C&W Cayman Islands Response to ICTA/Telecordia Interrogatories

2.1 Cost Separations Methodology

1. Section 1 "Introduction" is the same for each of the three cost manuals; Background Cost Manual, Fixed Network Cost Manual, and Mobile Network Cost Manual. Subsection 4 "This revised submission is divided into five parts" lists the five parts of the revised submission as:

    a. The Background Document
    b. The Fixed Network Model Manual
    c. The Mobile Network Model Manual
    d. The cost separations methodology, which describes how the inputs to the expense factor analysis were developed
    e. The LRIC models

The document specified as item “d” (The cost separations methodology) is missing from the information provided to Telcordia. Please provide this document.

C&W Response

The cost separations methodology that C&W undertook for identifying operational expenditure for use in the LRIC model is the same approach it took to expense analysis in the fully allocated cost model. The document that the Authority requests is similar to the manual that C&W provided on a confidential basis for the in camera proceeding on the C&W FAC model in 2004. We attach that methodology herewith as Appendix I. We also provide the full fully allocated cost model for the year 05/06, so that the Authority can see more explicitly the source of the operational expenditure. Both we provide on a confidential basis.

We emphasise that the methodology itself will not be new to the Authority as it is the same as was applied to the operational expenditure in the 02/03 FAC model that lies at the heart of existing price regulation in the Cayman Islands.

Finally, as discussed both in Background manual and in specific responses to interrogatories below, the operational expenditure identified in the cost separations exercise were not imported directly into the LRIC model, but were explicitly adjusted to meet the requirements of the LRIC exercise.

2.2 Common Costs, Fixed Common Costs and Joint Costs

1. What is the difference, in C&W’s view, between Fixed Common Costs and joint costs?

C&W Response

Common costs are costs associated with the production of two or more services that, because they are incurred across more than one service, cannot be linked causally to one service. For the purpose of modeling, the important distinction to make is whether “service” means increment group, in which case the fixed costs are termed FCCs, or whether “services” mean all services within an increment group, in which case they are increment specific fixed costs or ISFCs. For the models perspective, FCCs are business-wide: common across all increment groups, i.e., access and traffic in the fixed model and subscriber and traffic in the mobile model. ISFCs are common across an increment group alone, e.g., within the fixed access increment, are common to residential and business access, ISDN access ADSL retail and wholesale.

It is worth mentioning that there is implicitly a third type of common cost that must be dealt with at the time of generation of inputs for the LRIC model: the costs that are common to both fixed and mobile within C&W. These costs—which include operational expenditure and non-network capital costs--are allocated within the top-down financial analysis between fixed and mobile, i.e., they are already separated by the time they reach the input stage to the LRIC models. This is discussed in section 4 of the Background manual.

For a graphic distinction between these three types of common costs, please refer to the diagram on page 44 of the Background manual. "Joint cost" refers to ISFCs, "BU Common Cost" refers to FCCs and "TD Common Cost" refers to costs common across a horizontally integrated fixed and mobile service provider.

2. Please provide the details of costs within the specific model that it considers FCC and show an example of how it has applied the Equal Proportionate Mark-Up.

C&W Response

As described in the Background manual, the model iteratively runs scenarios and stores cost results. It will set the value of each service in turn to zero and take the difference in total costs between the service-at-zero scenario and all-services-at-full-volume-scenario to identify the pure LRIC of each service. It will also set all increment groups to zero to identify the ISFCs, and then all services to zero to identify the FCCs. There are a number of ways to look at the LRIC, ISFC and FCC results in the model output. We can look at the services to see how much of their cost is pure LRIC, ISFC and FCC. This is done in sheet "Reconciliation" in the Consolidation file. We provide this in the table below detailing the FCCs and ISFCs for the fixed network. We note that the model does not explicitly report what specific cost makes up the report FCC for each service. It cannot produce a detailed and exhaustive list of what the FCCs include. By conducting running the model in the way that is described in the case studies, we can, however, home in the cost categories that contribute to pure LRIC, ISFCs and FCCs for any particular service.

	Pure LRIC	Fixed Model ISFC-Traffic (Mark-up over Pure LRIC=1700%)	Fixed Model ISFC-Access (Mark-up over Pure LRIC= 194%	Fixed Model FCC Mark-up over Pure LRIC + ISFC=44%)	Fully loaded LRIC^
900-ADSL RETAIL	###	N.A.	###	###	###
900-ADSL WHOLESALE	###	N.A.	###	###	###
900-DOMESTIC LEASED CIRCUITS RETAIL	###	###	N.A.	###	###
900-DOMESTIC LEASED CIRCUITS WHOLESALE	###	###	N.A.	###	###
900-DOMESTIC TRANSIT	###	###	N.A.	###	###
900-FIXED CALL TO C&W MOBILE	###	###	N.A.	###	###
900-FIXED CALL to OLO	###	###	N.A.	###	###
900-FIXED CALL TO OTHER MOBILE	###	###	N.A.	###	###

900-FIXED INTERNATIONAL INCOMING	###	###	N.A.	###	###
900-INTERNATIONAL TRANSIT to OLO	###	###	N.A.	###	###
900-NATIONAL PAYPHONE	###	###	N.A.	###	###
900-PSTN ACCESS BUS	###	N.A.	###	###	###
900-PSTN ACCESS RES	###	N.A.	###	###	###

^ We note that the LRIC models use the acronym "FAC" to refer to the "fully-loaded", i.e., fully marked-up, LRIC. This should not be confused with the fully allocated cost model that was the source of the operational expenditure used in the LRIC model

An analogous exercise can be undertaken for the mobile network model.

3. Are the investments in any network elements allocated through EPM?

C&W Response

Yes, any investment in a network element that is common to an increment group or common to all services is allocated through EPM. These values can be viewed in the Reconciliation, DET VAL, ABS VAL and MLRIC sheets by adjusting the "Mark-up type" filter.

2.3 Modern Equivalent Assets and Economic Asset Lives

1. In implementing the efficient requirements described in Principles 1, 3 and 3 of the Authority's Decision 2005-4, C&W assumed an efficient network using the latest technology current in use. While C&W's LRIC methodology for the fixed network was based on an IP-based architecture (as opposed to the traditional PSTN), the LRIC methodology for the mobile network was based on GSM technologies. Is C&W aware of any cases where new mobile market entrants are still purchasing 2G technology? If not, why has C&W not used 3G GSM technology in the mobile model?

C&W Response

Although this same question was put before us more than a year ago as well (see para. 7 of our Comments of 7 July 2006), we can still answer the same: C&W has not begun replacement of its GSM technology, and, although there are licenses issued for 3G, no other operator on the Cayman Islands that we are aware of is actively implementing 3G. Indeed, when we ourselves posed the question in the public proceeding, no one came forward. Our IP upgrade, in contrast, is well underway and we are aware of competitors implementing similar IP technologies as well.

2. C&W reports that it received input from engineers and vendors to develop its asset lives. Please provide the list of vendors contacted and specifically identify how each vendor reported the economic lives for the fixed and mobile network assets modeled in the study.

C&W Response

The Authority is referring here to a statement paragraph 43 of the Background document. The statement was an allusion to the fact that in the past when it was necessary to apply asset lives to *PSTN assets*, C&W has used asset lives consistent with the benchmarks given in the table. We would have done so after consulting with our own engineers or vendors. We did not contact vendors specifically to ask them about the economic lives for PSTN networks in connection with the development of the LRIC model. There would have been little point. In fact, the paragraph goes on to state that, in C&W's experience, NGN assets are shorter lived.

3. In addition to vendor information and the data shown in the Background document, was there any other source of information and/or assumption used to derive the economic asset lives for the fixed and mobile network assets? What was it?

C&W Response

The source of information on actual NGN asset lives (as well as the GSM asset lives) was the views of our C&W engineers and network staff who have a multi-year history of installing and operating IP equipment and GSM technology in the region and elsewhere throughout the world.

We are now two years beyond the time at which we reported those asset lives. We can say that those lives continue to reasonably correspond to the periods under which one can rely that the technology is supported by the manufacturer and is not discontinued. However, with respect to DSLAMs, we can also say that life in service can continue beyond the point at which the manufacturer produces and supports them. If the economic life of the DSLAM refers to the in-service life in practice, C&W would agree to have the 3 year DSLAM life bumped up to 5 years.

2.4 In-Year Depreciation Charge

4. C&W's BU models use an annuity approach to derive the "annualized capital costs", including the cost of capital. C&W states that a simple annuity approach is similarly used to calculate depreciation. Please explain:

    a. Does it mean that C&W used an annuity approach for both capital costs and depreciation, so that the sum of depreciation and return on capital employed is the same in each year of the defined asset life?

        i. If not, please explain the annuity approach used to calculate depreciation.

