Calculating the implied "return of capital" (non-standard depreciation) for PSE2

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1. Purpose and summary of conclusions

1.1 Purpose

This report recommends a method for calculating the implied "return of capital" (non-standard depreciation) to CIAL over the PSE2 period and how that value can be used to calculate the closing RAB at the end of the PSE2 period (which will then be the starting RAB at the commencement of the PSE3 period). This report should be read in conjunction with the accompanying spreadsheet that calculates the implied return of capital for CIAL for the PSE2 period.

The purpose of calculating the implied return of capital over the PSE2 period is to enable CIAL to produce restated versions of its relevant disclosure statements. Valid disclosure statements have already been prepared and disclosed. The purpose of these further voluntary disclosure statements is to address concerns expressed by the Commerce Commission as to the transparency of the return of capital, and specific methodological choices in its review of the Aeronautical Pricing Reset decision made by CIAL under the Section 56G review process. The prices set by CIAL for PSE2 will not change.

This report (and the accompanying model) also addresses how to:

- translate the results of the implied depreciation calculation into the pricing event disclosure statement for the "priced" services, and

- calculate the "internal rate of return" over the PSE2 period in a manner that is consistent with the Input Methodologies.

An earlier (draft) version of this report was prepared and submitted to the airlines, BARNZ, the Commerce Commission and other regulatory stakeholders,[1] and a face-to-face workshop was held.[2] The purpose of releasing the draft report and convening the workshop was to provide these interested parties with the opportunity to review the direction proposed, provide feedback and to seek points of clarification and/or query. A number of queries and requests for clarification were received and responded to in a further paper released after the workshop.[3] More detailed comments were subsequently received from the airlines and BARNZ, which included a report from BARNZ's expert advisers, Covec.[4] This final report includes the adjustments for one point arising out of the responses received from these key stakeholders and supporting expert advisers. A more detailed discussion of the views that were provided and the responses to these are set out in Appendix A.

The initial report also discussed a number of issues – and set out views – relating to how the price path should be reset for PSE3 if the levelised pricing approach is applied again. The decision on whether to re-apply the levelised pricing approach – and, if so, how it should be re-applied – is one that formally will be considered as part of the consultation process for the reset of prices for PSE3,

1 Incenta Economic Consulting, 2014, Method for calculating the implied return of capital for PSE2 and initial discussion of the method for resetting prices for PSE3, memorandum to CIAL, 27 May.
2 CIAL and Incenta Economic Consulting, Levelised pricing – rationale, improving transparency and resetting the price path, presentation to interested parties, Wellington, 1 July 2014.
3 Incenta Economic Consulting, 20014, Follow up on issues raised in the 1 July 2014 presentation on "implied depreciation", memorandum to CIAL, 6 August.
4 Covec, 2014, Comments on CIAL Revised Disclosures, Report for BARNZ, August.

and so that material has been omitted from this report. Importantly, however, the closing RAB for PSE2 that is calculated using the method recommended in this report will be appropriate irrespective of how prices are reset for PSE3 and beyond.

1.2 Outline of the approach to calculating implied depreciation

CIAL, in setting its prices for PSE2, set a levelised price path that was designed to deliver cash flows with NPV=0 over the 20 year period modelled. The rationale for setting the levelised price was to reduce the likelihood of inter-period price shock and, most importantly, to generate a more efficient spreading of the cost of the new terminal over its life.

In broad terms, the "implied return of capital" or "implied depreciation" or "non standard depreciation" spreadsheet model (these terms are used interchangeably) is endeavouring to work out the return of capital that was expected to be achieved during the PSE2 period under the levelised price path. The implied return of capital that is calculated in this manner will be used to update the RAB over PSE2 and so derive an opening RAB for PSE3. The objective of the calculation is to update the RAB over PSE2 so that it is consistent with the income that is generated during PSE2. It necessarily follows that any "revaluations" that are embedded in the closing RAB for PSE2 would have been treated as income and therefore "paid for" during PSE2.

The calculation of the return of capital ignores any under or over-recovery owing to variations in actual outcomes compared to forecast, including differences between forecast and actual demand for this period. However, once the RAB at the end of PSE2 has been calculated, the revised forecasts of future demand, operating and capital expenditure and the cost of capital will be components to be consulted upon as they are factored into the new prices.[5]

The key change in policy decision that has been given effect in the calculation of implied depreciation for PSE2 that is presented in this memorandum is to move from the use of a pre tax WACC to a post tax WACC. The effect of the calculations presented is to apply a post tax WACC and calculation of expected actual taxation liabilities for the PSE2 period.[6]

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5 How those forecasts are used will depend upon whether the prices are reset based upon (i) a new long term price path, or (ii) the application of the building block approach. As noted above, the closing RAB that is calculated as recommended in this report will be consistent with either approach.

6 To be clear, the prices for PSE2 remain unchanged; however, the closing RAB will change to reflect the application of a post tax WACC. Accordingly, the change from a pre tax WACC to reflect the application of a post tax WACC will affect prices from PSE3 onwards. The term "actual taxation" is used here for simplicity to refer to the fact that an explicit calculation of taxation payments has been made and the tax depreciation input used reflects CIAL's expected tax depreciation allowance, although the interest deduction assumed in the taxation calculation reflects the benchmark employed in the WACC rather than CIAL's expected actual interest payments.

1.3 Summary of conclusions

1.3.1 Results of calculations

Table 1 sets out the implied return of capital for each year of the PSE2 period (noting that 2012/13 is only 7 months in length) for each of the four cost centres that are used for pricing purposes.[7]

Table 1 – implied return of capital for PSE2 for each cost centre ($m)[8]

	2013	2014	2015	2016	2017
Airfield	9.35	10.25	10.49	11.12	12.08
International terminal	0.13	1.11	2.38	2.43	2.77
Domestic terminal - jet	1.23	2.60	2.99	3.35	3.69
Domestic terminal - turboprop	0.12	0.31	0.34	0.39	0.46
Total	**10.83**	**14.26**	**16.20**	**17.29**	**18.99**

Note: the 2013 figure is for the last 7 months of 2012/13. 5/12^{ths} of the annual straight line depreciation amount calculated in the standard manner is added to this figure in order to obtain the aggregate depreciation amount for 2012/13.

These return of capital values are specified in "money of the day" (i.e., inflation inclusive) terms.

When updating the RAB to derive the opening value at the commencement of PSE3, the return of capital values set out in Table 1 should be included in a standard roll-forward equation (the broad form of which is set out in section 2.2 of this report), in which:[9]

- the return of capital figures (implied depreciation) are used as set out in Table 1 without adjustment
- the starting RAB (at 1 July 2012) for non-land assets is the value that is used for disclosure purposes, which will be lower than the value that was used in the PSE2 pricing model (this issue is discussed further in section 2.3.3)
- the forecasts of capital expenditure that were factored into PSE2 prices are replaced with actual capital expenditure, including the full amount for 2012/13 (this is related to the matter noted above and is also discussed in section 2.3.3)

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7 The term "cost centre" is used to refer to the categories of service for which costs are separately collected (i.e., between which costs are separately attributed or allocated) for pricing purposes. Consistent with this, "airfield" is one cost centre. Separate airfield charges are levied for different types of aircraft with costs being allocated to different aircraft types after considering the fixed and variable nature of the cause of such costs.

8 The presentation provided at the workshop on 1 July including a chart showing the projected implied depreciation over the 20 year period for which the levelised prices were calculated, which was "lumpy" in the early years but then became a smooth function. It was later confirmed that the smoothness was due to (i) simplified assumptions about long term demand growth, and (ii) a smoothness in tax payable as depreciation allowances for certain assets were exhausted (in turn reflecting the simplified capital expenditure forecasts used in setting those prices).

9 The equation presented in section 2.2 is a simplified version and is not intended to rule out other valid adjustments that are permitted for disclosure purposes (for example, adjustments arising from a change in cost allocation).

- the starting RAB (as at 1 July 2012) for land is $79,387,867 (this is higher than the land value used for disclosure purposes at the commencement of PSE2, which is discussed in section 2.3.3)

- the forecast revaluation gains that were assumed when calculating implied depreciation for PSE2 are recalculated to reflect the actual change in the CPI over the period, in line with the approach required for fixed assets for disclosure purposes (for the avoidance of doubt, CPI revaluation is to be applied to all assets, including land), and

- depreciation for the first five months of 2012/13 (which must be added to the value in Table 1 to obtain the full depreciation amount for 2012/13) is to be calculated on the basis of straight line depreciation (reflecting the actual opening RAB and actual capital expenditure) calculated in the standard manner.

Important methodological choices that are embodied in these figures include:

- a post tax WACC and tax payable approach has been adopted

- in view of the fact that the PSE2 prices commenced only from 1 December 2012, the return of capital for 2012/13 has been calculated by:

  – applying standard straight line depreciation for the first five months of the year (1 July 2012 to 30 November 2012), and

  – calculating the expected return of capital under the PSE2 prices for the remaining seven months of the year, with the cost and revenue (apart from the return of the revaluation benefit) calculated by pro-rating down the annual values

- the return of the benefit associated with the pre-PSE2 revaluation gains has been recalculated to be consistent with the use of a post tax WACC and tax payable approach, and spread over the PSE2 period, and

- revenue used to derive the calculation of implied depreciation has been based upon the real long term price path rather than the actual prices in effect during PSE2. This has the effect of ensuring that the difference in revenue flowing from the actual prices in effect during PSE2 and the levelised prices remain as a permanent under-recovery as committed to by CIAL.

1.3.2 Other observations

The effect of calculating the closing RAB in this manner is that the value of the RAB at the end of the period will be consistent with income during the PSE2 period (that is, any revaluation gains that are embedded in the closing RAB when calculated according to the algorithms below would have been treated as income – and thus paid for – during PSE2, as this is the objective of the return of capital calculation). If there are further revaluations (or devaluations) of assets to establish the opening RAB for PSE3, then those revaluations (or devaluations) should be treated in the same manner as the pre-PSE2 revaluations (these revaluations are discussed in section 2.3.4).[10]

[10] That is, any difference will be carried forward and factored into future prices (either treated as an alternative source of revenue or as an additional cost item).

One aspect of the implied depreciation figures presented above that was unexpected is that the implied depreciation values are marginally *higher* than the conventionally calculated straight line depreciation figures when aggregated across the four cost centres. This result is driven by the airfield cost centre – implied depreciation for the terminal-related cost centres as expected are well below the conventional straight line values. Two reasons explain this outcome.

- First, the move to using a post tax WACC increased implied depreciation because the change to using a post tax WACC meant that the prepayment of tax implicit in the use of a pre tax WACC is reclassified as additional depreciation.[11]

- Secondly, the fact that CIAL revalued its assets prior to the commencement of PSE2 and rebated the value of this revaluation over PSE2 caused CIAL's cost of service to be artificially low during PSE2 compared to PSE3 and beyond.[12] The effect of levelising prices in this context is to generate a higher return of capital during PSE2 than otherwise (the return of capital acts like a "swing" factor to allow prices to remain constant in the face of varying costs, and tends to be higher when costs are low and lower when costs are high).

The two factors referred to above were approximately equal in magnitude and their net combined total resulted in the aggregate of the implied return of capital under levelised prices to exceed the straight line depreciation amount. These observations are discussed further in section 3.

1.4 Structure of the remainder of the report

The remainder of the note is set out as follows.

- Section 2 describes the method that has been applied to calculate implied depreciation, addressing:
  - The overall objective
  - The formulae applied
  - The issues addressed in applying the relevant formulae, spanning:

[11] The use of a pre tax WACC is akin to measuring the tax cost as the tax expense, in which the timing differences between tax and regulatory depreciation are ignored. This results in a mismatch between the cash received and the cash tax obligation (with more cash received than paid in early years). A post tax WACC and tax payable approach measures the tax cost as the cash tax obligation. Thus, moving from a pre tax regime to a post tax (and tax payable) will result in a reduction in the measured tax cost. As prices (and revenue) are fixed for PSE2, a surplus of revenue over the tax cost is created, which the implied depreciation calculation treats as additional depreciation (reducing the closing RAB).

[12] That is, the revaluation and rebate created two effects. First, the revaluation caused CIAL's RAB to increase, which will flow through to its cost of service (through the return on and return of capital) over the life of the relevant assets (which is 40 years for the majority of the revaluation gain). Secondly, the rebate provided by CIAL reduced CIAL's cost of service over PSE2. As the benefit to CIAL from the revaluation and the rebate are equal in present value terms, but the rebate will apply only during PSE2 whereas the effect of the higher RAB will last for many years, there must be a net reduction in CIAL's cost of service during PSE2 (and a higher cost of service in PSE3 and beyond) compared to the case where the assets had not been revalued.

- The form of post tax WACC
- The extent to which values used to calculate implied depreciation and/or the rolled-forward RAB should be updated to account for the difference between forecast and actual (outturn) outcomes
- The implications of the commencement of PSE2 partway through 2012/13
- The treatment of the pre-PSE2 revaluation gain, which had not been foreshadowed and treated as an offset to prices during PSE1 (and, given their nature, could not have been)
- Whether the "levelised" prices or actual prices should be applied to calculate implied depreciation

- Section 3 sets out the results of the calculation of implied depreciation, and comments on how this compares to an application of standard straight line depreciation.
- Section 4 then describes the implications of the implied depreciation calculation for the disclosure schedules, and describes how to calculate the internal rate of return to CIAL for PSE2 that is implied by the inputs prescribed in the Input Methodologies and consistent with the method used by the Commerce Commission in it section 56G reports.

2. Calculation method and assumptions

2.1 Objective

This note describes how the value of the RAB should be calculated as at the end of PSE2, with this RAB then being the opening RAB for PSE3 on which future prices will be determined.

The objective behind this calculation is two-fold.

- *Reflect the actual "return of capital" during PSE2* – the closing RAB should reflect the return of capital that is implied by the pricing during PSE2, rather than straight-line depreciation. To the extent that PSE2 prices were set at a lower level than would have been implied by straight line depreciation, then the closing RAB will be higher than the straight line depreciation RAB.
  - In this note, the calculation is described as deriving the actual "return of capital" implied by the PSE2 prices rather than the "return of capital" that would be implied by straight line depreciation.
- *Reflect a post tax WACC and tax payable calculation* – the calculation of the "return of capital" will be determined in a manner that is equivalent to using a post tax WACC and tax payable approach to setting prices – that is, with the "return of capital" defined as revenue net of the recovery of operating costs, a post tax return on assets and tax payable. This contrasts with the use of a pre tax WACC, where the "return of capital" would be defined as revenue net of the recovery of operating costs and a pre tax return on capital, the latter of which includes a notional, long term average, allowance for taxation.
  - Where a pre tax WACC is used, the fact that the allowance is a long term average measure means that there is typically an over recovery of taxation in the early years of an asset's life. This situation then reverses over time as the value of tax depreciation allowances are eroded by inflation and eventually used up, with a pre tax WACC typically undercompensating for taxation for older assets (i.e., because the value of tax depreciation allowances get eroded by inflation and are eventually exhausted).
  - The switch to a post tax WACC means that any initial over-recovery of taxation will become defined instead as "return of capital", with the result that the "return of capital" in the early period is higher (and so the closing RAB is lower) under a post tax WACC approach than under the pre tax WACC approach. However, where a pre tax WACC would undercompensate for taxation (e.g., when assets are older, as noted above) then the return of capital under a post tax WACC and tax payable approach is lower than under the pre tax WACC approach as the higher tax payable is recognised as a cost to be recovered before capital is deemed to be returned.

