works in a similar way to the accounting depreciation calculation but uses a declining value method where a constant percentage of the remaining tax book value is depreciated in each year. It uses its own VBA user defined function.

3.6 Special points of note in the calculation

3.6.1 Limits on asset values arising from their original source

The IMs[13] place limits on the value of core fibre assets:

- acquired from another regulated provider
- previously employed by another regulated provider
- acquired in a related party transaction.

For the avoidance of doubt, this model assumes that there are no such assets in the FAR and makes no allowance for such limits.

3.6.2 Shared cost allocation cap

The IMs[14] place a limit on the allocation of shared or common costs to UFB FFLAS. Within this model we do not apply such a limit: in other words, we assume that such a limit on the allocation of shared costs does not apply in the period of interest for this model (up to implementation date).

3.6.3 Each modelled period is not necessarily the same length

Chorus came into existence in December 2011; this means that FY12 is not 12 months in duration. Also, we explicitly model 2021H2 and 2022H1 as separate periods.

The relevant calculations within the IAV model take into account the period length, meaning they deal with this complexity.

3.6.4 FFLAS classes

For the post-implementation period, the Commission has specified distinct FFLAS classes:

- The ID-only FFLAS class is subject only to Information disclosure regulation, ("ID")),

13 Fibre Input Methodologies (initial value of financial loss asset) Amendment Determination 2020, 2.2.13(3)(e),(f), and (g)

14 Fibre Input Methodologies (initial value of financial loss asset) Amendment Determination 2020, 1.1.6(4) "…when a regulated provider allocates either an asset value or an operating cost that is not directly attributable to UFB FFLAS, the total asset values or operating costs allocated to UFB FFLAS must not be more than the total asset values or total operating costs that the regulated provider could not have avoided if it ceased supplying services that are not UFB FFLAS"

- The PQ FFLAS class is subject to both Price Quality regulation ("PQ") and ID regulation,
- The ID FFLAS class is subject to ID regulation. It is in effect the union of the ID-only and PQ FFLAS classes.
- It is possible that additional FFLAS classes may be defined in future.

The IAV model is built to calculate the initial allocated PQ FFLAS RAB, and allocated ID-only FFLAS RABs. An ID RAB can if necessary be calculated as the sum of these two RABs.

As no additional FFLAS classes have been specified, these are not calculated in the model.

3.6.5 Setting the initial asset value (IAV) for the allocated PQ FFLAS RAB

At the point at which the RAB is established, an IAV is set for all the assets, meaning that the NBV is fixed for the pre-2012, post-2012actual, and post2012forecast assets at that point. As explained in section D.3 , the model RAB values include all assets (not just core fibre assets), but assets that are not core fibre assets will always have zero allocation to PQ FFLAS.

The relevant asset class allocation factors to use at this point in time will be those applicable in the post-implementation period, at the start of that period. These allocation factors will be based on:

- all geographies that are in-scope post-implementation (for PQ FFLAS); Note that although we exclude the demand in the Lost/LFC area that overlaps with UFB areas serviced by non-Chorus LFCs, we are not able to identify assets only used by ID-only FFLAS (as the network elements serve the entire ESA area)
- all FFLAS services that are in-scope post-implementation (i.e. all FFLAS services including Voluntary FFLAS, but excluding those FFLAS offered in the Lost/LFC area[15])
- For the avoidance of doubt all FFLAS assets are included (i.e. UFB E assets dedicated to Voluntary FFLAS are included). UFB E (i.e. voluntary FFLAS) assets in the Lost area are only part allocated to in-scope FFLAS as some of these assets may be in the Lost/LFC area which is excluded.

The "unrecovered losses" asset will come into existence at implementation date, with a lifetime set to the weighted average life[16] of allocated UFB assets as at immediately before implementation date.

This means that the initial asset value (i.e. the initial allocated PQ FFLAS RAB value) is the sum of:

- The unrecovered loss (which is 100% allocated/directly attributable to PQ FFLAS)
- The PQ FFLAS allocated RAB at the start of the post-implementation period, using the post-implementation PQ FFLAS ("MAR") allocation factors. Note that the MAR model (q.v.) calculates MAR allocation factors for calendar years (CY) which are slightly different to the FY

15 This calculation makes use of the Lost/LFC granularity in the demand and revenue model outputs

16 Strictly speaking, this is the inverse of the weighted average inverse lifetime; this gives the correct expected depreciation per annum.

values calculated within this IAV model. Note that sheet SInitialMARAllocatedRAB calculates the CY22 allocation factor values in the same way as the MAR model.

3.6.6 Core fibre assets

Section D.3.2 below describes how the unallocated core fibre assets can be calculated from the unallocated RAB (which itself contains assets directly attributable to non-FFLAS services).

3.6.7 Unrecovered losses calculation

This section outlines the methodology to calculate the accumulated unrecovered returns on investments as required by section 177(3)(a) and in accordance with the IM clause B1.1.2.

The unrecovered losses are calculated on the "SCalcs" sheet.

This is probably the most complex part of the model and is discussed further below and is set out in detail in Annex B.

We use a DCF calculation to evaluate the Unrecovered Loss (also known as FLA).

This calculation makes heavy use of named ranges in Excel array formulae (in curly brackets). As a result, it is possible to "read" the formulas to check that they directly implement the algorithms set out in Annex B.

Vanilla WACC DCF based calculation of unrecovered loss

The structure of the DCF calculations (and compliance to the relevant IM clauses) is based on the Commission workbook released on 13 August 2020; this calculation has subsequently been modified (and the IM modified) to use a "Vanilla WACC" approach.

Within the IM[17] the Commission has set out a particular form of the Unrecovered Loss calculation that it prefers ("DCF"). The approach uses a Vanilla WACC to calculate the relevant cumulation factors to apply to the costs and revenues in each year, appropriate to the timing of those elements:

- Opening book value is assumed to be start of year (as if the assets were "bought")
- The cost allocation adjustment (i.e. change in allocated RABSOP) is assumed to be mid-year, to align with the requirements of the IMs
- Capex (VCA)
- NBV adjustments are added to capex to result in net capital additions, and are assumed to be at mid-year
- Opex is assumed to be mid-year
- Tax paid is assumed to be mid-year

17 IM clauses: B1.1.2; B1.1.3 B1.1.4; B1.1.5; B1.1.7; B1.1.8; B1.1.9. Some details are also instantiated in the example FLA calculation spreadsheet provided by the Commission.

- Revenue is assumed to be at revenue date.
- Ex-ante allowance (if any: none is used in the model pre-implementation) would be at end-year.

The PV of the benefit of CIP funding is calculated separately on the SCIPFunding sheet.

The Unrecovered loss (financial loss asset, FLA) is calculated as the overall deficit in the PV that is, the sum of:

- the cumulated cash flows (which is large and negative),
- the allocated RABEOP at implementation date (large and positive)
- and the PV of the benefit of CIP funding (positive, but an order of magnitude smaller).

Note: that in our PV deficit calculation of the value of the unrecovered loss (FLA) we use the allocated RABEOP calculated using the BBM IAV model convention regarding allocators, i.e. the in-period allocator. This is in effect the same as the allocator called "start of period allocator" by the Commission, though calculated using "average over period" inputs. To be consistent with this in-period single allocator approach, there is no cost allocation adjustment cashflow applicable to the transition to the RABSOP at implementation in our calculation. In other words there is no cost allocation adjustment cashflow applied at mid-period in the final period, and this is consistent with the fact that the Allocated RABEOP we use in the calculation is that using the in-period allocator[18] i.e. before the cost allocation adjustment has been applied This allows us to perform the same PV calculation as the Commission without having to calculate RABSOP at implementation date using the UL allocation factors.

3.6.8 UFB assets

Assets that are analysed in the FAR processing to be dedicated to UFB are recorded as being either "UFB A-D" (which means they were built for and used by Contracted FFLAS) or "UFB E" which means they are used only by voluntary FFLAS. As a result, "UFB E" dedicated assets are out of scope pre-implementation. "UFB A-D" assets are included as directly attributable to UFB FFLAS.

3.6.9 RBI assets

Assets recorded in Chorus FAR as having been funded by RBI are aggregated into separate asset classes with an RBI suffix and these have allocation factors zero and are not allocated to FFLAS.

3.6.10 IFRS16 assets

IFRS16 allows certain leases to be capitalised, and Chorus has adopted this standard and hence does capitalise certain leases in this way, However, we understand that such leases are not treated as capitalised for tax purposes in New Zealand.

18 The "start of period allocator" in the Commission's notation

When calculating the unrecovered loss, we treat the leases as capitalised. However, to follow NZ tax treatment of such assets, in calculating the tax, we use a "tax opex" that treats the lease expenditure as opex.

3.6.11 Modelling of "capital contributions"

This section outlines how we ensure that our calculated initial value of the fibre assets is calculated net of specified capital contributions as required by sections 177(1)(i). 177(6), and in accordance with the IM clause 2.2.5.

The Commerce Commission has indicated that capital contributions should not be treated as revenue but should be "netted off" the initial capital expenditure for an asset. As a result, the annual depreciation would be lower, and the RAB would also be lower.

The first of these points, not treating as revenues, is straightforward to implement. The "capital contributions" formerly treated as revenue are gathered together into a specific type of revenue in the Demand and Revenue model, and this revenue is not included in the FFLAS and non-FFLAS service revenues passed into the BBM IAV model (e.g. Contracted FFLAS etc).

However, two factors meant that the second requirement (netting off) was not simple to implement:

- this is not how such contributions are treated in the Chorus accounts. Where we can, for those assets which are present in the FAR, we want to be able to stay in line with the Chorus accounts actual depreciation and actual closing NBV.
- In addition, apart from assets tagged in the FAR as "RBI", Chorus do not know which assets were created as a result of the capital contributions, meaning we cannot simply deduct the capex from specific asset classes in specific geographies.

To manage both of these constraints we have introduced four special "capital contribution asset classes" in each geography representing the netted off non-RBI capital contributions.

RBI assets are excluded by a different mechanism, putting them into separate RBI asset classes which are not attributed to FFLAS. This is possible for RBI assets (but not for other capital contributions) because these assets can be identified in the FAR. Note also that grant funded assets are also treated as if they were RBI assets (so the asset classes marked RBI should be understood to be "RBI or other grant funded assets").

These capital contribution assets by design have a negative capex, negative book value, and in each year a negative depreciation[19]. As a result, when they are summed up with the other asset classes they mimic the effect of the netting off on the RAB, the depreciation, and the allocated RAB/tax RAB and depreciation respectively.

19 Normal assets in our sign convention have positive capex, positive book value, and positive depreciation.

These “Capital Contributions” asset classes are as follows:

Figure 13: Capital contribution asset classes in each geography and asset purchase time period [Source: Analysys Mason, 2021]

Asset class	Allocation factors are those of
CC Copper	Non-FFLAS assets, directly attributed to non-FFLAS
CC Fibre UFB A-D	Dedicated UFB A-D FFLAS asset classes; directly attributable to UFB FFLAS and PQ FFLAS post-implementation
CC Fibre UFB E	Dedicated UFB E FFLAS asset classes; allocated to PQ FFLAS or ID-only FFLAS post-implementation and excluded from UFB FFLAS
CC Shared	Shared assets; allocated as per ABAA

These asset classes are shared differently between services, meaning that they will be allocated differently according to the comment in the right-hand column in Figure 13 above. For example, the CC Copper assets will not be allocated to FFLAS. This approach is an approximation because we cannot map the capital contribution to specific Chorus assets because the data is not available, meaning that:

- we have had to estimate the fraction of the capital contributions that falls within each of the 4 different special purpose capital contribution asset classes in each geography, over time. This is done on the SCapitalContributions worksheet and is described in more detail in section 6.17 below
- the lifetime of the modelled capital contribution assets has to use a representative average over a wider set of assets. We use a value chosen to be similar to the average remaining lifetime of the assets at the implementation date (calculated as roughly 14 years on SLifetimesEndIAV).

Note: In order to replicate the tax treatment actually applied by Chorus in the period to date, we treat the capital contributions as being in three different classes:

- Some are capitalised for tax purposes, meaning they have a tax capex, a tax NBV and a tax depreciation
- Some capital contributions are treated as revenue and not capitalised for tax purposes (which means they have zero tax NBV, zero tax capex and zero tax depreciation). These divide into two types:
  - Those where the revenue is considered to be in-year for tax purposes
  - Those where the revenue is considered to be spread over ten years for tax purposes

The tax calculations for the unrecovered loss calculation are based on attributable revenues in period plus a term representing the revenues for the relevant capital contributions (converted to a positive value) in that period (which is the sum of the in-year and the relevant “spread over ten years” values).

As the capex forecast now deducts the capital contributions from the future capex, we do not have forecast capital contributions in the period from FY21.

3.6.12 Test asset classes

We have within the model four special test asset classes, one such asset class for each asset purchase time period. These are configured to be part of the calculation such that their behaviour can be easily observed, and their values calculated "by hand" should this be required. They always have a zero allocation to FFLAS meaning that they do not change the model results for UL or allocated IAV in any way.

3.6.13 "Lease adjustment" asset classes

In December 2021 Chorus changed a significant number of leases with Spark. This meant that the capitalised value of these leases was changed. However, these changes have not yet been incorporated in the FAR itself. In order to reflect these changes in the IAV model, we have created additional assets within the FAR processing, which are assigned to new lease adjustment asset classes. When added to the original leased assets they are intended to result in the correct NBV (RAB) and depreciation values in total: in this way they behave a little like the "capital contribution" assets in that they represent the changes to other assets, have negative book value, and negative depreciation.

The lease adjustment assets are allocated to FFLAS in the same way as the lease assets to which they are adjustments.

Note that the depreciation lifetime of the lease adjustment assets has been set in the MAR as the estimate in the IAV model does not know that the changed depreciation arising from these assets represented only one month of the year (ie the full year would have resulted in a much larger change in depreciation).

3.6.14 Special asset classes

Certain asset classes are not present in the FAR, meaning that they cannot match the actual closing NBV or actual depreciation, and are handled differently in the RAB, Tax RAB, Depreciation and Tax Depreciation calculations. These include:

- Test asset classes
- Capital contribution assets in each geography and asset purchase timeframe
- The "Lease adjustment" asset classes
- The "Unrecovered loss" placeholder asset
- The "Washup" placeholder asset
- The post implementation tax adjustment placeholder asset
- The post implementation depreciation adjust placeholder asset
- The post implementation depreciation repayment placeholder asset

3.6.15 Capex timing discussion

The timing of capex flows into the model calculations in two specific ways:

- Timing of capex affects the calculated depreciation and tax depreciation via the depreciation timing factor[20]. For example, pre-implementation, assets assumed to be purchased mid-year will depreciate by half a year's worth of straight-line depreciation in the year of purchase. The timing factors used in the depreciation calculations are constants for a given asset class, geography and asset purchase timeframe in each of the post2012actual (i.e. FY12-FY20), post2012forecast (FY21-FY23), and PostRAB (FY23-) model timeframes.
- The Commission's Post-tax WACC DCF calculation assumes that capex is mid-period.

3.6.16 Named ranges

The model makes heavy use of named ranges. Generally speaking, names with "MAR" in the name are designed for use in the post-implementation ("PostRAB") period. Names with "UL" in the name are for use pre-implementation in calculating the unrecovered losses.

All links to external workbooks link to named ranges in those external workbooks.

Local (worksheet) scope named ranges are avoided.

3.6.17 Tax adjustments

Chorus' actual tax calculation is not exactly that we derive in the model; there are a number of adjustments applied in addition to the use of tax depreciation and treating certain capitalised leases as operating leases for tax purposes. Accordingly, we bring in tax adjustments from a file. We have excluded from this calculation certain such tax adjustments which relate to, for example:

- Quantities already taken into account in the model tax calculation (such as tax depreciation and leases treated as operating leases for tax purposes)
- Financing
- RBI assets as these are not allocated to FFLAS
- Obsolete assets not relevant to FFLAS

These adjustments are treated similarly to the leases treated as operating costs; the adjustments are pro-rated between FFLAS and non-FFLAS and the FFLAS allocated tax adjustments reduce or increase the taxable profit in the tax calculation on the SCalcs sheet accordingly.

20 We note that as the model uses the actual depreciation values from the FAR for the vast majority of assets up to the end of the Post2012 actuals timeframe, for these assets we are relying on the Chorus accounts calculation of the actual depreciation figures. The calculated depreciation therefore only applies to assets not in the FAR.

3.6.18 Calculation of corrections required to adjust for effects of post-tax WACC

The calculation of the unrecovered loss at implementation date (the value of the FLA) is that suggested by the Commission in the IM (and the Commission's example spreadsheet, modified to reflect the amended IM approach of a Vanilla WACC) and uses a DCF method and a series of Vanilla WACCs (one for the cashflows in each period, which cumulate to implementation date using that rate).

A past version of the calculation used a post-tax WACC which led to an inaccuracy; using a Vanilla WACC removes this issue.

There was previously a calculation at the bottom of the SCalcs sheet to estimate the parameters needed to correct for the error which arose from using a post-tax WACC. However, as the Vanilla WACC approach has now been adopted, there is no longer any need for these parameters.

3.6.19 Calculation of asset remaining lifetimes

At various points in the model, notably at the end of the Post2012Actuals and at implementation date, it is necessary to estimate the remaining lifetime for the asset classes. This remaining lifetime is a key input parameter for the calculation of depreciation of the remaining net book value in the subsequent periods. These calculations are performed on the SLifetimes and SLifetimesEndIAV sheets.

The method we use estimates the remaining lifetime by using the (straight line) depreciation in the most recent period. In essence the calculation is: NBV at the date in question (at end of period) divided by depreciation in the period immediately before the date in question, corrected for the length of that period. This is an approximation, because it can be distorted by two effects:

- There can be capex on that asset class in the final period before the date in question, which only part-depreciates within that period (due to the mid-period assumed capex timing), which tends to lead to the last period's depreciation being an underestimate of the depreciation in the next period (i.e. increases the estimated lifetime).
- Assets becoming fully depreciated at the date in question, which would decrease the future depreciation (the last period's depreciation is higher than the next period's depreciation) and which can lead to an underestimate of the lifetime.

These two effects tend to cancel out if there is a long time history of purchases before the date in question, but this cancellation was previously less available for assets purchased in the Post2012Forecasts timeframe because that was relatively short, at the time being from end FY20 to implementation date, meaning few assets purchased in that period are fully depreciated at implementation date. Therefore, to mitigate against the risk of an overestimate in the case of the implementation date calculation for the assets that will become part of the RAB, within the calculation of SLifetimesEndIAV we did set a pragmatic ceiling[21] on the estimated asset lifetime

[21] This ceiling only applies to assets which depreciate

("asset.lifetimes.MAR"), based on the relevant lifetimes used within the Post2012Forecasts period ("asset.lifetimes.actual").

This ceiling is no longer important because we do not use the post2012Forecasts period (as we have actual depreciation data to the end of the post2012Actuals period.

4 Allocation factors used

4.1 How asset allocation factors are used in the model

4.1.1 General

Each asset class, asset purchase timeframe and geography has an appropriate allocation factor, which has a certain numerical value in each year. In principle, these allocation factors are calculated in the model based on the properties of the asset class, geography, timeframe, and selected scenario[22].

The allocation factor will be

- 1 (100%) for in-scope assets which are only used by in-scope FFLAS (i.e. directly attributable to the relevant FFLAS (e.g. pre-implementation, UFB FFLAS))
- zero for assets that are not in-scope (e.g. "Lost" and "Non" area assets in the pre-implementation period)
- zero for assets which are not used by in-scope FFLAS services (e.g. Copper assets)
- some allocation value between zero and one which may vary over time, for all assets that are shared between in-scope FFLAS and any other out-of-scope services

To calculate the allocation factors for a given time period (e.g. post2012actuals, post2012forecasts, PostRAB) it is therefore necessary to understand both:

- which assets are in-scope (which may vary with geography)
- and which services are in-scope (which may also vary with geography)

Note: It is these differences in allocation factors that lead to the requirement to track the assets from the different geographies separately.

The allocation method outlined in this section applies to both historical information and to forecasts, within the FLA calculation and in calculating the initial RAB.

4.1.2 Scope

The same asset allocation factors are used for all financial quantities of interest (RAB, taxRAB, depreciation, tax depreciation, capex, etc) for a given asset class, geography and asset purchase timeframe.

22 These allocation factors apply the accounting based allocation approach (ABAA) by allocating the asset classes derived from the FAR (and forecasts) to UFB FFLAS (pre-implementation) and PQ FFLAS and ID-only FFLAS (post-implementation) using asset allocators as defined in the IMs. Some assets are allocated 100% to a single service in all periods and these are directly attributable to those services, the remainder are allocated between services.

4.1.3 Timing

The asset allocation factors have been calculated for the mid-point of each period, typically using average over period values[23] and the asset allocation factor values generally vary from period to period, but are assumed to be constant in a given period. At the start of the next period, the allocation factor changes. This applies both pre-implementation and post-implementation.

4.1.4 Part 4 costs and related constraints do not apply to Chorus

During both the pre-implementation period and at implementation date, Chorus has not supplied Part 4 regulated services (e.g. electricity distribution services), therefore there is no resulting restriction on the cost allocation to FFLAS.

4.2 How asset allocation factors are calculated within the model

4.2.1 General

The asset allocation factors are either derived directly from suitable ratios such as average connections in the period (AOP), revenues, or traffic, or are based on input data (possibly in combination with another metric such as connections).

In different timeframes, different services are in scope, and different assets are in scope, which may also depend on geography.

4.2.2 Assets in scope

Assets in-scope in the pre-implementation period:

In the pre-implementation period, we include all assets except:

- Assets dedicated to non-FFLAS (copper) services
- Those assets recorded as RBI assets
- "UFB E" assets (assets dedicated to voluntary FFLAS)
- Assets in the "Lost" and Non" areas

Consistent with ABAA, assets that are in scope but which are shared with other services use allocation factors which take that sharing into account and allocate between UFB FFLAS and other services. These include some "National" assets.

23 A period is typically a financial year (financial loss year), but FY12 is 7 months in length and only half of FY22 (6 months) is pre-implementation.

Assets in-scope in the post-implementation period:

In the post-implementation period, all assets are in scope except:

- Assets dedicated to non-FFLAS services (Copper services)
- Those recorded as RBI assets

Consistent with ABAA, assets that are in scope but which are shared with other services use allocation factors taking that sharing into account and allocate between PQ FFLAS, ID-only FFLAS and other services. This includes assets in the "Lost" supporting services in the LFC area (the "Lost/LFC")[24].

4.2.3 Services in scope

Services in-scope in the pre-implementation period

In the pre-implementation period, we are calculating the unrecovered loss (UL). For this purpose, the only services that are in-scope are Contracted FFLAS in the Won area.

Services in-scope in the post-implementation period

Services that are in scope for PQ FFLAS in the post-implementation period are:

- Contracted FFLAS (this does not occur in Lost/LFC areas as there is no contracted FFLAS in these areas as Chorus is not the contracted LFC there)
- Voluntary FFLAS in the following geographies:
  - Entire Won area (Won/UFB + Won/RONZ)
  - Lost area that overlaps with RONZ (Lost/RONZ)
  - Entire Non area (Non/RONZ)

This is consistent with the definition of PQ FFLAS in the IMs.

Voluntary FFLAS services in the Lost area that overlaps with the LFC are ID-only FFLAS.

4.2.4 Geography is taken into account where appropriate

In calculating the values for the allocation factors, the geography is taken into account, to allow for the fact that the location of the assets changes the relative use of these assets by in-scope and out-of-scope services. So, for example:

[24] See the explanation of geographies in section 2.6.4

- the "connections" allocation factor has the value "In-scope connections in the geography" / "All connections in the geography" e.g. for the Won area in the pre-implementation period, this is "Contracted FFLAS in the Won area"/ "all Won area connections"
- The "National" geography "connections" allocation factor uses "All in-scope connections" / "All connections".
- Post-implementation, UFB E assets in the Lost are allocated based on the ratio of in-scope FFLAS (for PQ FFLAS this is Voluntary FFLAS in the Lost/RONZ; for ID-only FFLAS this is Voluntary FFLAS in the Lost/LFC) to total voluntary FFLAS.

4.2.5 Pre- and Post-implementation allocation factors have different numerical values based on these differences

As a result of these differences in the services that are in-scope and the assets that are in scope, we note that an asset may be allocated by "connections ratio", but that the appropriate numerical value of this allocation factor in the pre-implementation period will be different to the value of the same allocator for the post-implementation period.

This is because the relevant connections ratio is calculated as "in-scope service lines divided by all lines for the relevant geography". The value will be different because the scope of the lines included in the calculation is different pre-implementation (which we label "UL") and post-implementation which we label ("MAR") (also written as PQ FFLAS) and ID-only FFLAS[25].

A specific case where this difference is important is in reporting the initial asset value, because this calculation needs to represent the allocated RAB immediately after implementation. This means that post-implementation allocation factors are used for calculating the allocated RAB part of the IAV (for PQ FFLAS and ID-only FFLAS). All other calculations in the BBM IAV model, including the calculation of the unrecovered loss, use the pre-implementation ("UL") allocation factors. The scope of the allocators is outlined in Figure 14 below.

Figure 14: Differences arising in the allocation value calculations pre- and post-implementation [Source: Analysys Mason, 2021]

Aspect of calculation	Pre-implementation	Post-implementation	
	UFB FFLAS	PQ FFLAS	ID-only FFLAS
FFLAS services in scope	Contracted FFLAS	Contracted FFLAS and Voluntary FFLAS (other than in the Lost/LFC overlap)	Voluntary FFLAS in Lost/LFC overlap
Assets out of scope	RBI assets, UFB E assets, assets attributed to non-FFLAS	RBI assets, assets attributed to non-FFLAS	RBI assets, assets attributed to non-FFLAS

25 Post implementation there are both PQ FFLAS and ID-only FFLAS allocation factors.

Aspect of calculation	Pre-implementation	Post-implementation	
	UFB FFLAS	PQ FFLAS	ID-only FFLAS
Areas in scope (non-zero allocation to FFLAS)	Won and National (part)	All areas (noting only partial allocation in Lost and National, reflecting partial allocation to ID-only FFLAS)	Partial allocation in Lost and National

4.2.6 Other allocations

In addition to allocations based on ratios of connections discussed at length above, this model also supports a number of allocation factors, including:

- Revenue ratio (Revenue from in-scope services in the geography / Revenue from all services in the geography). Note that this allocator is not currently used in practice.
- Traffic ratio (based on connections weighted by a traffic ratio per service connection (FFLAS traffic/connection / Copper traffic/connection).
- Assets exclusively used by FFLAS, split between in-scope FFLAS connections and out-of-scope FFLAS connections
- Various domain-specific allocation factors based on extracts from Chorus network data for:
  - shared duct,
  - shared cable,
  - shared pole,
  - shared manhole,
  - premises passed, (note: not used)
  - property power,
  - property space,
  - property leased space,
  - shared electronics, (note: not used)
  - and various sets of shared IT percentages estimated by Chorus subject matter experts. (note: not used)

Some of these inputs are used directly as allocation factors; others have to be combined with other weighting factors (typically some form of connections ratio) to calculate the allocation factor used.

- Various alternative allocation factor choices required by scenarios of interest to the Commission in their draft decision or final decision:
  - An alternative "shared duct" allocation factor used by (shared) pre-2012 L1 Duct, which applies a ceiling to the calculated allocation factor value.
  - Alternative inputs for the "property space" and "property leased space" allocation factors

- Modified UFBA-D assets (which are used in some scenarios for post2012 L1 Duct UFB A-D and post 2012 L1 Manhole UFB A-D assets, but not used in the December 2021 Final Decision (scenario 14))
- Modified UFBE assets (which are used in some scenarios for post2012 L1 Duct UFB E and post 2012 L1 Manhole UFB E assets, but not used in the December 2021 Final Decision (scenario 14))

Each of these sets of allocation factors varies by geography and over time.

There is also a "shared ISAM" sharing factor only used for shared ISAM infrastructure which is based on national level data on the (small) fraction of ISAM line cards that are supporting FFLAS and hence is applied equally in all geographies.

4.2.7 Explanation of scenarios

The scenario used within the model for the Commission's final December 2021 decision was scenario 14. The True up scenarios are scenario 17 (with the 50% cut to property space allocators) and scenario 18 (without the cut to property space allocators) (see below).

Scenario 1: Connections based

In scenario one, the allocation factors are applied to asset classes based on an asset key as shown in the table below. Some allocation factors are split by geography. For example, *FFLAS shared* refers to four allocation factors: "*FFLAS shared, won"*; "*FFLAS shared, lost"* etc.

Figure 15: Asset key mapping to allocation factor in scenario 1 [Source: Analysys Mason, 2021]

Asset key	Allocation factor	Description	Attribution, Proxy allocation or causal allocation in this context
No / Copper	No allocation	0% in all periods	Attribution
Fibre	Full allocation	100% in all periods	Attribution
Shared core	Shared core	Applies the *Shared with copper* factor described below, using the 'national' geography.	Proxy
Shared ISAM	Shared ISAM	Based on input ISAM shared line cards ratio	Causal
Shared	Shared with copper (varies with geography)	Based on a connections ratio, calculated as the proportion of in-scope FFLAS connections to total connections within each geography. Average connections within the period are used.	Proxy
Shared FFLAS	FFLAS shared	Based on a connections ratio, calculated as the proportion of in-	Attribution and Proxy (although assets are

Asset key	Allocation factor	Description	Attribution, Proxy allocation or causal allocation in this context
	(Varies with geography)	scope connections to total FFLAS connections within each geography. Average connections within the period are used.	attributed to FFLAS, they are split between in-scope FFLAS and other FFLAS using a connections proxy)
Fibre UFB A-D	UFB A-D (Varies with geography)	Pre-implementation this is 100% in Won and National and zero elsewhere. Post-implementation it is 100% everywhere.	Attribution
Fibre UFB E	UFB E (Varies with geography)	Pre-implementation this is 0%; post-implementation, 100% in Won and Non and similar to "FFLAS shared" in Lost and National; the lower allocation in the Lost and National reflects exclusion of a portion of the FFLAS demand in the Lost.	Attribution

Scenario 2: Specific asset sharing for shared assets

The difference between scenario one and scenario two is that under scenario two, asset classes with the 'Shared' asset key are given specific allocation factors related to the type of asset.