C&W Response

First, we would like to note that section 2.4 of the Interrogatories has only one interrogatory which is numbered 4. We trust that this is just a typographical error and that interrogatories 1 through 3 have not gone missing.

With respect to interrogatory 2.4.4a, the answer is yes: the annuity approach incorporates both depreciation and the cost of capital in a single calculation. The value of the annuity, which is applied to the once-off capital expenditure on the asset, is determined by the cost of capital (in this case, the weighted average cost of capital) and the estimated life of the asset. The cost of depreciation is calculated implicitly. Paragraph 47 of the Background document could be omitted entirely.

    b. Why C&W has not used the economic depreciation approach?

C&W Response

We have on a number of occasions stated that we are open to a wide variety of approaches to the calculation of capital costs. Indeed, in the last round of comments we proposed a set of price trends that could be used for a tilted annuity approach to capital costs (see para. 24 of our 7 July 2006 comments).

Economic depreciation will generally result in more of the depreciation being incurred in the early years of an asset's life, and we can expect therefore that the use of economic depreciation will increase the annualized capital costs from where they stand now. The asset lives are already "economic", therefore, the capital charge is higher than what would have been the case under the assumptions of accounting asset lives for previous generation technology.

The switch from the simple annuity approach to a tilted annuity approach that would capture economic depreciation better could be implemented by simply adding the following line below the simple annuity formula and adjusting the appropriate links. In formula below we assume that we want to capture the first years' annualized capital costs.

=Capex*(WACC-relevant price trend assumption)*

(1+relevant price trend assumption)^(1-1)/

(1-(1+relevant price trend assumption)^simple annuity result/

(1+WACC)^ simply annuity result)

2.5 Recharges

1. Please clarify what is meant by the term "recharges". Are these internal corporate charges for services provided to a fixed or mobile business unit? Please identify how and

on what basis the cost is allocated among those that share the service (e.g., uniform mark-up, usage-based mark-up, etc.).

C&W Response

Recharges are indeed internal corporate charges for services provided to a fixed or mobile business unit by another Cable & Wireless Group entity. We took the recharges that were allocated to the Cayman Islands and allocated to network elements (in the case of expense factors) or retail services on a cost-causal basis. We note that the recharges used in the expense factor analysis are described more fully in Appendix 3 of the Background document.

The table below identifies what services and how each recharge type was allocated.

The allocation of the recharges is shown explicitly in the "Expense Factor" sheet of the Consolidation File.

Number	Recharge	Type of Cost	Allocated to	Basis
1.	INTER-Region Recharges IN (2304195) - RNMC	Network Opex	Fixed Core Network Elements	Expense factor: Proportionate to Bottom-up GRC
2.	INTER-Region Recharges IN (2304195) - Jamaica earthstation	Network Opex	Fixed Network International Transmission	Direct
3.	INTER-Region Recharges IN (3304195) - Area Office North	Overhead Opex	All fixed and mobile network elements	Expense factor: Proportionate to Bottom-up GRC
4.	INTER-Region Recharges IN (5004195) Oracle licences	Overhead Opex	All fixed and mobile network elements	Expense factor: Proportionate to Bottom-up GRC
5.	INTER-Region Recharges IN (5004195) (BAR & JAM business support)	Overhead Opex	All fixed and mobile network elements	Expense factor: Proportionate to Network Opex
6.	INTER-Region Recharges IN (6154195) – Cricket	Retail Opex	All Retail Services	Proportionate to Gross Revenue of equivalent services in FAC model
7.	INTER-Region Recharges IN (8004195) Telesales	Retail Opex	Mobile Services	Proportionate to Gross Revenue of equivalent services in FAC model
8.	INTER-Region Recharges IN (9004195) Carrier Service Billing	Network Opex	Interconnect Specific	Direct
9.	INTER-Region Recharges IN (9004195) Carrier Sales & Operations	Network Opex	Interconnect Specific	Direct
10.	INTER-Region Recharges IN (9004195) PLC Support	Overhead Opex	All fixed and mobile network elements	Expense factor: Proportionate to Bottom-up GRC
11.	INTER-Region Recharges IN (5004195)	Overhead Opex	All fixed and mobile network	Expense factor: Proportionate to

	OBS Support		elements	Bottom-up GRC

2.6 Expense Factors

1. The mapping of cost center/activity combination to expense factors should have been provided in Appendix II. Appendix II is either incomplete or missing. Please provide a revised complete Appendix II.

C&W Response

See the revised Appendix IIa for the mapping of Activities to Expense Factors.

2. Each expense factor calculated in the bottom-up models is driven by the Gross Replacement Cost of a network element or group of network elements. (In the consolidation model the expense factors may be driven by either the GRC or the Opex). C&W states that the selection of the driver element or group of elements is based on the way in which the associated activities are allocated in the ABC model.

    a. Does that mean that the ABC model uses the same driver element or group of elements as the ones selected for the bottom-up models?

C&W Response

The ABC model allocations (or stated otherwise, the activity-based cost allocations made within the FAC model) which are explained in detail in the methodology document referenced in 2.1 above were used to inform the development of the Expense Factor Driver Elements in the Bottom Up models. However, the driver element or group of elements are not necessarily the same as in the ABC model. Refer to columns E and F in Appendix IIb.

    b. Please explain how C&W selected the driver element or group of elements for each expense factor (based on the associated activities in the ABC model).

C&W Response

The Driver Element Group represents a high level grouping of the ABC model activities. An analysis was conducted in order to group the more detailed ABC activity assignments around common driver elements. For example, where the ABC allocation would have identified Monitor Core Network and Plan Core Network as separate activities, the Driver Element Group Analysis would result in these being grouped under a common element called Core Network. See Appendix IIb for a detail list of the activities and driver element groupings.

3. When the expense factors are calculated, what investment is used to derive them? Is it book investment? Historic? Current? Forward-looking? Please explain how the investment number is derived.

C&W Response

All expense factors are stated in terms of expense over gross replacement cost[1] of the network element. The GRC of the network elements is the bottom-up cost and is, therefore, forward-looking.

The relevant GRCs that are used and are found in the Expense Factor sheet in row 2 are taken from the bottom-up models, which can be found, for example, in the "Scenario Output" sheet of both the fixed and mobile model. For example, the Softswitch--call sensitive element GRC is CI$### and can be found at cell B3 of the "Scenario Output" sheet.

In column E of the "Expense Factor" sheet of the consolidation file, can be found all the expense factors. For example, for operational expenditure on collecting call data an expense factor of 0.3% is used. This is the annual expenditure CI$### over the total GRC of the relevant network elements. As only certain network elements are involved in the billing process—in particular the switch, voicemail and VAS platforms—this expense factor is only applied to those elements. The bill collection network elements are indicated in row 14. The GRC of these network elements is CI$###. The GRCs of the network elements relevant to each of the expense factors is given in column F. The expense factor therefore produces collecting call data expenditure for the network elements as follows:

Network element	*Bottom-up GRC (CI$)*	*Expense Factor*	*Expense (CI$)*
Softswitch (call sensitive)	###	0.3%	###
Fixed VAS platform	###	0.3%	###
Fixed Voicemail platform	###	0.3%	###
GSM switch(duration sensitive)	###	0.3%	###
Mobile voicemail platform	###	0.3%	###
Total	###	0.3%	###

4. Does C&W believe that the expenses associated with the fixed network will be applicable to the NGN? If so, why? What investigation, if any, has C&W done to validate its assumptions on this applicability?

C&W Response

C&W cannot be certain exactly what the expenses will be once the NGN is completed. The fact is there are certain types of expenditure that may increase the relative that in a traditional PSTN environment and certain types that may decrease. See also response to interrogatory 3.2.1. Without data that will only be available after complete transition to NGN, it is difficult to say what will be the net effect on any particular network element's opex. However, as the opex numbers

[1] In a few cases of overhead opex, they may be stated on the basis of bottom-up network opex, but in these cases the bottom-up network opex was itself allocated on the basis of GRC.

are from the period in which the transition to NGN had begun, however, we believe these numbers are the best estimates available.

Another reasonableness test is to look at the benchmarks for expense factors from bottom-up PSTN studies. In the table from page 23 of our draft costing manual, you will see that the FCC and Malaysian studies provide expense factors on the low-end with single digit percentages, the ACCC and Europe Economics represent high-end expense factors in the twenties to forties. Our analysis of the fixed network opex gives a total of CI$### in expenditure (cells F30-F101 in "Expense factors" sheet in the fixed model) over an investment (GRC) of $### (row 4 in "Expense factors" sheet), which is about 10.2%--somewhere in the middle of the results of these two sets.