2.2 Calculation method and formula

As discussed above, the "return of capital" is derived as revenue net of operating costs, a return on assets and tax payable. This formula is simply a rearrangement of the standard building block formula, as follows:[13]

$$Revenue\ requiremment = ROA + Depreciation + Opex + Tax - Reval$$
$$\therefore Implied\ depreciation\ (return\ of\ capital) = Revenue - ROA - Opex - Tax + Reval$$

Moreover, the revenue requirement formula is always applied in parallel with the asset value roll forward formula, so that both revaluation gain ("reval" in the formula above) and depreciation line items in the revenue requirement calculation match the amounts (but with opposite signs) included in the asset value roll forward. This relationship between the revenue requirement and asset value roll forward formula means that when the revenue requirement formula is rearranged to calculate the "implied depreciation (return of capital)", the two formulae need to be applied in a sequential (or recursive) manner. That is, implied depreciation is calculated for the first year, and from this the closing RAB for that year can then be calculated, which is then an input into the calculation of implied depreciation for the second year, and so forth. The associated RAB roll-forward is given in broad terms as follows:[14]

$$RAB_t^{Closing} = RAB_t^{Opening} + Capex_t - Return\ of\ capital_t + Reval_t$$
$$RAB_{t+1}^{Opening} = RAB_t^{Closing}$$

The detailed formulae for deriving the implied depreciation in each year are set out in Appendix B. In our earlier report, we had proposed a simplified formula for calculating implied depreciation (or, more specifically, the "return on assets" component). However, we have accepted Covec's suggestion to use a formula for calculating implied depreciation that, whilst more complex in its application, better reflected how CIAL had set its prices for PSE2. This is discussed in Appendix A.3.2.

The annual revaluation gain in the formula above has been calculated only on the opening of the RAB in each year, rather than on both the opening RAB and capital expenditure (with a half year typically applied to the latter).[15] Neither of the possible approaches (i.e., revaluation gains calculated on the RAB or RAB and capital expenditure) are necessarily preferable to the other; the important

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13 A complex issue when the benefits of past revaluation gains are to be rebated is whether the "reval" term in the expression above should be defined in pre tax (grossed up) or post tax terms. The answer to this is that if taxation is calculated on the observed (pricing) revenue, then the post tax rebate should be applied in the formulae above because the tax saving from the rebate is already captured in the tax calculation (being based on the observed revenue, which is already net of the rebate). This matter is addressed in more detail in Appendix C.

14 As noted in section 1.3, the equation presented here is a simplified version and is not intended to rule out other valid adjustments that are permitted for disclosure purposes (for example, adjustments arising from a change in cost allocation).

15 This choice reflects CIAL's preference and reflects how annual revaluation gains have been calculated historically.

requirement is that the method of calculating annual revaluation gains is applied consistently (that is, the same method is applied to forecast revaluation gains and to subsequently roll forward the RAB).[16]

As CIAL has identified four cost centres for pricing purposes (airfield, international terminal, domestic terminal – jet and domestic terminal – turboprop), these calculations will need to be undertaken for each of those cost centres.

The objective of the formulae set out above is to derive a closing RAB for PSE2 that is consistent with the income that is generated during PSE2. Thus, any "revaluations" that are embedded in the closing RAB when calculated using the equations above would have been treated as income during the period and therefore "paid for" during PSE2. To the extent that any further revaluations occur outside of the application of the above formulae, then those revaluations should be treated in the same manner as the pre-PSE2 revaluations (see section 2.3.4, below).

2.3 Issues for further consideration

Applying the formulae set out above provides for choices in relation to certain assumptions, and also requires decisions in relation to several ancillary issues, which are as follows:

- the form of the post tax WACC
- whether the formulae should be applied to the values of parameters as forecast when setting PSE2 prices or the actual values, or to some combination
- how the part year for the first year of PSE2 should be treated
- what adjustments should be made to the return of the revaluation gain for pre PSE2 revaluations as a consequence of moving from a pre tax WACC to a post tax WACC and actual tax payable approach, and
- what price should be used to derive the assumed revenue for the PSE2 period – the long term levelised prices or the actual prices?

2.3.1 Form of the post tax WACC

There are two versions of the post tax WACC that could be used to calculate the implied return of capital during PSE2, which are labelled here the pre-financing post tax WACC and the vanilla post tax WACC, the formula for which are as follows:[17]

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16 It is also noted that the calculations presented in this memorandum and accompanying spreadsheet assume that all assets are revalued for CPI inflation annually, which differs to CIAL's standard practice when applying standard straight line depreciation to its asset values (whereby some categories of minor assets were just carried forward without CPI indexation). To the effect that a difference emerges between the opening RAB for PSE3 that it is most convenient for CIAL to use and the rolled-forward value using the method prescribed in this report, then there will be an unexpected revaluation gain or loss that will need to be corrected in PSE3 in the same way as pre-PSE2 revaluation gains.

17 The labels for these two WACCs can often be confusing as the first is often labelled the "post tax WACC" and the second as the "vanilla WACC". For the avoidance of doubt, both WACCs refer to required after tax returns – and so both require an explicit calculation of taxation liabilities (i.e., actual tax payable).

$$Pre-financing\ post\ tax\ WACC = R_e.\frac{E}{V} + R_d.(1 - Tax\ Rate).\frac{D}{V}$$

$$Vanilla\ post\ tax\ WACC = R_e.\frac{E}{V} + R_d.\frac{D}{V}$$

The only difference between the versions is where the benefit from the tax deductibility of interest is placed. With the pre financing post tax WACC, this benefit is included in the WACC and so omitted from the calculation of taxation. In contrast, the benefit of interest deductibility is excluded from the vanilla WACC and included instead in the calculation of taxation.

Comparing the two, the pre-financing WACC will be lower than the vanilla WACC, but the calculated tax payable will be higher under the pre-financing WACC than under the vanilla WACC. With one exception, the results from the choice of WACC will be identical, that exception being if CIAL was in a tax loss position after taking account of the interest deductions, in which case the vanilla WACC should be preferred.[18]

As the calculations are marginally simpler when using a pre-financing post tax WACC, this WACC value is more familiar to analysts and CIAL is not in a tax loss position, the calculations in the accompanying spreadsheet have been undertaken using the pre financing post tax WACC.[19]

The pre-financing post tax WACC that CIAL used to develop its prices for PSE2 is 9.76 per cent (nominal), and so this value has been used to derive the implied return of capital for PSE2.

2.3.2 Forecast vs. actual amounts

Introduction

The formulae set out above could be applied to forecast values or to the actual values. However, the choice between the use of actual or forecast values will determine where, between CIAL and its customers, the risk associated with differences between forecast and actual outcomes is allocated. This risk allocation will also have an influence on the incentives of CIAL (to the extent factors causing the variation are within its control) as it affects the extent to which CIAL may "win" or "lose" from controlling the actual outcomes (for example, controlling operating and capital expenditure).

CIAL's intention when developing the long term real price path was to generate a risk sharing outcome that is materially the same as the risk sharing that where prices are simply calculated using the building block approach with the more conventional straight line depreciation (inflation indexed). Under this conventional approach, prices are set for a period subject to a mechanical escalation for inflation[20] (albeit normally subject to some forms of reopener), and then reset in line with cost at a periodic review. This results in the asset owner bearing the risk associated with differences between forecast and actual outcomes with respect to sales volumes, volumes of operating and capital expenditure items and real input price inflation, but passing on general inflation risk to customers (this

18 An identical result also requires the same assumption to be made about the quantum of interest deductions that are available, which requires some care when employing a vanilla WACC.

19 The earlier version of the spreadsheet that model that was circulated also presented the calculations using a vanilla WACC and demonstrated this equivalence.

20 It is observed here that CIAL's prices have been fixed in nominal terms for the term of PSE2, and so is a departure from this standard approach. The significance of this is addressed below.

is achieved through prices being escalated for actual inflation as noted above, and the RAB being escalated for inflation in a parallel manner).

Inputs other than inflation

Putting aside inflation (and the prospective revaluation gain) for the moment, implementing the normal allocation of risk described above would be approximately achieved by:

- calculating the implied return of capital for the PSE2 period using the forecasts of revenue, capital and operating expenditure, taxation and the WACC that were used to set the PSE2 prices, and
- rolling forward the RAB using the implied depreciation values determined above and actual capital expenditure over the period.

Locking in the implied return of capital in this manner, but using actual capital expenditure in the RAB roll-forward calculation, would result in CIAL bearing the difference between actual and forecast revenue and operating expenditure and between the actual and forecast financing cost associated with capital expenditure, during the pricing period. The one difference to the conventional approach is in relation to capital expenditure where, under the standard arrangements that apply in New Zealand, a regulated business would also retain the depreciation on the difference between forecast and actual capital expenditure during the pricing period; however, this is not a material difference to conventional arrangements.[21]

Inflation

Turning to inflation, it is common for two adjustments to be made to account for differences between forecast and actual inflation when rolling forward the RAB, which are that:

- the forecast of depreciation applied when setting prices is adjusted according to the difference between actual and forecast inflation, and
- the forecast of the revaluation gain is also adjusted according to the difference between actual and forecast inflation, so that the revaluation gain that is factored into the updated RAB reflects actual inflation.

In our previous report, we recommended not adjusting "implied depreciation" for any difference between forecast and actual CPI inflation, but to update the "authorised" revaluation gain to reflect actual CPI rather than the value of CPI inflation that was forecast.[22] Notwithstanding Covec's

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21 CIAL revised down its forecasts of capital expenditure during the price setting consultation process in response to feedback from its customers. This revised forecast was reflected in the price setting event disclosure, but occurred after the pricing model was released to the airlines. The calculation of the implied return of capital described in this note (and performed in the accompanying spreadsheet) uses the final forecast figures (i.e., as reflected in the price setting event disclosure). The consequence of using the lower capital expenditure forecasts when calculating the implied return of capital is that the implied return of capital is calculated to be higher (and therefore the closing RAB will be lower) than it otherwise would have been.

22 The term "authorised" is used here to refer to the revaluation gain/loss that is permitted before there should be an expectation of a correction in future periods.

comments on this matter, we have retained this recommendation. This matter is discussed further in Appendix A.3.4.

Implications for the accompanying financial model

The implication of the discussion above is that the calculations performed in the accompanying model – which calculates the implied return of capital over PSE2 and then applies this to demonstrate the updating of the RAB over PSE2 – will draw upon both forecast and actual values for the key inputs, in particular:

- the implied return of capital for PSE2 will be calculated on the basis of the adjusted opening RAB for PSE2, volumes, operating and capital expenditure, CPI-revaluation gains and straight line depreciation for the first 5 months of 2012/13, and the implied return of capital will then be "locked in", and

- the ("locked in") implied return of capital will be combined with the actual opening RAB for PSE2, actual CPI revaluation gains, actual capital expenditure and the actual straight line depreciation for the first 5 months of 2012/13 in order to update the RAB over the course of PSE2 and thus calculate the opening RAB for PSE3.[23]

2.3.3 Treatment of the first year of PSE2

Part year pricing for 2012/13

The new prices under PSE2 commenced on 1 December 2012 and proposed to remain in effect until 30 June 2017, implying that the pricing period extended for 4 years and 7 months. However, when CIAL calculated its long term price path, it did so using a starting RAB as at 1 July 2012. The part year was implemented by:

- Modelling all costs and revenues first on a full year basis for 2012/13 (i.e., commencing from 1 July 2012)

- Pro-rating down the cost and revenue items to reflect the part year of 2012/13 commencing 1 December 2012 (except for the return of the past revaluation gain, which was deemed to be an offset to cost for the period commencing from 1 December 2012),[24] and factoring this part year cost and revenue into the calculation of the 20 year NPV=0 price path, and

- Calculating the unsmoothed cost of service for 2013/14 on the basis of an opening RAB that factored in standard straight line depreciation in the 2012/13 year.

The implications of setting the long term price path in this manner for the implied return of capital for 2012/13 were that:[25]

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23 In practice, the opening RAB for PSE3 will contain elements of forecasts given that the actual results for the last year of PSE2 will not be available at the time the new prices are determined.

24 CIAL's treatment of the return of the past revaluation gain ensured that all of the revaluation gain was treated as an offset to future prices, with the benefit of this then spread over the 20 year period.

25 These outcomes are a consequence of calculating the opening RAB for 2013/14 that was used to calculate the "unsmoothed" cost of service using standard straight line depreciation and including the

- Standard straight line depreciation would apply for the first five months of the regulatory period, and

- The return of capital for the final seven months would reflect the actual return of capital under the long term price path (with the part year costs and revenues, with the exception of the rebate of the pre-PSE2 revaluation gain, being determined by pro-rating down the annual values).

The same principles have been applied to calculate the implied return of capital for the PSE2 period. The specific steps adopted in the calculation to apply the above principles to calculate the implied return of capital for PSE2 were as follows.

- First, the full-year cost of service and revenue are first calculated for 2012/13, and then these values are pro-rated down (to 7/12th) to calculate the values for the last seven months of 2012/13.[26] The full annual amount for the rebate for pre-PSE2 revaluation gains is attributed to the last seven months of 2012/13.

- Secondly, the implied return of capital for the last seven months of 2012/13 is calculated from the pro-rated values described above.

- Third, the forecast of the closing RAB for 2012/13 was then calculated by commencing with the opening RAB as at 1 July 2012 and adding in the full annual forecast of capital expenditure and the full annual revaluation gain for 2012/13, and deducting depreciation calculated as the sum of:

  – 5/12th of the forecast of the forecast standard straight line depreciation, and

  – the implied return of capital for the last seven months as describe above.

  This closing RAB for 2012/13 is then the opening RAB for 2013/14, and the calculation from that point reverts to the standard calculation described earlier.

Calculating the RAB in this manner means that any under-recovery to CIAL against a standard building block cost of service (and using straight line depreciation) for the period to 30 November 2012 is borne by CIAL and not carried forward to be recovered future periods.

