Deloitte.

24 March 2021

David Collins
Director
Chorus New Zealand Limited
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1 Willis Street
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COMMERCIAL IN CONFIDENCE

Dear David

FINANCIAL MODEL TEST PROCEDURES – TEST PROCEDURES COMPLETED ON THE MODELS THAT ESTIMATE INITIAL ASSET VALUE

Chorus New Zealand Limited (**Chorus** or **you**) has developed a suite of models (the **Models**, which are defined in Appendix D) in preparation for a new regulatory regime for fibre fixed line access services (**FFLAS**).

Chorus commissioned external consultants, AnalysysMason (**AM**), to develop the Models. The purpose of the Models are to analyse the forecast initial asset value (**IAV**) under the new regulatory regime.

Chorus and AnalysysMason have now refined the Models in preparation for Chorus' submission to the Commerce Commission. You have requested Deloitte to complete a set of test procedures on the Models, addressed to the Directors, to support Director attestation requirements in support of the submission. This is the purpose (the **Purpose**) of this engagement.

Findings

All issues raised during the course of our engagement have been resolved.

As part of this engagement, we completed the test procedures (the **Procedures**, which are defined in Appendix B) on each of the five Models and reported on our factual findings. All issues identified have been presented to you in an issues register for each Model.

You have reviewed the findings contained in each Model issues register and all issues have been resolved in one of the following ways:

- The Model has been updated in response to the issue raised and the relevant test Procedure(s) have been repeated such that no exceptions remain; or

- Chorus has provided further clarification on the issue so that no exceptions remain; or

- The issue relates to an inconsistency between the Model logic and the Model Documentation and the Model Documentation has been updated to resolve the inconsistency; or

- Chorus considers that the issue raised has no material impact on the output.

While we have considered the responses provided by AM in respect of issues raised, the response provided by Chorus is definitive.

We consider that all issues identified during the course of our engagement and summarised in the issues registers referenced as Appendix A have been resolved in one of the ways set out above and there are no outstanding exceptions in the Final Models provided to Deloitte.

A copy of the final issues registers are referenced as Appendix A.

Our Approach

Our engagement was conducted in accordance with the scope and terms set out in:

- The Master Services Agreement between Deloitte and Chorus dated 17 December 2017 and variation dated 28 August 2020 (the **MSA**), and

- The Statement of Work titled '2021 Review of Regulatory Models (Review)' dated 26 November 2020 (which defined the Procedures).

Collectively, these documents comprise our terms of engagement (the **Agreement**).

A copy of the Procedures undertaken during this scope of work is included as Appendix B.

Versions of the Financial Model Received

Appendix D sets out the versions of each Model received from Chorus. It specifies which Model is the **Original Version** of the Model, any **Updated Versions** received, and the **Final Version** (bold terms as defined in the Agreement) of the Model.

We used Spreadsheet Detective^{TM} (specialist modelling software) to identify Microsoft Excel formulae changes between the Original Version, any intermediate Updated Version(s), and the Final Model, excluding changes to input assumptions for those models which are developed in Excel. Relevant procedures were re-performed only on the changes identified for specific versions of the Model described in Appendix D.

We have completed test Procedures set out Appendix B to this report, subject to the limitations and restrictions set out in Appendix C.

Model Documentation Relied Upon

Appendix D also sets out the versions of the Model Documentation relating to each Model received from Chorus/AnalysysMason. For some Models, the Model Documentation has been updated in response to issues raised or edits proposed by Deloitte that have been confirmed by Chorus.

We consider that that the final versions of the Model Documentation set out in Appendix D were of sufficient detail and quality to be fit for purpose to complete our test procedures; and we would expect that the Documentation to provide adequate explanation of the model logic to an informed third party such as the Commission.

We have solely relied upon this Documentation as part of the Procedures and we have not checked the Documentation against any guidance prepared by the Commission or any other source.

Other Matters

This report is subject to the limitations set out in Appendix C and the Terms set out in the Agreement.

Our Work is for your exclusive use and must be used by you only for the Purpose. Unless we give our consent:

(a) *our Work must not be used for any other Purpose or made available to anyone else, except your Professional Advisers;*

(b) *our Work may not be relied on by anyone other than you; and*

(c) *you must not name us or refer to us, our Work or Services in any written materials, other than to your Professional Advisers, in any publicly filed documents or as required by law*

We understand that you wish to share this letter and Appendices B to D with the Commerce Commission for the purposes of informing the Commission of the Procedures completed on the Models and may ask that we provide the Commission with factual explanations of the scope and process undertaken.