The mapping of the Shared assets to allocation factors is determined by their "asset type", and is summarised in the table below. Each allocation factor may vary with geography.

Figure 16: Shared asset mapping of asset type to allocation factor in scenario 2 [Source: Analysys Mason, 2021]

Shared asset type	Allocation factor (each varies by geography)	Attribution, Proxy allocation or Causal allocation in this context
Duct	Shared with copper duct	Causal
Manholes	Shared with copper manhole	Causal
Poles	Shared with copper pole	Causal
Fibre cable	Shared with copper fibre cable	Causal
OFDF	Shared with copper fibre cable	Causal
Network electronics (L2 assets)	Shared with copper, traffic	Causal
Land and Buildings	Shared with copper property space	Causal
Land and Buildings - leased	Shared with copper property leased space	Causal

Shared asset type	Allocation factor (each varies by geography)	Attribution, Proxy allocation or Causal allocation in this context
Power equipment	Shared with copper property power	Causal
IT	Shared with copper (i.e. Connections)	Proxy
Supporting equipment (note: not used)	Shared with copper by revenues	Proxy
Copper and other excluded assets	No allocation	(Attributed)
CAPITAL_CONTRIBUTION_ASSET (Note: this only applies to the CC Shared asset classes; other CC asset classes are allocated differently)	Shared with copper (i.e. Connections)	Proxy
TAX_ADJUST	(not relevant in IAV model)	(not relevant in IAV model)
DEPRECIATION_ADJUST	(not relevant in IAV model)	(not relevant in IAV model)
UNRECOVERED_LOSSES	(not relevant in IAV model)	(not relevant in IAV model)

These allocation factors apply equally to pre-2012 and post-2012 asset purchase timeframes for shared assets (with one exception noted below).

These mappings only apply to assets that are shared; some assets are 100% allocated (attributed) to in-scope FFLAS at all times, and other assets only used by non-FFLAS are not allocated (i.e. 0% allocation, attributed to non-FFLAS). Assets that are only used by a mix of voluntary and contracted FFLAS are allocated using the "Shared FFLAS" allocator (reflecting that voluntary FFLAS are not in-scope pre-implementation). This is a mixture of an attribution to FFLAS and a proxy allocator which pro-rates between the in-scope FFLAS and other FFLAS by using a FFLAS connections ratio in the geography.

There is one exception to this mapping: Post-2012 capex on (otherwise shared) power assets in the Won area is allocated using "Full allocation" (100% to in-scope FFLAS at all times), whereas power assets employed pre-2012 are always allocated based on power usage (Shared with copper property power). We note that the allocator types for the power assets bought in a given period do not change over time and neither does the allocator type for power assets in other areas.

These asset specific allocation factors are calculated as described in Figure 17 below.

"Weighted" means that the factor is also multiplied by the connections ratio (in-scope connections to total connections (FFLAS and non-FFLAS) within each geography)[26].

[26] Note: that in-scope FFLAS connections includes both standard and non-standard connections.

Figure 17: How allocation factors are calculated in scenario 2 [Source: Analysys Mason, 2021]

Allocation factor	Description	Weighted
Shared with copper duct	Based on input *fraction of duct length overlapping UFB network* in each geography from FY12 to FY23.	Yes. (See below)
Shared with copper manhole	Based on input *fraction of manhole count overlapping UFB network* in each geography from FY12 to FY22.	Yes. (See below)
Shared with copper pole	Based on an input *pole metric* for each geography from FY12 to FY20, which counts poles used or planned to be used for GPON as a fraction of the poles in the geography.	Yes. (See below)
Shared with copper, premises passed	Based on input *Premises passed calculation (PPf/(PPc))* by geography from FY12 to FY21. Note: this allocation factor is currently not used.	No
Shared with copper fibre cable	Based on an input *fibre cable allocation profile* from FY12 to FY23. The allocation factor in all areas is calculated as 11.65% times the ratio of the in-year national duct length used for UFB to the 2023 national duct length used for UFB. The 11.65% is calculated from a recent estimate of the fraction of fibres in pre-demerger fibre cables in the whole of NZ. It calculates the ratio of fibres used for GPON as a fraction of used fibres in those same cables; the duct length ratio is used as a proxy for the extent of UFB network deployment over time. Post-implementation, the PQ FFLAS and ID-only FFLAS allocators take account of ID-only FFLAS in the geography (i.e. in the Lost and National areas).	No
Shared with copper, traffic	Estimated weighted in-scope FFLAS traffic/total traffic based on ratio of FFLAS usage per connection and non-FFLAS usage per connection (and in-scope connections)	No
Shared with copper property space	Based on input *space weighted average by zone* (Chorus only) for each geography from FY12 to FY25. Pre-implementation, takes account of UFB FFLAS Post-implementation, takes account of PQ FFLAS and ID-only FFLAS	No

Allocation factor	Description	Weighted
	The resulting PQ FFLAS allocator is (space used calculation*(1 – (ID-only FFLAS demand in geography/all FFLAS demand in geography)))	
Shared with copper property leased space	Based on input *space weighted average by zone* (space leased from Spark) for each geography from FY12 to FY25. Pre-implementation, takes account of UFB FFLAS Post-implementation, takes account of PQ FFLAS and ID-only FFLAS The resulting PQ FFLAS allocator is (space used calculation*(1 – (ID-only FFLAS demand in geography/all FFLAS demand in geography)))	No
Shared with copper property power	Based on input *power weighted average by zone* for each geography from FY12 to FY25. Pre-implementation, takes account of UFB FFLAS Post-implementation, takes account of PQ FFLAS and ID-only FFLAS The resulting PQ FFLAS allocator is (power used calculation*(1 – (ID-only FFLAS demand in geography/all FFLAS demand in geography)))	No
Shared with copper by revenues	Based on *in-scope* revenue in the geography to total revenue in the geography.	No

The "weighted" shared asset allocation factors for duct, manhole and pole discussed above take the following approach:

- Shared duct and shared manhole allocators use a calculation of the form
  - Weight 1 * fraction of assets overlapping with UFB network + weight 2 * fraction of assets not overlapping with UFB network
- Pole allocators use a similar form
  - Weight 1 * fraction of poles used or planned to be used by UFB + weight 2 * fraction of poles not used or planned to be used by UFB

The weights used take into account that post-implementation there are FFLAS using both the assets which overlap with the UFB network (allocated to FFLAS based on the ratio of in-scope FFLAS to total connections in the geography) and the assets which do not overlap with the UFB network which are partly allocated based on the ratio between the geography RONZ (voluntary) FFLAS connections and geography RONZ total connections.

Figure 18 below describes how the weights for the duct, manhole, and pole shared asset allocation factors are calculated for the pre-implementation UFB FFLAS case, and for the post-implementation PQ FFLAS case and ID-only FFLAS case respectively.

Figure 18: Overview of weighting factors used to calculate allocation factors [Source: Analysys Mason, 2021]

Geography	UFB FFLAS Weight 1 (usage of overlap)	PQ FFLAS Weight 1 (usage of overlap)	PQ FFLAS Weight 2 (usage of non-overlap)	ID-only FFLAS Weight 1 (usage of overlap)	ID-only FFLAS Weight 2 (usage of non-overlap)
Won (UFB area overlap)	Contracted FFLAS in Won/UFB / all demand in Won (i.e. Won/UFB and Won/RONZ)	All in-scope FFLAS in Won / all demand in Won (i.e. Won/UFB and Won/RONZ)	All in-scope FFLAS in Won/RONZ / all demand in Won/RONZ	Nil	Nil
Non (no overlap)	Nil	Nil	All in-scope FFLAS in Non / All demand in Non	Nil	Nil
Lost (no overlap)	Nil	Nil	All in-scope FFLAS in Lost/RONZ / All demand in Lost.	Nil	All in-scope FFLAS in Lost/LFC area / All demand in Lost
National (UFB area overlap, so overlap % is smaller than Won area)	Contracted FFLAS in Won/UFB / all demand in Won (like Won area)	All in-scope FFLAS in Won / all demand in Won (like Won area)	All in-scope FFLAS in Won/RONZ, Lost/RONZ, Non / all demand in Won/RONZ, Lost/LFC Lost/RONZ, Non	Nil	All in-scope FFLAS in Lost/LFC area / all demand in Won/RONZ, Lost/LFC, Lost/RONZ, Non

Scenario 14 (December 2021 Final Decision)

Scenario Fourteen is based on scenario 2; the difference between the allocation factors used in scenario two and those used in scenario fourteen is that under scenario fourteen a modified allocation factor incorporating a ceiling is applied to pre2012 L1 Duct (ie Duct assets that predate the UFB deployment), called "Modified pre 2012 duct" (one for each geography, so "Modified pre 2012 duct, lost" etc).

This modified allocation factor applies a ceiling to the allocation factor in the following way:

- The pre-ceiling allocation factor for shared duct is calculated for each allocation factor type (UL, MAR (PQ FFLAS), ID-only), in each geography and period, in the same way as for scenario 2, using the "weighted" overlap calculation as discussed in detail above[27].
- Pre-implementation (i.e. for the UL allocation factor), the allocation factor used is the lower of the ceiling or the calculated value
- Post-implementation (i.e. for MAR (PQ FFLAS) and ID-only FFLAS), the allocation factor used is based on applying the ceiling to the sum of the PQ FFLAS and ID-only FFLAS allocation factors. If the sum is below the ceiling, then the ceiling has no effect and the allocation factors are used unchanged; if the sum of the MAR (PQ FFLAS) and ID-only FFLAS allocation factors is above the ceiling then the result is the ceiling pro-rated between the PQ FFLAS and ID-only FFLAS allocation factors using their pre-ceiling values. For example if the ceiling was 50% and the MAR allocation factor was 55% and the ID-only FFLAS allocation factor 5%, then the resulting allocation factors would be 55/(55+5)*50% and 5/(55+5)*50% respectively.

True up scenarios

The True-up scenarios (Scenario 17 and Scenario 18) use the same formulas for the allocation factor calculations as Scenario 14 (the December 2021 final decision). The difference is that the input data for FY21 and 2021H2 has been updated based on actuals in those periods. This includes new input data for the various sharing inputs on sheet SSharingInputs.

4.3 Opex allocators

The allocation of opex between categories (and ultimately between in-scope FFLAS and anything else) is partly performed in the opex allocation model and partly performed in the BBM IAV model.

This has been done for reasons of convenience in modelling: while most of the opex items can be allocated in the opex model, some of the opex items are allocated using quantities which are known in the BBM IAV model, including NBV (RABSOP), traffic and capex in year. Keeping this allocation in the BBM IAV model means that the opex model does not itself depend on the BBM IAV model[28].

For a description of the opex model, please see the separate opex allocation model documentation.

4.3.1 Opex categories

The opex model provides the following opex categories (for each financial year) as outputs to the BBM IAV model:

27 A further multiplier is also applied as part of this calculation of the pre-ceiling result, but in scenario 14 this further multiplier has the value of 100% so has zero impact on the result

28 There is one minor dependency: the version of the opex model used in the final decision uses the vanilla WACC; rather than have a bidirectional dependency in the Excel we have pasted the relevant vanilla WACC values into the opex model.

Figure 19: Output categories from the opex allocation model [Source: Analysys Mason, 2022]

Opex model output categories
FFLAS (fibre) directly attributed
FFLAS (fibre) not directly attributed
Non-FFLAS (copper) directly attributed
Non-FFLAS (copper) not directly attributed
Other services
Billable Provisioning
Billable third party
Core fibre (national)
Infrastructure Rates alloc by Won areas
Infrastructure Rates alloc by Lost areas
Infrastructure Rates alloc by Non areas
Infrastructure Rates alloc by National areas
Costs allocated based on 'capex spend for the year'
Costs allocated by Totex
Costs allocated by NBV
Pass-through costs (excluding Rates) directly attributed to FFLAS
Pass-through costs (excluding Rates) allocated to FFLAS
Pass-through costs (excluding Rates) allocated to Copper
Pass-through costs (excluding Rates) allocated to Other services
Pass-through costs (excluding Rates) allocated to Core fibre (national)
Billable third party (fibre)
Billable third party (copper)
Costs allocated using traffic
Costs allocated by using L1 NBV

Note: that no opex values are per se directly attributable to UFB FFLAS (pre-implementation) or PQ FFLAS (post implementation) in the opex model. This is because the allocation takes place in two steps in the model: the opex model output is to opex service categories (including opex directly attributed to FFLAS), and allocation between in-scope FFLAS and other FFLAS is done within the BBM IAV model. As a result while some opex costs are directly attributable to FFLAS in the opex model (see above list), they are subsequently allocated to a specific subset of FFLAS (such as UFB FFLAS, or PQ FFLAS, or ID-only FFLAS) in the IAV model.

Pass-through costs (including Rates) are distinguished from other opex only for the purposes of the MAR model; within the IAV model and the DCF calculation of the FLA, we treat pass-through costs just like other opex.

4.3.2 Allocators used for opex categories

The opex model outputs are allocated within the BBM IAV model using the following allocators:

Figure 20: Opex allocators used [Source: Analysys Mason, 2021]

Allocator	Description of allocator value used
None	Zero (directly attributable to non-FFLAS services)
All	Customer allocator type. Proportional to AOP in-scope FFLAS demand / all AOP FFLAS demand (i.e. will not be 100% to UFB). This is because not all FFLAS are in-scope for the UL calculation
Prorated	Customer allocator type. AOP in-scope subscribers / AOP subscribers
Prorated – Won	NBV allocator type. Allocated L1 RABSOP in Won geography/L1 RABSOP in Won geography
Prorated – Lost	NBV allocator type. Allocated L1 RABSOP in Lost geography/L1 RABSOP in Lost geography
Prorated – Non	NBV allocator type. Allocated L1 RABSOP in Non geography/L1 RABSOP in Non geography
Prorated – National	NBV allocator type. Allocated L1 RABSOP in National geography/L1 RABSOP in National geography
Prorated – Capex	Allocated Capex /Capex
Prorated – Totex	Totex allocator type. (Allocated Capex + Allocated Opex (excluding opex to be allocated by totex)[29]) / (Capex + Opex (excluding opex to be allocated by totex))
Prorated – NBV	NBV allocator type. Allocated L1 RABSOP in all geographies /L1 RABSOP in all geographies (i.e. Won, Lost, Non and National)
Prorated – traffic	Traffic allocator type. Estimated in-scope FFLAS traffic as a fraction of all traffic. (summed over all geographies)

The specific allocator to category mapping used is presented in Figure 21 below.

Note: that the services below refer to FFLAS and non-FFLAS, and geography refers to Won, Lost, Non and National (as per 2.6.4 above).

Figure 21: Allocators used in BBM IAV model for opex output categories [Source: Analysys Mason, 2021]

Opex output category	Allocator	Proxy or causal in context	Use within IAV model
FFLAS (fibre) directly attributed	All	Mix of attribution and causal. Attributed to FFLAS in opex model; uses	Allocates from FFLAS to in-scope FFLAS (i.e. UFB FFLAS

29 Note that in v127g12 and later versions this calculation can either include or exclude passthrough costs, according to a parameter defined for each scenario.

Opex output category	Allocator	Proxy or causal in context	Use within IAV model
		connections ratio to pro-rate between in-scope and out of scope FFLAS in IAV model.	pre-implementation; PQ FFLAS or ID-only FFLAS respectively post-implementation)
FFLAS (fibre) not directly attributed	All	Causal	Allocates from FFLAS to in-scope FFLAS as above
Non-FFLAS (copper) directly attributed	None	Attributed	Directly attributable to non-FFLAS.
Non-FFLAS (copper) not directly attributed	None	Causal	Directly attributable to non-FFLAS.
Other services	None	Attributed	Directly attributable to non-FFLAS.
Billable Provisioning	Prorated	Proxy	Partly allocates to in-scope FFLAS
Billable third party	Prorated	Proxy	Partly allocates to in-scope FFLAS
Core fibre (national)	Prorated	Proxy	Partly allocates to in-scope FFLAS
Infrastructure Rates alloc by Won areas	Prorated – Won	Causal	Partly allocates to in-scope FFLAS.
Infrastructure Rates alloc by Lost areas	Prorated – Lost	Causal	Partly allocates to in-scope FFLAS.
Infrastructure Rates alloc by Non areas	Prorated – Non	Causal	Partly allocates to in-scope FFLAS.
Infrastructure Rates alloc by National areas	Prorated – National	Causal	Partly allocates to in-scope FFLAS
Costs allocated based on ‘capex spend for the year’ (Note: not used)	Prorated – Capex	Proxy	Partly allocates to in-scope FFLAS
Costs allocated by Totex	Prorated – Totex	Proxy	Partly allocates to in-scope FFLAS

Opex output category	Allocator	Proxy or causal in context	Use within IAV model
Costs allocated by NBV	Prorated – NBV	Causal	Partly allocates to in-scope FFLAS
Pass-through costs (excluding Rates) directly attributed to FFLAS	All	Mix of attribution and causal. Attributed to FFLAS in opex model; uses connections ratio to pro-rate between in-scope and out of scope FFLAS in IAV model.	Allocates from FFLAS to in-scope FFLAS (i.e. UFB FFLAS pre-implementation; PQ FFLAS or ID-only FFLAS respectively post-implementation)
Pass-through costs (excluding Rates) allocated to FFLAS	All	Causal	Allocates from FFLAS to in-scope FFLAS as above
Pass-through costs (excluding Rates) allocated to Copper	None	Causal	Directly attributable to non-FFLAS.
Pass-through costs (excluding Rates) allocated to Other services	None	Attributed	Directly attributable to non-FFLAS.
Pass-through costs (excluding Rates) allocated to Core fibre (national)	Prorated	Proxy	Partly allocates to in-scope FFLAS
Billable third party (fibre)	All	Causal	Partly allocates to in-scope FFLAS
Billable third party (copper)	None	Attributed	Directly attributable to non-FFLAS.
Costs allocated using traffic	Prorated - traffic	Proxy	Partly allocates to in-scope FFLAS
Costs allocated using NBV of L1 assets	Prorated – NBV[30]	Causal	Partly allocates to in-scope FFLAS
Leases – fibre	All	Attributed	Partly allocates to in-scope FFLAS
Leases – shared	Prorated	Proxy	Partly allocates to in-scope FFLAS

30 Note that this service class is thus allocated using the same allocation factor as "costs allocated using NBV" (i.e. in practice both are allocated based on the ratio of NBV of in-scope FFLAS L1 assets to NBV of all L1 assets)

Opex output category	Allocator	Proxy or causal in context	Use within IAV model
Tax adjustments[31]	Prorated	Proxy	Partly allocates to in-scope FFLAS

Note: The Lease opex is only included in the tax calculations, as explained in section 2.6.5 above.

31 As discussed in section 3.6.17, tax adjustments are brought in in a similar manner to the operating costs of leases that are treated as operating costs for tax purposes. These adjustments are based on relevant adjustments applied by Chorus in the period in question; a fraction of these is allocated to in-scope FFLAS.

5 Model use

5.1 Installation

The model is designed to be used with the latest versions of the following files located in a single directory:

- Chorus Integrated Demand Revenue Model
- Opex allocation model
- Chorus NZL BBM Core and IAV model (this model)

The model requires the BBM IAV workbook to have valid links to these other files.

In addition, the opex allocation sheet also links to the demand and revenue file.

You can use the Data menu, “Edit Links” and then Check Status which should say “OK” and /or “Source is open” for the workbooks linked from the Core and IAV model file.

5.1.1 Note about model configuration for the December 2021 final decision

The December 2021 version of the models required the use of two parallel copies of the opex model and the IAV model, representing “pre-implementation” (normal) and “post-implementation”(also known as “modified”). However, in BBM IAV model v135, this use of two copies is no longer required, as there are now separate columns for 2021H2 and 2022H1.

5.2 Running the model

Calculation is set to manual. The model can be run by hitting F9.

The model takes approximately 60 seconds to run for a new scenario, though the first run when the model is opened, and links refreshed can take several minutes (e.g. 360s). If “Calculate” can be seen at the bottom left, then the workbook is not fully calculated and needs to be recalculated before the results can be used.

6 Detailed walkthroughs of model worksheets

6.1 Introduction

This section provides a walk-through of each calculation sheet associated with the BBM IAV model. The aim of the section is to allow a competent modeller to understand the purpose and flow of the calculations and to be able to update input data or change key parameters (where appropriate).

We describe each sheet using a common structure: the purpose of the sheet and a description of each section within the sheet.

6.1.1 Sheet by sheet summary

In *Figure 22* below we have given an overview of the purpose of each sheet in the model.

Figure 22: Overview of model assumptions and methodology [Source: Analysys Mason, 2021]

Sheet name	Sheet purpose, assumptions and methodology
C	Contents sheet
V	A history of the versions of the workbook
S	A guide to the styles used in the workbook
SListsAssumptions	Includes the main lists used throughout the model
Sscenarios	Drives results scenarios for allocation of shared assets
ScontrolSheet	The main assumptions and key outputs of the model
SCIPFunding	Data on the funding provided by Crown Infrastructure Partners
Srevenue	The model's revenue forecast
Scapex	The capex (VCA) forecast for IAV and MAR calculations
Sopex	The opex calculations
SDemandMAR	Demand data for the MAR calculation
SdemandUL	Demand data for the UL calculation
Inputs →	Section break for inputs calculations
SLifetimes	Creation of asset lifetimes
SFARLinks	Aggregation of the fixed asset registry inputs flowing through the model
SFARInputPost2012	Raw asset registry inputs for Post2012 assets
SFARInputPre2012	Raw asset registry inputs for Pre 2012 assets
SOpexInput	Opex input
SCapitalContributionsInput	Capital contributions input
SSharingInput	Data on asset sharing for specific asset classes
SCapexInput	Raw inputs for capex forecasts FY21-FY25
IAV -->	Section break for IAV calculations

Sheet name	Sheet purpose, assumptions and methodology
STaxRABSOP	The start of period tax RAB forecast for tax depreciation calculations
STaxRABEOP	The end of period tax RAB forecast for tax depreciation calculations
SRABSOP	The start of period RAB forecast for IAV calculations
SDepreciation	The depreciation forecast for IAV calculations
STaxDepreciation	The tax depreciation forecast for IAV calculations
SIndexation	The forecast of indexation/revaluation for IAV calculations
SDisposals	The disposals forecast for IAV and MAR calculations
SRABEOP	The end of period RAB forecast for IAV calculations
SAssetULAllocationFactor	The asset allocation factors used for UL calculations
SOpexUL	Calculates the opex used in the UL calculation
SCalcs	A series of calculations leading to that of the unrecovered losses
Alt tax loss calculation	A worksheet implementing a version of the Commission's own preferred calculations of the starting value of the tax effect of tax losses
SLifetimesEndIAV	Calculates remaining lifetimes at the point at which the RAB starts.
SInitialMARAllocatedRAB	Calculates CY22 PQ FFLAS allocated RAB (including FLA)

6.2 C, V and S sheets

The C, V and S sheets are simple administrative sheets, performing the following functions:

C	*Contents* sheet
V	A history of the *versions* of the workbook
S	A guide to the *styles* used in the workbook

6.3 SListsAssumptions

Purpose of the sheet

The SListsAssumptions sheet contains all the standard lists used in the model. These lists are often used for row labels. The sheet also contains assumptions that vary according to the row labels in the model.

The sheet is broken down into three sections, with list relating to: assets, opex and auxiliary functions

Assets

The assets section has the following lists:

Full list of assets	The full list of 1612 asset types, which combines the asset classes with the options for geography and asset purchase timeframe. The full list includes a number of assumptions specific to each combination of asset class, geography and asset purchase timeframe, including: • The accounting asset lifetime for the IAV calculation • The tax asset lifetime for the IAV calculation • The tax DV rate • The asset price trend used in the indexation calculation • The timing factor used in the IAV depreciation calculation; and • The timing factor used in the MAR depreciation calculation
Timeframe	The options for asset acquisition timeframe used in the model
UFB status	The options for asset UFB status used in the model, as well as a lookup table assisting in the exclusion of certain statuses under different scenarios
Geography	The options for geography used in the model
Allocation factors	The options for allocation factors (used to allocate fibre (ie FFLAS), copper (i.e. non-FFLAS), and shared assets as applicable). Each sharing factor is replicated for each geography so that the full list of possible combinations is considered
Asset depreciation class	The classes used to assign depreciation methods in the MAR model.
List of asset types	The subsection includes: • The list of asset classes used in the model, also including some supplementary labels and assumptions for each: – A high-level categorisation of asset types – Classification of the asset classes into the asset categories used in NZ tax law – The tax lifetime for each asset class – The tax DV rate for each asset class
NZ tax general depreciation rates	Includes data from the NZ inland revenue on the lifetimes and DV rates to be used in the calculation of depreciation for tax purposes

Full asset list	This subsection builds the full 1612-long list of row labels, through the combination of asset class, asset purchase timeframe and geography
No geography asset list	This subsection creates row labels which include only asset class and asset purchase timeframe (does not include geography)
No timeframe asset list	The subsection creates row labels which include only asset list and geography (does not include asset timeframe)

Opex

This section includes the list of row labels used for including the opex calculation results into the main MAR calculation.

It also contains the block of opex allocation factors which are used to calculate attributable opex and tax opex.

Auxiliary

This section includes some lists which are used for other functionality in the model.

6.4 SScenarios

Purpose of the sheet

The scenarios sheet exists to allow the user to see what the BBM results will be, based on the different configurations of each scenario.

Top section: Summary of outputs for selected scenario, macro button

At the top of the sheet is a box in which the required scenario number can be entered, and a summary table of a short list of the key results of that scenario once it has calculated, notably the allocated RAB immediately before the start of the new regulatory period excluding the unrecovered loss (using the MAR allocation factors), the unrecovered loss, and the sum of these two (which is the allocated RAB at the start of the first regulatory period post-implementation).

MAR allocation factors

A block of cells at the left hand side contains the 1612 line by line so-called “MAR allocation factors” for each asset defined for various MAR allocation factor options. Each scenario selects one MAR allocation factor option and will use that set of MAR allocation factor values in range “MAR.Sharing.factors.in.scenario” which control the amount that each of the 1612 assets contributes to the resulting RAB. The specific fractions used in each year can change over time (e.g.

as connections or other relevant parameters change over time): this time dependence is defined in sheet "SControlSheet".

The MAR allocation factor values are calculated by short formulae based on the properties of each of the 1612 assets (e.g. the geography, allowing for those special assets such as test assets (always excluded), unrecovered loss (always included), and washup assets (always included)). In this way the asset classes in each timeframe and geography are mapped to the relevant allocation factors to use both pre- and post-implementation.

Note: that although this range is called "MAR allocation factors" this range also determines the UL allocation factors to use pre-implementation (i.e. if "Shared with Copper, Won" is used as the MAR allocation factor by a given asset class, geography and asset purchase timeframe, then it will also be used by the same given asset class, geography and asset purchase timeframe pre-implementation when calculating the unrecovered loss (FLA).

Note: that care is needed as a mistake here would lead to misleading results (e.g. if the calculation included assets it should not).

UL factors

A block of cells below the MAR allocation factors contains the 1612 line by line so-called UL factors. These act as a multiplier on the calculated allocation factors (0 excludes an asset,1 includes it).

The UL factor configuration defined is "Exclude RBI and UFB E and exclude Lost and Non". This setting ensures that assets related to "RBI" and "UFB E" as well as assets in "Lost" and "Non" areas will not contribute to the unrecovered loss calculation, even if those areas are included in the RAB and the MAR calculation. The UL factor values are calculated by short formulae based on the properties of each of the 1612 assets (e.g. the geography), and allowing for special assets such as test assets (excluded); unrecovered loss and washup assets will not be present in the UL calculation as these only exist post-RAB.

Parameters for each scenario in turn

The right hand side of the sheet is a set of two columns each of which contains the required input for a single scenario. These inputs have been discussed in section 2.6.6 above.

6.5 SControlSheet

Purpose of the sheet

The "SControlSheet" sheet includes a summary of the key outputs from the model, and a range of key parameters, settings and assumptions that can be changed to affect those key outputs.

Key results

The first section highlights some key results from the model:

- Total IAV RABEOP: the total net book value of the Chorus asset base including all fibre and all shared assets, without any allocation according to the use by the fibre business.
- Allocated IAV RABEOP: the net book value of the Chorus assets used by the fibre business (i.e. including the impact of allocation factors to exclude copper-only assets and accounting for the use of a portion of shared assets by the fibre business)
- Unrecovered losses: the total value of the unrecovered losses which are included in the starting RAB at the start of the new regulatory period

Parameter selection

The next section allows the user to change some of the key parameters used in the model. Many of these parameters are under control of the scenarios sheet.

Financial calendar parameters	This defines: – The first year of the new regulatory period (FY22) – How many months are in that first financial year of the first regulatory period (which allows the RAB to start at a date not aligned to Chorus FY end) – 6 (because implementation date is 1 Jan 2022)
Actual data period parameters	The user can choose the last year of the Post2012actual timeframe (i.e. the period for which actual depreciation and closing book value are available from the FAR - currently FY20)
Capex forecast period parameters	The user can choose the last year of the capex forecast period

WACC

WACC	The SCalcs DCF calculation uses a vanilla WACC..
Other WACC parameters	The model also includes a range of other parameters that can be used to affect the values used to calculate the vanilla WACC/post-tax WACC respectively, specifically: – Cost of equity – Cost of debt – Corporate tax rate – Gearing (debt/assets ratio)

Ex-ante allowance for stranding

Ex-ante allowance UL	The Commerce Commission has suggested that the maximum allowable revenue post-implementation should include an additional ex-ante allowance which is ex-ante compensation for certain stranding risks. It is not part of the WACC, but it acts on the RAB to generate an additional return. This parameter controls whether a similar factor is also included in the pre-implementation (unrecovered loss, "UL") timeframe.
Ex-ante allowance MAR	The Commerce Commission has suggested that the maximum allowable revenue post-implementation should include an additional ex-ante allowance which is ex-ante compensation for certain stranding risks. It is not part of the WACC, but it acts on the RAB to generate an additional return. This parameter controls the size of this factor in the post-implementation ("MAR") timeframe.