5. In its Decision 2005-4, the Authority states that the calculation of network operating costs should be developed based on a bottom-up approach and considers that the use of expense factors, adjusted for productivity gains, a reasonable method of estimating operating costs. Please explain why C&W included expense factors for "Annualized Capital Cost of Support Assets and "Annualized Working Capital Cost" (in the Fixed and Mobile Network models) if the Authority considered the use of (adjusted) expense factors just for estimating operational expenses? Does C&W consider these operating expenses? How and why?

C&W Response

C&W has adopted the principle of estimating all network related costs through a bottom-up approach. This is consistent with Principle 2 of the Authority's Decision 2005-4, in that, C&W has estimated all direct network capital costs under the bottom-up scorched node assumption and all network operating costs and network support capital costs (Assets and Working Capital) through the use of expense factors. C&W thought it reasonable to allocate network support capital costs through expense factors since these are capital costs realized through the level of use of the network assets. In other words the expense factors represent the causal link between the direct network assets and the supporting capital costs, noting of course, that these costs may prove difficult to reasonably estimate otherwise.

C&W believes that to run a telecommunications business, a company must invest in assets beyond network. These assets include buildings, furniture, computer equipment and vehicles. All other bottom-up studies we have seen include some sort of allowance for these assets, indeed, our list of expense factors from other bottom-up studies on page 23 of the Background section of the draft manual similarly included benchmarks for common cost investment. Furthermore, we did not consider that the Authority, by omitting a reference to these costs, was suggesting that such costs should be excluded. The Authority has no reasonable basis, after all, to determine that there should be no provision for buildings, furniture, computer equipment, vehicles and other non-network assets. Without specific guidance from the Authority on support assets, we proceeded as we had seen done elsewhere, i.e., through expense factors. We took a similar view with respect to working capital. The cost of service provision ought to include an allowance for working capital—expense factoring seemed the natural approach.

6. Has C&W adjusted its expense factors for productivity gains? If so, how?

C&W Response

C&W did not adjust its expense factor for productivity gains as it was taking the most recent financial data available to it at the time—the first 9 months of the 05/06 financial year, which were then annualized.

2.7 Calculation of Retail Costs

1. C&W states that it calculated the non-network costs for Retail services using a top-down approach in a separate MS Access model and imported to the service cost statements in the consolidation and reporting module. Please provide the abovementioned MS Access model.

C&W Response

The MS Access model was used to populate the consolidation file with the appropriate numbers. In fact, so long as the user is not refreshing the retail costs (as prompted when opening the consolidation file) the MS access program is not used at all in the LRIC models, it is therefore not an integral part of the LRIC models.

We did not include the MS Access model as, we did not and still do not believe that it is integral to the LRIC model and may distract from an examination of the model. However, to be responsive we are forwarding the MS Access model as well as a user's manual (which is attached as Appendix VII). The MS Access model is provided on a confidential basis.

2. Please provide the list of all non-network cost categories (operating expenses and capital balances) for which the Top-down approach was used in order to allocate these costs to network elements and services.

C&W Response

See the enclosed document in Appendix IIc entitled Non Network Cost Categories

3. Please provide the mapping of the financial accounts to cost categories.

C&W Response

The top-down analysis of retail costs does not include a direct mapping of Financial Accounts to Cost categories, but rather Activity Costs as defined and mapped in the revised Appendix IIa and IIb. A full description of the account separation exercise, which provides details as to how the Financial Accounts are treated in the ABC model, is included in our response to 2.1 above, the FAC/ABC Methodology Document.

4. C&W states that Cost Volume Relationships have been developed for the more material and functionally important cost categories. The other categories use either Straight Line Through Origin (SLTO) or Horizontal Fixed Element (HFE) shaped CVR curves. Please provide:

    a. The list of CVRs that have been explicitly developed

C&W Response

See the Excel file in Appendix III, which captures the underlying analysis of the CVRs developed for the top-down part of the model. In the 'Summary' sheet, rows 7 to 12 lists the CVRs explicitly developed.

    b. The list of CVRs modeled as SLTO

C&W Response

See the Excel file in Appendix III, 'Summary' sheet, column 'G' for all CVRs listed as 'SLTO'.

c. The list of CVRs modeled as HFE

C&W Response

See the Excel file in Appendix III, 'Summary' sheet, column 'G' for all CVRs listed as 'FLAT'.

5. Please explain the process undertaken for developing/modeling each CVR (of cost, asset and liability) and provide:

a. A description of each cost category indicating whether the cost category is Independent, Semi-independent or Dependent.

i. For each Dependent cost category, please also provide the Dependency Group (describing the dependency hierarchy).

b. The cost driver identified for that CVR.

c. The most material elements of cost in the category, and how they might vary in respect of the cost driver volume.

d. The minimum point and the assumptions regarding the economies of scale.

e. The method for linking the minimum and maximum point describing the shape of the cost curve and where data points have been interpolated.

f. The Increment-Specific Fixed Cost relative to each increment.

C&W Response

Section 5 of the Background document provides a thorough description of the CVRs and the method employed in developing them. Specifically, subsections 82 through to 85 speak to the construction of the CVRs and the method used to determine the intermediate points. Also, see the Excel file in Appendix III captures the actual CVRs developed and their underlying assumptions see sheets CVR_01 to CVR_06.

The enclosed file contains the following information:

Sheet 'Summary' captures the list of CVRs, CVR types, Drivers, Materiality and ranking.

Sheet 'Group List' captures the Dependency Groupings

Sheet 'LDA' captures the Dependency order and Drivers assigned

Sheet 'LGS' captures the CVR graphs, Driver element and affected elements.

Sheet 'ISFC' captures the Dependency order and the ISFC percentage values for the different cost categories.

Sheets 'CVR_01' to 'CVR_06' capture the graphs and descriptions of the specific CVRs developed.

6. Please provide the LRIC Driver Affected (LDA) table (which defines the dependency hierarchy).

C&W Response

See response to 5 above.

7. What is the basis of "product profitability reporting"?

    d. What data are these percentages based on?

    e. How are they calculated?

    f. Please provide the assumption percentages and their derivations.

C&W Response

The 'Product Profitability Reporting' is another term used to refer to the Cost Separation or FAC/ABC cost model. See response to 2.1 above for the methodology document.

8. What are the specific retail costs that are allocated top-down in the model?

C&W Response

See response to 2.7.2 for a list of the retail costs allocated TD in the model.

9. Are the investments (converted to costs) of any network elements allocated in a top-down fashion? If so, which ones and how?

C&W Response

No.

2.8 Equity Market Risk Premium

1. How was the EMRP developed?

C&W Response

The equity risk premium is the amount of added expected return that investors require to hold a broad portfolio of common stocks instead of risk-free government securities. The expected return can be developed using a discounted cash flow model or examining historical data on the return on a portfolio of common stocks. We looked at historical data on return on common stocks from Ibbotson Associates, Stocks, Bonds, Bills, and Inflation Yearbook, 2005.

2. Please provide the data and formulas used for calculation of the EMRP.

C&W Response

The spreadsheet containing data and calculations are attached herewith in Appendix IV.

3.1 Network Methodology

1. Section 2 "Methodology" Subsection 8 "Description of Network Components" contains the sentence "This section provides a description of the network components modeled."

Please provide a complete and full description of the fixed network components complete with their engineering and dimensioning information.

C&W Response

An apology is warranted here since there seems to be an error in the formatting of the document paragraphs. Subsections 9 through to 13 should be subsections of 8 'Description of Network Components'. Subsections 9 through to 13 fully describe the network components modeled in the fixed bottom up model.

The dimensioning information is available in the Technical assumption and Dimensions sheets. If there are specific queries or pieces of information the Authority feel is lacking in respect of the engineering and dimensioning used in the model, please let us know.

2. In Section 2 "Methodology" Subsection 14 "Network dimensioning rules and assumptions" merely contains the sentence "This section describes the rules and assumptions that underpin the dimensioning of the fixed and mobile networks." Please provide a complete and full description of the network dimensioning rules and assumptions used in the dimensioning of the fixed network.

C&W Response

Again C&W apologizes for this error in formatting, Subsections 15 through to 37 should be subsections of 14 'Network Dimensioning Rules and Assumptions', as these fully describe the dimensioning rules employed in dimensioning the fixed model network elements.

The dimensioning information is available in the Technical assumption and Dimensions sheets. If there are specific queries or pieces of information the Authority feel is lacking in respect of the engineering and dimensioning used in the model, please let us know.