Subject to Chorus providing a cover letter that specifies that this letter and appendices are provided commercially in confidence and on a non reliance basis, we agree that Chorus may provide the Commerce Commission with access to this letter and Appendices B to D on a non reliance basis for the purpose set out in the prior paragraph.

Please contact us if you wish to discuss any aspect of this report in further detail or if we can be on any further assistance.

Yours sincerely

John Tan
Partner
for Deloitte Limited (as trustee for the Deloitte Trading Trust)

Attachments:

Appendix A	Issues Registers (provided as separate attachments)
Appendix B	Procedures
Appendix C	Report Limitations
Appendix D	List of Model Versions

Appendix B: Procedures

Areas of Focus

You have requested that we focus our scope of work on the mathematical integrity of the formulae contained within the in-scope Models, and the consistency of logic with the supporting Model Documentation and our test Procedures set out below are focussed on this objective.

We completed the following scope of work on the in-scope Models and supporting Model Documentation, defined in Appendix D:

A.   Detailed testing of model formulae

We completed the following test **Procedures** on the in-scope Models:

1. Using the first cell in a range of cells that contained the same formula relative to that first cell, tested the internal computation logic and arithmetic calculations, as described by the headings, sub-headings and labels of the range are consistent with the description of this calculation in the Documentation.

2. Tested the consistency of formulae applied across time periods

3. Identified any material hard-coding within formulae.

4. Identified any material references to blank cells.

5. Identified any external links to the Model that appear to be duplicate, mis-linked or inconsistent with the documented methodology

6. Documented and present to you any exceptions identified in the above testing into an issues register for comment.

Where the Documentation was incomplete, in some cases we proposed comments to AM/Chorus for consideration. You acknowledge that it was outside of our scope of our Work, and we do not warrant that our proposed comments cover all material matters. You acknowledge that the effectiveness of the Procedures may be limited in relation to any undocumented calculations or incomplete or imprecise Documentation.

B.   Consistency Testing

7. We tested the consistency of the external links and/or specified input interface sheets between the IAV Core Model and the Revenue Model, Opex Model and Aggregation Model; and presented to you any exceptions identified into an issues register for comment.

During the course of our scope of work, Chorus provided multiple versions of some Models, including some Models that continued to be updated while the Procedures had been completed on other Models. The following table sets out on which versions the Consistency Testing Procedure 7 was completed on:

Consistency Test	Source Model	Recipient Model
Revenue to Core	Revenue v1	Core v5
Revenue to Opex	Revenue v2	Opex v2
FAR DB to FAR Agg	FAR DB v1	FAR Agg v1
FAR Agg to Core	FAR Agg v1	Core v5
Opex to Core	Opex v2	Core v5

Other than for the Aggregation Model, we did not trace back inputs from any other precedent model, system or process.

Model versions noted above are in reference to the versions defined in Appendix D.

C. Named Range testing

The Models make extensive use of named ranges and array formulae, and there were a substantial number of obsolete named ranges included in the previous version of the IAV Core Model. While our testing of named ranges substantively followed test Procedure #1, we completed the following additional test on some named ranges in some Models:

8. On a single version of the Model, we checked that the size of each named range is consistent with other similar name ranges in that category and that the upper left anchor point of the name range is consistent with the explanation set out in the Model Documentation. We listed any exceptions in the issues register for comment.

D. Macro Testing

9. We tested the internal computation logic and arithmetic calculations of the VBA procedures set out below for consistency with the description of this calculation in the Documentation:

    Function Revised_Func_Tax_Deprec3()
    (tax depreciation function in the IAV Core Model)

    Function NewSLDRow()
    (depreciation function in the IAV Core Model)

    Sub importAccessdataUFBFractionApproach
    (extraction macro in the Aggregation Model)

    All other VBA code is outside of the scope of this engagement.

E. Re-testing of any updated version(s) of any Model

10. Where you provided us with updated version(s) of any Model and where we agreed to repeat testing on any version(s), we used specialist modelling software to identify any changes between the Original and Updated versions of the Model, and repeated the Procedures that we deemed relevant on the changes identified.