Adjustment to the opening asset value for 2012/13

CIAL made two further adjustments in its pricing model to the opening asset value for 2012/13 compared to the annual disclosure values, which were to:

costs and revenues associated with the only last seven months of the year in the 20 year NPV=0 smoothing calculation. The effect of including the cost and revenues for the last seven months of 2012/13 in the NPV=0 smoothing calculation was that straight line depreciation for this period was effectively replaced with the actual return of capital; however, standard straight line depreciation was therefore left to apply (unadjusted) for the first five months.

[26] In the actual calculations, revenue and all costs – apart from taxation – were pro-rated down, and then actual taxation was calculated on the pro-rated values (with tax deductions similarly pro-rated down for the part year).

- assume that the last stage of the new terminal development (including the associated airside works) was in service at the time the new prices came into effect (1 December 2012), even though the terminal was actually completed and entered into service after that date (31 March 2013), and

- give effect to a revaluation of land for pricing purposes at MVAU undertaken at the start of the consultation on pricing (which was in the 2011/12 year). A parallel revaluation occurred for annual disclosure purposes in 2012/13.[27]

The effect of these two adjustments is shown in Table 2 below.

Table 2 – adjustment to the closing 2011/12 disclosure vales for pricing purposes

	$ million
Advancement of recognition of Stage 3 of the Intergrated Terminal Project	
Work in Progress at 30 June	35.627
Expenditure to complete in 2012/13	28.206
Sub Total - ITP advancement	**63.833**
Revaluation of land to MVAU for pricing purposes	7.277
Total	**71.110**

Source: CIAL, 2012, Price Setting Disclosure, December, section 2.3.

The consequence of the first of these adjustments is that capital expenditure for the last stage of the terminal was recognised earlier than otherwise, in turn implying that the cost of service for the first year of PSE2 (the last 7 months of 2012/13) overstated the required return in respect of this last stage. CIAL's reason for calculating the required return on assets in this manner was to compensate, in part, for the delay between the commissioning (and cessation of capitalisation of interest) of the earlier stages of the project and the time at which the new prices were set. I am informed that this issue was the subject of consultation between CIAL and the airlines during the PSE2 price review.

A summary of the initial stages of this project and their commissioning dates are set out in Table 3 below. This identifies that significant investment incurred and was commissioned some time before those new additional costs were factored into pricing (with the latter occurring from 1 December 2012).

Table 3 – commissioning dates of earlier stages of the Integrated Terminal Project ($'000)

Project	Cost	Commissioning
Stage 1	59,792	30/04/11
Stage 2	16,781	31/03/12

In relation to the first adjustment, the relevant matter for this report is how to calculate implied depreciation such that CIAL's intention to earn a return on the last stage of assets earlier than their commissioning (in partial compensation for the deferred return on the earlier stages) is delivered and not inadvertently unwound. For the intention behind this adjustment to be preserved, the implied depreciation for 2012/13 needs to be calculated using the same assumption about the timing of the last stage of the terminal project as CIAL used when it set its prices. This has been given effect by:

[27] This revaluation of the land for pricing purposes was included in the revaluation gains that were rebated over PSE2 (these are discussed in section 2.3.4).

- Calculating the "return on assets" input into implied depreciation using the adjusted opening RAB and capital expenditure discussed above, and

- When undertaking the actual rolled forward of the RAB for 2012/13 (i.e., when establishing the opening RAB for PSE3), replacing the adjusted values as described above with the "true" values – that is, commencing with the actual (lower) opening RAB for 2012/13, using the (higher) actual capital expenditure for 2012/13, using the actual (lower) straight line depreciation and revaluation gain for the first five months of 2012/13.

In relation to the second adjustment, the intention in the pricing proposal and consistency with the rebated revaluation gains (see section 2.3.4) is achieved by using the higher land value (compared to annual disclosure) in the starting RAB for the period when calculating implied depreciation, and also using that higher land value (compared to annual disclosure) when updating the pricing RAB over PSE2 to derive the opening value for PSE3. There will therefore be a difference between the appropriate value of land for the next price reset at the end of 2016/17 and the value of the same area of land for annual disclosure purposes to the extent that the revaluation that occurred for pricing in 2011/12 differs to the revaluation that occurred for annual disclosure in 2012/13.

2.3.4 Return of the revaluation gain for pre PSE2 revaluations

Treatment of taxation

CIAL revalued its assets at the end of PSE1. This was done to use an opening RAB for PSE2 that complied with the Input Methodologies. As this revaluation had not been factored into PSE1 prices (which were set prior to the Input Methodologies being finalised),[28] CIAL reduced the revenue requirement for the PSE2 period to return the benefit to CIAL from this revaluation to customers, with the reduction to the revenue requirement in PSE2 intended fully to return the benefit in NPV terms during the PSE2 period. Thus, the net effect of these measures were that:

- the underlying cost of service was increased, with this lasting for the remaining life of the revalued assets, and

- the benefit (in NPV terms) described above was returned to customers as a rebate, with this rebate fully returning the benefit to customers (in NPV terms) over the term of PSE2.

As CIAL originally used a pre tax WACC to calculate its required revenues, a pre tax WACC was also applied to determine the amount that would be required to be returned to customers in order to make CIAL neutral as a consequence of the revaluation.

However, given the decision to calculate the implied return of capital for PSE2 on the basis of a post tax WACC and actual tax payable, it is appropriate for the rebate for the pre-PSE2 revaluation gain to be re-determined. There are two specific drivers for reviewing the rebate that is provided in respect of the pre-PSE2 revaluation gain.

[28] While the revenue requirement for PSE2 was reduced to rebate the revaluation gain fully over PSE2, the benefit from this rebate was "smoothed" over the 20 year period for which the levelised prices were derived (this was an outcome of the levelised pricing method). The question of whether the implied depreciation for PSE2 should be calculated on the assumption that the revaluation gain is rebated completely over PSE2, or over the 20 year period, is discussed separately below.

- First, the increment to CIAL's revenue requirement as a consequence of the revaluation gain will increase as a consequence of moving to a post tax WACC and compensation for taxation based upon an explicit calculation of tax payable compared to what is calculated when using a pre tax WACC.

- Secondly, once taxation is modelled more accurately, it becomes clear that the rebate required to keep CIAL neutral in NPV terms is larger than predicted by a pre tax WACC. This is because the saving to CIAL in taxation when such a rebate is provided is larger than implicitly assumed by the use of a pre tax WACC.

Table 4 below shows the approximate increment to CIAL's revenue requirement that will be caused by the pre-PSE2 revaluation gains,[29] together with the rebate that is required to leave CIAL neutral in NPV terms (the rebate is assumed to return the benefit of the revaluation gain over five years). The results are shown both using a post tax WACC and a pre tax WACC (the former being the correct figures because they embody an accurate modelling of the taxation system).

Table 4 – Impact of the revaluation gain on required revenues and the required rebate ($m)

Form of WACC	Annuity ($m)
40 year asset life	
Post tax WACC calculation	4.65
Pre tax WACC calculation	4.56
Difference ($m p.a.)	**0.08**
5 year rebate	
Post tax WACC calculation	12.19
Pre tax WACC calculation	9.64
Difference ($m p.a.)	**2.54**

Note: the figures reflect the fixed amount in nominal terms (annuity) that would be generated for 40 years and required to be paid over 5 years, respectively, in order to generate a present value of $33.46 million (which is the value of the pre-PSE2 revaluation gains).

It flows from these figures that:

- Where assets are revalued for pricing purposes, the resulting increase in the cost of service (putting aside the rebate for now) will be higher when a post tax WACC is used to calculate the cost of service than when a pre tax WACC is used. In this example, CIAL's actual revaluation would lead to an increase in its cost of service of $4.65 million per annum (assuming an annuity and 40 year asset life), whereas its cost of service would increase by $4.56 million per annum if a pre tax WACC were used, a difference 0.08 million per annum. This difference arises because when a post tax WACC is used, the associated tax allowance can be calculated on the (correct) assumption that tax depreciation allowances are unchanged.

[29] These figures are approximate because an asset of 40 years is assumed, and annuity depreciation is assumed in order to make the pre tax and post tax figures easier to compare. The 40 year life has been used as this reflects the life of airfield assets, which accounted for 90 per cent of the pre-PSE2 revaluation gain.

- When a rebate with a target NPV is to be provided to customers – in this case, an NPV equal to the revaluation gain – the rebate that is calculated will be much larger when a post tax WACC is used than when a pre tax WACC is used. In this example, the NPV-neutral rebate required to return CIAL's revaluation gain over five years is calculated to be $12.19 million per annum when a post tax WACC is used, but only $9.64 million per annum when a pre tax WACC is used, a difference of $2.54 million per annum. Again, the reason for the difference is that when a post tax WACC is used, the full savings in tax to CIAL when the rebate is provided are reflected in the calculation.

The calculation of implied return of capital undertaken in the accompanying spreadsheet incorporates the full implications of the revaluation and rebate for the tax payable, consistent with the discussion above.

Period over which the past revaluation gain is rebated

The calculation of implied depreciation for PSE2 also requires a choice needs to be made as to whether implied depreciation is calculated on the assumption that the pre-PSE2 revaluation gains are assumed to be rebated wholly over PSE2, or whether they should be assumed to be rebated over the full levelised pricing period. It is possible to draw different conclusions about what CIAL intended from the modelling it performed, and statements it made, during the review of prices for PSE2.

Provided that the implied depreciation for PSE2 is calculated correctly under each approach and is fully factored into the opening RAB for PSE3, then the same long term price path would be determined irrespective of whether the past revaluation gain is rebated over 5 or 20 years (or indeed over some other period). Similarly, provided that the outstanding amount to be rebated is treated correctly, the choice between rebating past gains over 5 years or 20 years will not affect the internal rate of return that is calculated for PSE2 or for any of the years within this period.

However, calculating implied depreciation on the assumption that the past revaluation gain is fully rebated during PSE2 has administrative benefits, with the principal benefit being to avoid the need to carry-forward the unamortised revaluation gain from one pricing period to the next, which therefore avoids the need to recalculate the revaluation gain rebate in future periods. Rebating the past revaluation gains during PSE2 will also mean that the RAB that is calculated at the end of PSE2 will be the value that is to be recovered through future pricing, and so provides communication/transparency benefits. It is noted that CIAL's stakeholders agree with this choice.

Accordingly, the implied return of capital for PSE2 has been calculated on the assumption that the pre-PSE2 revaluation gains are rebated in full over PSE2.

2.3.5 "Price" that is assumed for the implied depreciation calculation

CIAL has stated that it intends to bear the consequences associated with prices transitioning up to the long term levelised level. This principle would be met from the use of the long term levelised prices to calculate the forecast of revenue for the implied return of capital calculation.

The one issue arising with this is that the prices for the airfield and the domestic terminal – jet charges will be above the long term levelised values for the last 2 or 3 years of the period. Notwithstanding this, it is observed that the forecast present value of revenue from these services under the actual charges is still considerably lower than the present value of revenue forecast calculated using the

levelised prices, with the early under-recovery exceeding in present value terms the later over-recovery. On this basis, it remains reasonable to continue to use the levelised (rather than actual) prices in the calculation of the implied return of capital for the PSE2 period. CIAL has confirmed that, when it sets prices for PSE3, none of the prices will be set above the new long term levelised price path for the activity in question.

3. Outcomes of the calculations

3.1 Results

Table 5 (repeating Table 1) sets out the implied return of capital for each year of the PSE2 period (noting that 2012/13 is only 7 months in length) for each of the four cost centres that are used for pricing purposes.

Table 5 – implied return of capital for PSE2 for each cost centre ($m)

	2013	2014	2015	2016	2017
Airfield	9.35	10.25	10.49	11.12	12.08
International terminal	0.13	1.11	2.38	2.43	2.77
Domestic terminal - jet	1.23	2.60	2.99	3.35	3.69
Domestic terminal - turboprop	0.12	0.31	0.34	0.39	0.46
Total	**10.83**	**14.26**	**16.20**	**17.29**	**18.99**

Note: the 2013 figure is for the last 7 months of 2012/13. 5/12^{ths} of the annual straight line depreciation amount calculated in the standard manner is added to this figure in order to obtain the aggregate depreciation amount for 2012/13.

This return of capital figure is specified in "money of the day" (i.e., inflation inclusive) terms, and should not be changed to reflect any difference between forecast and actual inflation.

When updating the RAB to derive the opening value at the commencement of PSE3, the return of capital values set out in Table s 1 and 5 should be included in a standard roll-forward equation (the broad form of which is set out in section 2.2 of this report), in which:

- the return of capital figures (implied depreciation) are used as set out in Table 1 and 5 without adjustment
- the starting RAB (at 1 July 2012) for non-land assets is the value that is used for disclosure purposes, which will be lower than the value that was used in the PSE2 pricing model (this issue was discussed in section 2.3.3)
- the forecasts of capital expenditure that were factored into PSE2 prices are replaced with actual capital expenditure, including the full amount for 2012/13 (this is related to the matter noted above and was also discussed in section 2.3.3)
- the starting RAB (as at 1 July 2012) for land is $79,387,867 (this is higher than the land value used for disclosure purposes at the commencement of PSE2, as discussed in section 2.3.3)
- the forecast revaluation gains that were assumed when calculating implied depreciation for PSE2 are recalculated to reflect the actual change in the CPI over the period, in line with the approach required for fixed assets for disclosure purposes (for the avoidance of doubt, CPI revaluation is to be applied to all assets, including land), and
- depreciation for the first five months of 2012/13 (which must be added to the value in Table 1 to obtain the full depreciation amount for 2012/13) is to be calculated on the basis of straight line depreciation (reflecting the actual opening RAB and actual capital expenditure) calculated in the standard manner.

The breakdown of the pricing "revenue requirement" for PSE2 aggregated across all cost centres that is consistent with these implied depreciation values calculated in this report is shown in Table 6 (this table corresponds to the PSE2 period and so spans the 4 year and 7 month period from 1 December 2012).