Time factors calculation

Time factor inputs	The subsection allows the user to input the number of days through the year that a particular cashflow is assumed to occur
Based on vanilla WACC	The subsection calculates the resultant time factors for a range of cashflow types based on the Vanilla WACC

Allocation factors

This section calculates the percentage allocation factors for shared assets of each sharing type, for each year, based on the inputs from the demand forecast side model.

MAR allocation factors	The MAR allocation factors are used to calculate the starting value of the RAB (i.e. the IAV). This subsection takes the EoP forecast of copper vs fibre lines by Geography, converts this to AoP values, and then assigns the resultant sharing factor to the sharing types used in the model. A variety of allocation methods can be used depending on the selected scenario including in proportion to the number of active fibre lines as a proportion of active fibre+copper lines.

MAR allocation factors assignment

The next subsection assigns the correct MAR allocation factor scheme to each of the 1612 combinations of asset class, timeframe and geography. One such allocation factor is "Shared with copper, national".

ID-only allocation factors

The ID-only allocation factors are used to calculate the value of assets that are allocated to FFLAS services provided by Chorus in areas where an alternative operator is the LFC (Lost/LFC area), in the post-implementation period.

Note: that the MAR allocation factors (PQ FFLAS allocation factors) have been adjusted based on the proportion of FFLAS services provided outside LFC-UFB areas, in order to exclude any assets attributable to ID-only FFLAS.

UL allocation factors

For the unrecovered loss calculation, a modified set of allocation factors is used. This multiplies the result of the allocation factors (looking up the appropriate numerical value of "Shared with copper, national" in the UL context) with a UL Asset Factor (a column vector of 1s and 0s). In this way some assets costs can be removed within the unrecovered loss calculation if desired, while those assets will still proceed into the RAB IAV.

Note: that the numerical values of the allocation factor selected (such as "shared with copper, national") in a given year are potentially different in the UL and MAR cases. For example, if these allocation factor values are calculated on the basis of the ratios of numbers of subscribers, and certain areas (and hence subscribers) are excluded from the UL calculations but not in the MAR, then the ratios used take this into account in an appropriate way.

6.6 SCIPFunding

Purpose of the sheet

This sheet contains various parameter documenting the CIP Funding, and it also calculates the PV of the benefit of CIP Funding, which is used in the SCalcs sheet to evaluate the DCF financial loss at implementation date.

The calculation is described in detail in Annex B.3.

CIP Funding parameters

This section calculates the CIP Funding parameters, which are used in the SCalcs sheet.

CIP Funding balance (AOP)	CIP Funding balance (AOP) is evaluated based on the CIP Funding balance (EOP), which is provided by the following categories: – Senior debt – Subordinated debt – Equity
WACC used in CIP funding netting off (UL and MAR)	This parameter is based on the weighted average avoided cost of CIP Funding. The costs associated with the different categories of CIP Funding are identified below: – Senior debt (Cost of debt) – Subordinated debt (Cost of debt + Subordinated debt premium) – Debit like equity[32] (Cost of debt) – Equity (Cost of equity) The weighted average avoided cost of CIP Funding is evaluated by weighting the relevant costs for each of the CIP Funding categories by the corresponding amount of CIP Funding balance (AOP), and then taking the average for each year.
WACC used in CIP debt interest netting off (UL and MAR)	This parameter is based on the average interest on debt-like categories of CIP Funding. Note: as specified by the Commission, this does not include debt-like equity. The average interest on debt-like categories of CIP Finding is calculated as a weighted average, where the interest on "Senior debt" and "Subordinated debt" is weighted by the corresponding amount of CIP Funding balance (AOP).
Interest Rate on CIP funding (UL and MAR)	Interest on CIP Funding is set to zero.

Benefit of CIP Funding

This section calculates the annual CIP net drawdown in period times the annual (ie 12 month[33]) CIP funding rate for each year (based on the relevant senior debt, subordinated debt, debt-like equity and

32 Note: A fraction of the CIP Funding in the category "Equity" is considered to be like debt

33 Note: this is by design a 12 month interest rate even in those financial years that are not 12 months in length

other equity annual costs), and then applies a compounding factor to evaluate the present value of that funding benefit at implementation date .

The compounding factor for each year is as specified in the FLA IM and is given by:

$$\frac{\left(\left(1 + vanilla\ annual\ WACC\right)^{years\ to\ implementation\ date}\right) - 1\right)}{vanilla\ WACC}$$

Note: that this PV of benefit of CIP funding calculation is therefore a complex mix of annual (12 month) CIP funding rate and vanilla annual (12 month) WACC, and is by design completely different to the cumulation factors used for the other cashflows.

This present value is aggregated for each year in the UL period to calculate the cumulative CIP Funding benefit at implementation date.

6.7 SRevenue

Purpose of the sheet

The purpose of the SRevenue sheet is to provide a place into which the output of the revenue forecast can be linked into the model.

Revenue summary

The fibre revenue forecast is linked in from the demand and revenue forecast file.

6.8 SCapex

Purpose of the sheet

The purpose of the SCapex sheet is to provide capex (VCA) input (historic and forecast) for use in both the IAV and MAR calculations.

The sheet also provides similar calculations of Tax Capex (Tax VCA) (taking account of differences resulting from the capital contributions that are treated as revenue for tax purposes) and for those capital contributions where the contribution is treated as revenue for tax purposes.

Capex summary

The first section presents the capex values for all combinations of asset class, asset purchase timeframe and geography without the impact of the allocation factors.

The section then presents the capex values attributable to the fibre business in different cases by multiplying the unallocated values with the UL allocation factors or MAR allocation factors respectively.

The same unattributed, UL attributed, and MAR attributed calculations are also undertaken for the Tax Capex and for the capital contributions treated as revenue for tax purposes.

Capex calculations

The capex calculations section includes three sub-sections:

Capex from accounts and forecast (including capital contributions)

The first subsection combines capex values from two sources:

- Capex values for post-2012 assets, from the SFARLinks sheet (linked to the FAR analysis); and
- Capital contributions evaluated in the SCapitalContributionInput sheet

Capex from accounts and forecast (excluding capital contributions)

The second subsection builds a complete timeseries of capex values from three sources:

- From FY12-2021H2, capex values for pre-2012 and post-2012 assets are included from the SFARLinks sheet; and
- From FY23 to the end of the capex forecast, capex values are linked in from the capex forecast

Beyond the end of the capex forecast, the capex values are assumed to be the same as the value in the final year of the capex forecast.

The timeseries of capex values is expressed in terms of the combination of asset class and geography (no asset purchase timeframe).

Capex allocation to timeframes

The third subsection allocates the correct capex values to the correct rows based on the asset purchase timeframe of assets:

- Pre-2012 assets: these receive the capex values associated with pre-2012 assets, between 2012 and the final year of the Post2012Actual timeframe
- Post-2012 Actual assets: these receive the capex values associated with post-2012 assets and capital contribution assets, between 2012 and the final year of the Post2012Actual timeframe (2021H2)
- Post-2012 Forecast assets: these receive the capex values from the capex forecast and capital contribution forecast, between the first year after the Post2012Actual timeframe and the final year before implementation (noting that there are no such inputs in the true-up version as the post2012Actual timeframe extends to implementation date); and
- Post-RAB assets: these receive the capex values from the first year of the new regulatory period through to the last year considered by the model (2057).
- This last section is repeated to calculate the TaxCapex and Capital contributions treated as revenue for tax purposes, again bringing in inputs

from the SCapitalContributionInput sheet. Currently, the only differences between TaxCapex and Capex are as a result of this difference in treatment of the capital contributions.

6.9 SOpex

Purpose of the sheet

The SOpex includes the opex; for all periods.

The opex information is calculated in a separate side model (the opex model), or is provided as inputs from other calculations (leases and tax adjustments), and is grouped into 24 types of cost:

- FFLAS (fibre) directly attributed
- FFLAS (fibre) not directly attributed
- Non-FFLAS (copper) directly attributed
- Non-FFLAS (copper) not directly attributed
- Other services
- Billable Provisioning
- Billable third party
- Core fibre (national)
- Infrastructure Rates alloc by Won areas
- Infrastructure Rates alloc by Lost areas
- Infrastructure Rates alloc by Non areas
- Infrastructure Rates alloc by National areas
- Costs allocated based on ‘capex spend for the year’
- Costs allocated by Totex
- Costs allocated by NBV
- Pass-through costs (excluding Rates) directly attributed to FFLAS
- Pass-through costs (excluding Rates) allocated to FFLAS
- Pass-through costs (excluding Rates) allocated to Copper
- Pass-through costs (excluding Rates) allocated to Other services
- Pass-through costs (excluding Rates) allocated to Core fibre (national)
- Billable third party (fibre)
- Billable third party (copper)
- Costs allocated using traffic
- Costs allocated using NBV of L1 assets
- Leases - fibre
- Leases - shared
- Tax adjustments (permanent differences)
- Tax adjustments (temporary differences)

Structure of the sheet

The sheet has one component, annual opex for all types of services. Each category of opex is assigned an allocation factor:

Figure 23: Opex category allocation factors [Source: Analysys Mason, 2021]

Opex category	Allocation factor
FFLAS (fibre) directly attributed	All
FFLAS (fibre) not directly attributed	All
Non-FFLAS (copper) directly attributed	None
Non-FFLAS (copper) not directly attributed	None
Other services	None
Billable Provisioning	Prorated
Billable third party	Prorated
Core fibre (national)	Prorated
Infrastructure Rates alloc by Won areas	Prorated – Won
Infrastructure Rates alloc by Lost areas	Prorated – Lost
Infrastructure Rates alloc by Non areas	Prorated – Non
Infrastructure Rates alloc by National areas	Prorated – National
Costs allocated based on 'capex spend for the year'	Prorated – Capex
Costs allocated by Totex	Prorated – Totex
Costs allocated by NBV	Prorated – NBV
Pass-through costs (excluding Rates) directly attributed to FFLAS	All
Pass-through costs (excluding Rates) allocated to FFLAS	All
Pass-through costs (excluding Rates) allocated to Copper	None
Pass-through costs (excluding Rates) allocated to Other services	None
Pass-through costs (excluding Rates) allocated to Core fibre (national)	Prorated
Billable third party (fibre)	All
Billable third party (copper)	None
Costs allocated using traffic	Prorated - Traffic
Costs allocated using NBV of L1 assets	Prorated – NBV
Leases – fibre	All
Leases – shared	Prorated
Tax adjustments[34]	Prorated

Additional details on the opex allocation factors are provided in section 0.

34 As discussed in section 3.6.17, tax adjustments are brought in in a similar manner to the operating costs of leases that are treated as operating costs for tax purposes. These adjustments are based on relevant adjustments applied by Chorus in the period in question; a fraction of these is allocated to in-scope FFLAS.

Lease opex is only included in the "Tax opex" used within the calculation of tax allowances on the SCalcs sheet.

6.10 SDemandMAR

Purpose of the sheet

The SDemandMAR sheet calculates various demand-related ratios used by the MAR Allocation factors calculations.

6.11 SDemandUL

Purpose of the sheet

The SDemandUL sheet calculates various demand-related ratios used by the UL Allocation factors calculations.

6.12 SLifetimes

Purpose of the sheet

The SLifetimes sheet assigns full lifetimes and calculates various appropriate "remaining lifetime" assumptions for use in the depreciation calculations in various timeframes used in the rest of the model.

Full lifetimes

Full lifetimes for most of the asset classes have previously been calculated from an analysis of the full asset lives shown in the FAR. These are then mapped onto the asset classes used in the model. Where asset lives are not available, estimates are used. Note that for all assets in the FAR these lifetimes will not affect the depreciation of the asset classes in the post2012actual period because this is taken directly from the Chorus FAR.

Then the full lives by asset class are replicated across the list of 400 combinations of 100 asset classes and 4 geographies for use in various parts of the model.

In this section, full tax lives and the tax declining value (DV) rates are also replicated for 400 combinations of asset class and geographies.

Remaining lifetimes, IAV

There are two subsections:

Remaining lifetimes, pre-2012 assets, FY12	In this subsection, remaining asset lives are calculated for the pre-2012 assets in the IAV calculation. The asset lives are calculated based on the starting NBV in 2012 and the 2012 depreciation. Both of these datasets are provided by the analysis of the FAR. Note: that this calculation is not "weighted sum of lifetimes" but "inverse of weighted sum of inverse lifetimes".. The FAR analysis provides the NBV and depreciation broken down into the geographies. The remaining lifetimes are calculated for the list of 400 combinations of asset class and geography for use in the model based on the NBV divided by the depreciation.
Full list of assets and lifetimes used in Post2012Actuals period	While the remaining asset lives calculated in the subsection above are assigned to the pre-2012 assets, the rest of the assets are assigned their respective full lifetimes.

Remaining lifetimes, Post2012Actual timeframe end

There are two subsections:

Remaining lifetimes, pre-2012 assets, Post2012Forecast period	In this subsection, remaining asset lives are calculated for the pre-2012 and post-2012 Actual assets in the IAV calculation, at the end of the actual data period. The asset lives are calculated based on the year-end NBV and the depreciation in the final year of the actual data period. Both of these datasets are provided by the analysis within the IAV model; SRABEOP and SDepreciation sheets.
Full list of assets and lifetimes used in Post2012Forecast period	While the remaining asset lives calculated in the subsection above are assigned to the pre-2012 and post-2012 Actual assets, the rest of the assets are assigned their respective full lifetimes.

6.13 SFARLinks

Purpose of the sheet

The purpose of this sheet is to aggregate the data from the FAR analysis into a format that can be used in the model.

Structure of the sheet

In general, the SFARLinks sheet converts the format of the FAR outputs to the format used in the remainder of the model (one block of cells per data output, for all years, asset classes and geographies).

The sheet allows the formatting of 8 key data sets which are used elsewhere in the model:

Capex

Total capex from FAR excluding capital contribution	Aggregates Post-2012 Actual in year capex excluding capital contribution capex for post-2012 Actual assets
Post-2012 Actual in year capex excluding capital contribution	Receives capex from post-2012 FAR analysis, which gets assigned to the post-2012 Actual assets. For each period (FY12-2021H2), data is linked to an individual block in the SFARInputPost2012 sheet
Capital contribution capex	Receives capex from capital contribution analysis in the SCapitalContributionInput sheet, which gets assigned to the post-2012 Actual assets; Post2012Actual_CC Copper_(Won/Non/Lost/National) Post2012Actual_CC Fibre UFB A-D_(Won/Non/Lost/National) Post2012Actual_CC Fibre other_(Won/Non/Lost/National); and Post2012Actual_CC Shared_(Won/Non/Lost/National) For each period (FY12-2021H2), data is linked to an individual block in the SCapitalContributionInput sheet Similar blocks are used to handle the similarly formatted inputs from the SCapitalContributionInput sheet regarding the capital contributions tax capex and the relevant value for each year for the capital contributions treated as revenue for tax purposes. (Note: that the sign convention for the capital contributions is maintained for this last item, meaning it is a negative quantity for an additional revenue)

Opening NBV for post-2012 Actual assets	Receives starting FY12 NBV from post-2012 FAR analysis, which gets assigned to the post-2012 Actual assets This only consists of zeros, as it would be inconsistent for these assets to have any book value before FY12. Therefore, this data is ignored
Pre-2012 in year capex	Receives capex from pre-2012 FAR analysis, which gets assigned to the pre-2012 assets. For each period (FY12-2021H2), data is linked to an individual block in the SFARInputPre2012 sheet
Timing	
Capex timing	Receives capex timing from pre-2012 FAR analysis, which gets assigned to the pre-2012 assets. For each period (FY12-2021H2), data is linked to an individual block in the SFARInputPre2012 sheet Also receives capex timing from post-2012 FAR analysis, which gets assigned to the post-2012 Actual assets. For each period (FY12-2021H2), data is linked to an individual block in the SFARInputPost2012 sheet In the period 2022H1-FY57, the capex timing for pre-2012 and post-2012 Actual assets is set to 0.5. The capex timing for the rest of the assets is also set to 0.5, for FY12-FY57
NBV	
NBV (year-end)	Receives NBV (year-end) from pre-2012 FAR analysis, which gets assigned to the pre-2012 assets. For each period (FY12-2021H2), data is linked to an individual block in the SFARInputPre2012 sheet Also receives NBV (year-end) from post-2012 FAR analysis, which gets assigned to the post-2012 Actual assets. For each period (FY12-2021H2), data is linked to an individual block in the SFARInputPost2012 sheet
Tax NBV	
Tax NBV (year-end)	Receives tax NBV (year-end) from pre-2012 FAR analysis, which gets assigned to the pre-2012 assets. For each period (FY12-2021H2), data is linked to an individual block in the SFARInputPre2012 sheet Also receives tax NBV (year-end) from post-2012 FAR analysis, which gets assigned to the post-2012 Actual assets. For each period (FY12-2021H2), data is linked to an individual block in the SFARInputPost2012 sheet
Depreciation	

Depreciation in year	Receives depreciation in year from pre-2012 FAR analysis, which gets assigned to the pre-2012 assets. For each period (FY12-2021H2), data is linked to an individual block in the SFARInputPre2012 sheet Also receives depreciation in year from post-2012 FAR analysis, which gets assigned to the post-2012 Actual assets. For each period (FY12-2021H2), data is linked to an individual block in the SFARInputPost2012 sheet
Depreciation (converted to positive)	The depreciation data is multiplied by -1 in order to convert it to positive values, to observe our chosen sign convention (which is the opposite to Chorus' accounts).
Tax depreciation	
Tax depreciation in year	Receives tax depreciation in year from pre-2012 FAR analysis, which gets assigned to the pre-2012 assets. For each period (FY12-2021H2), data is linked to an individual block in the SFARInputPre2012 sheet Also receives tax depreciation in year from post-2012 FAR analysis, which gets assigned to the post-2012 Actual assets. For each period (FY12-2021H2), data is linked to an individual block in the SFARInputPost2012 sheet
Tax depreciation (converted to positive)	The tax depreciation data is multiplied by -1, in order to convert to our sign convention.
Opening NBV	
Opening FY12 NBV	Receives starting FY12 NBV from pre-2012 FAR analysis, which gets assigned to the pre-2012 Actual assets.
Opening tax NBV	
Opening FY12 tax NBV	Receives starting FY12 NBV from pre-2012 FAR analysis, which gets assigned to the pre-2012 Actual assets.

6.14 SFARInputPost2012

Purpose of the sheet

The SFARInputPost2012 sheet includes the data outputs from the FAR analysis for assets deployed in 2012 or after.

Structure of the sheet

The FAR outputs are in the form of one block of cells per combination of year and data outputs, for all asset classes and geographies.

6.15 SFARInputPre2012

Purpose of the sheet

The SFARInputPre2012 sheet includes the data outputs from the FAR analysis for assets deployed before 2012.

Structure of the sheet

The FAR outputs are in the form of one block of cells per combination of year and data outputs, for all asset classes and geographies.

6.16 SOpexInput

Purpose of the sheet

The SOpexInput sheet links in the results of the opex analysis, which takes place in two separate files.

Structure of the sheet

The overall structure of the sheet is as follows:

Input from the opex allocation model, by service, by period:

- Total opex for FFLAS (fibre) directly attributed
- Total opex for FFLAS (fibre) not directly attributed
- Total opex for Non-FFLAS (copper) directly attributed
- Total opex for Non-FFLAS (copper) not directly attributed
- Total opex for Other services
- Total opex for Billable Provisioning
- Total opex for Billable third party
- Total opex for Core fibre (national)
- Total opex for Infrastructure Rates allocated by Won areas
- Total opex for Infrastructure Rates allocated by Lost areas
- Total opex for Infrastructure Rates allocated by Non areas
- Total opex for Infrastructure Rates allocated by National areas
- Total opex for Costs allocated based on ‘capex spend for the year’
- Total opex for Costs allocated by total expenditure

- Total opex for Costs allocated by NBV
- Pass-through costs (excluding Rates) directly attributed to FFLAS
- Pass-through costs (excluding Rates) allocated to FFLAS
- Pass-through costs (excluding Rates) allocated to Copper
- Pass-through costs (excluding Rates) allocated to Other services
- Pass-through costs (excluding Rates) allocated to Core fibre (national)
- Total opex for Billable third party (fibre)
- Total opex for Billable third party (copper)
- Total opex for Costs allocated using traffic
- Total opex for Costs allocated using NBV of L1 assets

Input from the lease-opex file:

- Total opex for leases-dedicated to fibre
- Total opex for leases-shared
- Tax adjustments (permanent differences)
- Tax adjustments (temporary differences)

6.17 SCapitalContributionsInput

Purpose of the sheet

The SCapitalContributionsInput sheet contains inputs on capital contributions (specific revenues which instead of being treated as revenues, are to be "netted off" from the capex).

The model transforms the input into modelled (negative) capital expenditure on four "capital contribution" asset classes (below), in each of the four geographies (Won, Lost, Non, National) for each year for which we have data on the capital contributions. The capital contribution asset classes are as follows:

- CC Copper
- CC Fibre UFB A-D
- CC Fibre UFB E
- CC Shared

Each of these annual capital expenditures is modelled as falling within a particular timeframe, according to the year in which it occurs (e.g. post2012actual or post2012forecast).

As is indicated by their names, these capital contributions are allocated differently between FFLAS and non-FFLAS.

Processing of data

The first section collates all the input data on potential capital contributions into a single block.

1. Network relocations resulting from Roadworks activity.
2. Reticulation for new property development
3. Access seekers NGA Provisioning Ancillary Charges (these are not considered further as capital contributions)
4. Other Persons (Building owners) NGA Provisioning Ancillary Charges (these are not considered further as capital contributions)
5. NZD20M NSI funding
6. Access seeker HSNS (High Speed Network Service) Installations
7. Access seeker Fibre Installation Fees (DFAS, ICABS)

For each of these there are a set of flags controlling how these are to be treated (e.g. capitalised, capitalised for tax purposes, or treated as one of two different types of revenue for tax purposes).

The second section creates various allocation factors which can be used for allocating the various capital contribution of different kinds between the different geographies and capital contribution asset types (i.e. providing weightings for each available combination of capital contribution asset class and geography (4x4)). The sum of the weightings within each allocation factor is equal to one.

Note that at the top of this section there are two blocks of cells that represent the RABSOP and the capex for the 400 combinations of asset class and geography (ie of any asset purchase timeframe). These blocks are pasted values taken from a like block (linked to the relevant ranges in the model) immediately below them. We have built the sheet in this way because if we do not, then Excel is either very slow to calculate or falsely perceives there to be a circular reference (e.g. via the CC being affected by the capex, and in turn affecting RABSOP, even though the filters exclude the CC from the capex items that affect the CC). There are test cells that detect whether the capex or RABSOP calculated by the model differ from the pasted values.

Each of the sources of capital contribution revenue considered uses one of these allocation factors.

- These allocation factors are calculated based on either capex (excluding capital contributions) or RABSOP of groupings of specific asset classes. So, for example, new fibre installations contributions might be thought to be correlated with Fibre capex, but certain capital contributions regarding existing network might be correlated with existing book value (i.e. RABSOP).The first part of the allocation factor name indicates which sub group of assets are included in the calculation of the weightings. A series of filters are used as follows.

  - *L1 non-RBI* excludes assets tagged as UFB status *RBI* and includes only assets tagged as *L1*. Both of these tags are inputs to the model for each asset class.
  - *Fibre non-RBI* excludes assets tagged as UFB status *RBI* and includes only assets with an asset key *Fibre*. Both of these tags are inputs to the model for each asset class

The second part of the allocation factor name indicates whether RABSOP or capex should be the basis of the weighting. The allocation factor values for each geography are based on the fraction of the assets RABSOP in that year or in-year capex in that geography meeting certain criteria, as follows.

CC Fibre UFB A-D	UFB Status <> RBI Asset key = Fibre UFB Status = UFB A-D
CC Fibre UFB E	UFB Status <> RBI Asset key = Fibre UFB Status <> UFB A-D
CC Shared	UFB Status <> RBI Asset key = Shared
CC Copper	UFB Status <> RBI Asset class <> capital contribution (avoids circularity) Above filters are all equal to zero (essentially a sweep of all other non-RBI assets, excluding capital contributions)

Subsequently, these calculated allocation factors are used to assign capital contributions to the relevant capital contribution assets by geography and year.

There is an exception to the use of the allocation factors mentioned above, as capital contributions from "Roadworks activity" are allocated based on the relevant settlements from the Decision Packet Settlements data (also used in the FAR analysis). We have used the split of these settlements by asset type and geography, to assign capital contributions from Roadworks activity to the relevant capital contribution assets by geography and year.

Finally, for all capital contribution assets, the required capital contribution capex values are organised in individual blocks for each period (FY12-FY30) by specific asset class and geography. This layout is chosen such that the capital contributions can be handled as a set of 100 asset classes and added to the other capex data sets where appropriate in the SFARLinks sheet.

We have created similar blocks which calculate:

- The Capex (vca) values needed to create the relevant capitalised assets in each geography and financial year (typically negative capex)
- The tax Capex (vca) values needed to create the relevant capitalised assets in each geography and financial year (typically negative capex) (based on those capital contributions which are capitalised for tax purposes)
- The values for the additional revenue for tax purposes in each geography and financial year (for those capital contributions either treated as in-year revenue, or as revenue spread over 10 years). Note: that we maintain the local sign convention (typically CC are shown as negative capex in the rest of the sheet); a negative value here means extra revenue for tax purposes.

Finally, for all capital contribution assets, the required capital contribution capex values are organised in individual blocks for each year (2012-2030) by specific asset class and geography. This layout is chosen such that the capital contributions can be handled as a set of 100 asset classes and added to the other capex data sets where appropriate in the SFARLinks sheet. Again, we have blocks for Capex, Tax Capex, and for contributions to be treated as revenue for tax purposes.

At the bottom of the sheet is a matrix used to distribute the revenue over future years for those items treated as revenue spread over ten years for tax purposes; this explicit matrix was added to simplify the calculations elsewhere in the sheet when the calculation includes explicit part-year periods such as 2021H2.

6.18 SSharingInput

Purpose of the sheet

The SSharingInput sheet contains the inputs used to determine the allocation of shared assets such as ducts, fibre cables, manholes, poles, space, rented space, and power assets.

Processing of data

The first section collates all inputs into an array consistent with the list of allocation factors, which is then linked to SControlSheet.

Input date

The second section contains the input tables of sharing factors by geography (pasted values). Some of these items have alternate values used in the true-up scenarios; the switches on the scenario sheet are used to determine which of the inputs are used in the model.

6.19 SCapexInput

Purpose of the sheet

The SCapexInput sheet manipulates the results of the external capex forecast analysis into a format that can be used in the main model.

Capex forecast inputs

The first section takes the capex forecast for the years 2021 to 2025; which are provided on a national basis, and allocates the figures over the geographies used in the model.

The capex forecasts are allocated to one of the geographies based on one of several drivers:

- National (i.e. allocated to the national geography)
- Net fibre adds in each geography
- Total subs in each geography
- Total copper subs in each geography
- UFB
- LFC
- RONZ

- LFC+RONZ
- Won (i.e. allocated to the Won geography)
- Lost (i.e. allocated to the Lost geography)
- Non (i.e. allocated to the Non geography)
- Total fibre subs in each geography

These drivers use a combination of inputs and calculations, as follows:

National	100% for National and zero for all other geographies.
Net fibre adds	Calculated as the proportion of new fibre connections in a given year within each of geography. Based on EOP connections and includes both contracted and voluntary.
Total subs	Calculated as the proportion of total connections within each geography. Based on AOP. Includes all services (Contracted FFLAS, Voluntary FFLAS, and Copper and other).
Total copper subs	Calculated as the proportion of copper and other connections within each geography. Based on AOP.
UFB	100% for Won and zero for all other geographies.
LFC	100% for Lost and zero for all other geographies.
RONZ	Based on RONZ copper lines % by geography values from the Revenue Model.
LFC + RONZ	The aim is to distribute the capex in accordance with the ratio: (Total RONZ Copper lines and LFC_UFB Copper lines in geography) / (Total copper lines in RONZ and LFC UFB) For the *Lost* geography, this is equal to the proportion of RONZ Lost copper lines and total LFC UFB copper lines (all of which are in the Lost) to total RONZ copper lines and total LFC UFB copper lines. For Won, this is equal to the proportion of RONZ Won copper lines to total RONZ copper lines and LFC UFB copper lines. For Non, this is equal to the proportion of RONZ Non copper lines to total RONZ copper lines and LFC UFB copper lines.
Won	100% for Won and zero for all other geographies.
Lost	100% for Lost and zero for all other geographies.
Non	100% for Non and zero for all other geographies.
Total fibre subs	Calculated as the proportion of fibre connections within each geography. Based on AOP.

All forecast capex applies to the Post 2012 Forecast period or the Post RAB period depending on the year in which it is incurred.

Manipulate capex forecasts for use in main model

In the second section, the results of the capex forecast are restructured into a format than can be used in the model, i.e.:

From: 5 calculation blocks, one for each year, each for all asset classes and geographies
To: 1 calculation block, for all five years, and for all asset classes and geographies.

6.20 IAV

Purpose of the sheet

This worksheet is a placeholder for the IAV calculation section of the workbook.

6.21 STaxRABSOP

Purpose of the sheet

The STaxRABSOP sheet provides the starting point for the IAV Tax RAB calculation. The values here are the IAV Tax RAB at the start of each period ("SOP"), usually financial year. For years other than the first year, this is the end of period value ("EOP") at the end of the previous period.