3.2 Service Equivalence and Relative Costs

1. Is C&W aware if the engineered "Grade of Service" and "Quality of Service" associated with the IP network for the support of voice traffic is equivalent to that of the PSTN? What steps, if any, has C&W taken to achieve this goal and to validate that it has been met?

C&W Response

Ensuring QoS on an IP network involves a different process from that on TDM voice network as there are discrete circuits per call. However, the NGN is built for voice traffic, and the QOS must be the same as on a TDM voice network. With the IP network, C&W monitors overall peak traffic over all IP links and ensures there is enough capacity to carry peak traffic.

2. In C&W's Comments filed 7 July 2006, C&W states in paragraph 3 that the IP-based network is lower cost in comparison with traditional PSTN equipment even in the consideration of the shorter asset lives. Table 1 is included and said to contain a comparison of the annualized capital costs and depreciation of traditional PSTN assets and NGN network elements as produced by the LRIC model. Please clarify the following:

    a. Table 1 does not show the depreciation data. Please clarify this and provide the depreciation data.

C&W Response

The annualised capital costs include both the return on capital and depreciation. With respect to the PSTN values, please find the spreadsheet in the confidential Appendix V with the cost of capital and depreciation disaggregated. PSTN values are based on the asset values found in the FAC model that we are submitting in the response pertaining to the cost separation methodology of interrogatory 2.1.1. In the discussion here we refer to the location of these assets in the FAC model, but for convenience the rows are replicated in the spreadsheet in Appendix V.

The Network Opex can be found in row 6 of the of the "Expense" worksheet of the "Network cayman 2006 v13". In particular, the sum of B6 and C6 gives PSTN international transmission network opex, the sum of D6 through I6 gives the PSTN switching network opex, the sum of J6 through N6 gives PSTN domestic transmission, Y6 gives PSTN local loop network opex and the sum of AB6 and AC6 gives PSTN interconnect network opex.[2]

For depreciation, one conducts a similar exercise with the figures in row 5 of the "Assets" worksheet of the Network cayman 2006 v13 workbook.

For the cost of capital, one conducts a similar exercise with the figures in row 21 of the "Assets" worksheet of the Network cayman 2006 v13 file workbook and multiplies by 13.5%.

With respect to the LRIC values, depreciation values are not explicitly calculated because the model uses an annuity approach to capital cost.

We note that in undertaking the comparisons as C&W did, we were addressing the point that Digicel seemed to be making which was that the prices for fixed interconnection services that are now in place were formulated on a lower cost basis than those proposed under the LRIC model. Our point is that this is not the case, and we compared the two cost bases to demonstrate that.

It is in fact very difficult to make simple comparisons between the cost base under the FAC approach and the LRIC approach. For example, the FAC model used a different data set and approach for calculating cost of capital; and the FAC uses a Net Book Value rather than Gross Replacement Cost.

Finally, it is worth noting that given price changes over time, we are facing something of a moving target. As we mentioned in our July 7, 2006 comments the NGN equipment prices are from late 2003 or early 2004, and updating the pricing will bring the fixed LRIC model costs down further still.

b. How were PSTN assets matched to the NGN assets?

C&W Response

Please find an explicit mapping if the PSTN to NGN Assets in Appendix V.

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[2] We note that the annualised capital cost for international transmission should be CI$### rather than CI$### found in the table of our 7 July 2006 submission due to an inadvertent inclusion of network opex; however, the conclusion remains the same in respect of the level of PSTN vs. NGN cost- it is higher.

c. How did C&W derive the annualized capital cost of the PSTN Network Assets. Was an annuity used?

C&W Response

As the reader can see from the calculations in the spreadsheet in Appendix V the annualised cost of the PSTN Network Assets was accomplished through a straight addition of the capital cost and depreciation. Again, we were addressing a comment about the level of LRIC costs against those derived under a FAC approach. That FAC approach did not use an annuity approach for annualized capital cost but rather straight-line depreciation plus cost of capital off of the NBV.

d. How did C&W derive the network opex? What is meant by saying that the same analytical approach was used for network opex as used in the expense factors?

C&W Response

The derivation of the network opex for the LRIC Network Assets applied the same analytical approach as that for the network opex in the PSTN analysis. Please see our response to interrogatories 2.1.1 and 2.6, for a discussion of drivers and allocation basis for network opex. See, as well, the attached FAC model.

3.3 Technical Assumptions

1. Please provide explanation and justification for the following assumptions on the "Technical Assumptions" worksheet:

a. cell C15: Softswitch ratio of call-sensitive/duration-sensitive

C&W Response

In the absence of a more reasonable estimate for the proportion of a softswitch that is call sensitive vs. the proportion that is duration sensitive, C&W thought it most reasonable to allocate this on equal 50/50 basis. Nonetheless, the results of the LRIC models are posted on a per minute basis in any event, making such a split immaterial.

b. cell C19: Max Lines per MG

C&W Response

This represents the maximum number of customer lines typically carried by an MG/MSAN and indeed as is currently installed in C&W's network.

c. cell C21: Circuit Efficiency Factor

C&W Response

The fixed model defines Circuit Efficiency Factor as the maximum desired utilization of traffic ports. 66% represents a reasonable and conservative estimate of the level of utilization obtained for optical transmission systems, which may range between 65% and 75%. This estimate was

employed in determining the required transmission capacity for the Interconnect and International transmission links.

3.4 Demand and Traffic Assumptions

1. What is the source of the traffic and demand data assumptions used in the fixed model? How were they developed?

C&W Response

C&W developed these demand levels based on its expectation of how the market and competition might develop over the three years following the time of the modeling. We will look at each of the services in turn below. We also include a spreadsheet with the explicit calculations in the confidential Appendix VI. Please note that in the following discussion and in the spreadsheet terms like "current" and "today's" refer to the 05/06 period.

ADSL Retail. Firstly, we assumed ADSL retail service demand would remain primarily driven by residential demand. ###. ### ### ### ### ### ### ### ### ### ### ### ### ### ### ### ### ###. ### ### ### ### ### ### ###-### ### ### ### ### ### ### ### ### ### ### ### ###.

ADSL Wholesale. We assumed wholesale would be equivalent to ###% of retail sales.

Dial-up usage. We assumed that ###% of residential lines would remain using dial-up usage. It is the equivalent of ###% today, but much of this demand will migrate to broadband services. We estimate that each line will make ### ### a day on average and that call will last ### minutes. This figure for average call duration was based on data from 05/06.

Direct Connect (also referred to as Direct Internet Access). We assumed that the fixed network would be able to maintain 50% of the 05/06 C&W level of DIA. This does not mean that the overall market would not expand just that the representative fixed network modeled would have less than the monopoly service provider. Therefore of the ### lines C&W sold in 05/06, the hypothetical network would be selling ###, each at a speed of ### ###, which is ### times the current average speed.

Domestic retail and wholesale DQ. For the retail volume, we assume that each line makes an average of ### DQ calls a month. We use the current average call duration to estimate minutes. Wholesale calls and minutes are assumed to be 50% of the retail numbers.

Domestic retail and wholesale Leased Lines. Again, we assume that the operator sells 50% of the 05/06 C&W level of leased lines. We assume that the average speed increases to ### ### for retail. This is roughly twice the average current circuit bandwidth found today. We note that, based on actual C&W data, the average speed of the wholesale line is ### than that for retail, and we therefore assumed that the same speed differential, such that the average speed of wholesale leased line increases to ###.

Domestic transit. We assumed domestic transit should be derived between third party fixed and mobile networks. In particular, we assumed that domestic transit will consist of mobile-to-mobile and OLO-to/from-mobile. For these two transit traffic types, then, we multiplied PSTN termination traffic by 2. We also assumed that the mobile-to-mobile traffic would continue to transit the fixed network. We therefore multiplied the Mobile-to-mobile traffic from the mobile network by 2 to capture balanced traffic flow between two mobile operators.

Emergency Retail and Wholesale calls. We assumed that 5% of residential and business lines would make a single emergency call per year and that call would last only one minute. Wholesale calls would be half of those totals.

Fixed to Mobile calls. These volumes are derived in part on an assumption that the current on-net – off-net pricing distinctions are likely to become less pronounced as the mobile termination rate reduces. We assumed that the same level of fixed-to-own mobile calling is maintained (effectively, a reduced market share in mobile calling and access lines is compensated in equal measure by underlying growth in minutes). Calls to third-party mobile ### ### ### ### ### ### ### ### ### ### ### ### ### ### ### ### ### ###. The average duration of each of these calls is based on current duration. Fixed-to-own mobile is ### minutes per call. Fixed-to-other mobile is ### minutes per call.

###. ### ### ## ### ###. ### ### ### ### ### ### ### ### ### ### ###.