Table 6 – Contribution to the revenue requirement for PSE2 ($m)

	2013	2014	2015	2016	2017
Return on assets	23.58	41.99	42.34	42.61	42.82
Implied depreciation	10.83	14.26	16.20	17.29	18.99
Opex	14.55	26.75	27.28	27.94	28.54
Other revenue	0.05	0.09	0.09	0.09	0.09
Past revaluation gain (avoided post tax return)	8.77	8.77	8.77	8.77	8.77
Revaluation gain	4.92	8.96	9.11	9.11	9.22
Taxation allowance	4.19	7.61	8.82	9.56	9.65
Pricing revenue requirement	**39.41**	**72.79**	**76.67**	**79.41**	**81.92**

The forecast of the closing RAB at the end of each year in PSE2 for each of the four cost centres that is consistent with the pricing proposal is shown in Table 7 below.[30]

Table 7 – forecast closing RAB for each year in PSE2 ($m)

	2013	2014	2015	2016	2017
Airfield	212.39	217.88	218.63	218.32	219.02
International terminal	119.19	121.17	121.73	128.64	129.07
Domestic terminal - jet	82.54	81.90	80.89	79.53	77.84
Domestic terminal - turboprop	12.76	12.77	12.74	12.67	12.54
Total	**426.88**	**433.72**	**433.99**	**439.15**	**438.46**

3.2 Comparison with conventional straight line depreciation

One aspect of the implied depreciation and closing RAB figures presented above that was unexpected is that the implied depreciation values are marginally *higher* than the conventionally-calculated straight line depreciation figures when aggregated across the four cost centres (implied depreciation for the terminal-related cost centres are lower, but implied depreciation for the airfield cost centre is much higher). This means that the closing RAB (when aggregated across the cost centres) is lower than what would have been the case with conventional straight line depreciation. This contrasts with what was expected, namely that setting a levelised price would imply a deferral of recovery of capital compared to conventional straight line depreciation, and so a higher closing RAB at the end of PSE2.

There are two reasons that explain this result.

30 These values are an approximate forecast of the RAB that would be calculated over the period if all forecasts proved to be correct because the straight line depreciation that is used for the first 5 months of 2012/13 is calculated on that assumption that some of the terminal-related capital expenditure that took place during 2012/13 was in service at the start of 2012/13 (this was discussed in section 2.3.3). It is concluded in this report that the correct depreciation value (i.e., straight line depreciation calculated in the conventional manner) should be applied for the first five months of 2012/13 when the RAB is updated to calculate the closing value for PSE2 (which in turn sets the opening value for PSE3).

First, as noted earlier, the move to using a post tax WACC was expected to increase the amount of implied depreciation that is calculated. This is because the prepayment of tax for "new" assets that is implicit when using a pre tax WACC instead gets reclassified as additional depreciation.

Secondly, the treatment of the pre-PSE2 revaluation gains had the effect of increasing the implied depreciation materially, with the most significant effect occurring for the airfield cost centre (which accounted for 90 per cent of the total revaluation gain). The link between the pre-PSE2 revaluation gains and the implied depreciation is as follows.

- The revaluation gains increased the RAB, and thus will cause "cost" to increase over a 40 year period (reflecting the airfield lives). However, the benefit of the revaluation gain is being returned over PSE2. The effect of these two entries is that cost will be low during PSE2 (due to the accelerated return of the benefit), and higher in PSE3 and beyond (i.e., after the rebate has ended).

- Prices are being "smoothed" over a 20 year period. An implication of smoothing prices in a situation when cost is variable is that the implied return of capital will be higher when cost is low and lower when cost is high as it becomes the "swing" factor.

- Thus, as PSE2 is a low cost time for airfield (thanks to the accelerated rebate of the revaluation gain), the implied return of capital will be higher, all else constant.[31]

Table 8 illustrates the approximate magnitude of these factors for CIAL's aggregate RAB.

Table 8 – effect of depreciation method / treatment of taxation and revaluation gains on the closing RAB for PSE2 (2016/17) ($m)

	Straight line closing RAB	Pre tax closing RAB	*Difference between pre tax and straight line*	Post tax closing RAB	*Difference between post tax and straight line*	*Difference between post tax and pre tax*
			Effect on closing RAB of changing depreciation / treament of tax			
Closing RAB - No revaluations	416.40	487.85	*71.45*	441.98	*25.57*	*-45.87*
Closing RAB - Revaluations	446.66	482.12	*35.46*	438.46	*-8.20*	*-43.66*
Effect on closing RAB of revaluations	*30.26*	*-5.73*	*-35.99*	*-3.51*	*-33.78*	*2.21*

Note: pre tax and post tax refer to the use of a levelised price path and implied depreciation, the difference being how taxation is treated under that approach.

The figures against the white background are the closing RABs for the aggregate asset base under two scenarios:

- Conventional straight line depreciation vs. the actual return of capital, with the latter further divided into whether a pre tax or post tax WACC is used, and

- No asset revaluations prior to PSE2 (and therefore no rebate) vs. asset revaluations and an accelerated return of the revaluation benefit.

Some of the inferences that can be drawn are as follows.

[31] Where cost starts low and increases, a higher return of capital when cost is low can also be thought of as being necessary to make "room" in the cost structure (via a lower RAB than otherwise) to accommodate other increases in cost (in this case, the ending of the revaluation gain rebate).

- If there had been no asset revaluations, then the "implied return of capital" RAB at the end of PSE2 would have been higher than the straight line RAB, albeit with the gap if a pre tax WACC were used ($71.45 million) materially higher than if a post tax WACC were used ($25.57 million, implying that changing the treatment of taxation would have narrowed the gap by $45.87 million).

- The introduction of asset revaluations (and the accelerated rebate) reduced the implied return of capital RABs (i.e., by increasing the "return of capital" required in PSE2 to smooth out the early cost reduction) by $5.73 million and $3.51 million for a pre tax and post tax WACC, respectively. In contrast, the revaluations would have increased the straight line depreciation RAB by $30.26 million. These effects were sufficient for the straight line depreciation RAB to exceed the implied return of capital RAB when this latter value is calculated using a post tax WACC (the difference in this case being $8.20 million).

4. Implications for the disclosure statement and internal rates of return for PSE2

4.1 Schedule 18 disclosure statement

Schedule 18 sets out, in standard form, the cost and revenue assumptions and forecasts that sit behind the prices that are determined for a pricing period. The accompanying model to this report provides our calculation of schedule 18, which is reproduced below.

Table 9 – Regulated services that are the subject of the price setting event ($'000)

	Pricing Period Starting Year Jun-13	Pricing Period Starting Year +1 Jun-14	Pricing Period Starting Year +2 Jun-15	Pricing Period Starting Year + 3 Jun-16	Pricing Period Starting Year +4 Jun-17
Forecast value of assets employed	414,172	430,299	433,856	436,573	438,806
Forecast cost of capital	9.76%	9.76%	9.76%	9.76%	9.76%
Forecast return on assets employed	40,419	41,993	42,340	42,605	42,823
Forecast operational expenditure	24,943	26,749	27,279	27,938	28,543
Forecast depreciation	16,571	14,264	16,197	17,288	18,995
Forecast tax (on actual revenue)	2,021	4,865	7,737	9,945	10,001
Forecast revaluations	-8,431	-8,964	-9,108	-9,114	-9,222
Forecast other income	-87	-89	-91	-93	-95
Other factors	-26,325	-15,840	-11,571	-7,780	-7,879
Forecast total revenue requirement - adjusted	49,112	62,978	72,784	80,790	83,167
Revenue requirement not applicable to price setting event	0	0	0	0	0
Revenue smoothing adjustment	0	0	0	0	0
Forecast revenue for services applicable to price setting event	**49,112**	**62,978**	**72,784**	**80,790**	**83,167**

As indicated in the table, the line item for taxation has been calculated to reflect the forecast of tax on actual revenue.[32] In addition, the taxation line item has been calculated on a pre-financing basis (that is, ignoring the notional interest deduction) in order to be consistent with the version of the WACC that has been used to derive the forecast cost of capital (this issue was discussed in section 2.3.1).

It is also highlighted that the asset value figures set out in this schedule differ to those that will be reported for annual disclosure, for the reasons that are provided in section 2.3.2, namely that:

- the opening value for non-land assets will be higher than for annual disclosure by the forecast cost associated with Stage 3 of the Integrated Terminal Project (and the forecast capital expenditure for 2012/13 will be correspondingly lower than expected) – however, the difference between the disclosure value and pricing value will disappear from the end of 2012/13, and

- the opening value of the land component will be higher than for disclosure purposes as a consequence of the revaluation in 2011/12 for pricing; however, as a parallel revaluation was undertaken in 2012/13 for disclosure, this gap will reduce.

32 The accompanying spreadsheet model presents a reconciliation between (amongst other things) the forecast of tax under the forecast of actual revenue and the forecast of tax on the forecast of revenue under the levelised price path.

The key item in the table above is the "other factors" line, which identifies the extent to which the adjustments that CIAL has made have reduced the charges to customers compared to the "gross" revenue requirement.[33] The adjustment applied comprises two components, which are:

- The rebate that CIAL has applied to return to customers the benefit of the pre-PSE2 revaluation gains, and
- The implications of CIAL charging prices that are below the levelised prices, which in turn can be broken down into the difference between:
  - the cost of service for the first 5 months of 2012/13 that is implied by the levelised price calculation and the revenue actually received, and
  - the revenue forecast under the levelised prices for the pricing period (4 years and 7 months) and the revenue forecast under the actual prices.

The breakdown of the adjustment into these three items is shown in Appendix D (the full calculation of which is shown in the accompanying model).

The equivalent schedule for the other regulated services (leased services) is set out in Table 10 below.

Table 10 – Regulated services not the subject of the price setting event ($'000)

	Pricing Period Starting Year Jun-13	*Pricing Period Starting Year +1 Jun-14*	*Pricing Period Starting Year +2 Jun-15*	*Pricing Period Starting Year + 3 Jun-16*	*Pricing Period Starting Year +4 Jun-17*
Forecast value of assets employed	77,917	76,312	74,538	72,721	70,759
Forecast cost of capital	9.76%	9.76%	9.76%	9.76%	9.76%
Forecast return on assets employed	7,604	7,447	7,274	7,097	6,905
Forecast operational expenditure	1,914	1,954	1,996	2,037	2,080
Forecast depreciation	3,471	3,388	3,365	3,398	3,581
Forecast tax (on actual revenue)	1,300	1,371	1,426	1,466	1,466
Forecast revaluations	-1,659	-1,621	-1,584	-1,547	-1,508
Forecast other income					
Other factors	-2,602	-2,301	-2,024	-1,780	-1,628
Forecast total revenue requirement - adjusted	10,028	10,238	10,453	10,673	10,896
Revenue requirement not applicable to price setting event	10,028	10,238	10,453	10,673	10,896
Revenue smoothing adjustment	0	0	0	0	0
Forecast revenue for services applicable to price setting event	**0**	**0**	**0**	**0**	**0**

Unlike the case of the priced services, it is impracticable to derive the "other factors" adjustment on a bottom-up basis and so this adjustment has merely been calculated as the balancing item that is required to reconcile to forecast revenue.

[33] The adjustments shown here exclude the reduction in the associated allowance for company tax as revenue is reduced (this is excluded because the tax amount shown in the previous table is consistent with actual revenue). The full adjustments to revenue inclusive of the reduction in tax can be obtained by adding back the tax effects that are shown in Table 12 (Appendix D), so that, for example, the full adjustment for 2012/13 is -$36.6 million (= -26.325 – 1.959 – 4.866 – 3.412 = -36.563 million).

4.2 Calculation of internal rates of return

The accompanying model also sets out the calculation of the internal rate of return (IRR) that is implied by the pricing decision in a manner that is consistent with the Input Methodologies and the method employed by the Commerce Commission in its section 56G reports. The IRR for both the priced and other regulated services is presented, together with the IRR for the aggregate of the two. The specific assumptions adopted are as follows.

- Capital expenditure is incurred at the midpoint of each year and revenue at the end,[34] except for year 1 for priced services (the part year) in which case capital expenditure is assumed to be incurred at the end of the year.

- The "compromise" opening asset value described in section 2.3.3 is used as the opening value for the priced services, and the forecast closing RAB calculated on the basis of implied depreciation is used as the residual value. As the rebate of past revaluation gains will not extend beyond PSE2, the closing RAB for PSE2 will be the value for which prices in PSE3 and beyond are set to recover.[35]

- The IRR is calculated on a post tax (pre-financing) basis, imply that the taxation liability ignores the notional interest deduction (the result of this is that the IRR as calculated is comparable to CIAL's target return of 9.76 per cent).

- The IRR for the priced services is calculated over the period after the commencement of the new prices (i.e., the period from 1 December 2012), whereas the IRR for the other regulated services is calculated for the full five year period, which both follow the Commission's method in the section 56G review.

- The IRR for the combined priced and other regulated services is calculated by summing the relevant cash flows and computing the IRR. This is different to how the Commission calculated the IRR for the combined projects; however, the result is almost identical.[36]

The results of this analysis are set out in Table 11 below.

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34 The Commission's modelling for the section 56G inquiry actually assumed that half of the capital expenditure is incurred at the start of the year and half at the end; however, this is a very close proxy for assuming that capital expenditure is incurred at the midpoint of each year (the IRR rounded to two decimal places does not change).

35 If the rebate of the past revaluation gains was instead structured to be provided over a longer period, then it would have been necessary to adjust downward the closing RAB to reflect the (negative) value associated with this continuing rebate.

36 The Commission calculated the overall IRR by taking a weighted average of the separate IRRs, with average asset values used as weights. This method also yields an overall IRR of 6.68 per cent.

Table 11 – Input Methodology consistent IRR calculations

	IRR
IRR for the priced services (part year for 2012/13)	**6.65%**
IRR for the other regulated services (full year for 2012/13)	**6.86%**
IRR for the combined services (combination of part year and full year for 2012/13)	**6.68%**

It is noted that the IRR calculated for the priced services (6.65 per cent) is lower than the value the Commission reported (7.0 per cent), which is caused by using the closing RAB that is consistent with implied depreciation rather than the straight line depreciation closing RAB (as used in the Commission's figure). Combining this with the estimated IRR for other regulated services (6.86 per cent) results in an IRR for the combined regulated services of 6.68 per cent, which is below the value the Commission reported in the section 56G report.[37]

[37] It is noted that the IRR for the other regulated services that has been estimated and used here (6.86 per cent) is higher than the value reported by the Commission in its section 56G report (5.7 per cent). The difference is because the Commission's calculations appeared to misinterpret some of CIAL's disclosure information and incorrectly classify values as capital expenditure that were actually forecasts of revaluation gains.

A. Consideration of comments from interested parties

A.1 Introduction

As discussed in section 1.1, a number of comments were received from interested parties in relation to how implied depreciation should be calculated, or how it should be applied to calculate the closing RAB for PSE2. These included a number of specific suggestions for change.[38] These suggestions and our response to them – the majority of which have been accepted and incorporated into the calculations presented in this report – are discussed in section A.3.

However, the report from Covec also contained a more fundamental comment on the proposed calculation of depreciation for PSE2, advocating that it would be inappropriate to change from the approach to calculating depreciation from what CIAL had applied previously in its disclosure statements. Given the importance of this matter, it is discussed next.

A.2 Response to Covec's principal comment

A.2.1 Introduction

As noted above, Covec's principal comment on our earlier report and other material was that the concept of implied depreciation is inappropriate and will generate windfall gains and should not be applied at all. It advocated instead that CIAL should continue to report a RAB value that is based upon straight line depreciation as it foreshadowed and that to do otherwise would be inconsistent with CIAL's previous statements.