First year of Tax RABSOP (2012) is linked to the 2012 opening Tax NBV numbers derived from the analysis of the FAR; these values are included from the table "Opening FY12 tax NBV" in the SFARLinks sheet.

6.22 STaxRABEOP

Purpose of the sheet

The STaxRABEOP sheet provides the IAV Tax RAB calculation. The values calculated here are the IAV Tax RAB at the end of each year (end of period, EOP).

Calculations

The Tax RAB calculations are explained in section 3.3 above.

The effect of the TaxNBVCorrections term is that the TaxRABEOP will stay exactly in line with the Chorus accounting ClosingTaxNBV, for assets in the FAR, for the period for which the FAR data is available. These ClosingTaxNBV values are linked to the table "Tax NBV (year-end)" in the SFARLinks sheet.

Assets not in the FAR include test assets and the capital contributions assets.

6.23 SRABSOP

Purpose of the sheet

The SRABSOP sheet provides the starting point for the IAV RAB calculation for each asset class in each period. The values here are the IAV RAB at the start of each year (start of period, SOP).

RAB SOP (SOP is EOP of previous year)

The sheet first presents the IAV RABSOP for all year *without* the effect of any allocation factors to account for use by the fibre business. In other words, it maintains a RAB for all asset classes.

First year of RABSOP (2012) is linked to the 2012 opening NBV numbers derived from the analysis of the FAR; these values are linked to the table "Opening FY12 NBV" in the SFARLinks sheet. Subsequent years (2013 onwards) are linked to the RABEOP of the previous year.

The sheet then calculates the allocated RABSOP, which is needed in the calculations elsewhere in the model (SCalcs sheet). This is done by multiplying the unallocated RABSOP values with the UL allocation factor.

6.24 SDepreciation

Purpose of the sheet

The SDepreciation sheet calculates the annual depreciation charges for use in the IAV calculation.

Depreciation summary

The first section presents the calculated depreciation charge for all combinations of asset class, asset purchase timeframe and geography without the impact of the allocation factors.

The section then presents the depreciation charge attributable to the fibre business by multiplying the unallocated charges with the UL allocation factors (i.e. the allocation factors relevant to the calculation of the unrecovered loss in the pre-implementation period).

The first section also creates two column vectors with the depreciation charge in the last year of the Post2012actuals timeframe and the last year of the Post2012Forecast timeframe (ie the period before implementation). These are used elsewhere in the model to calculate the remaining lifetimes of the assets in the subsequent period (post2012forecast and PostRAB periods, respectively). In v135, the post2012actual period extends all the way to implementation date.

Depreciation from the FAR

A section contains the depreciation from the FAR (which is used later in the calculation of the depreciation in the Post2012Actuals timeframe, for those asset classes where there are assets in the FAR).

Depreciation calculations

The depreciation calculations section performs a series of calculations required to produce the straight-line depreciation charge in each year:

- RABSOP from the accounts for 2012 is linked in from the table "Opening FY12 NBV" in the SFARLinks sheet, to give a starting book value for assets acquired before 2012
- Net capital additions (capex less disposals) provides data on how the book value has changed or will change (in the future)
- Changes to the Pseudo-GBV[35] combines the first two elements to give the total incremental impact on the (pseudo) gross book value over time.

In order to stay in line with the depreciation in the Chorus accounting FAR, we use the FAR values for depreciation where these values are available (i.e. for assets in the FAR, and within Post2012Actuals timeframe). The FAR depreciation values are included from the table "Depreciation (converted to positive)" in the SFARLinks sheet. Assets not in the FAR such as test assets and capital contribution assets, and all assets in the Post2012Forecast timeframe, use a calculation.

To deal with these two cases, the calculation is undertaken in two sections of the spreadsheet (one based on actuals + calculation from the start of the Post2012Forecast timeframe (i.e. just actals, in v135), one where the calculation is for the entire period).

The VBA user defined function that performs each of these depreciation calculations is discussed in section A.4 in more detail.

The final section calculates the forecast depreciation for each asset class as appropriate; those for which the actuals can be used use the actuals followed by the post2012forecast calculation; those not in the FAR use the alternate block which calculates the depreciation from the starting book value / capex over the entire period.

35 Pseudo GBV is GBV for post-2012 assets (recovered over full lifetime) and NBV at start of FY12 for pre-2012 assets (recovered over remaining lifetime).

6.25 STaxDepreciation

Purpose of the sheet

The STaxDepreciation sheet calculates the annual tax depreciation charges for use in calculating the TaxRABEOP and for use in the unrecovered losses tax calculations on the SCalcs sheet.

Structure of the sheet

The components and calculation flow are broadly the same as those used in the SDepreciation sheet. The key difference is that a user defined VBA function is used to calculate the tax depreciation charge on a diminishing value (DV) basis. This function is discussed in A.5

6.26 SIndexation

Purpose of the sheet

The SIndexation sheet is included only because indexation may be used as part of MAR calculations. However, indexation is not included in the IAV calculation because we only use straight line depreciation and so the indexation values in this sheet are set to zero.

6.27 SDisposals

Purpose of the sheet

The SDisposals sheet is included to maintain a complete RAB calculation structure for the IAV. However, there are no Disposals assumed in the modelling and so the disposals values in this sheet are set to zero.

6.28 SRABEOP

Purpose of the sheet

The SRABEOP sheet calculates the End of Period (EOP) RAB for the IAV, based on the following previously calculated components, as described in section 3.2 above:

Calculated RABEOP = RABSOP + Capex – Depreciation – Disposals + Indexation.

NBVCorrections = For asset classes present in the FAR, Closing NBV - Calculated RABEOP, else 0

RABEOP = Calculated RABEOP + NBVCorrections

RAB EoP summary

The first section presents the RABEOP results for all combinations of asset class, asset purchase timeframe and geography without the impact of the allocation factors.

The second section then presents the RABEOP values attributable to the fibre business in different timeframes by multiplying the unallocated values with the MAR and UL allocation factors respectively.

It also creates a column vector with the RABEOP in the final year of the Post2012Actuals timeframe and the final year before implementation. This is used elsewhere to calculate the remaining lifetimes of the assets.

Below this is a section containing the closing NBV by asset class and geography and asset purchase timeframe from the Chorus FAR. These closing NBV values are included from the table "NBV (year-end)" in the SFARLinks sheet.

Below this are the sections of the worksheet that actually perform the required calculations.

First there is a block which calculates Calculated RABEOP from its components.

Then the NBVCorrections are calculated (as well as the UL allocated NBV Corrections which is used in the SCalcs sheet).

Finally we combine Calculated RAB and NBVCorrections to get the desired RABEOP.

6.29 SAssetULAllocationFactor

Purpose of the sheet

The SAssetULAllocationFactor sheet contains a table of the allocation factors used in the unrecovered loss (UL) calculations. It provides a multiplier for each combination of asset class, asset purchase timeframe and geography which shows how much of that asset is attributable to the fibre business in the pre-implementation period. It varies over time.

6.30 SOpexUL

Purpose of the sheet

The purpose of the sheet is to calculate two arrays of opex values, for use in the unrecovered loss calculation. One set of opex values is relevant for accounting purposes, while the second set of opex values is relevant only for tax calculation purposes (because it includes lease payments which are considered capitalised in non-tax contexts).

6.31 SCalcs

Purpose of the sheet

The purpose of the sheet is to calculate the unrecovered losses (Financial Loss Asset, FLA), based on a DCF calculation using post-tax WACC, as described in section 3.6.7 above. It is based on the IMs and the structure and calculations in the Commission's 13 August 2021 Excel spreadsheet.

This sheet implements the calculations described in detail in Annex B.

The unrecovered loss at implementation date will be linked to as a key parameter for the RABSOP at the beginning of the MAR calculation.

Key financial inputs

In this section we bring in one summary line for each of the key inputs (e.g. allocated RABSOP, WACC, allocated capex in year, allocated opex in year, allocated depreciation in year, and the tax analogues of each of these).

Compounding factors

This section calculates compounding factors from various dates in the relevant financial years to the implementation date, these include:

- Compounding factor from end-year date
- Compounding factor from mid-year date
- Compounding factor from start date
- Compounding factor from revenue date

These are used to evaluate the present value of cashflows at the implementation date.

UFB revenue cashflows

This section calculates the present value of the relevant UFB revenues at the implementation date.

UFB cost cashflows

This section calculates the present value of the various UFB costs at the implementation date.

These costs are realised at different dates (start, mid-year and end-year) within a financial year. Therefore, costs incurred at similar dates are aggregated, and multiplied by the corresponding compounding factor.

Net cashflows

The present value (PV) of annual net cashflows is evaluated by deducting the PV of UFB costs from the PV of UFB revenues.

The PV total net cash flows are calculated by aggregating the PV annual net cashflows across the UL period.

Loss at implementation date

The total loss balance at the implementation date calculation is equal to:

PV total net cashflows – UFB asset base closing value at implementation date (allocated RABEOP) – PV benefit of Crown Financing.

Tax adjustment input calculations

This section previously calculated certain adjustments to be applied in the MAR model, including a subsidiary supporting calculation on the impact of CIP funding. However, these adjustments are no longer important as the DCF calculation now uses a vanilla WACC, which means they are not required.

6.32 Alt tax loss calculation

This worksheet implements a version of the Commission's preferred calculation of the starting value of tax effect of tax losses. It is based on a workbook provided to Analysys Mason by the Commission. Because it has been based on the worksheet provided to Analysys Mason by the Commission, and does not represent Chorus' and Chorus' advisors preferred calculation, it has not been subject to any assurance processes by Analysys Mason, Chorus, or Chorus' external assurance providers.

We understand that there is one very small difference between this implementation and the Commission's own version of the calculation, but that it results in an immaterial difference in the resulting tax loss.

6.33 SLifetimesEndIAV

Purpose of the sheet

The purpose of this sheet is to calculate the remaining lifetimes of the asset classes in each of the asset purchase timeframes (pre-2012, post-2012actual, and post2012forecast) at implementation date (ie the point at which the IAV is set).

The remaining lifetime in years is derived from the calculated NBV (RABEOP) at the end of the current period divided by the calculated depreciation in the final period, corrected for the length of the final period (in case it is not 12 months long).

As noted in section 3.6.19, the resulting Post2012Forecast values have been constrained to not exceed the "full" asset lifetime. However, in the "true up" model, this no longer is needed as the Post2012Actuals period extends to implementation date and there are no assets in the "Post2012Forecast" timeframe.

Assets from each geography and asset purchase timeframe will have different average remaining lives.

6.34 SInitialMARAllocatedRAB

Purpose of the sheet

The purpose of this sheet is to calculate the opening value of the allocated RAB (including FLA) in the MAR.

To do this, it calculates the initial CY22 MAR allocation factors, which are a blended average of the 2022H1 and FY23 allocation factors, and applies these to the unallocated RAB and FLA measured at implementation date.

Annex A VBA

A.1 General

In this annex we discuss the various user defined functions (VBA) used within the BBM IAV model.

A.2 Run scenarios VBA user defined function

This is a subroutine defined as

Sub RunScenarios2()

This subroutine runs the designated set of scenarios defined by those having a value of 1 in the range "SScenarios.Scenarios.To.Run" in turn, pasting the key results into the required locations. It will optionally delete previous sets of results. It is called by a button on the SScenarios sheet.

For each requested scenario to be run, it sets the scenario number in "Common.Master.scenario", recalculates, and then pastes the main output values (allocated RAB, UL, total) into the relevant column and row.

A.3 Support VBA user-defined functions

These are:

- dmin()
- Togglefacilities()

dmin()

This function is defined as:

Function dmin(a As Double, b As Double) As Double

This function returns the lower of the two double precision real inputs as a double precision real.

Togglefacilities()

This function is defined as:

Function togglefacilities(status As Boolean) As Integer

This function turns on and off things that slow down calculations such as Excel screen updating.

If status = true, it turn things on; if status = false, turns them off

A.4 Depreciation VBA user defined function

This function is defined as:

Function newSLDRow(capex As Range, lifetime As Range, dyf As Range, depreciates As Range, timingfactor As Range) As Variant

It calculates total asset depreciation in a given period based on the capex[36] over all periods, period length, and asset lifetime. It returns a row vector.

Unlike the related tax depreciation function discussed below, it is designed to be used "one asset class at a time" by being called as a one row array formula.. It is passed its inputs as a mix of scalars and row vectors and returns a row vector array. This "one asset class at a time" approach is deliberate as the alternatives are slower and/or can lead to perceived circular references within the BBM IAV model.

It accounts for part-year periods such as FY12 through the "dyf" array (which is a row vector, one value per period), which represents the period's length in years (usually 1, but sometimes smaller than 1).

"Capex" is a row vector, with as many columns (periods) as it is wished to use for the calculation. It does not have to be positive (indeed there are assets for which capex is negative[37]).

"Lifetime" is a scalar asset lifetime in years (which depending on the timesframe and asset purchase timeframe may be a remaining lifetime[38]. Note: that the lifetime does not have to be an integer.

If the scalar "Timingfactor" is 1, then the depreciation on new capex in a period is calculated for the entire period (e.g. as if the capex was at the very start of the period); if 0.5 then the depreciation on new capex is calculated for half the initial period (i.e. as if it occurred at mid-period), and if zero then the tax depreciation on new capex in the period is zero for that initial period (as if the capex occurred at the end of the period).

If the scalar "depreciates" is not equal to 1 then the depreciation is zero.

A.5 Tax Depreciation VBA user defined function

This function is defined as:

36 Although it is called "capex" it may sometimes hold book value changes that are not strictly capital expenditure. For example it can be used for the starting NBV for assets brought in at the start of a given timeframe.

37 For example, capital contribution assets have negative capex and negative depreciation.

38 For example, it might be that the calculation for a particular asset class, geography and asset purchase timeframe (such as post2012 actuals) in a given timeframe (such as the post2012 forecast timeframe) is based on a starting NBV value of 60 and a remaining lifetime of 3 years, resulting in a depreciation of 20 in each of the first three years in that timeframe.

Function Revised_Func_Tax_Deprec3(capex As Variant, life As Variant, year_factor As Range, TaxDeprecRate As Variant, timingfactor As Variant, assettaxdepreciates As Variant, StopAtEndOfLife As Boolean) As Variant

It calculates an array of tax depreciation in a given period based on the (tax) capex over all periods and tax depreciation rate. It accounts for part-year periods such as FY12 through the year_factor range (which is a row vector, one value per period).

It is passed its inputs as a mix of two-dimensional arrays and one-dimensional arrays and returns a two-dimensional array: as a result, it is used to calculate the tax depreciation for all assets at once by being called as an array formula i.e. in curly brackets {}. This is different to the straight-line accounting depreciation function discussed above, which is called one row at a time.

Capex (Tax capex) is an array, with 1612 rows (one per combination of asset class, geography and asset purchase timeframe) and as many columns (periods) as it is wished to use for the calculation.

Life is a column vector, with one value for each of the 1612 combinations of asset class/geography/ asset purchase timeframe. It is the asset lifetime (which depending on the asset purchase timeframe may be a remaining lifetime); it is only relevant to the result if using the "StopAtEndOfLife" = TRUE option (which is not used within the BBM IAV model).

TaxDeprecRate is a column vector, with one value for each of the 1612 combinations. It holds the tax depreciation rate for each asset class/geography and asset purchase timeframe combination e.g. 5% per annum.

Timingfactor is a column vector, with one value for each of the 1612 combinations. If it is 1, then the tax depreciation on new capex in a period is calculated for the entire initial period; if 0.5 then the tax depreciation is calculated for half the initial period, and if zero then the tax depreciation on capex in the period is zero for that initial period.

Assettaxdepreciates is a column vector, with one value for each of the 1612 combinations. If it is not set to 1 for a given asset, then the tax depreciation is zero.

If StopAtEndOfLife is TRUE then assets depreciate the entire remaining tax NBV in the final year of their life, otherwise tax depreciation continues. This TRUE option is not used within the BBM IAV model.

Annex B Summary of SCalcs sheet

The table below lists key variables used in describing the calculations on this sheet.

Figure B.1: List of variables [Source: BBM IAV model, 2021]

Variables	Details
Tw	Post-tax WACC
W	Vanilla WACC
Tw offset one period to the left	Post-tax WACC (but starting from 1 Dec 2011 rather than FY12 value)
W offset one period to the left	Vanilla WACC (but starting from 1 Dec 2011 rather than FY12 value)
L	Gearing
NBV Corrections	Attributed changes in NBV arising in the Chorus accounts from things other than capital expenditure (e.g. from capitalised leases)
RoD	Cost of Debt Nominal
RoE	Cost of Equity Nominal

B.1 Calculation of tax revenues

Figure B.2: Summary of tax revenue calculations [Source: Analysys Mason, 2021]

Outputs	Excel Formula	Calculation	Comments	IM Clause
Tax Revenues attributable to in-scope services (row 25)	= RevenueAttr-CC.Tax.Revenue.Allocated.UL.Total	Allocated revenues plus CC treated as revenues for tax purposes	*TaxRevenueAttr*	

B.2 DCF calculation using vanilla WACC

The tables below summarise the vanilla WACC DCF calculations of the unrecovered loss.

Figure B.3: Summary of post-tax WACC compounding factor calculations [Source: BBM IAV model, 2021]

Outputs	Excel Formula	Calculation	Comments	IM Clause
Post-tax WACC (row 86)	= ROUND([(CostOfDebtNominal * Gearing * (1 – TaxRate)) + (CostOfEquityNominal * (1 – Gearing)], 4)	= ROUND((RoD * L * (1 – T)) + (RoE * (1 – L)), 4)	*Post.tax.WACC.UL* *(Note: not used, as we use vanilla WACC)*	B1.1.10(2)
Days from end-year to year-end (row 93)	= 0	= 0		
End-year date (row 94)	= (N78 – N93) + 0.00001	= (Year-end date – Days from end-year to year-end) + 0.00001	Note 1: only the excel formula in column N is documented, calculation in the rest of the row is consistent	
Days from end-year to implementation date (row 95)	= ROUND($X$78– N94, 0)	= ROUND(Last day of UL period – End-year date , 0)	Note 1 X66 contains the last day of the UL period	

Outputs	Excel Formula	Calculation	Comments	IM Clause
Years prior to 31 Dec 2021 for compounding index – from end-year date (row 96)	= N95 / 365.25	= Days from end-year to implementation date / 365.25	Note 1 *Years.from.end period.to.imple mentation.date*	
Compounding factor from end-year (row 98)	CFEoP = Compounding.factor.step.1 ^ Years.from.endperiod.to.implementation.date	= Compounding.factor.step.1 ^ Years.from.endperiod.to.implementation.date	*Compounding.f actor.EOP*	
Array of day offsets to allow calculation in the model to remain in line with the Commission's own calculation of numbers of days in relevant half-periods (row 100)	= 1	= 1	No name is defined	
Days from mid-year to year-end (row 101)	Linked Input	= S.ControlSheet.HalfYearDaysFromPeriodEnd.U L		B1.1.2(7)(a)
Mid-year date (row 102)	= (N78 – N101 + N100) + 0.00001	= (Year-end date – Days from mid-year to year-end +"offset days" (see row 100)) + 0.00001	Note 1	B1.1.2(7)(a)
Days from mid-year to implementation date	= ROUND($X$78 – N102, 0)	= ROUND(Last day of UL period – Mid-year date, 0)	Note 1	B1.1.2(7)(a)

Outputs	Excel Formula	Calculation	Comments	IM Clause
(row 103)				
Years prior to 31 Dec 2021 for compounding index – from mid-year date (row 104)	= N103 / 365.25	= Days from mid-year to implementation date / 326.25	Note 1 *Years.from.midperiod.to.implementation.date*	B1.1.2(7)(a)
Compounding factor step 1 (row 105)	= 1 + Vanilla.WACC.UL	= 1 + W	*Compounding.factor.step.1*	
Compounding factor from mid-year (row 106)	CFMoP = Compounding.factor.step.1 ^ Years.from.midperiod.to.implementation.date	= Compounding.factor.step.1 ^ Years.from.midperiod.to.implementation.date	*Compounding.factor.MOP*	B1.1.2(7)
Start date (row 109)	= M78	= Year-end date of the previous period	Note 1 Year-end date for the previous period is set to the start date for this period	
Days from start date to implementation date (row 110)	= ROUND($X$78 – M78, 0)	= ROUND(Last day of UL period – Start date, 0)	Note 1	B1.1.2(7)(c)
Years prior to 31 Dec 2021 for compounding index – from start date	= N110/ 365.25	= Days from start date to implementation date / 326.25	Note 1	B1.1.2(7)(c)

Outputs	Excel Formula	Calculation	Comments	IM Clause
(row 111)			*Years.from.startperiod.to.implementation.date*	
Compounding factor step 1 start (row 112)	= 1 + Vanilla.WACC.UL.Dec11	= 1 + (W offset one period to the left)	*Compounding.factor.step.1.start* In this way the start of FY12 uses the 1 Dec 2011 WACC	B1.1.2(7)
Compounding factor from start date (row 113)	= Compounding.factor.step.1.start ^ Years.from.startperiod.to.implementation.date	= Compounding.factor.step.1.start ^ Years.from.startperiod.to.implementation.date	*Compounding.factor.SOP*	
Offset days for calculation of revenue date to agree with Commission calculation (row 115)	= 0	= 0	*(not named)*	
Days from revenue date to year-end (row 116)	Linked input	= (S.ControlSheet.HalfYearDaysFromPeriodEnd.UL – revenue.days) * (S.ControlSheet.Mask.UL > 0)		B1.1.2(7)(b)
Revenue date (row 117)	= N78 – N116 + N115	= Year-end date – Days from revenue date to year-end + ”Revenue date offset days” (see row 115)	Note 1	B1.1.2(7)(b)

Outputs	Excel Formula	Calculation	Comments	IM Clause
Days from revenue date to implementation date (row 118)	= ROUND($X$78 – N117, 0)	= ROUND(Last day of UL period – Revenue date, 0)	Note 1	B1.1.2(7)(b)
Years prior to 31 Dec 2021 for compounding index (row 119)	= N118 / 365.25	= Days from revenue date to implementation date / 326.25	Note 1 *Years.from.revenue.date.to.implementation.date*	
Compounding factor from revenue date (row 121)	= Compounding.factor.step.1 ^ Years.from.revenue.date.to.implementation.date	= Compounding.factor.step.1 ^ Years.from.revenue.date.to.implementation.date	*Compounding.factor.revenue.date*	B1.1.2(7)

Figure B.4: Summary of intermediary cash flow calculations [Source: BBM IAV model, 2021]

Outputs	Excel Formula	Calculation	Comments	IM Clause
UFB cost allocation adjustment cash flow (row 179)	=IF(OFFSET(RABSOPAttr, 0, 1) > 0, OFFSET(RABSOPAttr, 0, 1) - RABEOPAttr, 0)	= IF(OFFSET(RABSOPAttr, 0, 1) > 0 Then OFFSET(RABSOPAttr, 0, 1) – RABEOPAttr Otherwise 0	Taking change in allocation factor at start of next period into account Needed for allocated RABEOP to roll over into Allocated	

Outputs	Excel Formula	Calculation	Comments	IM Clause
			RABSOP of next period Zero in final period because use Allocated RABEOP (this period allocator) in final DCF calculation *UFB.cost.allocation.adjustment.cash.flow*	

Figure B.5: Summary of tax cash flow calculations [Source: BBM IAV model, 2021]

Outputs	Excel Formula	Calculation	Comments	IM Clause
UFB revenues cash flows (row 203)	= TaxRevenueAttr	= TaxRevenueAttr		B1.1.7(3)
UFB operating expenditure cash flow (row 204)	= –TaxOpexAttr	= –TaxOpexAttr		B1.1.7(3)
Tax depreciation (row 205)	= –TaxDepAttr	= –TaxDepAttr		B1.1.7(3)
Interest (row 206)	= –N423	= –Notional Interest taking crown financing into account		

Outputs	Excel Formula	Calculation	Comments	IM Clause
UFB taxable income (row 207)	= N203 + N204 + N205 + N206	= UFB revenues cash flows + UFB operating expenditure cash flow + Tax depreciation + Interest (negative cashflow)	Note 1 *Commission.calculation.taxable.income*	B1.1.7(3)
Tax – before tax losses (row 208)	= Commission.calculation.taxable.income * TaxRate	= Commission.calculation.taxable.income * T	*Commission.tax.before.tax.loss*	*B1.1.9*
Tax costs at corporate tax rate (row 209)	= IF(Commission.tax.before.tax.loss < 0, 0, Commission.tax.before.tax.loss – Commission.tax.loss.used)	= IF(Commission.tax.before.tax.loss < 0) Then 0 Otherwise (Commission.tax.before.tax.loss – Commission.tax.loss.used)	*Commission.tax.paid*	*B1.1.9*
Opening tax losses (row 212)	= OFFSET(Commission.cloing.tax.loss, 0, -1)	= OFFSET(Commission.cloing.tax.loss, 0, -1)	*Commission.opening.tax.loss*	*B1.1.9(3)*
Current period tax losses (row 213)	= IF(Commission.tax.before.tax.loss < 0, Commission.tax.before.tax.loss, 0)	IF(Commission.tax.before.tax.loss < 0) Then Commission.tax.before.tax.loss Otherwise 0	*Commission.in.period.tax.loss*	*B1.1.9(5)*

Outputs	Excel Formula	Calculation	Comments	IM Clause

Utilised tax losses (row 214)	= IF(Commission.in.period.tax.loss < 0, 0, IF(Commission.in.period.tax.loss = 0, IF(Commission.opening.tax.loss > – Commission.tax.before.tax.loss, – Commission.opening.tax.loss, Commission.tax.before.tax.loss)))	IF(Commission.in.period.tax.loss < 0)
		
		Then
		
		0
		
		Otherwise
		
		IF(Commission.in.period.tax.loss = 0)
		
		Then
		
		IF(Commission.opening.tax.loss > – Commission.tax.before.tax.loss)
		
		Then
		
		– Commission.opening.tax.loss
		
		Otherwise
		
		Commission.tax.before.tax.loss
			Commission.tax.loss.used	*B1.1.9(1)*

Closing tax losses (row 215)	= Commission.opening.tax.loss + Commission.in.period.tax.loss + Commission.tax.loss.used	= Commission.opening.tax.loss + Commission.in.period.tax.loss + Commission.tax.loss.used	*Commission.closing.tax.loss*	*B1.1.9(4)*

Figure B.6: Summary of cash flows calculations [Source: BBM IAV model, 2021]

Outputs	Excel Formula	Calculation	Comments	IM Clause
Present value of UFB revenues cash flows (row 137)	= RevenueAttr * Compounding.factor.revenue.date	= RevenueAttr * Compounding.factor.revenue.date		
UFB value of net commissioned assets cash flow – opening value at start date (row 140)	= RABSOPAttr	= RABSOPAttr	Only the first year is included	
Sum of start of period cash flows (row 141)	= SUM(N140:N140)	= UFB value of net commissioned assets cash flow – opening value at start date	Note 1	
Present value of start of period cash flows (row 143)	= N141 * N142	= Sum of start of period cash flows * Compounding factor SOP	Note 1	
UFB value of net commissioned assets cash flow (row 145)	= CapexAttr +NBV.Corrections.AttributedUL.Total.By.Year	= CapexAttr +NBV.Corrections.AttributedUL.Total.By.Year		*B1.1.2(3)(a)(iv)*
UFB operating expenditure cash flow (row 146)	= OpexAttr	= OpexAttr		*B1.1.2(3)(a)(ii)*
UFB tax costs cash flow (row 147)	= Commission.tax.paid	= Commission.tax.paid		*B1.1.2(3)(a)(iii)*

Outputs	Excel Formula	Calculation	Comments	IM Clause
UFB cost allocation adjustment cash flow (row 148)	= UFB.cost.allocation.adjustment.cash.flow	= UFB.cost.allocation.adjustment.cash.flow	Final period consistent with use of Allocated RABEOP (this period) in final DCF calculation	
Sum of UFB mid-period costs cash flows (row 149)	= SUM(N145:N148)	= UFB value of net commissioned assets cash flow + UFB operating expenditure cash flow + UFB tax costs cash flow + UFB cost allocation adjustment cash flow	Note 1	
Present value of UFB mid-period costs cash flows (row 150)	= N149 * N150	= Sum of UFB mid-period costs cash flows * Compounding factor MOP	Note 1	
Ex-ante allowance – if present pre-implementation – on RABSOP (row 154)	= ex.ante.allowance.period.UL * RABSOPAttr	= ex.ante.allowance.period.UL * RABSOPAttr		
Sum of UFB end-period costs cash flows (row 155)	= SUM(N154)	= Ex-ante allowance (on RABSOP)	Note 1	
Present value of UFB end-period costs cash flows (row 157)	= N155 * N156	= Sum of UFB end-period costs cash flows * Compounding factor EOP	Note 1	

Outputs	Excel Formula	Calculation	Comments	IM Clause
Present value of annual net cash flows (row 160)	= N137 – N143 – N151 – N157	= Present value of UFB revenues cash flows – Present value of start of period cash flows – Present value of UFB mid-period costs cash flows – Present value of UFB end-period costs cash flows	Note 1	
Present value of total net cash flows (row 161)	= SUM(N160:X160)	= Present value of annual net cash flows summed across all the financial years included in the UL calculation		

Figure B.7: Summary of financial losses calculations [Source: BBM IAV model, 2021]

Outputs	Excel Formula	Calculation	Comments	IM Clause
Present value of total net cash flows (row 125	= X161	= Present value of total net cash flows		*B1.1.2(2)*
UFB asset base closing value at implementation date (row 126)	= X177	= Allocated RABEOP (at implementation date)	Note: before cost allocation adjustment, consistent with no cost allocation adjustment in final period	
Present value benefit of Crown financing (row 127)	Linked input	= Sum.Of.CIP.Benefit.Cumulated.At.Implementation.Date		*B1.1.2(5)*

Outputs	Excel Formula	Calculation	Comments	IM Clause
Financial losses (row 128)	= SUM(X125:X127)	= Present value of total net cash flows + UFB asset base closing value at implementation date + Present value benefit of Crown financing		*B1.1.2(2)*
Financial loss asset at implementation date (row 130)	= –MIN(0, X128)	= –MIN(0, Financial losses)	*Commission.DCF.Financial.Loss.Asset*	*B1.1.2(2)*

B.3 Tax adjustment calculations

The tables below summarise the calculation of the tax adjustments (see sections 3.6.18 and 6.31) in the SCalcs sheet.