Fixed International Incoming and Outgoing. We believe that the switch to IP will have ### ### ### ### ### ### ### ### ###. For inbound and outbound international calling, we assume that the fixed operators achieves ### ###, ### ### levels of volume both in terms of calls and minutes. We note that this is achieved on a lower subscriber base.

Fixed Voicemail. We began with the assumption that at least the same proportion of residential lines that took up this service in 05/06, would take it up over the forecast period. We also assumed an additional stimulative effect of 20% over the period. We then assumed that the subscribers taking up the service would make at least the same number of calls on average. We took the average calls per subscriber and increased that figure by 20%. Thus, relatively more subscribers pick up the service and each call in for messages more often. Finally, we assumed that the duration of the voicemail calls remains the same as it was in the 05/06 period.

International Retail and Wholesale DQ. For retail DQ, we assume-based on our best guess-that on average across all business and residential lines subscribers use DQ ### times a year. We further assume that these calls last on average ### ###. We assume that wholesale DQ calls and minutes are half of what the retail volumes are.

International Retail and Wholesale Frame Relay. We assume that retail and wholesale frame relay lines ### ### ### ### ### ### ### ### ### ### ### ### ### ### ###. We assume that the average speed of a frame circuit remains about what was in 05/06: ### ### for retail and ### ### for wholesale.

International Retail and Wholesale Leased Circuits. Similar to frame relay, we assume that retail and wholesale IPLCs ### ### ### ### ### ### ### ### ### ### ### ### ### ### ###. We assume that the average speeds remain about what they were in 05/06: ### ###.

International Payphone. We assume that ### ### ### ### made on a payphone per day and that on average ### ### ### minutes.

ISDN Access Retail. We assume that the ISDN subscription ### ### ### ### ### ### ### ### of the total number of business lines.

National Payphone. We assume that the number of payphones ### ### ### ### ### ### ### ### of the total number of residential lines. The number of domestic calls made from each of these payphones assumed to be ### per year, and on average they last ### minutes.

Operator Assistance. We assume that each business and residential access line make on average ### operator assistance calls a month. Each call is assumed to about ### minutes—the current average.

PSTN Access-Business. We assume that the operator operates ### ### ### ### ### of business exchange lines—reflecting market share loss.

PSTN Access-Residential. We assume that the operator operates a number equivalent to ### ### ### of residential exchange lines.

Fixed Call to OLO. In the absence of any forward looking data on other licensed operators, we assumed the same number of calls and call duration as those calls destined to the C&W mobile operator.

PSTN Termination. We added the traffic from the mobile model for mobile-to-fixed calls and multiplied by two to reflect two equal sized mobile operators. We then assume the other licensed operators will send a volume of traffic equivalent to 25% of the on-net national calls.

National Call Retail. We do believe that the switch to IP should have an ### ### ### ### ### ### ### ### ###. For national calling we assume that ### ### ### ### ### ### ### ### ### ### ### ### ### ### ### ### ###. We assumed that the call duration is similar to today's average.

International Transit from and to OLO. Whereas we have data on international transit to OLO, we do not for international transit from OLO. For simplicity, we have assumed that the number of outbound International transit calls and call duration are 50% of the inbound traffic terminated on the fixed operator itself. For inbound international transit call volumes we also assume 50% of inbound traffic to the inbound traffic terminated on the fixed operator itself, but for call duration we take the average for the 05/06.

2. Have traffic and demand projections been adjusted in any way to account for possible new demand levels and patterns that may emerge with the installation of the IP-based network?

C&W Response

Yes, as the description above indicates the fixed network volumes are at least as much as the per subscriber demand than the 05/06 levels. In most instances, they are significantly greater: ### ### ### ### ### ### ### ### ### ### ###. We also assume that bandwidth demanded per circuit increases.

3. How has C&W taken into account the impact on the cost allocations for the study of the provision of new or existing data services over the IP network?

C&W Response

The question is not entirely clear. The fact that this is an incremental cost model means that the cost allocations will vary by the volume increments of the services. Any assumption in respect of the volumes will impact the cost allocation.

In any case, all fixed services are provided over the same platform in this model. Thus, the economies of the converged network are implicit in the modeling. Please note that the routing

factor table quite clearly shows the linkages between the services and the network elements they use.

4. There is an annual growth rate factor for LINES. Is it assumed that growth rate for call volume remains constant and only varies with number of lines? (That is, is it correct that calling volume —number of length of calls remains constant over time?) If so, what is the basis for this assumption?

C&W Response

No. As the discussion above indicates, we have made a number of assumptions of growth in the other services. The growth in these services is not embedded in the model, but rather embedded in the initial level of the volume input.

5. Has C&W accounted in its demand and traffic projections due to use of VoIP, for possible changes in fixed-mobile calling patterns or for mobile substitution? If so, how? If not, why not?

C&W Response

We have accounted for an expansion of those types of fixed traffic where VOIP options are currently available, in particular in fixed-to-fixed national calling and international outbound and inbound calling. The fact that the mobile traffic is not assumed to be susceptible to that effect means implicitly that there is movement in relative terms in favour of fixed calling. Again, the stimulative effects are described in the response above at 3.4.1.

6. The same line growth rate (###%) is applied to all services (POTS, DSL, Leased Lines, ISDN, Wholesale). Is this correct? What is the basis/justification for this assumption?

C&W Response

While it is true there is a ###% growth rate for fixed access lines (and services tied to the access lines, e.g., ADSL and VAS) embedded in the model, the more significant factors are the assumptions that went into the base figures which are described above at 3.4.1. We prefer to think of the ###% as an underlying growth rate after the fundamental determinants of fixed network access demand have already been reflected in the base figures. Those fundamental determinants are adjustments to competitive market share and the increase in the take-up (in the case of ADSL).

7. Certain spreadsheet tabs (namely, "Demand Calculations" and the "Volume for TD"), show numbers for volume-minutes associated with the ADSL Retail service. What do these numbers represent in the context of this particular service, given that usage tends not to be a cost driver for Broadband access services such as DSL?

C&W Response

As some network assets are shared between voice services (measured in annual minutes) and data services (capacity measured in E1s), it is necessary to have some way to allocate these asset costs using a common volume driver. For this reason, services with E1s as the volume driver have also an equivalent minute driver.

3.5 Cost Assumptions Worksheet

1. Are the unit cost inputs for fixed equipment/materials based on supplier list pricing or do they reflect any kind of discount? If so, how much and how are they applied?

C&W's Response

The prices listed in this sheet represent pre-discounted current prices. These are current prices in so far as they were obtained from C&W's engineers who were then working on the outside plant reconstruction (after the devastating hurricane Ivan of 04/05) exercise and roll out of C&W's NGN.

2. The mobile model takes into account the use of equipment spares. This is not evident in the fixed model. Is it considered? If not, why not?

C&W's Response

No, spares were not explicitly shown in the fixed model; however, a consideration for spares has been included in the investment costs listed.

3. Please provide explanation and justification for the planning cost as % of Capex (cell B11 in the "Cost Assumptions" worksheet).

C&W's Response

This planning factor was determined in consultation with C&W's engineers as a reasonable method for estimating the cost of planning associated with capital investment. Application of this factor is reserved for those assets where an associated planning cost is not explicitly stated.

4. Why is the formula for the planning price of shared duct treated differently from all other equipment of the worksheet? The formula for most equipment is (Equipment purchase price * Installation Labor) * Planning cost as % of Capex, but the formula for the planning price of Shared duct (2-bore through 12-bore) Cells: C30 - C78 is: Equipment purchase price * (1 + Planning cost as % of Capex).

C&W Response

This is an error and should be corrected, planning cost should be estimated using the formula (Equipment purchase price * Installation Labor) * Planning cost as % of Capex.

5. Why is there no investment for Underground 6 pair dropwire Cells C99 - H99?

C&W Response

C&W does not have 6 pair underground copper drop-wire in its network in Cayman, therefore no price is listed for this item.

6. Why are there no planning investment for 8 fiber optical cable joints Cell G:198

C&W Response

This is an error to be corrected, the formula (Equipment purchase price * Installation Labor) * Planning cost as % of Capex should be applied to estimate the planning cost of the 8 fiber cable joints.

3.6 Routing Factors

1. What is the source of the routing factors used in the fixed model, and how were they developed?

C&W Response

In the first stage, each service is analyzed in collaboration with C&W engineers to determine which routes are theoretically possible for it to take. Each route can be defined in terms of the number of network elements it requires, and the specific quantity of network elements.