We disagree with the suggestion that windfall gains may be made from the application of implied depreciation (they cannot) and note that Covec comments appeared to miss the reason that CIAL is restating its disclosures to be based upon implied depreciation, which is to provide the Commission and airlines with the additional transparency over returns that both have sought.

More specifically, Covec observed that the outcome of the implied depreciation calculation is that the RAB is structured such that the expected return is equal in all years. Covec observed that:

- the equal expected return was not consistent with how CIAL described its expected return during the consultation for PSE2 prices (CIAL had described the levelised price path as generating a return that starts low and increases over time),[39] and
- would result in a higher closing RAB for PSE2 than would straight line depreciation and so imply higher prices for customers in PSE3 and beyond, describing the method as resulting in upwards revaluations that are not being rebated to customers.[40]

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38 The comments from interested parties also sought clarification on aspects of the proposed method or its outcomes. The relevant parts of this report have been revised in order to address these areas of uncertainty.

39 Covec, p.2.

40 Covec, p.2.

Covec advocated an alternative approach to setting prices in which:

- the RAB is carried forward using straight line depreciation, and
- the return on assets would vary over time – in the stylised example provided by Covec (20 year asset life, WACC of 10 per cent and a level cash flow), the annual return would increase over time from 8.0 per cent to 15.7 per cent.[41]

A.2.2 Will there be a windfall gain?

First, with respect to future prices, Covec is incorrect in its assertion that carrying forward the RAB using implied depreciation will generate a higher price to customers in PSE3 and beyond than under Covec's alternative approach. Rather, the price to customers for PSE3 and beyond will be identical provided the alternative approaches are applied consistently and so a fair comparison is being made. Indeed, this is the outcome under the stylised example that Covec provided in its report.[42]

This follows because under Covec's preferred approach, whereas the RAB would be lower than if implied depreciation is applied, the annual return that is required to achieve NPV=0 will increase over time to levels substantially in excess of the WACC. In the stylised example in Covec's report, a margin over the WACC of 0.02 percentage points would be required for year 6, rising to a margin over the WACC of 1.64 percentage points by the final year of the second pricing period (year 10). As Covec's stylised example demonstrates, while the RAB would be lower under its preferred approach, the rate of return provided would be higher by a precisely offsetting amount (this is clear from the fact that the "annual cash flow" under the two methods is identical at 117,460 in all years).

A.2.3 Should CIAL depart from how it described the effect of the levelised price path?

Covec is clearly correct that CIAL did make a number of statements suggesting that it expected its rate of return (on a straight line depreciated RAB) to commence low and then to escalate over time. However, this was the very aspect of how CIAL had presented the outcomes of the levelised price path that caused valid concerns with the Commission about the transparency of CIAL's returns over time.

More specifically, if the RAB is carried forward on a straight line depreciated basis, then as Covec's own analysis makes clear, the "appropriate" rate of return (i.e., the rate of return that is necessary to achieve NPV=0) will vary over time, with the "appropriate" return starting well below the WACC and then increasing to levels substantially higher. In turn, if the "appropriate" return varies in this manner, then it is difficult to compare CIAL's expected or measured return in any year with an estimate of the appropriate WACC and draw any meaningful inference about the appropriateness of those expected or measured returns. The whole purpose of deriving the depreciation that was implied for PSE2 under the levelised price path and using this to update the RAB is to convert a framework in which returns

41 This stylised example assumed, in effect, a constant demand. With demand growth and levelised prices, an even greater variation in the expected return over the period occurs.

42 Covec, p.10. Note that both approaches

are varying returns into an equivalent framework in which the expected return in each year is the assumed WACC so that the transparency sought by the Commission is achieved.[43]

In addition, if the RAB were derived in the manner advocated by Covec, then it would be necessary to again apply the levelised price approach for PSE3 and beyond. This is because, as Covec's stylised model shows, using the straight line depreciated RAB would only be consistent with an NPV=0 outcome over the life of the asset if the rate of return provided in future periods increases above the WACC as anticipated under the levelised price path. In contrast, if the RAB is updated to the end of PSE2 using implied depreciation (as recommended in this report), then the flexibility is provided to reapply a levelised price path for PSE3 or to switch to a more conventional application of the building block approach.

Clearly, however, the additional transparency intended by the switch to implied depreciation will only be realised if the information in the revised disclosure templates is analysed correctly. It is for this reason that the accompanying spreadsheet model demonstrates how to calculate the internal rate of return for the priced and other regulated services for the PSE2 when applying the inputs prescribed in the Input Methodologies (see Chapter 4).

A.3 Suggested changes to the method of deriving implied depreciation

A.3.1 Introduction

All of the suggested areas of change to the calculation of implied depreciation were addressed in the Covec report and so this section focusses on its arguments. The areas where Covec recommended a change to the method of deriving implied depreciation were in relation to:

- the formula that is used to calculate the "return on assets" component of the implied depreciation calculation (referred to as the "cash flow timing assumption")
- the WACC that is used in the calculation of implied depreciation, and
- the treatment of CPI inflation (specifically, whether or not the "authorised" RAB at the end of PSE2 should include CPI-related revaluation gains that reflect actual CPI inflation or the original forecast of CPI inflation).

These are addressed in turn. Covec endorsed the rebate of pre-PSE2 revaluation gains over the PSE2 period and the reasons presented for doing so, and so this matter is not discussed further.

A.3.2 Formula used to calculate "return on assets"

In our earlier report, we had proposed a simplified formula for calculating the "required return on assets" input into the annual implied depreciation. In effect, we specified the "required return on

[43] As noted in several places, the two frameworks are not precisely equivalent because a change has also been made from using a pre tax approach to a post tax approach, which is to the benefit of the airlines (that is, this change is likely to lead to prices for PSE3 and beyond being lower than would otherwise have been the case).

assets" as the WACC applied to the opening asset value and half of the within year capital expenditure, rather than the WACC applied to the average of the opening and closing asset values for the year (which, Covec is correct, is how CIAL calculated its PSE2 prices). Our reason for doing so was to simplify the presentation of the implied depreciation calculation given the newness of the concept.

Covec suggested that formulae should be applied that, whilst more complex in their application, better reflected how CIAL had set its prices for PSE2. Covec explained the importance of consistency as follows:[44]

> *Using the above formula for implied depreciation rather than IEC's approach leads to a reduction in the asset base at the end of PSE2 of around $2.2 million (or 0.5%). While this is a relatively small amount, it is preferable that the implied depreciation methodology is as consistent as possible with the approach used by CIAL to set prices for PSE2. If such consistency is not maintained then CIAL effectively has an opportunity to make unilateral changes to its pricing model part-way through a pricing period.*

We accept this view, and our recommended figures for implied depreciation in this report apply the more correct calculation (the formula for doing so is set out in Appendix B).

A.3.3 WACC used in the implied depreciation calculation

Covec suggested that the Commission's preferred WACC value should be used when deriving implied depreciation rather that the WACC value that CIAL actually used when setting the prices for PSE2.

We disagree with Covec's view in this regard. With the exception of implementing the change from a pre tax to a post tax approach, the objective of the implied depreciation calculation is to make CIAL's pricing decision for PSE2 more transparent, rather than to remake the pricing decision. Changing the WACC as Covec suggests would have a substantial impact on the effect of the PSE2 pricing decision.[45]

Moreover, Covec's view that CIAL should use a different WACC to calculate implied depreciation from what it applied when setting prices for PSE2 is inconsistent with the principle that Covec advocated in relation to the "return on assets" formula discussed above. In that context, Covec (in our view, correctly) advocated applying the assumptions embedded in CIAL's pricing decision as fully as possible when calculating implied depreciation, observing that:[46]

> *If such consistency is not maintained then CIAL effectively has an opportunity to make unilateral changes to its pricing model part-way through a pricing period.*

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44 Covec, p.15.

45 That is, prices for PSE2 would not change, but the closing RAB for PSE2 would be much lower than anticipated in the levelised price path, which in turn would lead to lower prices expected from PSE3 onwards.

46 Covec, p.15.

A.3.4 Treatment of CPI inflation

In our previous report, we noted that when a conventional inflation-indexed RAB roll forward is performed, there are two adjustments for the difference between forecast and outturn inflation that are made:

- The annual depreciation allowance adjusted implicitly for the difference between forecast and outturn inflation, and
- The revaluation gain is also adjusted implicitly for the difference between forecast and outturn inflation.

In a conventional application of an inflation-indexed RAB roll-forward, these adjustments would be "authorised" in that there would be no suggestion that change in the RAB that resulted from these adjustments would be a windfall gain or loss for which a correction was warranted (rather, these adjustments are required to avoid windfall gains or losses if returns are correctly specified).

In our draft report, we recommended not adjusting "implied depreciation" for any difference between forecast and actual CPI inflation, because of the complexity of trying to do so and because this appeared most consistent with CIAL fixing prices in nominal terms throughout PSE2. However, we recommended updating the "authorised" revaluation gain to reflect actual CPI rather than the value of CPI inflation that was forecast.[47] Our arguments for updating the "authorised" revaluation gain (following from the point made above) were that:

- This reduces the likelihood of windfall gains or losses being received, noting that investors target real (i.e., after inflation) returns, and so need higher nominal (i.e., inflation inclusive) returns when actual inflation exceeds the forecast and are content with lower nominal returns when inflation is lower than forecast
- Treating inflation in this manner is standard regulatory practice in Australasia and the UK, and
- The intention to adjust for the difference between forecast and actual inflation was implicit in the financial modelling that CIAL performed when it set its prices (CIAL escalated asset values by forecast CPI – this makes little sense unless asset values were to be updated for actual inflation after the fact).

In its advice to BARNZ, Covec challenged this approach, observing that:

- Statements from CIAL suggested that it intended to correct for all unforecast revaluation gains
- If asset values are to be updated for actual inflation, then regulation is more complex because inflation needs to be forecast, and
- If asset values are to be updated for actual inflation, then CIAL will face less risk than assumed in its WACC and a lower WACC should be used.

[47] The term "authorised" is used here to refer to the revaluation gain/loss that is permitted before there should be an expectation of a correction in future periods.

Notwithstanding Covec's and BARNZ's comments, we have retained our recommendation to recalculate the revaluation gain to reflect the actual change in the CPI over the period rather than the forecast.

We observe that many of Covec's comments appear to contain an assumption that the use of actual CPI revaluation gains inevitably would create a windfall gain for CIAL at the expense of the airlines. However, for PSE2, this is unlikely to be the case, and indeed the reverse is more likely. The inflation outcomes for 2012/13 and 2013/14 are already known, and over those years the CPI increased by 0.68 per cent and 1.62 per cent, both of which are substantially lower than the forecast CPI increase of 2.1 per cent.

We remain of the view that updating the RAB to reflect actual CPI inflation rather than the forecast is the better "in principle" position for the reasons we provided in the draft report and summarised above.[48] We highlight here that it is unusual for regulated firms in Australasia (and in the UK) to be exposed to long term inflation risk. In relation to Covec's principal analytical issues:

- *Consistency with the WACC* – when advising CIAL on the appropriate WACC, our assumption was that CIAL would not bear long term inflation risk, although the precise impact of the allocation of inflation risk is not something that we addressed explicitly.[49] We note, however, that the debate about the WACC was conditioned by the Commission's views on the appropriate WACC for inflation disclosure, and the inflation disclosure regime requires non-land assets to be revalued by the change in the actual CPI, which is consistent with our recommendation.[50]

- *Complexity of the regulatory process* – we disagree with Covec's suggestion that the need to forecast CPI inflation adds substantial complexity to the regulatory process. CPI inflation is one of the more straightforward economic variables to forecast given that the Reserve Bank of New Zealand has an explicit target for inflation and there are traded instruments that allow market evidence to be brought to bear.[51]

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48 It is acknowledged, however, that the analysis of inflation risk in a real life setting is more complex. For example, if the focus is on the providers of equity finance and the debt finance for the asset in question is standard fixed rate finance (i.e., not inflation linked or floating rate debt), then the real return to equity providers will not remain constant if revenues and asset values are indexed for inflation. Rather, equity providers will be better off in times of higher than forecast inflation, and worse off in times of low inflation.

49 Whether the CIAL WACC is consistent with (i) CIAL bearing long term inflation risk, or (ii) CIAL being shielded from long term inflation risk, depends upon the extent to which the firms that were used as the comparator entities when deriving beta estimates for NZ airports are exposed to long term inflation risk. We have not undertaken this analysis and we are not aware of it having been done.

50 The fact that the disclosure regime requires non-land assets to be revalued according to the actual change in the CPI (and allows this for land, given that actual CPI revaluations are required in the absence of the airport choosing to revalue at MVAU) implies that the pricing decision will be easier to present in a transparent manner in the disclosure regime if the revaluation gain is recalculated to reflect actual CPI. However, this is not a strong grounds for preferring to a recalculation of CPI revaluations – if a strong in principle case had existed for adopting BARNZ's position, then the preferred course of action for aligning pricing and disclosure would have been to seek an exemption from this aspect of the disclosure regime in the short term and a change to the disclosure regime in the longer term.

51 New Zealand currently has two long term inflation-linked bond series on issue (2025 and 2030), from which a real risk free rate of return can be inferred directly and the market's forecast of CPI inflation inferred as necessary.

We have also reviewed CIAL's statements about what it intended in relation to differences between actual and forecast CPI and the full context of these statements (including its financial modelling and the disclosure regime, discussed above). We find it hard to read anything definitive into these statements. We observe that while CIAL made definitive statements about the treatment of revaluations, the focus of this debate was upon the much more significant issue of how the real increase in replacement costs or land values should be treated for pricing purposes, rather than on the more subtle and second order issue of how a difference between forecast and actual CPI inflation should be treated.

We observe, however, that the issue of how differences between forecast and actual CPI inflation should be treated could be reconsidered when CIAL reviews its prices for PSE3 and, as part of this, decides how the opening RAB for PSE3 should be updated over PSE3.[52] We note that a change away from the treatment recommended here would require a change to the (annual) disclosure regulations in order for the RAB that is reported for disclosure purposes to be capable of following accurately the RAB that is used for pricing.

[52] The purpose of this report is to provide certainty as to how the RAB will be updated over PSE2, the outcome of which will be the opening RAB for PE3. It will be an issue for the PSE3 review as to how the opening RAB in PSE3 will be updated over PSE3 in order to establish the starting point for PSE4.