Our modelling software is designed for use on Excel spreadsheets only. We relied on a change log of any changes made to the FAR Database provided by AM.

Some of the data contained in the Models that we tested may not be current and were updated in parallel with our testing. We coordinated with you such that any re-testing of any updated version(s) of any Model incorporate both changes by AM in response to our queries and any data updates. Where AM made structural changes between Model versions, which were beyond the capabilities of our modelling software, we relied on the log of structural changes to the model provided by AM.

We have used Procedure 10 to test differences in model logic between Scenarios A and B of the Opex Model.

F.   Extraction Testing between the Aggregation Model and the FAR Database

In addition to the set of Procedures set out above in section A that we completed on all unique formulae in the Aggregation Model, we will also:

11.   Stepped through the VBA subroutine that runs the queries within the FAR Database and extracts data into the Aggregation Model for consistency with the process described in the Model Documentation

G.   Specific Test Procedures in relation to the FAR Database

In-scope queries are defined as those queries contained within the FAR Database that meet the following criteria:

- They are prefixed with '12', indicating that they are part of Workstream 12;

- They are prefixed with 'FAST12', indicating that they are used to populate the Aggregation Model; or

- Specific other queries referenced in AM's Documentation of the FAR Model that are not prefixed using the syntax above, where AM indicates to us that that these need to be tested.

We completed the following test specific set of test procedures, specifically on the FAR Database, on any in-scope queries:

12.   We read the Documentation provided by AM in relation to the FAR Database and make any clarification queries needed to understand the process and business rules applied

13.   We performed a step through test of all in-scope queries to test the consistency of the query logic with the business rules set out in the Documentation (including the run order of the in-scope queries), and noted any exceptions in the issues register.

14.   We stepped through any reconciliation check queries that AM has developed that exist within the FAR database that you specify to us are relevant for this purpose and noted any exceptions in the issues register.

Similar to the scope for the Models, you asked us to test the application of the methodology and assumptions through the FAR Database, and we will assume that all data contained in any table in the FAR Database is correct (including the Decision Packet Settlements file) and will not opine on the appropriateness of the underlying methodology.

H.   Model Documentation

Where the Documentation was incomplete, in some cases we proposed comments to AM/Chorus for consideration. You acknowledge that it was outside of our scope of our Work, and we do not warrant that our proposed comments cover all material matters. You acknowledge that the effectiveness of the Procedures may be limited in relation to any undocumented calculations or incomplete or imprecise Documentation.

Appendix C: Report Restrictions

The Procedures undertaken in this report are subject to the Terms set out in the Agreement, including the following restrictions:

- The Services did not constitute an assurance engagement in accordance with New Zealand standards for assurance engagements, nor did they represent any form of audit under New Zealand standards on auditing (International Standards on Auditing (New Zealand)), and consequently, no assurance conclusion nor audit opinion has been provided, including for example, on the merits of or whether you should proceed with the project. We do not warrant that our enquiries have identified or revealed any matter which an assurance engagement or audit might have disclosed.

- In no way do we guarantee or otherwise warrant that any forecasts of future profits, cash flows or financial position of Chorus will be achieved. Forecasts are inherently uncertain. They are predictions of future events which cannot be assured. They are based upon assumptions, many of which are beyond the control of Chorus and its management team. Actual results will vary from the forecasts and these variations may be significantly more or less favourable.

- We have not reviewed, or provided any comment on, the governance and model management processes established in relation to the Model.

- The Procedures undertaken are limited to the extent of the Documentation provided. You acknowledge that limitations in the quality and completeness of the Documentation, creates uncertainty and increases risk of error from differences of interpretation between the tester and the Model developer's intended purpose for any calculation and may have limited the effectiveness of our advice.

- We did not check any of the inputs back to source documents.

- We have not tested any of the internal Chorus processes that support the Models or the input assumptions such as cost allocation principles or methodology.

- The Procedures set out above were performed on the static base case of the Model. We did not review any scenarios, undertake any sensitivity analysis or flex the value of any input assumptions. Further test procedures may need to be undertaken if the Model is run using assumptions other than the base case.

- We have no responsibility to update this report for events and circumstances occurring after the date of this report. We have no responsibility for changes made to the Model.

- We carried out our test Procedures on the Model on a standalone basis and treated external links to other models as input assumptions to the Model.