Figure B.8: Summary of discount factor calculations [Source: BBM IAV model, 2021]

Outputs	Excel Formula	Calculation	Comments	IM clause
Discount factor – vanilla WACC (SOP) (row 233)	=(1+Vanilla.WACC.UL.Dec11)^Years.from.start period.to.implementation.date	=(1+Vanilla.WACC.UL.Dec11)^Years.from.start period.to.implementation.date	*TaxAdjustCalc.Discount.Vanilla.SOP*	
Discount factor – vanilla WACC (mid period) (row 234)	=(1+Vanilla.WACC.UL)^Years.from.midperiod.to.implementation.date	=(1+Vanilla.WACC.UL)^Years.from.midperiod.to.implementation.date	*TaxAdjustCalc.Discount.Vanilla.MOP*	
Discount factor – vanilla WACC (at revenue date) (row 235)	=(1+Vanilla.WACC.UL)^Years.from.revenue.date.to.implementation.date	=(1+Vanilla.WACC.UL)^Years.from.revenue.date.to.implementation.date	*TaxAdjustCalc.Discount.Vanilla.RevenueDate*	

We also calculate post tax WACC discount factors but these are not used.

Figure B.9: Summary of net cash flow calculations [Source: BBM IAV model, 2021]

Outputs	Excel Formula	Calculation	Comments	IM clause
Revenue (at revenue date) (row 238)	=RevenueAttr	=RevenueAttr		
Opex (mid year) (row 239)	=-OpexAttr	=-OpexAttr		
Opening assets (SOP) (row 240)	=-RABSOPAttr (first cell only)	=-RABSOPAttr (first cell only)		
Capex (mid year) (row 241)	=-CapexAttr	=-CapexAttr		
NBV adjustments (assumed mid year) (row 242)	=-NBV.Corrections.AttributedUL.Total.By.Year	=-NBV.Corrections.AttributedUL.Total.By.Year		
Cost allocation adjustment cashflow (assumed mid year) (row 243)	=-UFB.cost.allocation.adjustment.cash.flow	=-UFB.cost.allocation.adjustment.cash.flow		
Tax (pre-financing) (mid year) (row 244)	=-TaxAdjustCalc.tax	=-TaxAdjustCalc.tax		
Total (row 245)	=SUM(N238:N244)	=RevenueAttr – OpexAttr – RABSOPAttr (first cell only) – CapexAttr - NBV.Corrections.AttributedUL.Total.By.Year - UFB.cost.allocation.adjustment.cash.flow - TaxAdjustCalc.tax	*TaxAdjustCalc.cashflows*	
Total excluding opening assets (row 246)	=SUM(N238:N244)-N240	=TaxAdjustCalc.cashflows + RABSOPAttr (first cell only)		

Figure B.10: Summary of tax calculations [Source: BBM IAV model, 2021]

Outputs	Excel Formula	Calculation	Comments	IM clause
Revenue (row 249)	=TaxRevenueAttr	=TaxRevenueAttr		
Opex (row 250)	=-TaxOpexAttr	=-TaxOpexAttr		
Tax depreciation (row 251)	=-TaxDepAttr	=-TaxDepAttr		
Tax loss carried forward (row 252)	=IF(N253<0,N253,0) [for column O]	=IF (Tax profit in previous year<0) THEN Tax profit in previous year Otherwise 0.		
Tax profit (row 253)	=Sum(N249:N252)	=TaxRevenueAttr - TaxOpexAttr,- TaxDepAttr + Tax loss carried forward		
Tax (row 254)	=IF($N$253:$AO$253>0,$N$253:$AO$253* TaxRate,0)	=IF (Tax profit>0) THEN Tax profit * tax rate OTHERWISE 0	*TaxAdjustCalc.tax*	

Figure B.11: Present value of cashflows at implementation date calculation [Source: BBM IAV model, 2021]

Outputs	Excel Formula	Calculation	Comments	IM clause
PV of cashflows at implementation date (using vanilla WACC) (row 258)	=SUMPRODUCT(RevenueAttr,TaxAdjustCalc.Discount.Vanilla.RevenueDate)+SUMPRODUCT(-OpexAttr,TaxAdjustCalc.Discount.Vanilla.MOP)+SUMPRODUCT($N$240:$AO$240,TaxAdjustCalc.Discount.Vanilla.SOP)+SUMPRODUCT(-CapexAttr,TaxAdjustCalc.Discount.Vanilla.MOP)+SUMPRODUCT($N$242:$AO$242,TaxAdjustCalc.Discount.Vanilla.MOP)+SUMPRODUCT(-UFB.cost.allocation.adjustment.cash.flow,TaxAdjustCalc.Discount.Vanilla.MOP)+SUMPRODUCT(-TaxAdjustCalc.tax,TaxAdjustCalc.Discount.Vanilla.MOP)	=SUMPRODUCT(RevenueAttr, TaxAdjustCalc.Discount.Vanilla.RevenueDate) + SUMPRODUCT(-OpexAttr, TaxAdjustCalc.Discount.Vanilla.MOP) + SUMPRODUCT(Series containing only opening assets in opening year, TaxAdjustCalc.Discount.Vanilla.SOP) + SUMPRODUCT(-CapexAttr, TaxAdjustCalc.Discount.Vanilla.MOP) + SUMPRODUCT(-NBV.Corrections.AttributedUL.Total.By.Year, TaxAdjustCalc.Discount.Vanilla.MOP) + SUMPRODUCT(-UFB.cost.allocation.adjustment.cash.flow, TaxAdjustCalc.Discount.Vanilla.MOP) + SUMPRODUCT(-TaxAdjustCalc.tax, TaxAdjustCalc.Discount.Vanilla.MOP)		

Figure B.12: Summary of WACC on net additions calculations [Source: BBM IAV model, 2021]

Outputs	Excel Formula (Column X used as example)	Calculation	Comments	IM clause
Year on year opening balance (row 260)	=W263 [in column X]	= previous year's year on year closing balance but = Opening assets in first period	For column N (i.e. 2012) =-N237=RABSOP Attr for 2012.	
Year on year net additions (cash flow) (row 261)	=-X246	= - Total net cash flow excluding opening assets		

Year on year WACC on net additions (row 262)	=X263 – SUM(N260:N261)	=Closing balance – (Year on year opening balance + Year on year net additions)		
Year on year closing balance (row 263)	= X370	= Closing balance (calculated via tables below, which include both net additions and WACC on net additions (with additions at different times using different tables)		
Cumulated values arising from net additions at opening and WACC (grey, row 341)	=IF(X$340=$E341,((1+$F341)^X$339)*$G341,((1+$F341)^X$339)*W$341) (in column X)	Calculates the cumulated element (after interest at the WACC) arising from the opening value at the start of FY12		
Matrix of cumulated values arising from net additions at mid-period (blue) and WACC on balance due to previous net additions at mid period in Year n (rows 342-352)	=(X$340>=$E342)*IF(X$340=$E342,((1+$F342)^(0.5*X$339))*$G342,(((1+$F342)^X$339))*W342) [in column X]	Within this table: Row n calculates the cumulated element (after interest at the WACC) arising from mid-period cashflows in period n Column “year number” represents the cumulated element in period “year number” = IF (year number>=n), THEN IF (year number=n) THEN (1 + half a period’s WACC) times mid-period cashflows for Year n		

		OTHERWISE (1+ full period's WACC)*(cumulated mid-period cashflows in year n including effects of WACC on mid-period cashflows in year n in prior years) OTHERWISE 0		
Total cumulated values arising from net additions at opening and mid point (row 353)	=SUM(X341:X362)	=sum(cumulated value arising from net additions at opening and WACC on net additions at mid point for periods 1 to11)		
Blank line (row 356)	0	0	(for simplicity we have mimicked the pervious table, but for revenue date cashflows. There is no "opening balance" to deal with in this case. Row 356 is therefore blank	
Matrix of cumulated values arising from net additions at revenue date (blue) and WACC	=(X$340>=$E357)*IF(X$340=$E357,((1+$F357)^((0.5*X$339)+(X$229-X$228)))*$G357,(((1+$F357)^X$339))*W357) [in column X]	Within this table: Row n calculates the WACC element arising from revenue date cashflows in period n Column "year number" represents the WACC charge occurring in period "year number"		

due to net additions in Year n (rows 357-367)		= IF (year number>=n), THEN IF (year number=n) THEN appropriate WACC on revenue date cashflows for Year n OTHERWISE full period's WACC*(cumulated revenue date cashflows in year n plus effects of WACC on revenue date cashflows in year n in prior years) OTHERWISE 0		
Total cumulated values arising from net additions at revenue dae (row 368)	=SUM(X356:X367)	=sum(WACC on net additions at opening and WACC on net additions at revenue date for periods 1 to11)		
Sum of cumulated values(row 370)	=X353+X368	= Total cumulated values arising from net additions at opening and mid point + Total cumulated values arising from net additions at revenue date		

Interest charges on effect of opening balance (row 373)	=(W341+W356)*(((1+$F373)^X$339)-1)*X$225 [in column X]	=(opening balance (including effect of WACC in prior years)) * Cost Of Debt for Dec11 cumulation adjusted for period length *		
Interest in period on opening balance (arising from past opening, mid period, revenue date cash flows) due to Year n (rows 374-384)	=(X$340>$E374)*(W342+W357)*(((1+$F374)^X$339)-1)*X$225 [in column X]	Within this table: Row n calculates the interest element arising from the opening balance of the cumulated values in period n Column "year number" represents the interest charge arising, in period "year number" from the starting balance in "year number" arising from cashflows in period n plus the cost of financing at the WACC (worked out in the tables above) = IF (year number>n), THEN (sum(cumulated opening balance arising from net additions at opening and mid period and revenue date in year n)) * cost of debt for year n adjusted for period length*Gearing OTHERWISE 0		
Total (row 385)	=SUM(X373:X384)	Sum of interest in period from cumulated opening balances arising from opening and mid-period and revenue date cashflows		
Interest in period on changes in balance (arising from opening	0	0	*(as these are opening cashflows they are taken into account in the*	

cash flows) (row 388)			*opening balance calculation above)*	
Matrix of interest in period on changes in balance (arising from mid period cash flows) (rows 389-399)	=(X$340=$E389)*($G389)*(((1+$F389)^(X$339/2))-1)*X$225	Mid period cash flow * cost of debt for year n adjusted for period length * gearing		
Total interest in period on changes in balance (arising from mid period cash flows) (row 400)	=SUM(X388:X399)	Sum of the above rows		
Blank row (row 404)	0	0	*(not needed, but allows calculation to have same form as blocks above)*	
Matrix of interest in period on changes in balance (arising from revenue date cash flows) (Rows 405-415)	=(X$340=$E405)*($G405)*(((1+$F405)^((0.5*X$339)+(X$229-X$228)))-1)*X$225	Revenue date cash flow * cost of debt for year n adjusted for period length from revenue date to end of period * gearing		
Total interest in period on changes in balance (arising	=SUM(X404:X415)	Sum of the above rows		

from revenue date cash flows) (row 416)				
Total interest in period (arising from past opening, mid period, revenue date cash flows) (row 419)	=X385+X400+X416	Sum of interest in period on opening balance (arising from past opening, mid period, revenue date cash flows)		

B.4 Benefit of CIP funding calculations (in the SCIPFunding sheet)

The tables below summarise the calculation of the benefit of CIP funding calculations in the SCIPFunding sheet.

Figure B.13: Summary of CIP benefit calculations [Source: BBM IAV model, 2021]

Outputs	Excel Formula	Calculation	Comments	IM clause
Senior debt – EOP (row 35)	=IF(scenariocommon.use.true.up.data.CIP.Funding,$N$164:$BH$166,$N$158:$BH$160)	=IF(scenariocommon.use.true.up.data.CIP.Funding) Then Input data with FY21 and 2021H2 actuals Otherwise Input data with FY21 and 2021H2 forecasts	*CIPFundingBalanceEOP.Senior.Debt*	
Subordinated debt – EOP (row 36)	=IF(scenariocommon.use.true.up.data.CIP.Funding,$N$164:$BH$166,$N$158:$BH$160)	=IF(scenariocommon.use.true.up.data.CIP.Funding) Then Input data with FY21 and 2021H2 actuals Otherwise Input data with FY21 and 2021H2 forecasts	*CIPFundingBalanceEOP.Subordinate.Debt*	

Equity – EOP (row 37)	=IF(scenariocommon.use.true.up.data.CIP.Funding,$N$164:$BH$166,$N$158:$BH$160)	=IF(scenariocommon.use.true.up.data.CIP.Funding) Then Input data with FY21 and 2021H2 actuals Otherwise Input data with FY21 and 2021H2 forecasts	*CIPFundingBalanceEOP.Equity*	
Premium for subordinated debt (row 45)	Input data	Input data	*SubordinatedDebtPremium*	
Fraction of equity that is debt-like (row 46)	Input data	Input data	*EquityFractionLikeDebt*	
Senior debt – drawdown in year (row 50)	= CIPFundingBalanceEOP.Senior.Debt – OFFSET(CIPFundingBalanceEOP.Senior.Debt, 0, -1)	= CIPFundingBalanceEOP.Senior.Debt – OFFSET(CIPFundingBalanceEOP.Senior.Debt, 0, -1)	*CIPFunding.Drawdown.Senior.Debt*	
Subordinated debt – drawdown in year (row 51)	= CIPFundingBalanceEOP.Subordinate.Debt – OFFSET(CIPFundingBalanceEOP.Subordinate.Debt,0,-1)	= CIPFundingBalanceEOP.Subordinate.Debt – OFFSET(CIPFundingBalanceEOP.Subordinate.Debt,0,-1)	*CIPFunding.Drawdown.Subordinate.Debt*	
Debt-like equity – drawdown in year (row 52)	= (CIPFundingBalanceEOP.Equity – OFFSET(CIPFundingBalanceEOP.Equity, 0, -1)) * EquityFractionLikeDebt	= (CIPFundingBalanceEOP.Equity – OFFSET(CIPFundingBalanceEOP.Equity, 0, -1)) * EquityFractionLikeDebt	*CIPFunding.Drawdown.Debt.Like.Equity*	

Equity-like equity – drawdown in year (row 53)	= (CIPFundingBalanceEOP.Equity – OFFSET(CIPFundingBalanceEOP.Equity, 0, -1)) * (1 – EquityFractionLikeDebt)	= (CIPFundingBalanceEOP.Equity – OFFSET(CIPFundingBalanceEOP.Equity, 0, -1)) * (1 – EquityFractionLikeDebt)	*CIPFunding.Drawdown.Other.Equity*	
Senior debt – UL drawdown fraction (row 58)	=IF(S.ControlSheet.YearFraction.UL>0,1,0)	=IF(S.ControlSheet.YearFraction.UL>0) Then 1 Otherwise 0	*CIPFunding.Drawdown.UL.Fraction.Senior.Debt* Based on a block array formula (rows 58-61)	
Subordinated debt – UL drawdown fraction (row 59)	=IF(S.ControlSheet.YearFraction.UL>0,1,0)	=IF(S.ControlSheet.YearFraction.UL>0) Then 1 Otherwise 0	*CIPFunding.Drawdown.UL.Fraction.Subordinate.Debt* Based on a block array formula (rows 58-61)	
Debt-like equity – UL drawdown fraction (row 60)	=IF(S.ControlSheet.YearFraction.UL>0,1,0)	=IF(S.ControlSheet.YearFraction.UL>0) Then 1 Otherwise	*CIPFunding.Drawdown.UL.Fraction.Debt.Like.Equity* Based on a block array formula (rows 58-61)	

		0		
Equity-like equity – UL drawdown fraction (row 61)	=IF(S.ControlSheet.YearFraction.UL>0,1,0)	=IF(S.ControlSheet.YearFraction.UL>0) Then 1 Otherwise 0	*CIPFunding.Drawdown.UL.Fraction.Other.Equity* Based on a block array formula (rows 58-61)	
Senior debt (row 82)	=CIPFunding.Drawdown.Senior.Debt *CIPFunding.Drawdown.UL.Fraction.Senior.Debt	=CIPFunding.Drawdown.Senior.Debt *CIPFunding.Drawdown.UL.Fraction.Senior.Debt	*CIP.Senior.Debt.Drawdown.UL*	
Subordinated debt (row 83)	=CIPFunding.Drawdown.Subordinate.Debt *CIPFunding.Drawdown.UL.Fraction.Subordinate.Debt	=CIPFunding.Drawdown.Subordinate.Debt *CIPFunding.Drawdown.UL.Fraction.Subordinate.Debt	*CIP.Subordinate.Debt.Drawdown.UL*	
Debt-like equity (row 84)	=CIPFunding.Drawdown.Debt.Like.Equity *CIPFunding.Drawdown.UL.Fraction.Debt.Like.Equity	=CIPFunding.Drawdown.Debt.Like.Equity *CIPFunding.Drawdown.UL.Fraction.Debt.Like.Equity	*CIP.Debt.like.Equity.Drawdown.UL*	
Equity-like equity (row 85)	=CIPFunding.Drawdown.Other.Equity *CIPFunding.Drawdown.UL.Fraction.Other.Equity	=CIPFunding.Drawdown.Other.Equity *CIPFunding.Drawdown.UL.Fraction.Other.Equity	*CIP.Other.Equity.Drawdown.UL*	
Cost of Senior Debt (row 88)	= CostOfDebtNominal	= RoD	*Annual.Cost.Of.Senior.Debt.UL*	
Cost of Subordinate Debt (row 89)	= CostOfDebtNominal + SubordinatedDebtPremium	= RoD + SubordinatedDebtPremium	*Annual.Cost.Of.Subordinate.Debt.UL*	

Cost of debt-like equity (row 90)	= CostOfDebtNominal	= RoD	*Annual.Cost.Of.Debt.like.Equity.UL*	
Cost of equity (row 91)	= CostOfEquityNominal	= RoE	*Annual.Cost.of.Other.Equity.UL*	
Average interest on Drawdowns (row 112)	= ((CIP.Senior.Debt.Drawdown.UL * Annual.Cost.Of.Senior.Debt.UL + CIP.Subordinate.Debt.Drawdown.UL * (Annual.Cost.Of.Subordinate.Debt.UL)) * (1)) + (CIP.Debt.like.Equity.Drawdown.UL * Annual.Cost.Of.Debt.like.Equity.UL) + (CIP.Other.Equity.Drawdown.UL * Annual.Cost.of.Other.Equity.UL)	= ((CIP.Senior.Debt.Drawdown.UL * Annual.Cost.Of.Senior.Debt.UL + CIP.Subordinate.Debt.Drawdown.UL * (Annual.Cost.Of.Subordinate.Debt.UL)) * (1) + (CIP.Debt.like.Equity.Drawdown.UL * Annual.Cost.Of.Debt.like.Equity.UL) + (CIP.Other.Equity.Drawdown.UL * Annual.Cost.of.Other.Equity.UL)	*CIP.Drawdown.times.average.interest.rate.in.year*	
Commission cumulation factor (row 115)	= IF(Vanilla.WACC.UL > 0, (((1+Vanilla.WACC.UL)^Years.from.midperiod.to.implementation.date) -1) / Vanilla.WACC.UL, 0)	= IF(W>0, Then (((1+W)^Years.from.midperiod.to.implementation.date)-1)/W Otherwise 0	*CIP.Drawdown.times.rate.Commission.Cumulation.Factor*	
CIP Benefit Cumulated (row 116)	=CIP.Drawdown.times.average.interest.rate.in.year *CIP.Drawdown.times.rate.Commission.Cumulation.Factor	= CIP.Drawdown.times.average.interest.rate.in.year *CIP.Drawdown.times.rate.Commission.Cumulation.Factor	*CIP.Benefit.Cumulated*	

CIP Benefit Cumulated at implementation date (cell K116)	= SUM(CIP.Benefit.Cumulated)	= SUM(CIP.Benefit.Cumulated)	*Sum.Of.CIP.Benefit.Cumulated.At.Implementation.Date*	B1.1.2(2) B1.1.2(5)

Annex C Alignment with Input Methodologies

Below we present detailed compliance matrices for clauses 2.1.1-2.1.4, 2.2.1-2.2.13, 3.2.1-3.2.13, 3.3.1(8), and for clauses B1.1.2-11 of Schedule B of attachment B of the IM Determination.

Clauses 2.1.1-2.1.4

Figure C.1 below demonstrates and discusses the compliance of the BBM IAV model with clauses 2.1.1-2.1.4 of the IM Determination.

Figure C.1: Compliance matrix for IM clauses 2.1.1-2.1.4 [Source: Analysys Mason, 2021]

Clause/ Section	Text	Sheet	Cell	IM Compliance	Notes
2.1.1	**Allocation of FFLAS for regulated fibre service providers subject to both information disclosure regulation and price-quality regulation**			(Heading)	
2.1.1 (1)	This clause applies if a regulated fibre service provider is subject to both information disclosure regulation and price-quality regulation in regulations made under s 226 of the Act.			See below	
2.1.1 (2)	Operating costs or asset values that are directly attributable to the provision of-			See below	
2.1.1 (2) (a)	PQ FFLAS must be allocated to PQ FFLAS;	SControlSheet	0997:BI2608	Compliant	PQ asset values that are designated 'full allocation' or "UFB A-D" have the full asset value allocated to PQ FFLAS . Operating costs are directly attributed to FFLAS in the opex

Clause/ Section	Text	Sheet	Cell	IM Compliance	Notes
					model but the opex model does not distinguish between PQ FFLAS and ID-only FFLAS, meaning we pro-rate between these in the BBM IAV model
2.1.1 (2) (b)	ID-only FFLAS must be allocated to ID-only FFLAS; and	SControlSheet	05845:BI7456	Compliant	There are no assets which are directly attributable to ID-only FFLAS; this is because asset classes in the Lost support both ID-only and PQ FFLAS. Operating costs are directly attributed to FFLAS in the opex model but the opex model does not distinguish between PQ FFLAS and ID-only FFLAS, meaning we pro-rate between these in the BBM IAV model
2.1.1 (2) (c)	any additional FFLAS class specified by the Commission must be allocated to that additional FFLAS class.			N/A at current date	
2.1.1 (3)	The following must not be allocated to PQ FFLAS, ID-only FFLAS, or any additional FFLAS class specified by the Commission:			See below	
2.1.1 (3) (a)	(a) any **operating cost** that is **directly attributable** to the provision of **services that are not regulated FFLAS**;			Compliant	See opex model documentation
2.1.1 (3) (b)	any asset value that is directly attributable to the provision of services that are not regulated FFLAS; or	SControlSheet	0997:BI2608 05845:BI7456	Compliant	Asset values that are out of scope have been given a 'no allocation' allocation type. This allocates none of the asset value to either PQ or ID-only FFLAS.

Clause/ Section	Text	Sheet	Cell	IM Compliance	Notes
2.1.1 (3) (c)	any other cost that is recovered in respect of a Part 4 regulated service.			N/A	Not relevant to Chorus
2.1.1 (4)	ABAA must be applied in accordance with subclauses (5) and (6) when any of the following are allocated:			See below	
2.1.1 (4) (a)	(a) **operating costs** that are not **directly attributable** to the provision of **PQ FFLAS**, **ID-only FFLAS**, or **services that are not regulated FFLAS**; and			Compliant	See opex model documentation
2.1.1 (4) (b)	asset values that are not directly attributable to the provision of PQ FFLAS, ID-only FFLAS, or services that are not regulated FFLAS.	SControlSheet	0997:BI2608 05845:BI7456	Compliant	We use ABAA to allocate assets that are not directly attributable to PQ FFLAS or ID-only FFLAS.
2.1.1.5	(1) In respect of **operating costs** that are not **directly attributable** to the provision of **PQ FFLAS**, **ID-only FFLAS**, or **services that are not regulated FFLAS**, **cost allocators** must be used to allocate those **operating costs** to either:			Compliant	See opex model documentation
2.1.1 (5) (a)	(a) **PQ FFLAS**; or			Compliant	See opex model documentation
2.1.1 (5) (b)	(b) **ID-only FFLAS**.			Compliant	See opex model documentation
2.1.1 (6)	In respect of asset values that are not directly attributable to the provision of PQ FFLAS, ID-only FFLAS, or services that are not regulated FFLAS, asset allocators must be used to allocate those asset values to either:			See below	
2.1.1 (6) (a)	PQ FFLAS; or	SControlSheet	0997: BI2608	Economically equivalent	Post-implementation, we allocate to both PQ FFLAS and ID-only FFLAS. Asset classes in the Lost and

Clause/ Section	Text	Sheet	Cell	IM Compliance	Notes
					National can be partly allocated to both PQ FFLAS and ID-only FFLAS using ABAA. The total allocated is reasonable, and the pro-rating between them is also reasonable. This is because asset classes in the Lost (e.g. L1 Duct) will support a mix of services, some of which will be delivered in the Lost/LFC area and subject only to ID regulation, but some of which will be delivered in the Lost/RONZ and subject to PQ regulation. This is discussed in sections 4.2.2 and 4.2.4 of the BBM IAV documentation.
2.1.1 (6) (b)	ID-only FFLAS.	SControlSheet	05845:BI7456	Economically equivalent	Post-implementation, we allocate to both PQ FFLAS and ID-only FFLAS. Asset classes in the Lost and National can be partly allocated to both PQ FFLAS and ID-only FFLAS using ABAA. The total allocated is reasonable, and the pro-rating between them is also reasonable. This is because asset classes in the Lost (e.g. L1 Duct) will support a mix of services, some of which will be delivered in the Lost/LFC area and subject only to ID regulation, but some of which will be delivered in the Lost/RONZ and subject to PQ regulation. This is discussed in sections 4.2.2 and 4.2.4 of the BBM IAV documentation.

Clause/ Section	Text	Sheet	Cell	IM Compliance	Notes
2.1.1 (7)	For the purpose of subclause (2), the financial loss asset must be treated as being directly attributable to PQ FFLAS.	SScenarios	D7	Compliant	Compliant (though financial loss asset is a separate output in the BBM IAV model, and not allocated within it).
2.1.1 (8)	If the Commission specifies an additional FFLAS class, any operating costs or asset values that are not directly attributable to that additional FFLAS class must be allocated using an approach that:			N/A at present	
2.1.1 (8) (a)	is specified by the Commission when it specifies the additional FFLAS class; and			N/A at present	
2.1.1 (8) (b)	results in a total amount of operating costs or asset values allocated to each FFLAS class that does not exceed the total operating costs or total asset values attributable to PQ FFLAS and ID-only FFLAS combined.			N/A at present	
2.1.1 (9)	For the purpose of subclauses (2), (5)-(6), and (8), where the Commission specifies an additional FFLAS class, any operating costs or asset values may be simultaneously allocated to both:			N/A at present	
2.1.1 (9) (a)	that particular additional FFLAS class or any other additional FFLAS class specified by the Commission (where applicable); and			N/A at present	
2.1.1 (9) (b)	either PQ FFLAS or ID-only FFLAS (whichever is applicable).			N/A at present	
2.1.3	**Allocation requirements for ABAA**			(Heading)	
2.1.3 (1)	A regulated provider or regulated fibre service provider (whichever the case may be) must:			See below	

Clause/ Section	Text	Sheet	Cell	IM Compliance	Notes
2.1.3 (1) (a)	update the allocator values it uses to apply cost allocators and asset allocators in accordance with clause 2.1.1 or 2.1.2 (whichever the case may require) no less than once every 12 months;	SControlSheet	0405:BI496	Compliant	Allocator values are recalculated in each period. (Requirement also relates to future recalculations of allocators)
2.1.3 (1) (b)	review its choice of allocator types for cost allocators, proxy cost allocators, asset allocators and proxy asset allocators no less than once every 18 months; and			N/A at present	This requirement is in effect related to future processes regarding the allocators to be used and not the model itself.
2.1.3 (1) (c)	when using ABAA to allocate an operating cost or an asset value to different FFLAS classes, use the same cost allocator or asset allocator (or combination of the same cost allocators or asset allocators) to allocate to PQ FFLAS, ID-only FFLAS, and any additional FFLAS class.	SSharingInput	F103:AZ308	Compliant	The BBM IAV model asset class/geography and asset purchase timeframe combinations each have a single allocator type. That allocator type allocates to PQ FFLAS and ID-only FFLAS in consistent ways, as discussed in the answers for questions B23.6 and B39 of the s221 notice response.
2.1.3 (2)	Where a regulated provider or regulated fibre service provider (whichever the case may be) uses a proxy cost allocator for the purposes of clause 2.1.1(5), 2.1.1(8), 2.1.2(5) or 2.1.2(8) or a proxy asset allocator for the purposes of clause 2.1.1(6), 2.1.1(8) 2.1.2(6) or 2.1.2(8), it must, in accordance with the requirements in the relevant ID determination, explain-			Compliant	Allocators are identified as proxy or causal in a given context the BBM IAV model and opex model documentation.
2.1.3 (2) (a)	why a causal relationship cannot be established; and			Compliant	The proxy cost allocators used, are identified in Annex A and justified in section 4 of the opex model documentation.