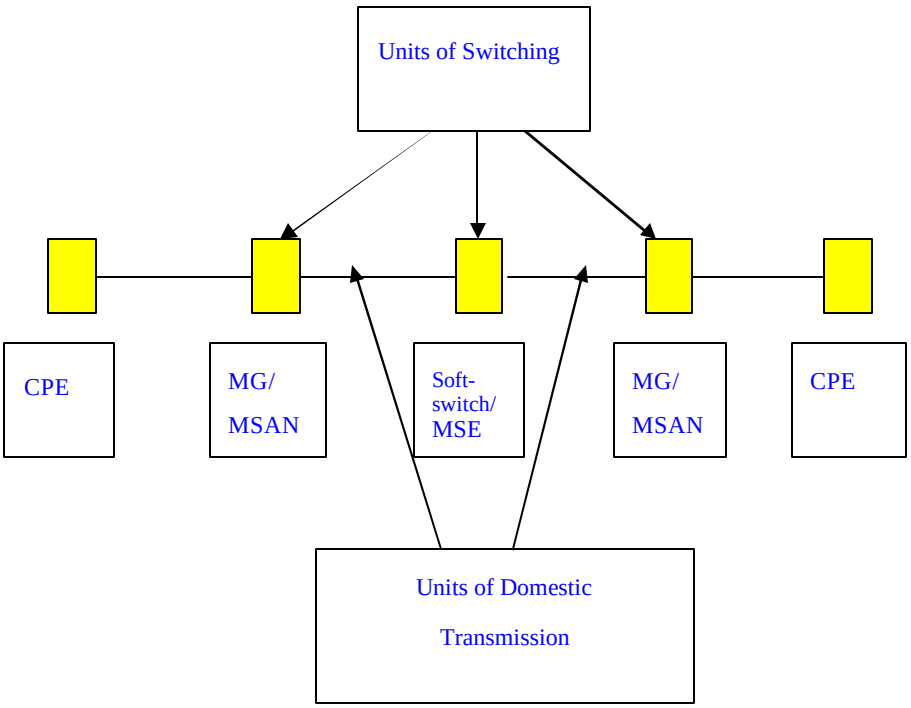

Figure 1: Hypothetical National Call

For example, from the diagrams above we can determine that a National Call uses two bits of the network element National Transmission and three bits of the network element Switching. Indeed some route factors were determined through this first step, this is possible given the simple nature of the modeled network - two switches and a single point of interconnection.

However a second step may be required for some call types, this second stage involves an analysis of the Call Data Records (CDRs) within the switches to determine the probability of each call type taking a particular route. The volumes of each service can now be combined with the probabilities and the quantities of each network element to determine the Usage Factor Matrix.

3.7 Asset Lives

1. How did C&W choose the asset lives assigned in the model, considering those identified in its benchmarking?

C&W response

We used the benchmarks where applicable. Where there were instances where C&W experience was at variance with the benchmarks, we used our own experience. Also, we could find no benchmarks on NGN assets, so we relied on our experience.

2. What specific pieces of equipment are considered "NGN Equipment" for the purpose of application of the asset lives?

C&W response

All the pieces of equipment specified in the "NGN Cost" sheet in the fixed LRIC model.

3. What is the source or basis for the five-year life assigned to "NGN Equipment"?

C&W response

C&W experience with IP Equipment and asset retirement plans. Also, see our response to Interrogatory 2.3.3.

4. What is the source or basis of the three-year asset life assigned to the DSLAM?

C&W response

C&W experience with DSLAM Equipment, but see also our response to Interrogatory 2.3.3.

3.8 Core Fiber Costs Worksheet

1. Why does the sheet make reference to 6 fiber aerial optical cable and incorporate costs for this cable type into the total fiber and joint costs when no investment data exits for this cable type on the "Cost Assumptions" worksheet?

C&W Response

The model does not include an investment cost for 6 fiber aerial optical cable as this was assumed to be the same as that for 8 fiber, nonetheless we acknowledge that this should have also been shown explicitly in the Cost Assumptions sheet. The model does include a quantity of 6 fiber as shown in the Core Fibre Dimensions sheet, cell B5 against which the assumed cost was applied.

2. Why does the sheet use 12 fiber optical cable investment for both 8 fiber aerial optical cable and 8 fiber underground optical cable when 8 fiber optical cable investment exists on the "Cost Assumptions" worksheet?

C&W Response:

This is an inadvertent error and will be corrected.

3.9 MG Costs

1. Please explain the calculation for the Fixed Cost per MG and the Variable Cost per MG on the "MG Calculations" worksheet:

   - The equation for Fixed Cost per MG calculation (worksheet "MG Calculations" column E) is:

     Fixed Cost as % of Total RSU/MG Investment * Total RSU/MG lines

     ***RSU/MG Investment per port / Number of RSU/MG's**

     Where the Fixed Cost as % of Total RSU/MG Investment is the intercept of the MG total investment vs MG total subscriber curve.

   - The equation for Variable Cost per MG calculation (worksheet "MG Calculations" column F) is:

     Total Cost per MG - Fixed Cost per MG

   - The Fixed Cost per MG is unitized be dividing by the number of lines (worksheet "NGN Costs" G35) and the Variable Cost per MG is unitized by dividing by the number of minutes (worksheet "NGN Costs" F:35).

   The above calculation method for splitting the MG cost into fixed and variable costs in not based on the MG dimensioning rule and component function. It has the effect of placing the investment for MG components which are dimensioned solely on the basis of terminations (such as termination units) in the Variable Cost per MG, which is unitized on the basis of minutes, while the investment for fixed MG components (such as racks, frames, etc.) are placed in the Fixed Cost per MG, which is unitized on the basis of lines. Please explain.

C&W Response

There seems to be a misunderstanding in the interpretation of the MG unit costs calculation in the NGN Costs sheet. The actual calculation of the unitized MG costs divides the Fixed costs using minutes and the Variable costs using lines and not the other way around as stated above. The MG unit cost calculated in the NGN Costs sheet is consistent with the NGN dimensioning rule.

2. Please explain the calculation for the Fixed RSU/MG Investment per port (worksheet "Cost Assumptions" E270). This calculation appears to be based on two different types of equipment: (the Nortel NGN and the AXE RLU/RSM). Please provide more detail about each type of equipment and explain the use of each in this calculation.

C&W Response

The reference 'worksheet "Cost Assumptions" E270' seems to be incorrectly stated as checks have not revealed the above issue. Please clarify further.

It should be noted however that cell E270 of the "Cost Assumptions" sheet provides a cost per line based on MG equipment actually installed in C&W's network at the time. The list of MG equipment is cited in rows 255:266.

3.10 Expense Factors and Retail Costs

1. In what ways has C&W adjusted PSTN-based expense data to account for the expense variations likely to apply to the NGN network (e.g., modern equivalent assets' maintenance required, energy consumption, accommodation, etc) with respect to:

    a. The network operating expenses estimated using the expense factor calculations

CW Response

C&W believes that the jury is still out on the balance of expense savings in the transition to NGN. It is true there are savings in terms of space and power. However, software and technical support appear to be higher than the PSTN environment. Still, we did make some adjustments to capture anticipated economies in expenditures. We eliminated CI$### of annual switching opex which was allocated to the "international switch" in the FAC model. We also eliminated ###% or CI$### of the fixed network opex associated with recharges.

    b. The non-network operating expenses estimated using the top-down LRIC calculations

CW Response

We made one major adjustment to the non-network operating expenses to eliminate 90% of hurricane management recovery costs. Admittedly, this has nothing to do with the transition to the NGN network. However, it does impact the cost-base of the fixed network.

2. Has C&W made any adjustments to current network expense data to account for the moving from separate networks for voice and data services to one integrated IP-based fixed network, which would potentially bring cost savings coming from having one single fixed network to maintain and manage (as opposed to different networks for voice and data services), reduction in the number of routes to be maintained, reduction in the number of access nodes, consolidation on fewer sites, improved scalability of IP networks and other sources of economies of scale and scope?

CW Response

Please note our response to 3.10.1a above. Further, however, we refer the Authority to the comments in our 7 July 2006 submission, paras. 6-11.

3.11 Cost Summary and Mapping

1. Why is the optical fiber cable and joint costs split between host and remotes using the ratio 25% host and 75% remote Cells D21 - E21 on the "Cost Summary and Mapping" Worksheet? What is the basis of this assumption?

C&W Response

This 25:75 split between host-host and host – remote fiber and joint costs represents a rough engineering estimate of the proportion of km length of fiber linking the two host exchanges and the host exchanges and their respective remotes, taking into consideration the average number of joints per km fiber. This estimate was deemed reasonable having taken into consideration the km lengths of the 3 fiber rings (off which the remotes are connected) and the direct fiber link between the two host exchanges.