- We did not assess or report on the accuracy of any assumptions or inputs contained within the Model (including any which may have been linked to, or manually copied from, any other models within Chorus). The accuracy and assessment of all assumptions remains the responsibility of Chorus.

- We did not provide accounting or taxation advice, nor did we comment on the accounting or taxation treatment contained in the Model other than checking the calculations contained in the Model for consistency with the description of these calculations as outlined in the Documentation.

- You have not asked us to opine on the correctness or otherwise of the methodology applied in any Model or to test the consistency of the logic to any guidance provided by the Commerce Commission, including but not limited to the Draft Input Methodologies. We have relied upon the Documentation and responses from AnalysysMason as confirmed by Chorus as the basis for completing our Procedures.

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Appendix D: List of Model Versions and Documentation

Core Model

Model Reference	File Name	Platform	Date	Size (KB)
Core v1 (Original)	Chorus NZL Core BBM v314_103 CRM IAV CC s2j.xlsb	Excel	2 Dec 20	21,334
Core v2 (Updated)	Chorus NZL Core BBM v314_115 CRM IAV CC s2k.xlsb	Excel	18 Feb 21	20,063
Core v3 (Updated)	Chorus NZL Core BBM v314_116 CRM IAV CC s2j.xlsb	Excel	25 Feb 21	20,125
Core v4 (Updated)	Chorus NZL Core BBM v314_118b CRM IAV CC s2j.xlsb	Excel	4 Mar 21	22,458
Core v5 (Final)	Chorus NZL Core BBM v314_119b CRM IAV CC s2j.xlsb	Excel	8 Mar 21	22,146
Core Doc v1	BBM model CRM documentation v103.docx	Word	2 Dec 20	526
Core Doc v2	BBM model CRM documentation v115 revised.docx	Word	18 Feb 21	521
Core Doc v3 Part A	BBM model CRM documentation v116 revised.docx	Word	25 Feb 21	521
Core Doc v3 Part B	Allocation factor revisions in v116.docx	Word	25 Feb 21	58
Core Doc v4	BBM model CRM documentation v118b old.docx	Word	4 Mar 21	529

Revenue Model

Model Reference	File Name	Platform	Date	Size (KB)
Revenue v1 (Original)	Chorus Integrated Demand Revenue Model_v4.3y CC.xlsm	Excel	25 Nov 20	8,526
Revenue v2 (Final)	Chorus Integrated Demand Revenue Model_v4.3aa CC.xlsm	Excel	1 Feb 21	8,109
Revenue Doc v1	Demand and revenue model documentation for version v4.3y CC_a.docx	Word	26 Nov 20	530
Revenue Doc v2	MarkUp - Demand and revenue model documentation for version v4.3aa CC.docx	Word	1 Feb 21	546

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FAR Database and FAR Aggregation Model

Model Reference	File Name	Platform	Date	Size (KB)
FAR Database v1 (Final)	FARAccessv26 for audit.accdb	Access	20 Nov 20	1,334,496
FAR Aggregation v1 (Final)	Aggregation workbook from Access v26.xlsm	Excel	20 Nov 20	560
FAR Database Doc v1	FAR processing documentation_v2.6 incl updated Chorus Annex.docx	Word	23 Nov 20	523
FAR Database Doc v2	Mark-Up FAR processing documentation_v2.6 23.12.20 with modifications.docx	Word	1 Feb 21	556

OPEX Model

Model Reference	File Name	Platform	Date	Size (KB)
Opex A v1 (Original)	BBM Opex Allocation v3.30 Scenario A.xlsm	Excel	16 Nov 20	6,185
Opex B v2 (Original)	BBM Opex Allocation v3.30 Scenario B.xlsm	Excel	16 Nov 20	6,176
Opex A v3 (Final)	BBM Opex Allocation v3.30 Scenario A + changes after Deloitte audit v1.xlsm	Excel	19 Jan 20	6,106
Opex Doc v1 Part A	Opex allocation documentation v3.30 2020-11-12 v5c.docx	Word	18 Nov 20	870
Opex Doc v1 Part B	Opex allocation figures for model v3.30 - 2020-11-12 v1.pptx	Powerpoint	18 Nov 20	375
Opex Doc v2	Mark-Up Opex allocation documentation v3.30 23.12.20 + Analysys Mason.docx	Word	19 Jan 20	889