Clause/ Section	Text	Sheet	Cell	IM Compliance	Notes
					The proxy asset allocators used are identified and justified in the answers for questions B23.2 and B23.6 of the s221 notice response, respectively.
2.1.3 (2) (b)	the rationale used for the proxy cost allocator or proxy asset allocator.			Compliant	As discussed above, the rationale used for the proxy cost allocators is provided in section 4 of the opex model documentation, and the rationale used for the proxy asset allocators is provided in the answer for question B23.6 of the s221 notice response.
2.1.3(3)	For the purposes of establishing an **initial RAB**, a **regulated provider** must apply the same **allocator types** as those used to determine the **financial losses** in accordance with Schedule B.			Compliant	
2.1.3(4)	A **regulated fibre service provider** subject to both information disclosure regulation and price-quality regulation in regulations made under s 226 of the **Act** must apply the same cost allocation approach as used in Subpart 2 of Part 3 when the actual expenditure is reported, unless-			N/A at this time	Not relevant to BBM IAV model
2.1.3(4)a	the **regulated fibre service provider** can show that it is objectively justifiable and demonstrably reasonable to use an alternative **allocator type**, where the requirements of satisfying that alternative approach are specified in an **ID determination**; or			N/A at this time	Not relevant to BBM IAV model

Clause/ Section	Text	Sheet	Cell	IM Compliance	Notes
2.1.3(4)b	it uses an **allocator type** that is comparable, in all material respects, to the **allocator type** used in Subpart 2 of Part 3.			N/A at this time	Not relevant to BBM IAV model
2.1.3 (5)	Subject to subclause (6), when a regulated provider allocates either an asset value or an operating cost that is not directly attributable to PQ FFLAS, ID-only FFLAS, or ID FFLAS (whichever is applicable), the total asset values or operating costs allocated to PQ FFLAS and ID-only FFLAS combined, or ID FFLAS (whichever is applicable) must not be more than the total asset values or total operating costs that the regulated provider could not have avoided if it ceased supplying services that are not regulated FFLAS.			Compliant	This cap is not modelled; we do not believe that the current cost or asset allocators for shared assets would exceed this cap. There is a further discussion of this point in the answer for question B6.3 of the s221 notice response.
2.1.3 (6)	Subclause (5) only applies to an allocation or allocations of an asset value or an operating cost that would have a material effect on the total asset values or total operating costs allocated to PQ FFLAS and ID-only FFLAS combined, or ID FFLAS (whichever is applicable), and for which some of the asset value or operating cost was allocated to services that are not regulated FFLAS.			Compliant	See 2.1.3(5) above
2.1.4	**Costs or values in respect of regulated FFLAS**			(Heading)	
2.1.4 (1)	Subject to subclause (2), a regulated provider must, in accordance with the requirements in the relevant ID determination, identify-			See below	
2.1.4 (1) (a)	operating costs that are directly attributable to PQ FFLAS, ID-only FFLAS, or ID FFLAS (whichever is applicable);	SOpexInput	N12:BH49	Compliant	Operating costs are directly attributed to FFLAS in the opex model but the opex model does not

Clause/ Section	Text	Sheet	Cell	IM Compliance	Notes
					distinguish between PQ FFLAS and ID-only FFLAS, meaning we pro-rate between these in the BBM IAV model
2.1.4 (1) (b)	asset values that are directly attributable to PQ FFLAS, ID-only FFLAS, or ID FFLAS (whichever is applicable);	SControlSheet	0997:BI2608 05845:BI7456	Compliant	Asset classes/geography/asset purchase timeframe combinations using certain asset allocation factors ("Full allocation", "UFB A-D") are directly attributed.
2.1.4 (1) (c)	operating costs which are not directly attributable to PQ FFLAS, ID-only FFLAS, or ID FFLAS (whichever is applicable), but are incurred in the provision of such PQ FFLAS, ID-only FFLAS, or ID FFLAS (whichever is applicable); and	SOpexInput	N12:BH49	Compliant	Operating costs that are not directly attributed are so allocated.
2.1.4 (1) (d)	asset values which are not directly attributable to PQ FFLAS, ID-only FFLAS, or ID FFLAS (whichever is applicable) but relate to fibre assets that are employed in the provision of such PQ FFLAS, ID-only FFLAS, or ID FFLAS (whichever is applicable).	SScenarios	B24:C1635	Compliant	Asset values that are not directly attributed are so allocated.
2.1.4 (2)	As required under an ID determination, a regulated provider must specify the operating costs and asset values in subclause (1) in terms of one or more of:			Compliant	Compliant under (b) for assets; operating cost granularity is driven by the data available.
2.1.4 (2) (a)	product groups;			See 2.1.4(2) above	Assets are not categorised into product groups in the BBM, but the fact that different products use different asset types was taken into account in choosing the asset classes (e.g. some services use cabinets, some use splitters).

Clause/ Section	Text	Sheet	Cell	IM Compliance	Notes
					Operating costs are not categorised into product groups due to the nature of such costs.
2.1.4 (2) (b)	geographic coverage; or			See 2.1.4(2) above	Assets are categorised into either a 'won', 'lost', 'non', or 'national' geography. Most opex (apart from infrastructure rates) is only available for the entire business (i.e. national).
2.1.4 (2) (c)	level of fibre network functionality or other functionality.			See 2.1.4(2) above	Assets are categorised into core network, layer 1 access, layer 2 which relate to fibre network functionality. Most operating costs are not so categorised (due to the nature of such costs generally being spread across multiple products let alone specific "layers").

Clauses 2.2.1-2.2.15

Figure C.2 below demonstrates and discusses the compliance of the BBM IAV model with clauses 2.2.1-2.2.15 of the IM Determination.

Figure C.2: Compliance matrix for IM clauses 2.2.1-2.2.14 [Source: Analysys Mason, 2021]

Clause/ Section	Text	Sheet	Cell	IM Compliance	Notes
2.2.1	RAB			(Heading)	

Clause/ Section	Text	Sheet	Cell	IM Compliance	Notes
2.2.1 (1)	The relevant ID determination must require the disclosure of information for the ID RAB and PQ RAB.			Not directly relevant	
2.2.1 (2)	The relevant ID determination may require the disclosure of information for the ID-only RAB and any additional RAB.			Not directly relevant	
2.2.2	Composition of initial RAB			(Heading)	
2.2.2 (1)	'Initial RAB' for a regulated provider means the collection of fibre assets in a given RAB as at:			See below	
2.2.2 (1) (a)	in respect of the ID RAB, the implementation date;			Compliant	Within the BBM IAV model we work with all assets (as opposed to fibre assets) and we calculate allocation factors which apply to those assets. We do not (at the moment) calculate an ID RAB; but we can calculate the fibre asset RAB and the PQ FFLAS allocated fibre RAB and the ID-only FFLAS allocated fibre RAB (which can in combination be used to calculate a consistent ID RAB). We note that as assets in the Lost and National can support both PQ FFLAS and ID-only FFLAS, the concept of a PQ RAB and an ID-only RAB need great care as there can be assets counted in both of them (e.g. L1 Ducts in the Lost which support services in both the Lost/LFC and Lost/RONZ areas). Accordingly, it is not

Clause/ Section	Text	Sheet	Cell	IM Compliance	Notes
					possible to calculate an ID RAB simply by adding together the PQ RAB and the ID-only RAB; instead we can calculate an ID RAB by identifying any asset class that is partly or fully allocated to PQ FFLAS or ID-only FFLAS. For the avoidance of doubt, the current BBM IAV model approach does not lead to any double counting.
2.2.2 (1) (b)	in respect of the PQ RAB, the implementation date;			Compliant	As noted above, within the BBM IAV model we work with all assets (as opposed to fibre assets) and we calculate allocation factors which apply to those assets to calculate the allocated fibre asset RAB. However, we can calculate the fraction of the assets that are fibre assets from the allocation factors, as explained in sections D.3.2 and D.3.3 of the BBM IAV model documentation, allowing us to calculate the core fibre asset RAB or fibre asset RAB (or the UFB asset RAB) if necessary.
2.2.2 (1) (c)	in respect of the ID-only RAB, the implementation date;			Compliant	As noted above, within the BBM IAV model we work with all assets (as opposed to fibre assets) and we calculate allocation factors which apply to those assets to calculate the allocated fibre asset RAB. However, we can calculate the fraction of the assets that are

Clause/ Section	Text	Sheet	Cell	IM Compliance	Notes
					fibre assets from the allocation factors, as explained in section D.3.2 of the BBM IAV model documentation, allowing us to calculate an ID-only RAB if necessary. See our note above: as assets in the Lost and National can support both PQ FFLAS and ID-only FFLAS, the concept of a PQ RAB and an ID-only RAB need great care as there would need to be assets that were counted in both of them (e.g. L1 Ducts in the Lost which support services in the Lost/LFC and Lost/RONZ areas). A more useful concept is the fibre asset RAB.
2.2.2 (1) (d)	in respect of the additional RAB, the date specified by the Commission as the date when that additional RAB is first determined.			Not yet applicable	
2.2.3	Initial RAB values of core fibre assets			(Heading)	
2.2.3 (1)	The 'unallocated initial RAB value' of a core fibre asset as at the implementation date is its value of commissioned asset as calculated in accordance with clause 2.2.13 (1).	SRABEOP	N17:X1516	Compliant	We follow the FAR VCA. We also use NBV corrections to allow us to track the FAR net book values in periods when net book values are available. The FAR follows GAAP. We track an "all assets "RAB which we can relate to the fibre asset RAB, as noted above. Our approach is consistent with clause 2.2.13 (1).

Clause/ Section	Text	Sheet	Cell	IM Compliance	Notes
2.2.3 (2)	The 'initial RAB value' of a core fibre asset as at the implementation date is the unallocated initial RAB value allocated to regulated FFLAS as a result of-			See below	
2.2.3 (2) (a)	adopting its unallocated initial RAB value; and	SRABEOP	N19:X1630	Compliant	The BBM IAV model calculates the unallocated all assets initial RAB value at the implementation date in accordance with clause 2.2.13 (1). From this we can calculate the unallocated fibre asset RAB.
2.2.3 (2) (b)	applying:			See below	
2.2.3 (2) (b) (i)	in respect of actual values, clause 2.1.1 or 2.1.2 (whichever the case may require) to it; and	SRABEOP	N1643:X3254	Compliant	Pre-implementation and post-implementation calculations for UFB FFLAS, PQ FFLAS and ID-only FFLAS respectively use consistent calculation methods which reflect the differing circumstances
2.2.3 (2) (b) (ii)	in respect of forecast values, clause 3.2.1.				Refer to clause 3.2.1 (separate table)
2.2.3 (3)	If an asset is both a UFB asset and a core fibre asset, it ceases to be a UFB asset at implementation date.			Compliant	(Noting that we do not calculate UFB assets post-implementation)
2.2.4	Initial RAB value of financial loss asset			(Heading)	
2.2.4(1)	The 'initial RAB value' of the financial loss asset for a regulated provider is equal to the financial losses determined by the Commission in respect of the financial loss period in accordance with s 177(2) of the Act and clause B1.1.2(2) of Schedule B.			Compliant	

Clause/ Section	Text	Sheet	Cell	IM Compliance	Notes
2.2.13	Value of commissioned assets			(Heading)	
2.2.13 (1)	Subject to subclause (3) and (4), 'value of commissioned asset', in relation to a core fibre asset with a commissioning date prior to the implementation date (including a core fibre asset in respect of which capital contributions were received, or a vested asset), means-			See below	
2.2.13 (1) (a)	the cost as of the commissioning date-	SCapex	N29532:X37033	Compliant	We follow the FAR, for VCA to end 2021H2. Beyond this point we in effect use a forecast of capex as a forecast of in-year VCA. In reality there will be existing works under construction in the transition year (2021H2) which are not in the forecast (but in turn, some of the forecast 2021H2 capex is likely to become VCA in a subsequent year).
2.2.13 (1) (a) (i)	incurred by a regulated provider under GAAP in constructing or acquiring the core fibre asset, net of capital contributions; or	SCapex	N29532:X37033	Compliant	Capex (VCA) from the FAR is used as the cost incurred by Chorus in constructing or acquiring the fibre assets.
				Economically equivalent	Capital contributions are subtracted from VCA by adding in separate "capital contribution asset classes" which have negative capex and negative depreciation. Forecast capex (which has already had the capital contributions netted off) are used for 2022H1-FY25, meaning we do

Clause/ Section	Text	Sheet	Cell	IM Compliance	Notes
					not need to have additional negative VCA on capital contribution asset classes from 2022H1.
2.2.13 (1) (a) (ii)	if Chorus owned the core fibre asset before 1 December 2011, recorded by Chorus for the core fibre asset in its published general purpose financial statements as of 1 December 2011; and	SCapex	N29132:X29531	Compliant	For pre 1 December 2011 assets, starting values are NBV from the aggregation model as at 1 December 2011. Some assets have no starting book value but have a closing book value in 2012 because transfers of asset value can occur between assets in each year or capex may be added to the asset.
2.2.13 (1) (b)	adjusting that cost for accumulated depreciation and impairment losses (if any) recognised by the regulated provider (ignoring any accounting adjustment for Crown financing), as at the implementation date, under GAAP.	SRABEOP	N6513:X8124	Compliant	Note:in v135 we no longer need to forecast 2021H2 annual capex and depreciation as we have true up values from the FAR
2.2.13 (1) (b)				Compliant	Actual depreciation from the FAR (via the aggregation model) is used where available, otherwise depreciation is calculated using a straight line method. Actual depreciation is not available for forecast years and for asset classes that do not exist in the aggregation model (e.g.: capital contribution assets). Assets are (partly) depreciated in the year they are

Clause/ Section	Text	Sheet	Cell	IM Compliance	Notes
					purchased/commissioned, consistent with GAAP. Existing assets are depreciated using remaining life, and new assets are depreciated using total life.
2.2.13 (1) (b)				Compliant	Estimated remaining life for assets is calculated by dividing total NBV for the asset class by total depreciation in the final period.
2.2.13 (1) (b)				Economically equivalent	Disposals are deducted from asset values through the RAB end of period NBV corrections.
2.2.13 (1) (b)				Economically equivalent	The NBV corrections include the effects of transfers and lease revaluations within the FAR; if there were any impairment writedowns these would also be within this term
2.2.13 (2)	Subject to subclause (3) and (4), 'value of commissioned asset', in relation to a core fibre asset with a commissioning date on or after the implementation date (including a core fibre asset in respect of which capital contributions were received, or a vested asset), means-			Not relevant	The BBM IAV model deals with pre-implementation commissioning only
2.2.13 (2) (a)	the cost as of the commissioning date-			See 2.2.13(2) above	
2.2.13 (2) (a) (i)	incurred by a regulated provider under GAAP in constructing or acquiring the			See 2.2.13(2) above	

Clause/ Section	Text	Sheet	Cell	IM Compliance	Notes
	core fibre asset, net of capital contributions; or				
2.2.13 (2) (a) (ii)	if Chorus owned the core fibre asset before 1 December 2011, recorded by Chorus for the core fibre asset in its published general purpose financial statements as of 1 December 2011; and			See 2.2.13(2) above	
2.2.13 (2) (b)	adjusting that cost for accumulated depreciation and impairment losses (if any) recognised by the regulated provider (ignoring any accounting adjustment for Crown financing), as at the FFLAS commissioning date, under GAAP.			See 2.2.13(2) above	
2.2.13 (3)	For the purposes of subclauses (1)-(2), the value of commissioned asset of-			See 2.2.13(2) above	
2.2.13 (3) (a)	an easement, is limited to its market value as on its FFLAS commissioning date as determined by a valuer;			See 2.2.13(2) above	Specific comments on this point are in the s221 Notice response
2.2.13 (3) (b)	easement land is nil;			See 2.2.13(2) above	
2.2.13 (3) (c)	a network spare is nil, where it is not held in accordance with good telecommunications industry practice;			See 2.2.13(2) above	
2.2.13 (3) (d)	a network spare whose cost is not treated wholly as or part of the cost of a core fibre asset under GAAP, is nil;			See 2.2.13(2) above	
2.2.13 (3) (e)	a core fibre asset acquired from another regulated provider and employed by that regulated provider in the provision of regulated FFLAS, is limited to the unallocated closing RAB value of the core	SCapex	N29532:X37033	Compliant	We have been informed by Chorus that no such assets have been purchased

Clause/ Section	Text	Sheet	Cell	IM Compliance	Notes
	fibre asset that would have applied for the other regulated provider in the disclosure year when the core fibre asset was transferred;				
2.2.13 (3) (f)	a core fibre asset that was previously employed by a regulated provider or another entity in the supply of Part 4 regulated services, is limited to the 'unallocated opening RAB value' of the core fibre asset in relation to those Part 4 regulated services as on the day before the FFLAS commissioning date (as 'unallocated opening RAB value' is defined in the input methodologies as applying to the supply of Part 4 regulated services supplied by the regulated provider or other entity);	SCapex	N29532:X37033	Compliant	We have been informed by Chorus that no such assets have been purchased
2.2.13 (3) (g)	a core fibre asset or a component of a core fibre asset acquired in a related party transaction, is the cost specified in clause 2.2.15; and	SCapex	N29532:X37033	Compliant	We have been informed by Chorus that no such assets have been purchased
2.2.13 (3) (h)	a vested asset, in respect of which the vested asset's fair value is treated as its cost under GAAP, must exclude any amount of the fair value of the vested asset determined under GAAP that exceeds the amount of consideration provided by the regulated provider.			Compliant	We have been informed by Chorus that no such assets are in the FAR.
2.2.13 (4)	When applying GAAP for the purposes of subclauses (1)-(2), the cost of financing is-			See below	

Clause/ Section	Text	Sheet	Cell	IM Compliance	Notes
2.2.13 (4) (a)	applicable only in respect of the period commencing on the date an asset becomes a works under construction and terminating on its commissioning date; and			Input	We follow the FAR as regards capitalised cost of financing of works under construction.
2.2.13 (4) (b)	for each applicable disclosure year, calculated using a rate not greater than the regulated provider's weighted average of borrowing costs for each applicable disclosure year.			Input	see 2.2.13(4)(a) above
2.2.13 (5)	For the purposes of subclause (4)(b), the 'weighted average of borrowing costs' is calculated for a disclosure year using principles set out in GAAP, where:			Input	see 2.2.13(4)(a) above
2.2.13 (5) (a)	the cost of financing rate is the weighted average of the costs applicable to borrowings in respect of capital expenditure that are outstanding during the disclosure year;			Input	see 2.2.13(4)(a) above
2.2.13 (5) (b)	the total costs applicable to borrowings outstanding, as used in calculating the weighted average, must include costs of borrowings made specifically for the purpose of any particular capital expenditure projects or capital expenditure programmes;			Input	see 2.2.13(4)(a) above
2.2.13 (5) (c)	the amount of borrowing costs capitalised during the disclosure year must not exceed the amount of borrowing costs incurred during the disclosure year;			Input	see 2.2.13(4)(a) above

Clause/ Section	Text	Sheet	Cell	IM Compliance	Notes
2.2.13 (5) (d)	if a regulated provider receives a capital contribution, the relevant asset becomes works under construction for the purposes of calculating the cost of financing;			Input	see 2.2.13(4)(a) above
2.2.13 (5) (e)	subject to paragraph (i), a capital contribution will reduce the cost of works under construction for the purpose of the calculation of the finance cost, even if the resulting value of works under construction is negative;			Input	see 2.2.13(4)(a) above
2.2.13 (5) (f)	subject to paragraph (g), if the value of works under construction is negative in accordance with paragraph (e), the cost of financing for the period ending on the commissioning date will be negative;			Input	see 2.2.13(4)(a) above
2.2.13 (5) (g)	if the cost of financing an asset which is works under construction is negative under paragraph (f), the value of the relevant asset or assets will reduce by that negative amount if such a reduction is not otherwise made under GAAP;			Input	see 2.2.13(4)(a) above
2.2.13 (5) (h)	for the purpose of paragraph (d), works under construction includes assets that are forecast to be enhanced or acquired; and			Input	see 2.2.13(4)(a) above
2.2.13 (5) (i)	if the cost of financing is derived as income in relation to works under construction and is both negative and included in regulatory income under an ID determination, the value of the			Input	see 2.2.13(4)(a) above

Clause/ Section	Text	Sheet	Cell	IM Compliance	Notes
	relevant asset or assets will not reduce if such a reduction is not otherwise made under GAAP.				
2.2.13 (6)	For the avoidance of doubt-			See below	
2.2.13 (6) (a)	revenue derived in relation to works under construction that is not included in regulatory income under an ID determination or preceding regulatory information disclosure requirements reduces the cost of an asset by the amount of the revenue if such a reduction is not otherwise made under GAAP; and			Input	see 2.2.13(4)(a) above
2.2.13 (6) (b)	if, after a core fibre asset is commissioned, a regulated provider incurs expenditure on the core fibre asset that forms part of the cost of that core fibre asset under GAAP, such expenditure is treated as relating to a separate asset.			Economically equivalent	Within the FAR, we believe that sometimes additional capex (VCA) is booked to the same asset number and subnumber; given that we follow the FAR (in order to align with the Chorus accounting VCA as depreciated etc, as required by the Act) , we have a difference from the IM on this detailed point. However, our approach is economically consistent with the intention of the IM, because we are working with aggregated quantities which could have capex in later periods in any case. For assets where we calculate depreciation and do not use the FAR depreciation numbers (e.g. capital contribution

Clause/ Section	Text	Sheet	Cell	IM Compliance	Notes
					assets) we assume for the purposes of calculating the depreciation of new assets that the separate periods' spend are treated separately (i.e. for such assets, each year's spend is depreciated separately over a full lifetime in the calculated depreciation).
2.2.14	Minimum levels of specificity required to describe assets in RAB			(Heading)	
2.2.14(1)	A **regulated provider** must ensure it maintains adequate records, recording the regulatory characteristics of assets that make up the **fibre assets** in an **initial RAB** and any subsequent **closing RAB value** and **opening RAB value**, to satisfy the following minimum levels of specificity-			See below	
	(a) in respect of the financial loss period: (i) the level of specificity required under **GAAP**; and (ii) with such additional records as are necessary to satisfy the minimum level of asset specificity consistent with **good telecommunications industry practice**;			Compliant	Our approach is based on the FAR The asset classes are designed to provide the required level of granularity. We also maintain records distinguishing the major geographical differences relevant to regulation and in which time period these asset classes were purchased (asset purchase timeframes), which are discussed in section 3.1. How they are allocated is discussed in (for example) in the answer to

Clause/ Section	Text	Sheet	Cell	IM Compliance	Notes
					question B23.2 in the response to the s221 Notice
	(b) on or after the **implementation date**, as set out in Table A.1 of Schedule A.			Not relevant to BBM IAV model	Applies post-implementation only
2.2.15	Related Party Transactions			Not relevant	

Clauses 3.2.1-3.2.13

Figure C.3 below demonstrates and discusses the compliance of the BBM IAV model with clauses 3.2.1-3.2.13 of the IM Determination.

Figure C.3: Compliance matrix for IM clauses 3.2.1 – 3.2.13 [Source: Analysys Mason, 2021]

Clause/ Section	Text	Sheet	Cell	IM Compliance	Notes
3.2.1	Calculation of price-quality path forecast values			(Heading)	
3.2.1 (1)	For the purposes of specifying a price-quality path any operating costs or asset values that are forecast as directly attributable to the provision of-			See below	
3.2.1 (1) (a)	PQ FFLAS must be allocated to PQ FFLAS;	SControlSheet	0997:BI2608	Compliant	Asset classes using the 'full allocation' and UFB A-D allocator types have the entire asset value allocated to PQ FFLAS.
3.2.1 (1) (b)	ID-only FFLAS must be allocated to ID-only FFLAS; and	SControlSheet	05845:BI7456	Compliant	As we explain above, within the BBM IAV model there are no asset classes that are directly attributed to ID-only FFLAS. This is because

					assets in the Lost geography are likely to support both services in the Lost/LFC area (subject to ID-only FFLAS) and services in the Lost/RONZ (subject to PQ regulation)
3.2.1 (1) (c)	any additional FFLAS class specified by the Commission must be allocated to that additional FFLAS class.			N/A at this time	
3.2.1 (2)	The following must not be allocated to PQ FFLAS, ID-only FFLAS, or any additional FFLAS class specified by the Commission:			See below	
3.2.1 (2) (a)	any operating cost that is forecast as directly attributable to the provision of services that are not regulated FFLAS;	SControlSheet	0997:BI2608	Compliant	Compliant; costs forecast to be directly attributable to non-FFLAS are not allocated to FFLAS. See operating cost model documentation
3.2.1 (2) (b)	any asset value that is forecast as directly attributable to the provision of services that are not regulated FFLAS; or	SControlSheet	0997:BI2608	Compliant	Asset values that are out of scope have been given a 'no allocation' allocation type. This does not allocate any of the asset value to regulated FFLAS.
3.2.1 (2) (c)	any other cost that is forecast to be recovered in respect of a Part 4 regulated service.			N/A to Chorus	
3.2.1 (3)	Subject to subclauses (1)-(2), for the purposes of specifying a price-quality path, any operating cost must be:			See below	
3.2.1 (3) (a)	determined by applying, as required:			See below	
3.2.1 (3) (a) (i)	cost allocators in accordance with subclause (7), and, where applicable, subclause (9); or			Compliant	See opex model documentation

3.2.1 (3) (a) (ii)	proxy cost allocators (whichever the case may require); and			Compliant	See opex model documentation
3.2.1 (3) (b)	calculated by applying forecasts, subject to subclauses (5) and (6).			Compliant	See opex model documentation
3.2.1 (4)	Subject to subclauses (1)-(2), for the purposes of specifying a price-quality path, any asset value must be:			See below	
3.2.1 (4) (a)	determined by applying, as required:	SControlSheet	0997:BI2608	Compliant	Asset allocators are used to allocate asset values that are designated shared.
3.2.1 (4) (a) (i)	asset allocators in accordance with subclause (8), and, where applicable, subclause (9); or			Compliant	
3.2.1 (4) (a) (ii)	proxy asset allocators (whichever the case may require); and			Compliant	
3.2.1 (4) (b)	calculated by applying forecasts, subject to subclauses (5) and (6).			Compliant	
3.2.1 (5)	For the purpose of subclauses (1), (2), (7), (8) and (9), all forecasts must be:			See below	
3.2.1 (5) (a)	based on relevant and demonstrably reasonable assumptions, data, methods and judgements; or			Compliant	The forecasts for connections, revenue, traffic, and various asset sharing inputs such as ratios of estimated exchange space used are discussed in the documentation of the demand and revenue model, the BBM IAV model documentation, and the s221 Notice response. They are based on relevant and demonstrably reasonable assumptions, data, methods or judgements.

3.2.1 (5) (b)	if the Commission has approved the forecast values in accordance with an input methodology or other process relating to an ID determination or PQ determination, consistent with those forecast values.			N/A at this time	
3.2.1 (6)	Subclause (5) relates to, but is not limited to, forecasts of operating costs, capital expenditure, revenue, or any of the allocator types and allocator values that may be used in forecasting an asset allocator or cost allocator.			Compliant	
3.2.1 (7)	For the purpose of subclause (3), in respect of operating costs that are forecast as not directly attributable to the provision of PQ FFLAS, ID-only FFLAS, or services that are not regulated FFLAS, cost allocators must be used to allocate those operating costs to either:			See below	
3.2.1 (7) (a)	PQ FFLAS; or			Compliant	Operating costs are allocated in the opex model to service classes including FFLAS (but not directly to PQ FFLAS); the service category opex can then be further allocated to in-scope FFLAS such as PQ FFLAS (although this allocation of FFLAS opex to PQ FFLAS does not occur in the BBM IAV model as it will be post-implementation). Note that such FFLAS costs will be partially allocated to PQ FFLAS and partly to ID-only FFLAS.

3.2.1 (7) (b)	ID-only FFLAS.			Compliant	Operating costs are allocated in the opex model to service classes; the service category opex can then be further allocated to in-scope FFLAS such as ID-only FFLAS (although this allocation of FFLAS opex to ID-only FFLAS does not occur in the BBM IAV model as it will be post-implementation). Note that such FFLAS costs will be partially allocated to PQ FFLAS and partly to ID-only FFLAS.
3.2.1 (8)	For the purpose of subclause (4), in respect of asset values that are forecast as not directly attributable to the provision of PQ FFLAS, ID-only FFLAS, or services that are not regulated FFLAS, asset allocators must be used to allocate those asset values to either:			Compliant	The model uses asset allocators to allocate asset values by asset class. Various inputs to these allocator calculations are inputs to the model. Assignment of allocators to asset classes is based on asset type and geography. The rationale for the allocator assignment is in the opex allocation documentation or the s221 notice response document.
3.2.1 (8) (a)	PQ FFLAS; or	SControlSheet	0997:BI2608	Compliant	Asset allocators are used to allocate all-asset RAB to PQ FFLAS. Note that some asset classes are (partly) allocated to both PQ FFLAS and to ID-only FFLAS.
3.2.1 (8) (b)	ID-only FFLAS.	SControlSheet	05845:BI7456	Compliant	Asset allocators are used to allocate all-asset RAB to PQ FFLAS. Note that some asset classes are (partly) allocated to

					both PQ FFLAS and to ID-only FFLAS.
3.2.1 (9)	If the Commission specifies an additional FFLAS class, any operating costs or asset values that are forecast as not directly attributable to that additional FFLAS class must be allocated using an approach that is specified by the Commission when it specifies the additional FFLAS class.			N/A	
3.2.1 (10)	For the purpose of subclause (1), if a regulated fibre service provider is subject to both information disclosure regulation and price-quality regulation in regulations made under s 226 of the Act, the financial loss asset must be treated as being directly attributable to PQ FFLAS.			Compliant but does not affect BBM IAV model, as post-implementation	
3.2.1 (11)	Subject to subclause (12), when either a forecast asset value or a forecast operating cost that is not directly attributable to PQ FFLAS or ID-only FFLAS is allocated to PQ FFLAS and ID-only FFLAS, the total forecast asset values or forecast operating costs allocated to PQ FFLAS and ID-only FFLAS combined must not be more than the total forecast asset values or total forecast operating costs that the regulated provider could not have avoided if it ceased supplying services that are not regulated FFLAS.			Compliant	The allocation factors we have used do not exceed this cap, but this has not been modelled. See the additional discussion in the answer for question B6.3 of the s221 notice response.
3.2.1 (12)	Subclause (11) only applies to an allocation or allocations of a forecast asset value or a forecast operating cost that would have a material effect on the			Compliant	

	total forecast asset values or total forecast operating costs allocated to PQ FFLAS and ID-only FFLAS combined, and for which some of the asset value or operating cost is forecast to be allocated to services that are not regulated FFLAS.				
3.2.1 (13)	For the purpose of subclauses (1) and (7)-(9), where the Commission specifies an additional FFLAS class, any forecast operating costs or forecast asset values may be simultaneously allocated to both:			N/A at current	
3.2.1 (13) (a)	that particular additional FFLAS class or any other additional FFLAS class specified by the Commission (where applicable); and			N/A at current	
3.2.1 (13) (b)	either PQ FFLAS or ID-only FFLAS (whichever is applicable).			N/A at current	

Clause 3.3.1(8)

Figure C.4 below demonstrates and discusses the compliance of the BBM IAV model with clause 3.3.1(8) of the IM Determination.