B. Formula for calculating implied depreciation

The formula that CIAL used to derive the "building block" revenue requirement in each year of PSE2 and beyond – which in turn was used to derive the levelised price path – was as follows:

$$Revenue\ requirement_t = r.\left(\frac{RAB_t^{Open} + RAB_t^{Close}}{2}\right) + Dep_t + Opex_t + Tax_t - Reval_t$$

Rearranging this formula means that the return of capital for a year that is implied by the forecast revenue (under levelised prices) for that year can be expressed as:[53]

$$Return\ of\ Capital_t = \frac{Revenue_t - r.RAB_t^{Open} - \frac{r}{2}.Capex_t + \left(1 - \frac{r}{2}\right).Reval_t - Opex_t - Tax_t}{1 - \frac{r}{2}}$$

This formula has been applied to calculate the implied return of capital for the second year onwards for PSE2.

For the first year, the formula needs to be modified to reflect the fact that:

- the calculation of implied depreciation applies over a part year only, but
- the roll-forward of the asset value occurs over a whole year, with straight line depreciation applying for the first 5 months (5/12th) of the year.

The full algorithm is embedded in the accompanying spreadsheet model.

[53] This is essentially the same as the formula that Covec derived (see Covec, p.14), with the only change being the correction of an obvious error (namely that Covec's formula provided for the half-return on capital expenditure in its year of commissioning twice).

C. Formula for calculating tax when rebating revaluation gains

The following terms are used in this appendix:

- *GRR* (gross revenue requirement) = the revenue requirement using the revalued asset base before the rebate of the benefit of the revaluation gain
- *NRR* (net revenue requirement) = the revenue requirement using the revalued asset base and after the rebate of the benefit of the revaluation gain, which is the revenue to be recovered through prices.
- *RGR* (revaluation gain rebate) is the rebate required to return the revaluation gain, so that *NRR = GRR – RGR*.
- *ROA*, *Dep*, *Tax Dep* and *Opex* are all based on the revalued asset base (*ROA* and *Dep* and defined in post tax terms)
- $Amort^{RG}$ is the post tax amortisation of the revaluation gain, and can be broken down into the post tax return on assets component (ROA^{RG}) and depreciation (Dep^{RG}, also post tax).

The standard formula for the gross revenue requirement is:

$$GRR = ROA + Dep + Opex + \frac{T}{1-T}(ROA + Dep - Tax\ Dep)$$

Similarly, the standard formula for calculating the required rebate for the revaluation gain is:[54]

$$RGR = Amort^{RG} + \frac{T}{1-T} Amort^{RG}$$

If these formulae are combined, then the net revenue requirement – and the amount to be factored into prices – can be expressed as:

$$NRR = ROA + Dep + Opex - Amort^{RG} + \frac{T}{1-T}(ROA + Dep - Amort^{RG} - Tax\ Dep)$$

This formula says that the *net revenue requirement* can be calculated as the sum of:

- the revenue requirement in post tax terms, which is given by the post tax return on the asset base, less the amortisation of the revaluation gain in post tax terms (this is the first part of the expression), and
- taxation on the post tax revenue requirement, which (as noted above) is already net of the (post tax) revaluation gain rebate.

54 This in turn simplifies to $\frac{Amort^{RG}}{1-T}$, although this expression is not used here.

This formula can be applied in an ex post sense (that is, to estimate implied depreciation or measure actual returns) by noting that the *pricing revenue* that is observed (denoted *PR* below) is equal to the net revenue requirement if costs are being recovered precisely (i.e., *PR* = *NRR*).

The expression for implied depreciation can be derived by grouping the "depreciation" terms on the left hand side, that is:

$$PR = ROA + Dep + Opex - Amort^{RG} + \frac{T}{1-T}(ROA + Dep - Amort^{RG} - Tax\ Dep)$$
$$\therefore Dep\left(1 + \frac{T}{1-T}\right) = PR - ROA - Opex + Amort^{RG} - \frac{T}{1-T}(ROA - Amort^{RG} - Tax\ Dep)$$
$$\therefore Dep = PR - (ROA - Amort^{RG}) - Opex - T(PR - Opex - Tax\ Dep)$$

Thus, *implied depreciation* can be calculated as:

- pricing revenue, less
- the post tax return on asset, net of the post tax rebate of the revaluation gain, less
- opex, less
- taxation calculated on the pricing revenue.

It is observed that the rebate of the revaluation gain in post tax terms is used in this expression because taxation is calculated on the pricing revenue (which is a revenue stream that is already net of the rebate of the revaluation gain).

Similarly, once the implied depreciation values have been determined, the annual post tax return on assets (in dollar terms) can be derived as:

$$ROA = PR - Dep + Amort^{RG} - Opex - T(PR - Opex - Tax\ Dep)$$

Thus, the revaluation gain rebate in post tax terms should be treated as income (i.e., part of the post tax return), and taxation should be calculated on the (actual) pricing revenue. An alternative expression can be derived in which the pre tax (grossed up) rebate is treated as income; however, that would also require taxation to be calculated on a higher base.

D. Breakdown of the "other factors" in the disclosure statement

As discussed in section 4.1, the "other factors" line item in the Schedule 18 disclosure statement in relation to "regulated services that are the subject of a price setting event" (Table 9) can be broken down into:

- The rebate that CIAL applied to return to customers the benefit of the pre-PSE2 revaluation gains, and
- The implications of CIAL charging prices that are below the levelised prices, which in turn can be broken down into the difference between:
  - the cost of service for the first 5 months of 2012/13 that is implied by the levelised price calculation and the revenue actually received, and
  - the revenue forecast under the levelised prices for the pricing period (4 years and 7 months) and the revenue forecast under the actual prices.

The breakdown of the adjustment into these three items is shown in Table 12 below. The full calculation of these values is shown in the accompanying model.[55]

Table 12 – Breakdown of the adjustment to revenue ($'000)

	2013	2014	2015	2016	2017
Rebate of past revaluation gains (effect on charges)	-12,186	-12,186	-12,186	-12,186	-12,186
Tax effect of rebating past revaluation gains	3,412	3,412	3,412	3,412	3,412
Net adjustment (1)	**-8,774**	**-8,774**	**-8,774**	**-8,774**	**-8,774**
Revenue for the first 5 months consistent with levelised price cost of service	34,081				
Actual revenue for the first 5 months	16,701				
Difference between first 5 months of revenue and levelised price cost of service	*-17,380*				
Tax effect of reduction in revenue	4,866				
Net adjustment (2)	**-12,514**				
Forecast revenue under levelised prices (4 years and 7 months)	39,408	72,792	76,669	79,410	81,924
Forecast revenue under actual prices (4 years and 7 months)	32,411	62,978	72,784	80,790	83,167
Difference between revenue under actual prices and levelised prices - 4 years and 7 months	*-6,997*	*-9,814*	*-3,885*	*1,380*	*1,243*
Tax effect of reduction in revenue	1,959	2,748	1,088	-386	-348
Net adjustment (3)	**-5,038**	**-7,066**	**-2,797**	**994**	**895**
Total adjustment	**-26,325**	**-15,840**	**-11,571**	**-7,780**	**-7,879**

Most of the adjustments presented in the table above are self-explanatory. One concept that may not be obvious is what is referred to as the "levelised price cost of service" for the first 5 months of 2012/13. As discussed earlier, the implied depreciation for the last 7 months of 2012/13 has been calculated by allocating 7/12^{ths} of the annual cost items to this latter period, which means implicitly that 5/12^{ths} of those items relate to the first 5 months of the year. The two exceptions are:

55 As discussed in section 4.1, the net adjustments shown here exclude the reduction in the associated allowance for company tax. The full adjustments inclusive of the reduction in tax can be obtained by adding back the tax effects.

- *Depreciation* – where the appropriate amount for the first 5 months is 5/12^{ths} of the annual straight line depreciation amount as this is the depreciation amount that is being applied to the RAB for the first 5 months when rolling it forward, and

- *Rebate of past revaluation gains* – all of the rebate for 2012/13 was applied to the last 7 months of 2012/13 when calculating implied depreciation, meaning that there is no rebate remaining to attribute to the first 5 months of 2012/13.

BOARD OF AIRLINE REPRESENTATIVES NEW ZEALAND

22 August 2014

Mr Neil Cochrane
General Manager Business Services
Christchurch International Airport Ltd
PO Box 14001
Christchurch 8544

Dear Neil,

Feedback on revised information disclosures

I refer to your letters (and accompanying materials) of 6 June and 8 August 2014 outlining CIAL's proposed approach for revising its price setting event and historic information disclosures in light of observations made by the Commerce Commission during its review of the effectiveness of information disclosure regulation in relation to CIAL.

BARNZ has now reviewed the material provided by the airport and is able to provide the following feedback. In addition, we commissioned Covec to review the proposed approach and supporting spreadsheets. Covec's report is attached.

Background

In its report on CIAL to the Ministers of Commerce and Transport under s56G of the Commerce Act, the Commerce Commission reached the view that CIAL's expected profitability performance was not transparent for interested parties (contrary to the s53A objective for information disclosure) which made it difficult for parties (including the Commission) to assess whether or not CIAL was limited in its ability to earn excessive profits as per s52A(1)(d).

Key to the Commission's conclusions on lack of transparency were:

- CIAL's preparation of its pricing setting and information disclosures using straight-line depreciation rather than depreciation consistent with its levelised price path (ie, reflecting relatively low capacity utilisation in the short term, as well as an expectation of higher cash-flows in the future). This caused the disclosed target return to under-estimate expected returns in PSE2 because it represented returns on an RAB depreciated using straight-line depreciation which (initially, at least) is higher than depreciation consistent with the levelised pricing path adopted by the airport;
- CIAL's use of a pre-tax WACC to estimate its levelised pricing path, rather than a post-tax cost of capital as specified under the input methodologies together with an explicit building

block for tax. This resulted in CIAL's financial model not appropriately treating the tax effects of the revaluation wash-ups, causing the airport to target a higher post-tax return than it claimed it was, and than its disclosures showed;

- The disclosure by CIAL of detailed calculations for the first ten years of the model only, with a terminal value representing years 11 to 20, rather than explicit assumptions for the full 20 years; and
- Lack of clarity over the pricing path after the first four years seven months of the model, as a result of CIAL's pricing path shown in the financial model moving above the levelised pricing path. This was exacerbated by statements by CIAL during the Commission's conference process that it intended adopting rolling 20 year pricing periods starting afresh at each new pricing period, rather than completing the 20 year levelised pricing path on which prices were set for PSE2.

The airport's proposed revision to its disclosures

As a result of these and other concerns identified by the Commission, CIAL indicated that it would revise its price setting disclosures for PSE2 as well as its FY13 disclosures in order to improve transparency. Moreover, subsequent disclosures for FY14 onwards would be based on the new approach too. Primarily the airport proposed:

- Moving to disclose a non-standard depreciation approach reflecting its levelised pricing approach;
- Changing to a post-tax (rather than pre-tax) WACC; and
- Including explicit forecasts of the regulatory tax allowance calculated using the tax input methodology.

The airport has produced spreadsheets and provided explanations and a presentation of an approach which:

- Calculates the forecast tax payable on the basis of the Commission's tax input methodology;
- Calculates the non-standard depreciation as the residual after deducting the airport's target 9.8% post-tax return, forecast opex and forecast tax from the forecast levelised pricing path revenue and after adding back forecast revaluations for PSE2 and the rebated revaluation credit from PSE1; and
- Provides as a further output the closing RAB for PSE2 reflecting the levelised pricing path, target 9.8% return and the above calculated non-standard depreciation.

Comment on proposed methodology to calculate the implied depreciation

The aims of improving transparency of the depreciation profile, of moving to a post-tax WACC, of applying the Commission's tax input methodology to calculate the tax payable and of endeavouring to provide certainty as to the closing RAB in PSE2 (and hence the opening RAB in PSE3) are all endorsed by BARNZ.

BARNZ considers that the pricing approach adopted in PSE2 was unnecessarily complex, and has led to considerable problems and lack of transparency. It has now created the need to 'reverse engineer' the depreciation implicit in the levelised pricing path. We do not support the current pricing approach being continued to be used in PSE3 or thereafter.

We have some serious reservations about the approach being proposed by IEL on behalf of CIAL to unravel the PSE2 pricing decision in order to provide a stable base for going forward.

First, the IEC proposed approach of treating the return on capital as the constant element takes the opposite assumption to what is normally the case where depreciation is usually a pre-determined amount. IEC propose treating the target 9.8% return on capital as a fixed cost to be notionally recovered first, with depreciation being the residual (after allowing for forecast tax, forecast opex and forecast revaluations). Compared with straight-line depreciation, all else being equal (that is, specifically putting to one side the tax error requiring rectification), this approach results in depreciation being reduced in PSE2 because it becomes the remainder, and will cause asset values to be higher going into the subsequent pricing period, likely resulting in higher prices in PSE3 and thereafter than would otherwise be the case.

Secondly, IEC's approach of a 9.8% return on capital being recovered throughout PSE2 is inconsistent with CIAL's stated approach as it set charges targeting varying levels of return on capital over its 20 year pricing path, with returns being below the target WACC in early years and exceeding WACC in later years, specifically in PSE 4 and 5, so that overall the outcome was one of its target level of return on average over the 20 years, albeit not necessarily so in any individual year or in any five yearly pricing period. IEL's approach therefore ascribes a higher return on capital to PSE2 than CIAL did as it set prices. As Covec observes, this is akin to a bank unilaterally changing the mix of interest and principal payments on a mortgage, thereby increasing total interest payments and the total cost of the loan. The result is a lower return of capital in the early years than would be the case if CIAL's approach when it set charges of returns on capital increasing over time was applied, and consequently a higher closing asset base. As Covec point out, this is equivalent to an upwards revaluation of CIAL's assets, occurring through a reduction in the amount of depreciation in PSE2. However, unlike a normal revaluation, it will not be recognised as income, and hence it will generate a windfall gain for CIAL.

Third, IEC's approach locks in a target return of capital which substantially exceeds the appropriate range identified by the Commerce Commission, of 6.6% to 7.6% for PSE2 (or 7.6% to 8.5% for a 20 year period). It is also substantially greater than the 6.8% which the Commerce Commission considered CIAL was targeting in PSE2 on the basis of an RAB which was depreciated using straight line depreciation and indexed for inflation. In its submissions to the Commission CIAL confirmed that the Commission's profitability analysis of a 6.8% target return was in accordance with the Airport's own expectations of how the Commission would measure the returns being targeted by CIAL for PSE2. To be consistent with CIAL's expectations as prices were set, the implied depreciation calculation should therefore be based on the 6.8% target return value identified by the Commission and confirmed by CIAL. Moving away from the 6.8% target rate of return for PSE2 to the 20 year overall target of 9.8% is a clear unilateral rewriting of the pricing decision, resulting in the return targeted in PSE2 being substantially greater than CIAL were targeting, the depreciation substantially less and the closing RAB being substantially higher. Covec estimate that the PSE2 closing asset base under IEC's approach using a 9.8% target return will be $55m higher than would be the case using a 7.1% WACC (the middle of the Commission's acceptable range). As noted above, this is the equivalent of an upwards revaluation of CIAL's assets, albeit not one recognised as income. It will likely result in prices being higher than would otherwise be the case in PSE3.