3.12 Case Study

1. Section 4 "Case Study" Subsection 51 states "Again, we have made these simplifications to facilitate presentation. Upon request we will be happy to provide a more detailed demonstration of the Model." Please provide a full and more detailed demonstration of the Model without any simplifications.

C&W Response

The statement quoted above is meant to convey that C&W would be happy to make a direct presentation (in confidence) of the model if so desired. This is in recognition that a full understanding of the model may be better achieved through a "one on one" presentation where questions or issues can be raised, discussed and indeed, where possible, answered immediately.

2. Section 4 "Case Study" Subsections 67 and 68. If this example is based on the actual model, please give cell references for each of the values cited in these subsections. Please give cell references and value changes for all input changes to produce the changes in costs described in these subsections. If the example is not based on the model, please provide one that is.

C&W Response

See the reworked fixed line case study from section 18 through to section 25 which references the version of the model submitted.

3.13 Workbook Notes

1. Missing Workbook Notes: Several of the Worksheets within the Fixed Model Calculation Workbook contain references to "notes." For example:

    a. "Duct Dimensions" worksheet contains references to "see note 1" in cells B9, B11, B13.

    b. "Core Fibre Calculations" worksheet contains references to "see note 4" in cells B6 and B14 and "see note 9" in cells B18 and B19.

   Please provide the notes identified by these references.

C&W Response

These references do not pertain to the model and should have been deleted before submission. C&W apologises for their inclusion.

3.14 Macros

1. Please provide complete descriptions as well as step by step code descriptions of the following macro sub-routines contained in the Fixed Model Calculation Workbook:

    a. Sub GenerateRF()

b. Sub RunIncrement(strIncrement As String, intIncrementRow As Integer, ByRef intOutputRow As Integer)

c. Sub RunBIG_Increment(strIncrement As String, ByRef intOutputRow As Integer)

d. Sub RunBUmodel(strDatabaseName As String)

e. Sub update_fac()

f. Sub update_volumes()

C&W's Response

See the attached Macro Documentation, section Fixed and Mobile Model macros for a description on macros used in both the fixed and mobile models.

3.15 Bugs and Possible Calculation Errors

Below is a list of possible bugs and calculation errors in the Fixed Model Calculation Workbook. If any of these calculations are not errors please provide a full and detailed explanation of the calculation.

1. Macro bug: Volume Inputs: Go To button tries to access worksheet "Vol_IP_for_TD" instead of worksheet "Volume_Input_for_TD"

C&W Response

C&W apologizes for this error and will make the necessary corrections.

2. Calculation Error: Worksheet "MG Calculation" cells: E7 through E54: The equation in these cells reads:

='MG_Analysis'!$F$25*SUM($B$7:$B$72)*'Cost_Assumptions'!$D$236/COUNTIF($A$7:$A$72,"<>""")"

The reference in SUM($B$7:$B$72) appears to be incorrect. Should the reference be SUM($B$7:$B$55)?

The use of function COUNTIF($A$7:$A$72,"<>""") appears to be incorrect. Should the use of the function be COUNTIF($A$7:$A$55,"<>0") or replace the function with a reference to cell F3?

C&W Response

Yes, both of these statement contain and error. We will correct both. With respect to the COUNTIF error, we would prefer to change the function to COUNTIF($A$7:$A$55,"<>0"). We note that the errors cited here causes only a slight overstatement of the fixed component cost in column E of the MG Calculations sheet.

3. Calculation Error: Worksheet "NGN Costs" cells: C21 and E21. The equation in cell C21 reads: =Cost Assumptions'!F248. The equation in cell E21 reads: =C21. This price position on worksheet "Cost Assumptions" cell F248 is divided by quantity of 2 to calculate the price per unit. In cells C21 and E21 it is shown as part of the per network price positions and not per site price positions. Therefore it is multiplied by 1 to calculate the total cost. Is this correct?

C&W Response

Yes this is correct. The model employs 1 USP per network.

4. Calculation Error: Worksheet " Core Fibre Costs" cell:N9. The equation in cell N9 reads: = SUM(D9,F9,I9,J9). The references appear to be incorrect. Should the references be D9+F9+G9+J9+K9?
5. Calculation Error: Worksheet " Core Fibre Costs" cell:O9. The equation in cell O9 reads: = SUM(E9,G9,H9,K9). The references appear to be incorrect. Should the references be E9+H9+I9+L9?
6. Calculation Error: Worksheet " Core Fibre Costs" cell:E12. The equation in cell E12 reads:

   = ROUND(GETPIVOTDATA("Km",$B$6,"Aerial/UG",E8,"Pairs",E7)/E11+0.5,0).

   Column E appears to reference a non-existent fiber type with 0 km of underground cable. The calculation of 1 joint by the equation in cell E12 appears to be erroneous.
7. Calculation Error: Worksheet " Core Fibre Costs" cell:N12. The equation in cell O9 reads: = SUM(E12:K12). The references appear to be incorrect and include the erroneous calculation from cell E12 above while excluding the calculation for the number of joints for 8 Fiber underground cable. Should the references be sum of F12 through L12?
8. Calculation Error: Worksheet " Core Fibre Costs" cell:G12. The equation in cell G12 reads:

   =ROUND(GETPIVOTDATA("Km",$B$6,"Aerial/UG",G8,"Pairs",F7)/G11+0.5,0)

   The references appear to be incorrect. Should the references be:

   GETPIVOTDATA("Km",$B$6,"Aerial/UG",G8,"Pairs",G7)?
9. Calculation Error: Worksheet " Core Fibre Costs" cell:H12. The equation in cell H12 reads:

   =ROUND(GETPIVOTDATA("Km",$B$6,"Aerial/UG",H8,"Pairs",H7)/H11+0.5,0)

   The references appear to be incorrect. Should the references be:

   GETPIVOTDATA("Km",$B$6,"Aerial/UG",H8,"Pairs",G7)?
10. Calculation Error: Worksheet " Core Fibre Costs" cell:K12. The equation in cell K12 reads:

    = ROUND(GETPIVOTDATA("Km",$B$6,"Aerial/UG",K8,"Pairs",J7)/K11+0.5,0)

    The references appear to be incorrect. Should the references be:

    GETPIVOTDATA("Km",$B$6,"Aerial/UG",K8,"Pairs",K7)?
11. Calculation Error: Worksheet " Core Fibre Costs" cell:L12. The equation in cell L12 reads:

    = ROUND(GETPIVOTDATA("Km",$B$6,"Aerial/UG",L8,"Pairs",L7)/L11+0.5,0)

    The references appear to be incorrect. Should the references be:

    GETPIVOTDATA("Km",$B$6,"Aerial/UG",K8,"Pairs",K7)?
12. Calculation Error: Worksheet " Core Fibre Costs" cells:L24, L26, and L28. The calculations for the fiber cable costs in cells F24 through K24 for the different types of

fiber appear to exclude the costs for the 12 fiber aerial cable therefore the cost for this type of fiber is not included in the total in cell L24. The same error appears to occur for the total joint costs in cell L26 and the total fiber and joint cost in cell L28.

C&W Response

The following pertains to interrogatories 3.15.4 to 3.15.12:

C&W apologises for the above errors and will correct them. These came about as a result of the pivot table which required refreshing, including the associated references.

4.1 Network Methodology

1. Please provide a complete and full description of the mobile network components complete with their engineering and dimensioning information.

It is not clear to us the information being requested in this interrogatory as the description of the mobile network components and dimensioning information is available in the Technical assumption, Radio, Transmission and Switching Calculations sheets. Please clarify whether there are specific queries or pieces of information the Authority feel is lacking in respect of the engineering and dimensioning used in the model, or if the Authority just seeks more of a written description of what is already in these spreadsheets.

2. Please provide a complete and full description of the network dimensioning rules and assumptions used in the dimensioning of the mobile network.

The dimensioning rules and assumptions are very explicit in the Technical assumption and Dimensions sheets. Again, it is not clear what the Authority is after: whether there are specific queries or pieces of information the Authority feel is lacking in respect of the engineering and dimensioning used in the model, or just more of a written description of what is already in these spreadsheets. Please let us know.

4.2 Cost Assumptions

1. C&W notes that “site costs” and costs of network management system are considered a common cost to the two mobile increments (traffic and subscriber) and the cost of providing the mobile switching center is treated as incremental to traffic services. Please describe and provide the details of the costs that are included in “site costs”.

C&W Response

Site cost listed in the cost assumptions sheet consists of the equipment, rigging and installation cost of a cellular tower plus any ancillary equipment such as cable trays, cabinets, platforms, etc.