Figure C.4: Compliance matrix for IM clause 3.3.1(8) [Source: Analysys Mason, 2021]

Clause/ Section	Text	Sheet	Cell	IM Compliance	Notes
3.3.1	Calculation of price-quality path forecast values			(Heading)	
3.3.1 (8)	For the purpose of subclause (7)(a), the “opening RAB values” of all fibre assets			See below	

	for the PQ RAB as of the implementation date must be determined by:				
3.3.1 (8) (a)	adopting any relevant actual values prepared in accordance with GAAP and obtained from a regulated provider by the Commission prior to the implementation date, provided those GAAP values are applied in accordance with s 177 of the Act relating to the "initial value of a fibre asset";			Compliant	We follow the FAR which is GAAP compliant
3.3.1 (8) (b)	where relevant actual values are not available in respect of any disclosure year (or part thereof) prior to the implementation date, applying forecasts of all values required to determine the "opening RAB values" as of the implementation date using GAAP values obtained under paragraph (a) to inform or support those forecast values,			Compliant	This is what the BBM IAV model previously did in the post2012Forecasts period. However, in the true-up version v135, this is not required.
3.3.1 (8) (c)	where: all forecasts applied under paragraph (b) must be: (i) based on relevant and demonstrably reasonable assumptions, data, methods and judgements; or (ii) if the Commission has approved the forecast values in accordance with an input methodology or other process relating to an ID determination or PQ determination, consistent with those forecast values;			Compliant	The forecasts used were based on relevant and demonstrably reasonable assumptions However, in the true-up version, v135, such forecasts are no longer required.
3.3.1 (8) (d)	the relevant actual values contributing to the "opening RAB value" of the financial loss asset, as adopted under paragraph			Compliant	See discussion of B1.1.5(1)(a) below

	(a), are determined in accordance with clause B1.1.5(1)(a) of Schedule B; and				
3.3.1 (8) (e)	the relevant forecast values contributing to the "opening RAB value" of the financial loss asset, as applied under paragraph (b), are determined in accordance with clause B1.1.5(1)(b) of Schedule B.			Compliant	See discussion of B1.1.5(1)(b) below

Clauses B1.1.2-B1.1.11 of Schedule B of Attachment B of the IM Determination

Figure C.5 below demonstrates and discusses the compliance of the BBM IAV model with clauses B1.1.2-11, including B1.1.2(1)-(9), of Schedule B of attachment B of the IM Determination.

Figure C.5: Compliance with clauses B1.1.1-11 [Source: Analysys Mason, 2021]

Clause/ Section	Text	Sheet	Cell	IM Compliance	Notes
B1.1.2	**Initial RAB value of financial loss asset**			(Heading)	
B1.1.2 (1)	For the purposes of clause 2.2.4, in the case where the value of the 'financial losses' is: (a) negative, the initial RAB value of the financial loss asset for a regulated provider will be determined by the Commission to be the absolute value of the financial losses; and (b) positive or nil, the initial RAB value of the financial loss asset for a regulated provider will be determined by the Commission to be nil.	Scalcs	X130	Compliant	
B1.1.2 (2)	For the purposes of clause 2.2.4, 'financial losses' for a regulated provider are calculated in accordance with the	Scalcs	X128	Compliant	

Clause/ Section	Text	Sheet	Cell	IM Compliance	Notes
	formula: present value of total net cash flows + UFB asset base closing value at implementation date + present value benefit of Crown financing where-				
	'present value benefit of Crown financing' means the present value benefit of the avoided cost of Crown financing drawn down during the financial loss period calculated in accordance with subclauses (5) and (6);	Scalcs	X127	Economically equivalent	see B1.1.2(5)
	'present value of total net cash flows' means the sum of the 'present value of annual net cash flows' for each financial loss year, where, in summing the relevant values, any positive values arising for financial loss years are offset against negative values for other financial loss years;	Scalcs	X161	Compliant	
	'present value of annual net cash flows' means the value for that financial loss year determined in accordance with the formula- present value of UFB revenues cash flows – present value of UFB costs cash flows where-	Scalcs	N160 :X160	Compliant	
	'present value of UFB costs cash flows' means the value of UFB costs cash flows at the implementation date, and is: (a) subject to paragraph (b), in respect of UFB costs cash flows arising in a financial loss year, calculated by multiplying that cash flow amount by the relevant mid-year compounding factor; and (b) in respect of the "sum of UFB opening asset values as of 1 December 2011" component of the 'UFB value of net commissioned assets cash flow' arising for financial loss year 2012 referred to in subclause (4)(d)(i), calculated by	Scalcs	N151 :X151 N143	Economically equivalent	We note that the IMs specify that the UFB cost allocation adjustment cash flow is a mid-year cash flow. As explained in section D.3.6 of the BBM IAV model documentation, our use of a single in-period allocation factor means that our allocated RABEOP is calculated before application of the cost allocation adjustment, and the IM approach uses an allocated RABEOP using an end of period allocator that is after the cost

Clause/ Section	Text	Sheet	Cell	IM Compliance	Notes
	multiplying that cash flow amount by the start date compounding factor; and				allocation adjustment. The resulting cost allocation adjustment is the same value.
	'present value of UFB revenues cash flows' means the value of UFB revenues cash flows at the implementation date, and is calculated by multiplying that cash flow amount by the relevant revenue date compounding factor; and	Scalcs	N137 :X137	Compliant	
	'UFB asset base closing value at implementation date' means the sum of UFB closing asset values in respect of financial loss year 2022;	Scalcs	X126	Compliant	
B1.1.2 (3)	For the purpose of subclause (2): (a) 'UFB costs cash flow' means costs incurred by a regulated provider under the UFB initiative for the financial loss year in question and are the sum of the following amounts: (i) UFB cost allocation adjustment cash flow; (ii) UFB operating expenditure cash flow; (iii) UFB tax costs cash flow; (iv) UFB value of net commissioned assets cash flow; and	Scalcs	N149 :X149	Compliant	
	(b) 'UFB revenues cash flow' means revenues derived by a regulated provider from the provision of UFB FFLAS for the financial loss year in question, excluding any capital contributions to the extent they were accounted for as revenue under GAAP.	Scalcs	N135 :X135	Compliant	As stated in section 3.6.11of the BBM IAV model documentation, revenue is exclusive of capital contributions.
B1.1.2 (4)	For the purpose of subclause (3): (a) 'UFB cost allocation adjustment cash flow' means the sum of all amounts for UFB assets with a UFB closing asset value for a financial loss year calculated in accordance with the following formula-	Scalcs	N179 :X179	Economically equivalent	The BBM is calculating the cost allocation adjustment cash flow using the formula (allocated RABSOP(t+1) - allocated RABEOP(t)) which is economically equivalent to the

Clause/ Section	Text	Sheet	Cell	IM Compliance	Notes
	UFB unallocated closing asset value × (closing cost allocator value – opening cost allocator value) where-				calculation in the IMs (exactly so if the cost allocation adjustment cashflow is an end of period cashflow).
	'closing cost allocator value' is calculated in accordance with the following formula- UFB closing asset value ÷ UFB unallocated closing asset value; and 'opening cost allocator value' is calculated in accordance with the following formula- UFB opening asset value ÷ UFB unallocated opening asset value;			Economically equivalent	Our approach is economically equivalent because the "sum of all amounts for UFB assets" indicates that the calculation should be done asset by asset (asset class by asset class). We apply an asset class by asset class allocation factor.
	(b) 'UFB operating expenditure cash flow' means operating costs incurred under the UFB initiative for a financial loss year, allocated to the provision of UFB FFLAS by applying clause B1.1.6(1) of Schedule B;	Scalcs	N146 :X146	Compliant	Refer to clause B1.1.6 (1)
	(c) 'UFB tax costs cash flow' means the tax costs calculated for a financial loss year under clause B1.1.7 of Schedule B; and	Scalcs	N147 :X147	Compliant	Refer to clause B1.1.7
	(d) 'UFB value of net commissioned assets cash flow' means: (i) in respect of financial loss year 2012, the amount calculated in accordance with the following formula- sum of value of commissioned assets – sum of value of disposed assets + sum of UFB opening asset values as of 1 December 2011 where- 'sum of UFB opening asset values as of 1 December 2011' means the sum of UFB opening asset values calculated in accordance with subclause (9)(c); 'sum of value of commissioned assets' means the sum of value of commissioned asset for each UFB asset with a	Scalcs	N145 :X145	Economically equivalent	As noted in section 3.2 of the BBM IAV model documentation, we have included disposals within "NBV corrections" (disposals are a negative correction).

Clause/ Section	Text	Sheet	Cell	IM Compliance	Notes
	UFB FFLAS commissioning date in the financial loss year in question after applying clause B1.1.6(2) of Schedule B to allocate each value of commissioned asset to the provision of UFB FFLAS; and 'sum of value of disposed assets' means the sum of UFB opening asset values for each disposed asset for the financial loss year in question; and (ii) in all other cases, the amount calculated in accordance with the following formula- sum of value of commissioned assets – sum of value of disposed assets where- 'sum of value of commissioned assets' means the sum of value of commissioned asset for each UFB asset with a UFB FFLAS commissioning date in the financial loss year in question after applying clause B1.1.6(2) of Schedule B to allocate each value of commissioned asset to the provision of UFB FFLAS; and 'sum of value of disposed assets' means the sum of UFB opening asset values for each disposed asset for the financial loss year in question.				
B1.1.2 (5)	For the purposes of subclause (2), 'present value benefit of Crown financing' in respect of a regulated provider subject to both information disclosure regulation and price-quality regulation in regulations made under s 226 of the Act, means the sum of the 'present value of annual benefits' for each financial loss year, where the 'present value of annual benefits' for a financial loss year is calculated in accordance with the following formula- ((A × B) + (C × D)) × benefit of Crown financing compounding factor for the financial loss year in question where- A is the amount determined in accordance with the	SCIPFunding	K116 N116 :BH116	Economically equivalent	The BBM IAV model uses a mathematically equivalent method to calculate the present value benefit of Crown financing to that specified in the IMs. We note the formula written in the IMs can result in an error when subordinated debt is transferred to senior debt (or vice versa) and the resulting net debt drawdown is zero. The BBM IAV model method gets around this issue.

Clause/ Section	Text	Sheet	Cell	IM Compliance	Notes
	following formula: (proportion of 'B' that is senior debt × cost of debt for that financial loss year (1 - Tc)) + (proportion of 'B' that is subordinated debt × (cost of debt for that financial loss year + 0.41%)(1 - Tc)); B is the net drawdowns in the financial loss year that is debt (whether senior or subordinated); C is the amount determined in accordance with the following formula: (0.75 × cost of equity for that financial loss year) + (0.25 × cost of debt for that financial loss year); D is the net drawdowns in the financial loss year that is equity; 'benefit of Crown financing compounding factor' is the amount determined in accordance with the following formula: ((((1+financial loss year WACC)^Y)-1))/(financial loss year WACC) where Y is the amount determined in accordance with the following formula: (the number of days between the day that is the mid-point of the financial loss year and the implementation date)/365.25 'net drawdowns' means the amount of Crown financing that a regulated provider (or related party as referred to in section 164 of the Act) draws down in that financial loss year less the amount of Crown financing repaid in that financial loss year by the regulated provider (or related party as referred to in section 164 of the Act); and Tc is the corporate tax rate for the financial loss year.				
B1.1.2 (6)	N/A to Chorus			N/A to Chorus	N/A to Chorus
B1.1.2 (7)	(7) For the purpose of subclause (2), a 'mid-year compounding factor', 'revenue date compounding factor'	Scalcs	N136 :X136	Compliant	

Clause/ Section	Text	Sheet	Cell	IM Compliance	Notes
	and 'start date compounding factor' are the values calculated in accordance with the following formula- (1 + financial loss year WACC)days to implementation date/365.25 where- 'days to implementation date' means-		N142 :X142 N150 :X150		
	(a) for the purposes of determining a 'mid-year compounding factor', the number of days between the day that is the mid-point of the financial loss year and the implementation date;	Scalcs	N103 :X103	Compliant	
	(b) for the purposes of determining a 'revenue date compounding factor', the number of days between: (i) the 20th day of the month following the month in which the day that is the mid-point of the financial loss year falls; and (ii) the implementation date; and	Scalcs	N118 :X118	Believe consistent with intent of IM	Although our approach is not exactly what is specified in the IM, our approach (revenue date being 34 days after mid-period) is based on that used by the Commission in similar part 4 calculations. See hyperlink in footnote[39]
	(c) for the purposes of determining a 'start date compounding factor', the number of days between 1 December 2011 and the implementation date.	Scalcs	N110	Compliant	
B1.1.2 (8)	(8) For the purpose of subclauses (5)-(7), 'financial loss year WACC' means: (a) in respect of 1 December 2011, 1 December 2011 WACC; (b) in respect of financial loss year 2012, 31 March 2012 WACC; (c) in respect of financial loss year 2013, 31 December 2012 WACC; (d) in respect of financial loss year 2014, 31 December	Scalcs	N86:X 86	Compliant	

[39] ;See the IntraYr sheet of the following spreadsheet of the Commission: ; https://comcom.govt.nz/s-uat/redirect?collection=comcom-www-meta&url=https%3A%2F%2Fcomcom.govt.nz%2F__data%2Fassets%2Fexcel_doc%2F0028%2F88093%2FRevised-Gas-Draft-Decision-Financial-Model-2.xlsx&auth=9%2BID3yzLbRFPwx4XRBgCdA&profile=noise&rank=2&query=Revised+Gas+Draft+Decision+Financial+Model+2

Clause/ Section	Text	Sheet	Cell	IM Compliance	Notes
	2013 WACC; (e) in respect of financial loss year 2015, 31 December 2014 WACC; (f) in respect of financial loss year 2016, 31 December 2015 WACC; (g) in respect of financial loss year 2017, 31 December 2016 WACC; (h) in respect of financial loss year 2018, 31 December 2017 WACC; (i) in respect of financial loss year 2019, 31 December 2018 WACC (j) in respect of financial loss year 2020, 31 December 2019 WACC; (k) in respect of financial loss year 2021, 31 December 2020 WACC; and (l) in respect of financial loss year 2022, 30 September 2021 WACC.				
B1.1.2 (9)	(9) In calculating the 'UFB value of net commissioned assets cash flow' and the 'UFB cost allocation adjustment cash flow', relevant values for a regulated provider are determined as follows-				
	'depreciation' means depreciation and impairment losses recognised by the regulated provider (ignoring any accounting adjustment for Crown financing) under GAAP during the financial loss year;	SDepreciation	N3251:X3251	Compliant	
	'UFB closing asset value' means, in respect of a UFB asset, the value allocated to the provision of UFB FFLAS as a result of- (a) adopting the UFB unallocated closing asset value for the financial loss year; and (b) applying clause B1.1.6(2) of Schedule B to the UFB asset;	SRABEOP	N3266:X4877	Economically equivalent	(a) The BBM IAV model calculates the allocated UFB closing asset value by using allocators which are calculated using the average values over the period (AoP) for that financial year. Section 4.1 of the model documentation discusses this point. We use a single in-

Clause/ Section	Text	Sheet	Cell	IM Compliance	Notes
					period allocator value (allocation factor) for each asset class in each period. This means that the closing asset value is calculated before application of the cost allocation adjustment as discussed in D.3.6. . (b)The asset allocator types used in the model are consistent with B1.1.6(2). We have asked for an additional 2 asset allocator types to be approved ('Shared with copper, fibre cable', 'Shared ISAM') Assets that are not relevant to UFB FFLAS (Assets attributed to non-FFLAS, RBI assets, UFB E assets, Assets in Lost and Non geographies) are set to a zero allocation pre-implementation within the SControlSheet calculations of the asset allocation factor values.
	'UFB opening asset value' means: (c) for the purposes of subclause (4)(d)(i), in respect of a UFB asset owned by Chorus before 1 December 2011, the value as of 1 December 2011 allocated to the provision of UFB FFLAS as a result of: (i) adopting the UFB unallocated opening asset value under paragraph (h); and (ii) applying clause B1.1.6(2) of Schedule B to the UFB asset; (d) in respect of a UFB asset with a UFB FFLAS commissioning date in financial loss year 2012, the value allocated to the provision of UFB FFLAS as a result of: (i) adopting the UFB unallocated opening asset value under paragraph (i); and (ii) applying clause B1.1.6(2) of Schedule B to the UFB	SRABS OP	N1629:X1629	Economically equivalent	As above, the BBM IAV model calculates the allocated UFB opening asset value by using allocators which are calculated using the average values over the period (AoP) for that financial year. Section 4.1.2 of the model documentation discusses this point. We use a single in-period allocator value (allocation factor) for each asset class in each period, as discussed in section 4.1.2 and D.3.6 of the BBM IAV model documentation. Also, note that because asset classes are aggregates of assets, we can have capex (VCA) and disposals (which may be partial disposals) for

Clause/ Section	Text	Sheet	Cell	IM Compliance	Notes
	asset; and (e) in respect of a UFB asset in relation to a financial loss year thereafter, its UFB closing asset value in the preceding financial loss year;				each asset class in each time period. This is economically equivalent to the IMs (capital maintenance): if the calculation was done at a highly granular asset level (which is infeasible due to the volume of data) and following the IM approach, then at the level of aggregated asset classes the current BBM IAV model behaviour would occur (VCA in all years, partial disposals, etc) .
	'UFB unallocated closing asset value' in respect of a UFB asset and a financial loss year, means, in respect of: (f) a disposed asset, nil; and (g) any other UFB asset with a UFB unallocated asset opening value, the value for the financial loss year in question, determined in accordance with the formula- UFB unallocated opening asset value – depreciation;	SRABE OP	N18:X 18	Economically equivalent	Note that as discussed in section D.3.3 of the BBM IAV model documentation, we have an all-asset RAB and allocation factors that are calculated to allocate from that all-asset RAB to the allocated UFB asset RAB; we can calculate the value of the unallocated UFB asset RAB using the unallocated all assets RAB, the allocation factors, and information about the fraction of the asset class that is in the UFB asset RAB (network overlap information). Also note that because asset classes are aggregates of assets, we can have partial disposals, meaning the closing value after a partial disposal may not be nil and these can occur in any time period. This is economically equivalent to the IM: capital maintenance is still being applied (for example, even if at the asset level the disposals were complete, at the aggregate level they could be partial).

Clause/ Section	Text	Sheet	Cell	IM Compliance	Notes
	'UFB unallocated opening asset value' in respect of a UFB asset and a financial loss year, means, in respect of: (h) a UFB asset for the purposes of paragraph (c), its value of commissioned asset; (i) a UFB asset with a UFB FFLAS commissioning date in the financial loss year in question, its value of commissioned asset; and (j) any other UFB asset, its UFB unallocated closing asset value in the preceding financial loss year.	SRABS OP	N13:X 13	Economically equivalent	Again, as the asset classes in the BBM IAV model are aggregates, we can have capex (VCA) in each period. Note also that as discussed in section D.3.3 of the BBM IAV model documentation, we have an all -asset RAB and allocation factors that are calculated to allocate from that all-asset RAB to the allocated UFB asset RAB; we can calculate the value of the unallocated UFB asset RAB using the unallocated all assets RAB, the allocation factors, and information about the fraction of the asset class that is in the UFB asset RAB (network overlap information).
B1.1.3	**Value of commissioned assets for UFB assets**			(Heading)	
B1.1.3 (1)	Subject to subclause (2) and (3), 'value of commissioned asset', in relation to a UFB asset with a commissioning date prior to 1 December 2011 or in the financial loss period (including a UFB asset in respect of which capital contributions were received, or a vested asset), means: (a) the cost as of the commissioning date: (i) incurred by a regulated provider under GAAP in constructing or acquiring the UFB asset, net of capital contributions; and (ii) if Chorus owned the UFB asset before 1 December 2011, recorded by Chorus for the UFB asset in its published general purpose financial statements as of 1 December 2011; and			Economically equivalent	We follow the FAR. This means that we are including NBV adjustments which include disposals, the effects of transfers, and the effects of lease revaluations.

Clause/ Section	Text	Sheet	Cell	IM Compliance	Notes
	(b) adjusting: (i) in respect of a UFB asset commissioned prior to 1 December 2011, that cost for accumulated depreciation and impairment losses (if any) recognised by the regulated provider (ignoring any accounting adjustment for Crown financing), as at the UFB FFLAS commissioning date, under GAAP; or (ii) in respect of a UFB asset commissioned in the financial loss period, adjusting that cost for accumulated depreciation and impairment losses (if any) recognised by the regulated provider (ignoring any accounting adjustment for Crown financing), as at the UFB FFLAS commissioning date, under GAAP.				
B1.1.3 (2)	For the purposes of subclause (1), the value of commissioned asset of- (a) an easement, is limited to its market value as on its UFB FFLAS commissioning date as determined by a valuer; (b) easement land is nil; (c) a network spare is nil, where it is not held in accordance with good telecommunications industry practice; (d) a network spare whose cost is not treated wholly as or part of the cost of a UFB asset under GAAP, is nil; (e) a UFB asset acquired from another regulated provider and employed by that regulated provider in the provision of UFB FFLAS, is limited to the UFB unallocated closing asset value of the UFB asset that would have applied for the other regulated provider in the financial loss year when the UFB asset was transferred; (f) a UFB asset that was previously employed by a regulated provider or another entity in the supply of Part 4			Compliant apart from easements (which are taken from the FAR). See detailed comments regarding easements and network spares in response to s221 Notice .	There are detailed comments on these points in the answers to questions B35.1 (a, b), B35.2 (c, d) and B35.5 (h) of the s221 notice response. (e), (f), and (g) do not apply.

Clause/ Section	Text	Sheet	Cell	IM Compliance	Notes
	regulated services, is limited to the 'unallocated opening RAB value' of the UFB asset in relation to those Part 4 regulated services as on the day before the UFB FFLAS commissioning date (as 'unallocated opening RAB value' is defined in the input methodologies as applying to the supply of Part 4 regulated services supplied by the regulated provider or other entity); (g) a UFB asset or a component of a UFB asset acquired in a related party transaction, is the cost specified in clause B1.1.4 of Schedule B; and (h) a vested asset, in respect of which the vested asset's fair value is treated as its cost under GAAP, must exclude any amount of the fair value of the vested asset determined under GAAP that exceeds the amount of consideration provided by the regulated provider.				
B1.1.3 (3)	When applying GAAP for the purposes of subclause (1), the cost of financing is for each applicable financial loss year, the regulated provider's costs under GAAP.			Compliant	We follow the FAR treatment which we believe to be GAAP compliant.
B1.1.3 (4)	For the avoidance of doubt- (a) revenue derived in relation to works under construction that is not included in regulatory income reduces the cost of an asset by the amount of the revenue if such a reduction is not otherwise made under GAAP; and (b) if, after a UFB asset is commissioned for UFB FFLAS, a regulated provider incurs expenditure on the UFB asset that forms part of the cost of that UFB asset under GAAP, such expenditure is treated as relating to a separate asset.			Economically equivalent	Part (a). We follow the FAR which we believe to be GAAP compliant. Part (b). The Chorus FAR does not always do this: sometimes additional capex (VCA) is booked to the same asset number and subnumber; given that we follow the FAR, we vary from the IM on this detailed point. However, our approach is economically consistent with the intention of the IM, because we are working with aggregated quantities which could have capex in later periods in any case. In timeframes where we calculate depreciation and do not use the FAR depreciation numbers (e.g.

Clause/ Section	Text	Sheet	Cell	IM Compliance	Notes
					capital contribution assets) we assume for the purposes of calculating the depreciation of new assets that the separate periods' spend are treated separately (i.e. for new assets, each year's spend is depreciated separately over a full lifetime in the calculated depreciation).
B1.1.4	**Related party transactions for UFB assets**			(Heading)	
B1.1.4 (1)	(1) For the purposes of clause B1.1.3(2)(g) of Schedule B, the cost of a UFB asset, or a component of a UFB asset, acquired in a related party transaction, must be determined on the basis that– (a) it must be given a value not greater than if that transaction had the terms of an arm's-length transaction; (b) an objective and independent measure must be used in determining the terms of an arm's-length transaction; and (c) the value that qualifies for recognition as the cost of the UFB asset or the component of a UFB asset must not exceed the actual amount charged to the regulated provider by the related party.			Compliant (not applicable)	Not applicable as there have been no such transactions
B1.1.5	**Calculation of price-quality path forecast values for financial loss asset**			(Heading)	
B1.1.5 (1)	For the purpose of clauses 3.3.1(8)(d)-(e), the "opening RAB value" of the financial loss asset adopted under clauses 3.3.1(8)(a)-(b) is determined by: (a) adopting actual values for calculations under clauses B1.1.2(2)-(9) of Schedule B in respect of financial loss			Compliant	Calculations are in line with B1.1.2(2)-(9); forecast values regarding allocators, demand, forecast capex and forecast opex are applied in a consistent way.

Clause/ Section	Text	Sheet	Cell	IM Compliance	Notes
	year 2012, financial loss year 2013, financial loss year 2014, financial loss year 2015, financial loss year 2016, financial loss year 2017, financial loss year 2018, financial loss year 2019, and financial loss year 2020; and (b) applying forecasts for calculations under clauses B1.1.2(2)-(9) of Schedule B in respect of financial loss year 2021 and financial loss year 2022, where (c) any relevant values adopted under clause 3.3.1(8)(a) must be consistent with any equivalent values adopted under paragraph (a); and (d) any relevant forecasts applied under clause 3.3.1(8)(b) must be consistent with any equivalent forecasts applied under paragraph (b).				
B1.1.6	**Allocation methodology for determining financial losses**			(Heading)	
B1.1.6 (1)	For the purposes of allocating operating costs incurred under the UFB initiative to the provision of UFB FFLAS for a financial loss year-			See below	
	(a) any operating cost during the financial loss period that is directly attributable to the provision of UFB FFLAS must be allocated to UFB FFLAS;			Compliant	See opex model documentation Note that there are a number of allocator types not in categories (i)-(ix) that we are asking to be approved by the Commission. Also note that the opex model does not distinguish between UFB FFLAS and other FFLAS, so although it can directly allocate some costs to FFLAS, these costs are later pro-rated between UFB FFLAS (Contracted FFLAS) and other FFLAS (Voluntary FFLAS) in the BBM IAV model.

Clause/ Section	Text	Sheet	Cell	IM Compliance	Notes
	(b) any operating cost during the financial loss period that is not directly attributable to the provision of UFB FFLAS must be allocated to UFB FFLAS by applying ABAA, where cost allocators must be used to allocate operating costs not directly attributable to either- (i) UFB FFLAS; or (ii) services that are not UFB FFLAS; and			Compliant	See opex model documentation
	(c) the allocator types available to be applied to allocate operating costs not directly attributable to the provision of UFB FFLAS are: (i) number of customers, end-users, or premises (intact, connected or passed); (ii) number of ports; (iii) revenue; (iv) central office space; (v) peak traffic; (vi) average traffic; (vii) used length of linear assets; (viii) power usage; (ix) number of events; and (x) any other allocator type as approved by the Commission.			Compliant	See opex model documentation
B1.1.6 (2)	For the purposes of allocating a UFB unallocated closing asset value, UFB unallocated opening asset value, or value of commissioned asset to the provision of UFB FFLAS under clause B1.1.2(9) of Schedule B for a financial loss year-			See below	
	(a) the 'UFB unallocated closing asset value', 'UFB unallocated opening asset value', and 'value of			Compliant	

Clause/ Section	Text	Sheet	Cell	IM Compliance	Notes
	commissioned asset' in question shall be considered an 'asset value';				
	(b) any 'asset value' that is **directly attributable** to the provision of **UFB FFLAS**, must be allocated to **UFB FFLAS**;			Compliant	
	(c) any 'asset value' that is not directly attributable to the provision of UFB FFLAS, must be allocated to UFB FFLAS by applying ABAA, where asset allocators must be used to allocate 'asset values' not directly attributable to either: (i) UFB FFLAS; or (ii) services that are not UFB FFLAS; and (d) the allocator types available to be applied using ABAA are: (i) number of customers, end-users, or premises (intact, connected or passed); (ii) number of ports; (iii) revenue; (iv) central office space; (v) peak traffic; (vi) average traffic (vii) used length of linear assets; (viii) power usage; (ix) number of events; and (x) any other allocator type as approved by the Commission.	SAsset ULAllocationFactor	N12:X1623	Compliant	The asset allocator types used in the model are consistent with this clause. We have asked for an additional asset allocator types to be approved ('Shared with copper, fibre cable', 'Shared ISAM') Assets that are not relevant to UFB FFLAS (Assets attributed to non-FFLAS, RBI assets, UFB E assets, Assets in Lost and Non geographies) are set to a zero allocation pre-implementation within the SControlSheet calculations of the asset allocation factor values.
B1.1.6 (3)	The allocator types specified in subclauses (1)(c) and (2)(d) must be applied using allocator values that are reviewed and updated in respect of each financial loss year.	SControlSheet	0899:BI990	Compliant	The allocator values are updated every financial loss year.