Fourth, although a much less material point, we note that IEL have undertaken their calculations on the basis of cash-flows occurring at the end of each year which differs to CIAL's approach when it set charges of using average assets. This changed approach results in the closing asset base being approximately $2m higher.

Suggested way forward by BARNZ

BARNZ agrees that the financial model used by CIAL to set charges in PSE2 and the subsequent disclosures do not provide a clear and transparent basis on which to move forward to set charges in PSE3. We would not support the current price setting approach being used to reset charges in PSE3.

We agree that there is merit in unravelling the depreciation implied in CIAL's current pricing approach, so as to provide transparency of targeted profitability and actual outcomes in PSE2 and also to provide certainty as to the closing asset base at the end of PSE2, thus enabling prices to be reset afresh in PSE3 off a consistent opening asset base.

While we are fundamentally opposed to the IEC reverse engineered depreciation approach being used going forward to set prices in PSE3 or subsequently (given the issues identified with the approach by Covec in its paper), the IEC approach (if modified to more accurately reflect CIAL's intentions for PSE2 as it set prices) is probably the best solution available in a bad situation in order to unravel the complexities and confusion created by the levelised pricing approach adopted by CIAL. However, it needs to reflect CIAL's approach as it set charges in PSE2 – not a subsequent reallocation of revenue away from depreciation to make good the (excessive) long-term 9.8% target return.

BARNZ therefore suggests that the IEC solution either be applied with the 6.8% return identified by the Commission as being what CIAL were targeting in PSE2 (which CIAL confirmed reflected their expectations of how the Commerce Commission would measure its target profitability) or with the top end of the acceptable WACC range the Commission was applying for PSE2 at the time CIAL set prices, which was 7.6%. We note that the 6.8% return calculation was based on an assumption that straight-line depreciation was applied. This suggests that the 7.6% estimate of the upper limit of acceptable returns applicable at the time CIAL set charges is therefore more appropriate to use as the target return on capital in calculating the residual return of capital inherent in the PSE2 forecast revenue streams.

BARNZ does not accept IEC's implied depreciation calculation being adopted with a 9.8% target return, which:

- Is significantly greater than the Commission's acceptable range of 6.6% to 7.6% for PSE2 and would lock in an excessive target return;
- Represents a long-term WACC estimate whereas the focus in the present task is on PSE2, not a twenty year period;
- Is inconsistent with CIAL's stated approach of not recovering that level of return in the initial stages of its 20 year financial model;
- Would result in depreciation being significantly under-stated and hence in the closing asset base being considerably higher than it should be;
- Effectively causes a revaluation of CIAL assets, without any of the revaluation gain being treated as income; and
- Will increase the over-all cost to users over the life-time of the assets.

For CIAL to now seek to ascribe the entire levelising of prices over its 20 year model to the depreciation element of the return on and of capital is for the airport to seek to rewrite history in a way that will advantage it and provide it with a windfall gain similar to a revaluation not being treated as income.

The airport's very clear intent during consultation was that while it would earn its target return over the 20 year pricing period, this would be by virtue of lower returns in the earlier pricing periods and higher returns, exceeding WACC, in later pricing periods. It described its approach to the Commerce Commission as 'a deliberate policy to backload future returns on investment' (emphasis added). In reality the levelising of prices was a mixture of a non-standard depreciation profile and the return on capital starting at a lower level and increasing over time. IEC's proposed approach of quantifying the amount of depreciation applicable to PSE2 as the residual after the entire (excessive) 9.8% targeted return was achieved does not reflect the philosophy adopted by CIAL as it set charges.

Comment on treatment of unforecast revaluations

While not directly relevant to the present exercise of quantifying the depreciation applicable to PSE2, BARNZ wishes to comment on the suggestion by IEC that unforecast revaluations attributable to any difference between forecast and actual CPI do not need to be treated as income (or a loss) in the following pricing period – rather, only unforecast revaluations over and above actual CPI require a rebate to be applied.

The treatment of unforecast revaluations is a matter BARNZ is always very attuned to, given the history of airports (including CIAL) having previously made substantial unforecast revaluations without treating these as income in the price setting process. During consultation BARNZ specifically raised with CIAL how any unforecast revaluations occurring during PSE2 would be treated going into PSE3 and CIAL advised that it considered that the most appropriate treatment for such valuation variations was to treat them as revenue in subsequent pricing resets.

IEC's proposal that the treatment of unforecast revaluations should differ between unforecast revaluations attributable to CPI outturns differing from forecast, and those attributable to real increases in asset values, is a nuance not previously put forward by CIAL.

We do not consider that there is any sound basis for distinguishing between the two sources of unforecast revaluations and treating one as income in subsequent pricing resets but not the other. If increases in asset values due to forecast CPI need to be treated as income, then so too should unforecast increases in asset values caused by actual CPI movements.

In any event, IEC's proposed distinction is not one that was raised by CIAL during price setting in PSE2, and to adopt a different approach now would be to re-write history and reallocate the risks faced (or not faced) by the asset owner, without this being able to be reflected in the WACC.

BARNZ therefore considers that any difference between the forecast CPI increases in asset values and the actual movements in asset values during PSE2 needs to be treated as a rebate (or credit) in PSE3, as was the common understanding among the parties as CIAL set its changes for PSE2.

We trust these comments are clear. We are, as always, available to provide any further information or clarification if required.

Yours sincerely,

John Beckett
Executive Director

Comments on CIAL Revised Disclosures

Prepared for BARNZ

21 August 2014

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Summary

1. This report comments on the information provided by Christchurch International Airport Limited (CIAL), including memoranda prepared for the airport by Incenta Economic Consulting (IEC), in relation to CIAL's proposed revised information disclosures for the PSE2 period.

2. The following issues are addressed:

- The proposal by CIAL and its consultants to implement an "implied depreciation" methodology whereby depreciation is calculated from forecast revenues using an assumption of a constant rate of return on capital;
- The treatment of rebates of pre-PSE2 revaluation gains;
- The treatment of CPI inflation-related asset revaluations; and
- Cashflow timing assumptions.

This report was prepared at the request of BARNZ but the following are independent views and not necessarily those of BARNZ.

The "implied depreciation" methodology

3. CIAL's proposal is to calculate depreciation (return of capital) in each year as the residual after other elements are subtracted from target revenues, ie

Return of capital = Revenue – Return on capital – Opex – Tax + Revaluations

where the return on capital component is calculated using the target WACC and this rate of return is held constant in every year. In contrast the conventional approach is to treat depreciation as a predetermined (but not necessarily constant) amount.

4. While intended by CIAL to improve transparency, the implied depreciation methodology introduces additional complexities into the analysis of CIAL's target returns and price setting in future periods. Fundamentally, the need for this complex depreciation approach has arisen from CIAL's complex pricing methodology. Irrespective of all other issues, it is not clear that the introduction of further complexity

is the best way to deal with the complexity that was created by CIAL's pricing model in the first place.

5. A significant problem in the proposed implementation of implied depreciation arises from the assumption of a constant rate of return on capital in each year, equal to CIAL's target post-tax rate of return over a 20-year period (9.76%). This is a restrictive assumption and is not the only assumption that could be used. Furthermore this assumption conflicts with CIAL's stated approach to pricing.

6. Specifically, CIAL described its pricing approach at the time it set charges as a *"deliberate policy to backload future returns on investment"* and that:[1]

> ***"CIAL's long-term pricing model means that our annual returns will differ during the investment cycle.*** *We expect that our return over PSE2 will be substantially below our WACC, but equally, we expect return in future periods – for example, in PSE4 and 5 – to exceed our WACC."* (emphasis added)

7. A profile of varying return on capital over time was thus clearly signalled and expected by CIAL's customers at the outset of PSE2. This is a separate issue from CIAL's decision to discount prices during the early years of PSE2 below its levelised pricing path for commercial reasons. In other words, the levelised pricing path itself was understood to embody a varying rate of return on capital such that the target rate of return was achieved on average over 20 years.

8. In practice, analysing the effects of the implied depreciation methodology is complicated by the fact that CIAL has made other changes in its revised disclosures including changes to its tax calculations and moving to a post-tax WACC. To isolate the effects of implied depreciation it is necessary to consider what would happen if everything else was unchanged.

9. In comparison with the scenario of an increasing rate of return on capital that was expected when prices for PSE2 were set, under implied depreciation with a constant rate of return on capital the amount of depreciation in each year will be lower, everything else being equal. This will lead to a higher opening asset base in PSE3 (again, everything else being equal) and higher prices in that period.

10. This proposed change to the depreciation methodology is thus equivalent to an upwards revaluation of CIAL's assets during PSE2, however unlike a normal revaluation it will not be rebated to customers.

11. In addition the implied depreciation is calculated using a rate of return on capital that is significantly in excess of the Commission's estimated range of acceptable returns for PSE2. Relative to what would occur with a return on capital within the acceptable range, this leads to a lower amount of depreciation during PSE2 and a higher opening asset base in PSE3, everything else equal. It can thus be argued that implementing implied

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[1] See pages 10 and 11 of CIAL's submission of 22 March 2013 on the Commission's section 56G process and issues paper.

depreciation in this way is evidence that CIAL is not effectively constrained by information disclosure regulation.

Other issues

Regarding the other issues identified above:

- It appears to be preferable for the rebate of pre-PSE2 revaluation gains to be spread over five years (as is being proposed by CIAL) rather than 20 years. While in theory the outcome is equivalent over both time periods, in the 20-year case this involves establishing a system of tracking progress of these rebates, which increases the complexity of future price setting and raises the possibility of errors in applying the rebate.

- CIAL proposes to revalue assets at the end of a pricing period on the basis of actual inflation, and to ignore the difference between actual inflation and the inflation forecast that was used to set prices at the beginning of the period. The consequences of this are:

    - The business risks faced by CIAL are reduced as it is not exposed to any errors in the CPI forecast, which should translate into a lower required return on capital and lower prices.

    - The inflation forecast will become a contentious issue in price setting.

    - If assets are revalued at a rate in excess of actual inflation due to changes in their underlying real value, the full extent of the revaluation gain may not be rebated to customers if the rebate is based on the difference between the change in asset value and actual inflation rather than the difference between the change in asset value and forecast inflation.

- The proposed implementation of implied depreciation uses assumptions about cashflow timing that differ from those used by CIAL in its price setting model. This is due to the nature of the implied depreciation calculation, however it is possible to resolve this issue algebraically. While this has a relatively minor impact, it is important that the implied depreciation calculation is as consistent as possible with the way that CIAL has set prices. Furthermore this is another example of the complexities created by CIAL's pricing model.

Background

12. This note comments on the information provided by Christchurch International Airport Limited (CIAL) in relation to its revised information disclosures for the PSE2 period. Specifically the following documents were reviewed:

    - The memorandum[2] prepared by Incenta Economic Consulting (IEC) discussing the method for calculating depreciation during PSE2 and associated issues, the slides from an accompanying presentation,[3] and an accompanying spreadsheet.

    - The memorandum[4] prepared by IEC in response to questions raised during the earlier presentation, and accompanying spreadsheet examples.

13. Covec was requested to undertake this review by BARNZ however the following are independent views and not necessarily those of BARNZ.

14. The IEC memoranda relate to issues raised by the Commerce Commission and others in relation to the information disclosures made by CIAL for PSE2. CIAL has previously chosen to set prices using a "constant levelised price" methodology. While conceptually relatively simple (involving per-unit prices that are constant in real terms over time), in practice the implementation of this methodology has turned out to be complex, and consequently there have been difficulties in assessing CIAL's targeted returns.

15. One particular area of difficulty has been assessing the "return of capital" (depreciation) given the prices that CIAL has set. This is an important issue because it affects the assessment of target returns during PSE2 and will also affect the size of the opening asset base in PSE3 and therefore prices in that period.

16. To address the depreciation issue, IEC and CIAL propose the calculation of "implied depreciation" given the pricing path, ie calculating the annual amount of depreciation as the residual that is left over when forecast operating expenses, tax, and return on capital have been subtracted from target revenues for a pricing period. In the next section the implications, appropriateness, and effects of the implied depreciation approach are discussed.

17. The IEC memoranda also address some other issues that affect CIAL's revised PSE2 disclosures and/or pricing in PSE3. Subsequent sections in this report comment on:

    - the treatment of the rebate of pre-PSE2 revaluation gains and whether these should be spread over 5 or 20 years;

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[2] *Method for calculating the implied return of capital for PSE2 and initial discussion of the method for resetting prices for PSE3*, Incenta Economic Consulting, 27 May 2014.

[3] *Levelised Pricing: Rationale, improving transparency and resetting the price path*, Incenta Economic Consulting, 1 July 2014.

[4] *Follow up on issues raised in the 1 July 2014 presentation on "implied depreciation"*, Incenta Economic Consulting, 6 August 2014.

- the treatment of differences between forecast revaluations and revaluations caused by applying actual CPI inflation to asset values; and

- assumptions about the timing of cashflows in the implied depreciation calculation.

The "implied depreciation" methodology

18. The IEC memoranda present the effects of applying the implied depreciation methodology together with other changes that CIAL is making to its PSE2 disclosures including moving to a post-tax WACC and changing its tax calculations. This makes it difficult to understand the effects of implied depreciation in isolation from the other changes. In this section, implied depreciation is discussed in terms of its effects assuming everything else remains constant.

Summary and implications

19. IEC propose to calculate implied depreciation in each year as the residual after other elements are subtracted from target revenues. IEC give the formula:

Return of capital = Revenue – Return on capital – Opex – Tax + Revaluations

20. Importantly, IEC propose that the return on capital element in this equation be calculated using the target WACC and that this rate of return be constant in every year. In their presentation of 1 July, IEC justified this by assuming that "a return on investment is required in each year and treated as a cost", and then the "surplus after operating expenses and the required return on capital is the (implied) return of capital / depreciation" (slide 18).

21. In contrast the conventional approach is to treat depreciation as a predetermined (but not necessarily constant) amount, and thus the return on capital is the surplus after expenses and the predetermined depreciation have been subtracted. Straight-line depreciation is a common way to implement predetermined depreciation, but this is by no means the only possible method.

22. The implied depreciation calculation depends on the asset base in each year, which in turn depends on the depreciation in the previous year. This makes calculation of implied depreciation more complex than predetermined depreciation, as it must be calculated in a sequential manner. The need for this complex depreciation approach has arisen from CIAL's complex pricing methodology, in which prices are set using a methodology that is somewhat divorced from the usual components of the building-blocks approach. The complexity in pricing has made it difficult for the Commission to assess CIAL's target returns, and difficult for CIAL's customers to understand the drivers of pricing. The implied depreciation methodology aims to improve transparency and certainty regarding the opening asset base in PSE3, however it introduces further complexity and has additional implications that will be discussed below.