2. How is the cost of BSC equipment and TCU equipment broken down into fixed and variable costs and why is the unit of variable cost 300 erlang? These breakdowns are in the following locations:

BSC equipment cells G24 - H25

TCU equipment cells G26 - H26

C&W Response

Manufacturers/Suppliers of BSC and TCU equipment typically offer pricing in terms of a base fixed component and a capacity scaling component based on the Erlang unit of measure with the capacity scaling increment usually set at 300 Erlangs.

3. How is the allocation percentage into Call Attempts, Minutes, and Subscribers of the equipment listed below (cells c65 - H76) determined?

a. Cell sites
b. BTS
c. BSC
d. MSC
e. TCU
f. HLR
g. SGSN
h. GGSN
i. PCU
j. Voicemail

C&W Response

The allocation percentages applied to the equipment above acknowledge the dual functionality of some components. In particular the MSC is split 50/50 between Traffic Minutes and Call Attempts whilst the HLR is split 50/50 between Call Attempts and Subscribers. In the absence of a more accurate allocation basis C&W thought it reasonable to apply a 50/50 split to these components. All other components are allocated 100% to their respective function.

4.3 Asset Lives

1. Please describe the source or basis for the asset lives used in the mobile model.

C&W Response

The assets lives were based on C&Ws own facilities' replacement planning. We presented the Ofcom life assumptions in the Background as we were required to list any benchmarks we found. However, we do not believe the Ofcom life assumptions are realistic based on our experience with these facilities in the Caribbean.

4.4 Routing Factors

1. What is the source of the routing factors used in the mobile model, and how were they developed?

C&W Response

These routing factors were developed through discussions with C&W's engineers, analysis of the calling patterns for each call type over the network and benchmark studies conducted by OFTEL (specifically, for the costs associated with switch usage we have used the data produced by OFTEL in their submission to the Monopolies and Mergers Commission (MMC) 1998 in the UK to allow for the difference of switch processing time for inbound versus outbound calls. The MMC explains how much of switch capacity can be allocated to each type of call based upon processor time (49.4 milliseconds for inbound calls compared to 19 ms for outbound calls a ratio of 2.6:1) Thus, the routing factors for call set-up are based on the switch routing factors but include an element to represent the difference in processing time to allow for the mobility management associated with incoming calls to mobiles. This would result in a factor of 2.6 for Int'l incoming and termination and a factor of 3.6 for on net calls.)

The mobile network modeled is a relatively simple one that allowed some routing factors to be developed through observational analysis. For example, a mobile on-net call would use 2 cell sites to complete a call, thus the BTS routing factor for such a call is 2.

2. Why does there appear to be no consideration of growth rates in the mobile model?

C&W Response

While no growth rates are explicitly provided for in the volumes, the demand levels used in the model, in terms of calls and minutes, are 20% higher than what they were in 05/06.

3. Has C&W considered and/or made any assumption on the impact of fixed-mobile substitution or increased fixed-to-mobile calling on demand traffic volumes?

C&W Response

Please see our response to interrogatory 3.4.1.

4.5 Technical Assumptions

1. Please explain how the following technical assumptions were determined:

a.	MSC increment	cell D49
b.	HLR increment	cell D50
c.	Number of cell sites per BSC	cell D51
d.	PCU Capacity	cell D52
e.	SGSN capacity	cell D55
f.	GGSN capacity	cell D56
g.	Internet Gateway Capacity increment	cell D59

C&W Response

These represent the minimum capacity constraint applied to each listed increment and are all industry benchmark figures supported by C&W's engineers and considered to be reasonable and appropriate estimates.

4.6 Cost Assumptions Worksheet

1. Are the unit cost inputs for mobile equipment/materials based on supplier list pricing or do they reflect any kind of discount? If so, how much and how is it applied?

C&W Response

The prices listed in this sheet represent pre-discounted prices in 2006.

4.7 Expense Factors and Retail Costs

1. In what ways has C&W adjusted current network expense data to account for the expense variations likely to apply to the latest technology network (e.g. 3G technologies) with respect to:

    a. The network operating expenses estimated using the expense factor calculations

    b. The non-network operating expenses estimated using the top-down LRIC calculations?

CW Response

We made no adjustments to reflect 3G technologies as we were modeling a GSM network. However, we did eliminate about CI$### in regional recharges for roaming. This was done because the roaming platform was built into the bottom-up mobile model.

4.8 Macros

Please provide complete descriptions as well as step by step code descriptions of the following macro sub-routine contained in the Mobile Model Calculation Workbook:

1. Sub GenerateRF()
2. Sub RunIncrement(strIncrement As String, intIncrementRow As Integer, ByRef intOutputRow As Integer)
3. Sub RunBIG_Increment(strIncrement As String, ByRef intOutputRow As Integer)
4. Sub RunBUmodel(strDatabaseName As String)
5. Sub update_fac()

C&W Response:

See the attached Macro Documentation (Appendix X), section Fixed and Mobile Model macros for a description on macros used in both the fixed and mobile models.

5.1 Costing Manual

1. A Costing Manual was provided for both the Fixed Model Calculation Workbook and the Mobile Model Calculation Workbook. These Costing Manual contained sections on Methodology, Model structure and Operation, and Case Study. Please provide a Cost Manual for the Consolidation Model Calculation Workbook with sections on Methodology, Model structure and Operation, and Case Study, which include the following information:

    a. Methodology Section:

A complete description of how the "Average cost per min/unit on a current cost basis" costs are calculated on both the Fixed Network Costs worksheet and the Mobile Network Costs worksheet.

A complete description of how the Total network service cost, Retail Costs, Total Service Cost, and Service unit cost are calculated on the Mobile Service Costs worksheet.

A complete description of how the Total network service cost, Network Unit Cost, Retail Costs, Total Service Cost, and Service unit cost are calculated on the Fixed Service Costs worksheet.

b. Model structure and Operation Section:

A complete and full description of each of the worksheets in the Consolidation Model Workbook and how the worksheets function together.

c. Case Study:

A complete description, including screen shot extracts showing how actual numbers flow through the model, of the calculations for the Service unit cost of one fixed network service and one mobile network service.

CW Response

Please find attached requested documents, Appendix IX and X respectively.

5.2 Expense Factors and Retail Costs

1. In what ways has C&W adjusted fixed and mobile network overheads expense data to account for the expense variations likely to apply to the latest technology network (NGN and 3G networks) (e.g., modern equivalent assets' maintenance required, energy consumption, accommodation, etc) with respect to:
    a. The network operating expenses estimated using the expense factor calculations
    b. The non-network operating expenses estimated using the top-down LRIC calculations?

CW Response

Please see our response to Interrogatories 3.10.1, 3.10.2 and 4.7.1.

2. Please explain why C&W apportions each General Overhead Expense (e.g., 100-Finance, accounting and budgeting, 100-Provide legal services, 100-Manage corporate affairs, etc) and Overheads/Specific Costs (e.g.,100-Audit fees, 100-Regulatory Authority fees, etc) to the Fixed and Mobile Networks using the expense factor approach in the consolidation model, instead of apportioning these non-network costs to service increments based on the top-down LRIC approach? Is this justified by a cost-causality relationship?

CW Response

These costs are business-wide common costs, i.e., FCCs. Any allocation to specific service or increment groups would therefore involve a degree of arbitrariness, i.e., transgress the cost-causality relationship. We therefore felt that they be made part of the equi-proportionate mark-up process.

3. Please clarify what "Overhead recharges" are.

CW Response

Overhead recharges are those opex recharges which are not direct attributed to network elements but allocated on the basis of GRC or network opex on the "Expense Factor" sheet. In the table in our response to interrogatory 2.5.1 you'll see that items 3, 4,5, 10 and 11 are overhead recharges.

5.3 Macros

Please provide complete descriptions as well as step by step code descriptions of the following macro sub-routines contained in the Fixed Model Calculation Workbook:

1. Sub Run_EF_Calculation(ByRef intOutputRow As Integer)
2. Sub CalculateMLRIC()
3. Sub CalculateMarkupType(strMarkupType As String, intActualColumn As Integer, ByRef intMLRIC_Row As Integer)
4. Sub AllocateValue(strMarkupType As String, strNE As String, strElement As String, dblLRIC_Value As Double, ByRef intMLRIC_Row As Integer)
5. Sub Run_BU_Model(strFileName As String, strSheetName As String, ByRef intActualRow_BU As Integer, _ByRef intActualRow_Vol As Integer, ByRef intActualRow_RF As Integer, ByRef intActualRow_FAC As Integer)

C&W's Response

See the attached Macro Documentation document, section 'Consolidation File' macros for a description on macros used in the consolidation file.