Clause/ Section	Text	Sheet	Cell	IM Compliance	Notes
B1.1.6 (4)	Subject to subclause (5), when a regulated provider allocates either an asset value or an operating cost that is not directly attributable to UFB FFLAS, the total asset values or operating costs allocated to UFB FFLAS must not be more than the total asset values or total operating costs that the regulated provider could not have avoided if it ceased supplying services that are not UFB FFLAS.			Compliant	The allocation factors we have used do not exceed this cap, but this has not been modelled. See the additional discussion in the answer for question B6.3 of the s221 notice response.
B1.1.6 (5)	Subclause (4) only applies to an allocation or allocations of an asset value or an operating cost that would have a material effect on the total asset values or total operating costs allocated to UFB FFLAS.			Compliant	
B1.1.7	**Tax costs for determining the financial losses**			(Heading)	
B1.1.7 (1)	'Tax costs' is, where UFB taxable income is- (a) nil or a positive number, the tax effect of UFB regulatory net taxable income; and (b) a negative number, nil.	SCalcs	N209 :X209	Compliant	
B1.1.7 (2)	'UFB regulatory net taxable income' is UFB taxable income less UFB utilised tax losses.			Compliant	
B1.1.7 (3)	Subject to subclause (4), 'UFB taxable income' means, for a financial loss year, the amount determined after applying the tax rules regarding the determination of taxable income to UFB revenues cash flows, minus depreciation under GAAP in respect of UFB assets and UFB operating expenditure cash flow.	SCalcs	N207 :X207	Believe consistent with intent of IM	UFB revenues for determining taxable income includes those capital contributions that are treated as revenue for tax purposes. The BBM calculates UFB taxable income by deducting opex (including leases treated as opex for tax purposes) and allocated tax depreciation. We understand use of tax depreciation is consistent with the Commission's intended approach for the Financial

Clause/ Section	Text	Sheet	Cell	IM Compliance	Notes
					Loss Asset as specified in the Reasons Paper, but inconsistent with this clause of the IMs (which says GAAP depreciation).
B1.1.7 (4)	For the purposes of subclause (3): (a) if the tax rules allow for a choice of methods in calculating taxable income, the same method as that elected to be used by the regulated provider must be used to determine UFB taxable income; and (b) in applying the tax rules in respect of particular items of cash flows and depreciation included in UFB taxable income- (i) any tax deduction for depreciation is only available in respect of a UFB asset and must be calculated by applying the tax depreciation rules to the regulatory tax asset value of the UFB asset in question; and (ii) the effect of any tax losses (other than those produced from the provision of UFB FFLAS) made by a regulated provider must be ignored.			Compliant	We apply the tax treatment used by Chorus. We include various relevant tax adjustments if these have been applied by Chorus. As described in section 4.1.2 of the BBM IAV model documentation, we apply the same allocation factors to the tax depreciation as we use for the accounting depreciation.
B1.1.8	**Regulatory tax asset value for UFB assets**			(Heading)	
B1.1.8 (1)	'Regulatory tax asset value', in relation to a UFB asset, means the value determined in accordance with the formula- tax asset value × result of asset allocation ratio	STaxRA BSOP	N1628:X1628	Compliant	Note: we apply the allocation factors asset class by asset class
B1.1.8 (2)	'Tax asset value' means- (a) in respect of the following UFB assets, the value of the UFB asset determined by applying the tax depreciation rules to its notional tax asset value:	STaxRA BSOP	N11:X11	Compliant	We take tax asset values from the Chorus FAR (apart from capital contributions). The sum of the taxNBV of Chorus assets is less than the sum of the accounting NBV; accordingly the

Clause/ Section	Text	Sheet	Cell	IM Compliance	Notes
	(i) a UFB asset in the UFB asset base where, as of the date when the 'regulatory tax asset value' is determined in the financial loss period, the sum of UFB unallocated opening asset values is less than the sum of the adjusted tax values of all UFB assets as of that date; and (b) in respect of any other UFB asset, its adjusted tax value.				adjustment is not necessary. Section 3.6.11 of the BBM IAV model documentation describes how different kinds of capital contributions are treated by Chorus for tax purposes and how we reflect this within the BBM IAV model.
B1.1.8 (3)	'Notional tax asset value' means for the purpose of subclause (2)(a), adjusted tax value of the UFB asset as of the date when the 'regulatory tax asset value' is determined, adjusted to account proportionately for the difference between the sum of the UFB unallocated opening asset values as of that date and the sum of the adjusted tax values of all UFB assets as of that date.			Compliant	The BBM IAV model does not need to apply this adjustment because the sum of the tax asset values is lower than the sum of the UFB unallocated asset values (i.e. taxNBV < NBV for the asset base as a whole).
B1.1.8 (4)	Where 'regulatory tax asset value' is determined in the financial loss period, 'result of asset allocation ratio' means- (a) where an asset or group of assets maintained under the tax rules has a matching UFB asset or group of UFB assets, the value obtained in accordance with the formula- (UFB opening asset value or sum of UFB opening asset values) / (UFB unallocated opening asset value or sum of UFB unallocated opening asset values) applying the formula in respect of the UFB asset or smallest group of UFB assets that has a matching asset or group of assets maintained under the tax rules; and	STaxRABSOP	N1629:X3240	Compliant	The BBM uses the same allocation factors (allocator types and allocator values) for allocating UFB assets and the regulatory tax asset value.

Clause/ Section	Text	Sheet	Cell	IM Compliance	Notes
	(b) where an asset or group of assets maintained under the tax rules does not have a matching UFB asset or group of UFB assets, the value of the asset allocated to the provision of UFB FFLAS were clause B1.1.6 of Schedule B to apply to the asset or group of assets.				
B1.1.9	**Tax losses**			(Heading)	
B1.1.9 (1)	'UFB utilised tax losses' means UFB opening tax losses, subject to subclause (2).	SCalcs	N214 :X214	Compliant	
B1.1.9 (2)	For the purpose of subclause (1), UFB utilised tax losses may not exceed UFB taxable income.	SCalcs	N214 :X214	Compliant	The BBM uses the same calculation as the Commission's FLA calculation spreadsheet.
B1.1.9 (3)	For the purpose of subclause (1), 'UFB opening tax losses'- (a) on 1 December 2011, are nil; and (b) for a financial loss year that commenced after financial loss year 2012, are UFB closing tax losses for the preceding financial loss year.	SCalcs	N212 :X212	Compliant	
B1.1.9 (4)	For the purpose of subclause (3)(b), 'UFB closing tax losses' means the amount determined in accordance with the following formula, in which each term is an absolute value: UFB opening tax losses + UFB current period tax losses - UFB utilised tax losses	SCalcs	N215 :X215	Compliant	The BBM uses the same calculation as the Commission's FLA calculation spreadsheet.
B1.1.9 (5)	For the purpose of subclause (4), 'UFB current period tax losses' is, where UFB taxable income is- (a) nil or a positive number, nil; and (b) a negative number, UFB taxable income.	SCalcs	N213 :X213	Compliant	The BBM uses the same calculation as the Commission's FLA calculation spreadsheet.

Clause/ Section	Text	Sheet	Cell	IM Compliance	Notes
B1.1.10	**Methodology for estimating the weighted average cost of capital for the financial losses**			(Heading)	
B1.1.10 (1)	Before the implementation date, the Commission will determine estimates of post-tax WACCs for the purposes of clause B1.1.2(8) of Schedule B in respect of the financial loss period, where the estimates of 1 December 2011 WACC, 31 March 2012 WACC, 31 December 2012 WACC, 31 December 2013 WACC, 31 December 2014 WACC, 31 December 2015 WACC, 31 December 2016 WACC, 31 December 2017 WACC, 31 December 2018 WACC, 31 December 2019 WACC, 31 December 2020 WACC, and 30 September 2021 WACC are determined in accordance with the formulas specified in subclause (2).			Compliant	
B1.1.10 (2)	For the purpose of subclause (1), "1 December 2011 WACC", "31 March 2012 WACC", "31 December 2012 WACC", "31 December 2013 WACC", "31 December 2014 WACC", "31 December 2015 WACC", "31 December 2016 WACC", "31 December 2017 WACC", "31 December 2018 WACC", "31 December 2019 WACC", "31 December 2020 WACC", and "30 September 2021 WACC" are determined in accordance with the formula: rd (1 – Tc) L + re(1 - L).	Scalcs	N86:X 86	Compliant	Formula is consistent with IMs.
B1.1.10 (3)	For the purpose of subclause (2) -			**S**ee below	
	L is leverage;	SCalcs	N84:X 84	Compliant	
	rd is the cost of debt and is estimated in accordance with the formula:				

Clause/ Section	Text	Sheet	Cell	IM Compliance	Notes
	rf + p + d;	SCalcs	N82:X 82	Input	Cost of debt is an input in the BBM IAV model, provided by Chorus
	re is the cost of equity and is estimated in accordance with the formula:			(See above)	
	rf(1 - Ti) + βeTAMRP;	SCalcs	N83:X 83	Input	Cost of equity is an input in the BBM IAV model, provided by Chorus
	rf is the risk-free rate;			(See above)	
	p is the debt premium;			(See above)	
	d is the debt issuance costs;			(See above)	
	Ti is the investor tax rate;			(See above)	
	βe is the equity beta; and			(See above)	
	TAMRP is the tax-adjusted market risk premium.			(See above)	
B1.1.10 (4)	For the purpose of subclause (3)- (a) the leverage, average corporate tax rate, investor tax rate, the equity beta, the debt issuance costs and the tax-adjusted market risk premium are the amounts specified in or determined in accordance with clause B1.1.11 of Schedule B; and (b) the risk-free rate must be estimated in accordance with clause B1.1.12 of Schedule B.			Input	Leverage is in line with B1.1.11(1). Corporate tax rate has been provided by Chorus
IM B1.1.11	**Fixed WACC parameters for financial losses**			(Heading)	
B1.1.11 (1)	For the purpose of clause B1.1.10 of Schedule B, 'leverage' means the ratio of debt capital to total capital and is 29%.	SCalcs	N84:X 84	Compliant	

Clause/ Section	Text	Sheet	Cell	IM Compliance	Notes
B1.1.11 (2)	For the purpose of clause B1.1.10 of Schedule B, 'average corporate tax rate' is the average of the corporate tax rates that, as at the date that the estimation is made, will apply during the financial loss year.	SCalcs	N85:X85	Input	Corporate tax rate has been provided by Chorus
B1.1.11 (3)	For the purpose of clause B1.1.10 of Schedule B, 'investor tax rate' is, for each financial loss year, the maximum prescribed investor rate applicable at the start of that financial loss year to an individual who is- (a) a resident in New Zealand; and (b) an investor in a multi-rate PIE.			Input	Input to the BBM IAV model provided by Chorus
B1.1.11 (4)	For the purpose of clause B1.1.10 of Schedule B, the 'Equity beta' is 0.70.			Input	Input to the BBM IAV model provided by Chorus
B1.1.11 (5)	For the purpose of clause B1.1.10 of Schedule B, 'debt issuance costs' are costs associated with the issuance of debt by a regulated provider and are 0.14%.			Input	Input to the BBM IAV model provided by Chorus
B1.1.11 (6)	For the purpose of clause B1.1.10 of Schedule B, 'tax-adjusted market risk premium' is: (a) in respect of the period starting on 1 December 2011 and ending on the last day before the commencement date, 7.0%; (b) subject to (c), in respect of the period starting on the commencement date and ending on the close of the day immediately before the implementation date, 7.5%; and (c) in respect of financial loss year 2021, a weighted average of 7.0% and 7.5% where the weights for 7.0% are the months prior to the commencement date and the weights for 7.5% are the months subsequent to the commencement date within that financial loss year.			Input	Input to the BBM IAV model provided by Chorus

Annex D Differences from the IMs with no economic impact

D.1 General

In this section we discuss differences from the IMs which have no economic impact. Some of these derive from using the FAR as our input data, and are treated in section 2.

D.2 Differences arising from using the FAR

Within the model we use the FAR as the source of truth in financial data relating to the assets. This has the great advantage that it provides an audited source of NBV data which is closely related to the costs net of depreciation and impairment losses at the relevant dates as required by the Act. However it has some other consequences as noted below

D.2.1 Additional transaction types

As a result of using the FAR, we need to accommodate transaction types that occur in the FAR, which include transfers (i.e. from one asset class to another) and other NBV adjustments (e.g. IFRS16 lease adjustments) in addition to disposals. The IMs don't mention transfers and writeups; they follow the Act by concentrating on cost incurred adjusted for depreciation and impairment losses (see for example IM B1.1.3(1)b). We say that transfers and lease adjustments (e.g. on IFRS16 leases) should be allowed[40]. So wherever the IMs has net VCA as "VCA less disposals" we use "VCA plus NBV adjustments" (disposals are a negative NBV adjustment: they form part of the NBV adjustments). Similarly net tax VCA is tax VCA plus tax NBV adjustments.

If the NBV adjustments could not be applied (or could not be applied for specific asset classes) then we will lose our good reconciliation to the FAR up to the end of 2021H2 and would in effect be estimating depreciation in all years and calculating NBV/Tax NBV for any such asset classes.

This is because if we diverge from the FAR at any point then we could not rely on the FAR financial metrics other than VCA in later years (as these would include the effects of the NBV adjustments).

Economic impact

The overall economic impact of including transfers is nil (because they maintain capital maintenance). Note that within the FAR processing we apply specific processing to make sure that transfers do not distort our recording of which assets were constructed for UFB purposes – see the FAR processing documentation.

40 Note that only the Dec 2021 lease adjustments which are not in the FAR have been added as separate asset classes: prior years adjustments that are present in the FAR flow through in the way described above.

The economic impact of lease adjustments (flowing through from the FAR as NBV adjustments) is nil as long as the Commission agrees that they are appropriate to include in this way. If they could not be accounted for in this way, then an alternative treatment of these changes would be required e.g. treating the lease payments as operating costs to avoid a situation in which Chorus FFLAS services were unable to cover their costs.

D.2.2 Not always treating VCA on existing assets as new assets

The IMs (B1.1.3(4)b, 2.2.13(6)b) ask for additional VCA on an asset in a new period (not including the date of commissioning) to be recorded as a separate asset.

However, in the FAR this does not always happen: there is sometimes additional VCA recorded on existing assets. Therefore, as we are staying in line with the FAR, the BBM IAV model does not follow the IM requirements in this regard.

It is also necessary for the BBMIAV model to have the possibility of VCA in each year because we are using asset classes (which are aggregates of individual assets). There is usually additional VCA on each asset class in each FY. This is easy to illustrate: even if the individual duct asset within the L1 Duct asset class bought in FY12 did not have VCA in FY13, other individual duct assets within the same L1 Duct asset class that were bought in FY13 would have VCA in FY13, etc.

Economic impact

The impact is minimal, for two reasons:

- In both the IM approach and in the BBM IAV model approach there is capital maintenance in operation, meaning there will be no impact on the NPV of future cashflows (there might be slight differences in depreciation and capital employed in specific years).
- Potential impact on depreciation calculations. One of the potential reasons for the Commission wishing to keep VCA on existing assets separate is to more easily calculate the required depreciation.
  - Up to 2021H2 the BBM IAV model uses the depreciation values calculated in the FAR (which is GAAP compliant).
  - For depreciation calculated after 2021H2:
    - the BBM IAV model does treat each post 2021H2 period's VCA as a separate investment depreciated over its full lifetime, meaning that there would be no distortion of the calculated depreciation for such assets arising from allowing VCA in each year;
    - pre-2021H2 assets depreciate the remaining book value as of the end of 2021H2 over the estimated remaining lifetime, which is an unbiassed approximation, but (as above) still maintains capital maintenance.

D.2.3 Aggregated asset classes need VCA and NBV adjustments (disposals) terms in each year

There is a related point to the points in section D.2.2 above in IM B 1.1.2(9)g (and the similar IM 2.2.5(2)c) which defines closing asset value for assets (other than in the year of commissioning) as starting value less depreciation (less disposals) i.e. in the IMs there is no VCA term in the calculation of the end of period asset base unless in the year of commissioning of the asset. This is consistent with the point above about the IM wanting VCA only to occur in the year of commissioning of the asset. However, we need a VCA term in each year, because we are working with aggregated asset classes.

A similar point is that when working with aggregated asset classes, disposals can be partial disposals. This means that although IM 2.2.5(2)a (and the similar IM B1.1.2(9)f) puts the closing asset base of a disposed asset as nil, in an aggregated asset class a partial disposal can occur (e.g. a disposal of one among many assets within the asset class) which means that the closing asset base of the asset class is not necessarily nil if there is a disposal.

As a result, because we are dealing with aggregate asset classes, and even if we were not dealing in aggregates because the FAR sometimes allows VCA to existing assets (see section D.2.2), in principle we can have VCA and (possibly partial) disposals in all years, so we implement our end of period(unallocated) asset base calculation for the asset class as described in section 3.2, i.e.:

Asset class closing asset base value = Asset class starting asset base value plus VCA plus NBV adjustments (which includes disposals or partial disposals if any) less depreciation.

The same point applies to the tax treatment of the tax NBV (the tax asset base) – there can be (tax) VCA in each year. The net effect is for the BBM IAV model to reproduce the FAR values of the accounting closing NBV/tax closing NBV in each period, in both cases.

Economic impact

There is no economic impact because our formulation will calculate the same closing book value for the asset base as a whole (and the tax asset base as a whole) as if the IM approach were adopted. Our approach is equivalent to summing up a set of assets that individually follow the IMs, for each asset class. Both approaches demonstrate “capital maintenance”.

D.2.4 Works under construction

In the BBM IAV model we follow the FAR, for all assets that are in the FAR (i.e. for everything other than “capital contribution assets” where the IMs request a different approach from Chorus’ accounting).

As works under construction have not yet entered the FAR, we do not have any costs for works under construction in the BBM IAV model. This is as required by the IMs: they do not form part of core fibre assets or UFB assets.

When the assets are commissioned they enter the FAR, marked up with the relevant interest costs relating to the time for which the capital has been tied up in the assets before commissioning, (which is done by Chorus under its GAAP accounting). As the BBM IAV model tracks the FAR, these costs then appear in the BBM IAV as part of the VCA and hence enter the asset base.

We understand that these interest costs are treated differently for tax purposes and are not treated as tax VCA (i.e. the additions to the tax NBV are lower than the additions to the NBV). Because we track the tax NBV recorded in the FAR to the end of 2021H2, we stay in line with Chorus' actual treatment of the capex as regards tax NBV and tax depreciation (TaxNBV adjustments will be being applied to keep the TaxNBV exactly aligned to the FAR). The tax adjustments noted in section 3.6.17 take this timing difference of treatment of interest costs into account.

In the period after 2021H2, we are basing our modelling on the forecast capex of Chorus, as modified by modifiers consistent with the regulatory templates (RTs). These modifiers include the effects of the cuts to Chorus' proposal set out by the Commission and also include adjustments that take into account the difference between capex and VCA, so the items discussed as capex forecasts are in fact VCA forecasts after the modifiers have been applied.

Economic impact

The economic impact of this is nil. The point about differences between forecast capex and VCA has been removed by the use of the modifiers in preparing the capex forecast, which take into account the Commission decision ("cuts") and the RTs("escalators", which include factors to convert from capex to VCA).

D.3 Other differences not arising from using the FAR

D.3.1 Entire Chorus asset base is within the BBM IAV model

In the BBM IAV model we model the entire Chorus asset base (not just the fibre asset base), and our allocation factors apply to that base. We discuss below how we can calculate the UFB asset base and the fibre asset base from these allocation factors and other data.

Economic impact

There is no economic impact because our formulation will calculate the same allocated quantities (e.g. PQ FFLAS allocated fibre asset base) as if the IM approach were adopted.

D.3.2 Fibre asset / Fibre asset base

In the IMs a fibre asset is an asset employed for the provision of FFLAS, and excludes works under construction and certain intangible assets. It is used in relation to post-implementation calculations such as the calculation of the MAR.

In the BBM IAV model we model the entire Chorus asset base, and out allocation factors apply to that base. However, we can calculate the core fibre asset base as follows:

- exclude from the Chorus asset base any asset directly attributed to non-FFLAS (i.e. whose PQ FFLAS and ID-only FFLAS allocation factor is always zero).

There is no concept of a fibre asset pre-implementation; there is a related term UFB asset (q.v.).

Economic impact

The economic impact of performing the calculations of the fibre asset base this way is nil (it gives the same answer as would be achieved by another method).

D.3.3 UFB asset / UFB asset base

In the IMs a UFB asset is an asset of the regulated provider employed for the provision of UFB FFLAS, and excludes works under construction and certain intangible assets. It is used in relation to pre-implementation calculations (such as the calculation of the financial loss asset).

In the BBM IAV model we model the entire Chorus asset base, and our allocation factors apply to that base. However, we can calculate the UFB assets / UFB asset base as follows:

- exclude from the asset base any asset directly attributed to services other than UFB FFLAS (i.e. whose UL allocation factor (UFB FFLAS allocation factor) is always zero);
- and exclude a subset of those assets which are shared, where the asset uses a so-called weighted allocation factor[41]. The fraction that is excluded relates to the so-called non-overlap assets:
  - for the shared duct and shared manhole assets, those outside the UFB deployment area,
  - in the case of poles, the fraction of shared poles not recorded as having an actual or planned GPON deployment on the pole. .

There is no concept of a UFB asset post-implementation; there is a related term fibre asset (see section D.3.2 above).

Economic impact

The economic impact of performing the calculations of the UFB asset base this way is nil (it gives the same answer as would be achieved by another method).

41 Weighted allocation factors are used by shared duct, shared manholes, and shared pole assets – see section.4.2

D.3.4 UFB FFLAS commissioning date

In the IM the UFB FFLAS commissioning date is the date at which a UFB asset is first commissioned for UFB FFLAS.

Because we model asset classes, which are potentially thousands of individual assets (see 2.8.3 above), we do not track the date at which specific assets are first used to provide UFB FFLAS or FFLAS services.

We do however calculate allocation factors for the asset classes which take into account:

- the geography (Won, Lost, Non, National)
- the financial loss year
- in the case of the weighted asset allocation factors used by specific shared assets, the extent of the aggregate usage of the assets by in-scope FFLAS (UFB) services in that geography over time (in terms of network overlap for duct and manholes and the fraction of shared poles used).
- In the case of other shared asset allocation factors such as shared space and power, these have taken the network deployment over time in the geography of interest into account either directly (e.g. via power and space requirements) or indirectly (e.g. the way in which shared cable has been prorated between in-scope FFLAS and other services over time).

The way in which the IMs use the UFB FFLAS commissioning date is to admit the UFB assets to the UFB asset base on that date (and related points about the VCA on such assets). As noted in section D.3, we calculate based on the entire asset base, which stays in line with the FAR to the maximum extent possible. As noted in section D.3.3 above, the UFB asset base can be calculated in the BBM IAV model with reference to the allocation factors and (for certain shared assets) the "network overlap" data.

The way in which assets are added to the UFB asset base in the BBM IAV model is therefore via:

- addition of new value to UFB assets
  - either by additional VCA on directly attributable asset classes,
  - or additional VCA on allocated asset classes
- and/or via changes in the UL allocation factors (described in section 4.2 above), which vary in each geography and period (financial loss year). Notably, if the network overlap increases, shared cable usage increases, or new space or power requirements have arisen, as a result of the newly commissioned assets, then these will affect the asset allocation factors used.

Thus the relevant parts of B1.1.3 are met by

- keeping the asset base aligned with the FAR (which ensures that the asset base value (FAR NBV) is in line with the original costs less depreciation and impairment losses[42]), and

[42] Noting that as explained in section 3.2 we use VCA plus NBV adjustments which includes lease revaluations, transfers, and disposals. Disposals would be negative NBV adjustments, as would impairment write-downs.

- calculating the UL allocation factors (UFB FFLAS allocation factors) such that only the appropriate assets employed for UFB (the appropriate fraction of the asset class) are allocated to UFB FFLAS; this in turn allows us to calculate the UFB asset base.

Economic impact

The economic impact of performing the calculations this way is nil.

D.3.5 FFLAS commissioning date

Similarly the FFLAS commissioning date is the date at which a fibre asset is first commissioned for FFLAS.

The situation is entirely analogous to the UFB FFLAS commissioning date discussed in section D.3.4 above.

Because we model asset classes, which are potentially thousands of individual assets (see 2.8.3 above), we do not track within the BBM IAV model the date at which specific assets are first used to provide FFLAS services.

We do however calculate allocation factors for the asset classes which take into account:

- the geography (Won, Lost, Non, National)
- the financial loss year
- in the case of the weighted asset allocation factors used by specific shared assets, the extent of the aggregate usage of the assets by in-scope FFLAS (UFB) services in that geography over time (in terms of network overlap for duct and manholes and the fraction of shared poles used).
- In the case of other shared asset allocation factors such as shared space and power, these have taken the network deployment over time in the geography of interest into account either directly (e.g. via power and space requirements) or indirectly (e.g. the way in which shared cable has been prorated between in-scope FFLAS and other services over time).

The way in which the IMs use the UFB FFLAS commissioning date is to admit the UFB assets to the UFB asset base on that date (and related points about the VCA on such assets). As noted in section D.3, we calculate based on the entire asset base, which stays in line with the FAR to the maximum extent possible. As noted in section D.3.2 this can be calculated in the BBM IAV model using the asset allocation factors.

The way in which assets are added to the fibre asset base in the BBM IAV model is therefore via:

- addition of new value to fibre assets
  - either by additional VCA on directly attributable asset classes,
  - or additional VCA on allocated asset classes
- and/or via changes in the PQ FFLAS (“MAR”) and ID-only FFLAS allocation factors (described in section 4.2 above), which vary in each geography and period (financial loss year). Thus for

example if new space or power requirements have arisen as a result of the newly commissioned assets, then these will affect the asset allocation factors used. However because there is a small allocation of the non-overlap area assets to PQ and ID-only FFLAS, the non-overlap assets are considered to be fibre assets and changes in the network overlap do not put more assets within the scope of fibre assets (i.e. all duct, manhole and pole shared assets will be considered fibre assets)

Thus the relevant parts of IM 2.2.13 are met by:

- keeping the asset base aligned with the FAR (which ensures that the NBV is in line with the original costs less depreciation and impairment losses[43]), and
- calculating the PQ FFLAS and ID-only FFLAS allocation factors such that only the appropriate assets employed for FFLAS (the appropriate fraction of the asset class) are allocated to FFLAS; assets directly attributed to non-FFLAS are excluded. This in turn allows us to calculate the fibre asset base.

Economic impact

The economic impact of performing the calculations this way is nil.

D.3.6 Opening cost allocator value / Closing cost allocator value / rollover equation for allocated UFB asset value

The IMs (see for example B1.1.2(4)a) use a closing cost allocator value and an opening cost allocator value. The closing cost allocator value is (in effect) defined as the opening cost allocator value for the next period; the Commission uses this closing cost allocator value for the closing allocated asset base.

Within the BBM IAV model we have a single allocator for the period. In terms of the way it is used, it is applied to all allocated quantities in the period, including the end of period quantities RABEOP and TaxRABEOP. For all quantities other than the RABEOP and TaxRABEOP, the BBM IAV allocation factor is equivalent to the way that the opening cost allocator is being used in the IM.

Because we use this same allocation factor for the RABEOP and TaxRABEOP, the result is that in the BBM IAV model, the allocated RABOP rollover equation at the end of period P is:

Allocated RABEOP(P) (using in-period allocation factor) + cost allocation adjustment for period P = AllocatedRABSOP(P+1) (using next period's allocation factor)

By comparison, the Commission uses a different definition of the allocated closing asset base (RABEOP in our notation), using the end of period allocation factor; in effect the IM calculation (as illustrated in the Commission's spreadsheet) includes the cost allocation adjustment in the calculated

43 Noting that as explained in section 3.2 we use VCA plus NBV adjustments which includes lease revaluations, transfers, and disposals. Disposals would be negative NBV adjustments, as would impairment write-downs.

allocated closing asset base (Allocated RABEOP(P) in our notation) such that it is equal to the starting value of the next period's allocated asset base (Allocated RABSOP(P+1) in our notation).

However, the two approaches are equivalent: they lead to the same calculated cost allocation adjustment.

The DCF calculation of the FLA uses both a series of cashflows that includes the cost allocation adjustment and the closing allocated RABEOP in the final period before implementation. In order to be internally self-consistent, the BBM IAV model has zero cost allocation adjustment in the final period before implementation because it is using an allocated RABEOP that is calculated before that last cost allocation adjustment has been applied. In the IM, it takes the opposite approach.

However, because the cost allocation adjustment and the Allocated RABEOP both contribute to the DCF calculation of the FLA, it does not matter whether the DCF FLA calculation is performed before the inclusion of the last period before implementation's cost allocation adjustment (which is what is done in the BBM IAV model) or after that adjustment (which is what is done in the IM and the Commission spreadsheet). The resulting calculated FLA is the same if (and only if) the cost allocation adjustment is considered to be an end of period cashflow (but it is currently considered to be a mid-period cashflow in the IMs).

Economic impact of these differences

The BBM IAV model allocation factors for each asset class are used in the same way as the IM opening cost allocator value for each asset class. Using one allocator in the period as we do in the BBM IAV model is economically equivalent to the approach in the IM. However, patently, it does make a difference which specific date's input values are used for calculating the cost allocator values; as demand and the network is growing over the period FY12-2021H2 the FLA and the IAV are slightly higher using mid-period estimates of the relevant inputs (such as connections, traffic, and network overlap etc). We think that mid-period estimates are the reasonable ones to use. It is not entirely clear which values are intended to be used by the IMs, although the allocator is described as "opening cost allocator value".

The way in which the cost allocation adjustment value is calculated is different between the BBM IAV model and the IM, but the result of that calculation is the same (for a given level of opening cost allocator value / in-period allocation factor).

The difference between the DCF calculation of the FLA (with (in the IM) and without (in the BBM IAV model) including the cost allocation adjustment in the last period before implementation) again gives the same answer but only if the cost allocation adjustment is considered to be an end of period cashflow (in the IM it is a mid-period cashflow).