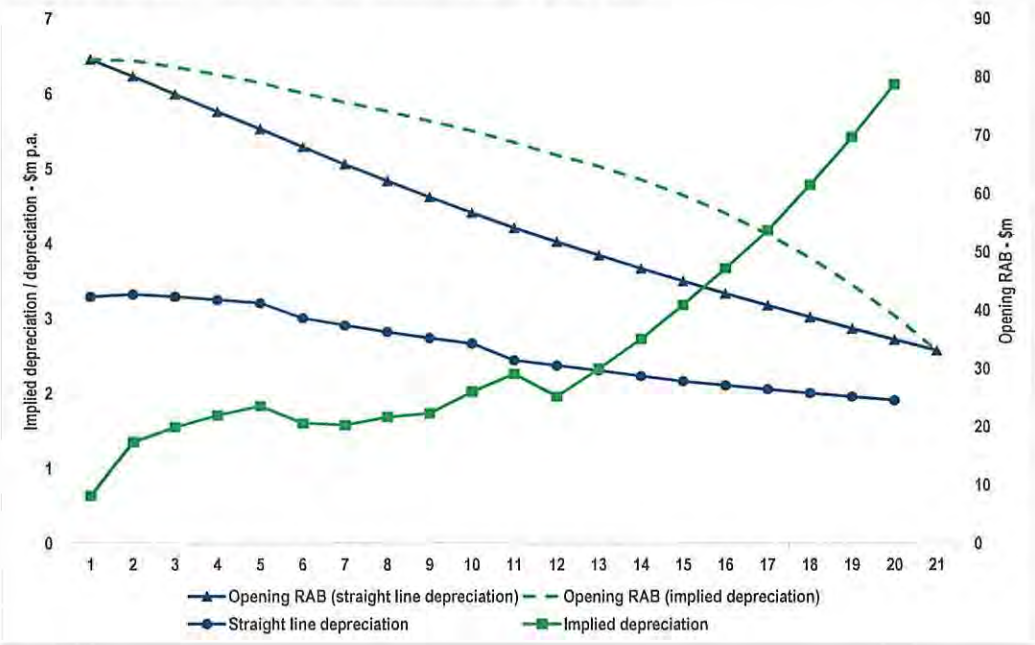
23. To understand the implications of implied depreciation, it may be helpful to observe that ignoring operating expenses, tax, and revaluations, constant levelised pricing with

implied depreciation calculated as proposed by IEC is as if CIAL has sold a table mortgage on its assets to its customers. Given expected revenues, the annual depreciation is equivalent to the mortgage principal repayment, and the return on capital is equivalent to the interest payment. Like a table mortgage, in early years the depreciation is relatively small and return on capital is a relatively large share of revenues. Over time, depreciation increases and the return on capital component decreases.

24. It is also worth noting that relative to straight-line depreciation for example, the implied depreciation approach with a constant WACC results in a higher asset base in every year. This is illustrated in Figure 1 below, which is reproduced from IEC's presentation.

25. This difference would not matter if prices were fixed in advance for the entire asset life. However, prices are only set for five-year periods, and the asset base at the end of a period affects prices in the next period. Thus adoption of implied depreciation is likely to lead to higher prices in future periods, everything else equal. In practice, isolation of the effects of CIAL's adoption of implied depreciation in its revised disclosures is complicated by the fact that a number of other changes have been made at the same time, including changes to tax calculations and changing from a pre-tax to post-tax WACC.

Figure 1 Comparison of CIAL's annual opening asset base and depreciation amount under implied and straight line depreciation (from IEC's presentation of 1 July 2014).



26. As noted above, IEC's proposed implementation of the implied depreciation calculation assumes that the target rate of return on capital is fixed and constant in every year. This is not the only assumption that could be made, and a constant rate of return on capital is not required by the constant levelised pricing methodology. Rather, the target rate of return on capital in each year is a choice variable and could potentially change over

time. If so, the implied depreciation in each year can still be calculated, but will be a different amount from what is calculated with a constant rate of return assumption.

27. In other words, under IEC's proposal the amount of implied depreciation in each year will vary with changes in the forecasts of revenues, operating expenses, tax, and revaluations, while the rate of return on capital will remain constant. In contrast, under straight-line or some other predetermined depreciation methodology, the amount of depreciation is fixed and the rate of return on capital in each year can vary. IEC's proposal thus embodies an important constraint on the path of return on capital over time. This issue is discussed further below.

Appropriateness and effects

28. The implied depreciation approach as proposed by IEC is consistent with the constant levelised pricing path in the sense that depreciation is calculated directly from the pricing path rather than being determined in an arbitrary fashion. It generates a profile of increasing depreciation over time that could be consistent with increasing utilisation of the assets, although the profile of utilisation implied by the implied depreciation is not necessarily the same as the expected profile of passenger and aircraft volumes handled by CIAL.

29. However as noted above the assumption of a constant rate of return on capital in every year is restrictive and is not the only assumption that could be used. Furthermore if the objective is to mimic an increasing profile of utilisation of the assets then the profile of depreciation that is generated by the implied depreciation calculation with a constant rate of return on capital may not be appropriate for all asset types. Implied depreciation that is calculated using an assumption of a constant rate of return on capital imposes a "one size fits all" methodology on the depreciation of assets, which is unlikely to be appropriate.

30. The assumption of a constant rate of return on capital is also completely different from how CIAL has previously stated it was setting prices, and is different from what was expected by CIAL's customers when prices for PSE2 were set. In particular, CIAL has made previous statements to the effect that it was targeting a variable rate of return on capital over time, with a relatively low rate of return in early years, offset by a higher rate in later years. Specifically, it was targeting an average post-tax return of 9.8% over 20 years, but did not expect to earn exactly this return in every year.

31. For example, in CIAL's submission on the Commission's Issues Paper at the start of the section 56G process,[5] CIAL stated that it has a *"deliberate policy to backload future returns on investment"* (page 10). In describing its pricing approach, CIAL stated (page 11):

> ***"CIAL's long-term pricing model means that our annual returns will differ during the investment cycle.*** *We expect that our return over PSE2 will be substantially below our WACC, but equally, we expect return in future periods – for example, in PSE4 and 5 – to exceed our WACC."* (emphasis added)

[5] *Commerce Commission Section 56G Review Process and Issues Paper*, Christchurch International Airport Limited, 22 March 2013.

32. An added complication is the fact that CIAL's pricing in PSE2 embodies a commercial decision to set actual prices below the constant levelised pricing path for the early years of PSE2. CIAL has stated that it does not intend to recover the resulting losses from its customers in future, and as a result IEC's implementation of the implied depreciation calculation correctly uses the forecast levelised prices during PSE2 rather than actual prices.[6]

33. However, the above statements in CIAL's submission on the Issues Paper reveal that it was intending to target a variable rate of return on capital over time, quite apart from the one-off price reduction that it has chosen to give for commercial reasons in PSE2. In other words, the forecast levelised pricing path was apparently derived such that the expected rate of return on capital would be relatively low in early years, offset by higher returns in later years. BARNZ has confirmed that this was its expectation of CIAL's approach to pricing.

34. Given this, IEC's proposed implementation of the implied depreciation calculation using a constant rate of return on capital in every year is problematic. In particular, IEC has assumed a constant rate of return in PSE2 at the average level that CIAL was targeting over the 20-year period for which it developed its pricing model, rather than the lower rate of return in PSE2 that CIAL was apparently targeting in its forecast levelised pricing path (again, this is separate from the one-off PSE2 discount discussed above). All else equal, the result is the implied depreciation during PSE2 will be lower than what CIAL had previously stated would occur in this period, and the opening asset base at the start of PSE3 will be higher, possibly leading to higher future prices.

35. In the mortgage analogy, it is as if, after having signed the mortgage contract, the bank unilaterally changes the mix of monthly principal and interest payments and also extends the duration of the loan. The effect is an increase in total interest payments and the total cost of the loan.

36. A simple example is useful to illustrate these issues. Consider an asset costing $1 million with a 20-year life. Table 1 illustrates the calculation of implied depreciation for this asset assuming a constant rate of return on capital of 10% and ignoring complexities such as operating expenses and tax. The cashflow is calculated to give NPV = 0 over the life of the asset, and the implied depreciation in each year is the difference between revenue and the return on capital. Return on capital is calculated as the rate of return on capital multiplied by the opening asset value in each year.

37. Table 2 shows the same example but where the rate of return on capital increases over time. Many paths of the rate of return on capital are possible; for the sake of illustration it has been assumed that the rate of return starts at 8% in the first year and increases by a constant amount each year. This annual increase was solved such that the closing asset value at the end of year 20 is zero, and was found to be approximately 0.40% per year, in this particular example.

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[6] See section 2.3.5 of the IEC memorandum of 27 May 2014.

38. Comparing the two cases it is clear that the increasing rate of return leads to higher implied depreciation in early years and lower implied depreciation in later years in comparison with a constant rate of return. Such a profile is consistent with CIAL's stated goal to "backload" its return on investment.

39. Figure 2 compares the opening asset value in each year across the two implied depreciation examples, and also shows straight-line depreciation for reference. Both implied depreciation examples lead to asset values that are higher than under straight-line depreciation. Asset values under implied depreciation with a constant rate of return are higher than with an increasing rate of return. The exact size of this difference depends on the path of return on capital in the non-constant case, but an increasing rate of return will always lead to lower asset values than a constant rate of return.

40. In summary, independent any other changes, implementing implied depreciation with a constant return on capital in every year leads to a profile of depreciation and returns that is different from CIAL's previously stated intention and different from what was reasonably expected by its customers at the start of PSE2. In particular, depreciation during PSE2 will be reduced, and as a result the asset value at the start of PSE3 will be inflated, leading to higher prices in PSE3, everything else equal.

41. In effect, IEC and CIAL's proposed implementation of the depreciation calculation is equivalent to an upwards revaluation of CIAL's assets during PSE2. However unlike a normal revaluation, this will occur through a reduction in the amount of depreciation. Unless this 'depreciation revaluation' is recognised as income in future periods, it will generate a windfall gain for CIAL.

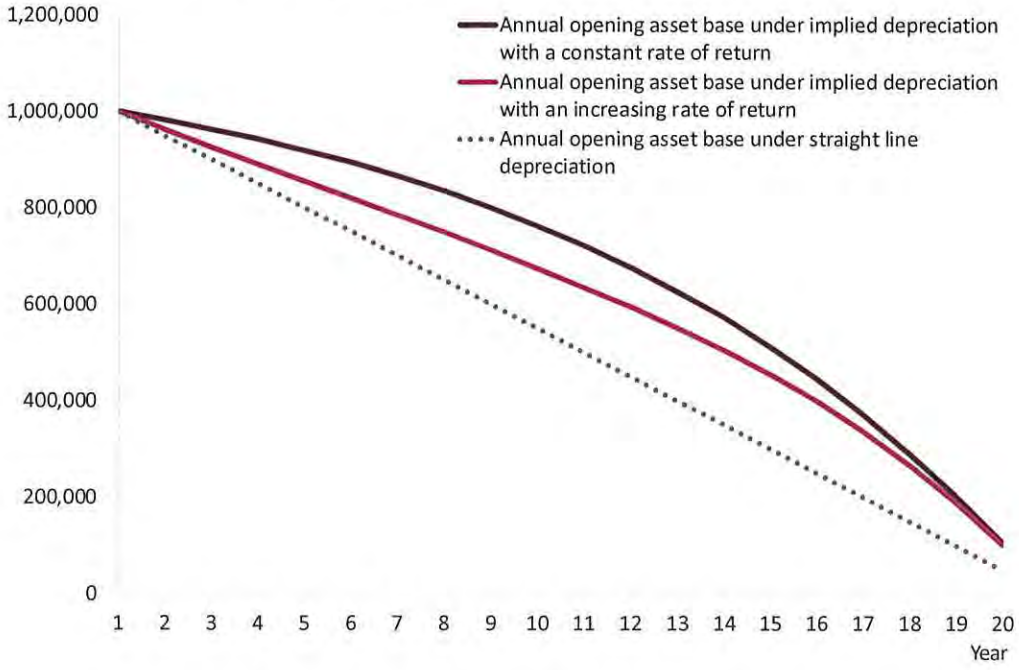
Table 1 Illustration of implied depreciation calculations with a constant rate of return on capital.

Year	Opening asset value	Implied depn.	Rate of return	Return on capital	Cashflow	Closing asset value
1	1,000,000	17,460	10.00%	100,000	117,460	982,540
2	982,540	19,206	10.00%	98,254	117,460	963,335
3	963,335	21,126	10.00%	96,333	117,460	942,209
4	942,209	23,239	10.00%	94,221	117,460	918,970
5	918,970	25,563	10.00%	91,897	117,460	893,407
6	893,407	28,119	10.00%	89,341	117,460	865,288
7	865,288	30,931	10.00%	86,529	117,460	834,358
8	834,358	34,024	10.00%	83,436	117,460	800,334
9	800,334	37,426	10.00%	80,033	117,460	762,907
10	762,907	41,169	10.00%	76,291	117,460	721,739
11	721,739	45,286	10.00%	72,174	117,460	676,453
12	676,453	49,814	10.00%	67,645	117,460	626,638
13	626,638	54,796	10.00%	62,664	117,460	571,843
14	571,843	60,275	10.00%	57,184	117,460	511,567
15	511,567	66,303	10.00%	51,157	117,460	445,264
16	445,264	72,933	10.00%	44,526	117,460	372,331
17	372,331	80,227	10.00%	37,233	117,460	292,105
18	292,105	88,249	10.00%	29,210	117,460	203,856
19	203,856	97,074	10.00%	20,386	117,460	106,781
20	106,781	106,781	10.00%	10,678	117,460	0

Table 2 Illustration of implied depreciation calculations with an increasing rate of return on capital.

Year	Opening asset value	Implied depn.	Rate of return	Return on capital	Cashflow	Closing asset value
1	1,000,000	37,460	8.00%	80,000	117,460	962,540
2	962,540	36,567	8.40%	80,892	117,460	925,973
3	925,973	35,899	8.81%	81,560	117,460	890,074
4	890,074	35,465	9.21%	81,995	117,460	854,609
5	854,609	35,279	9.62%	82,181	117,460	819,330
6	819,330	35,361	10.02%	82,098	117,460	783,969
7	783,969	35,737	10.42%	81,723	117,460	748,232
8	748,232	36,439	10.83%	81,021	117,460	711,793
9	711,793	37,509	11.23%	79,951	117,460	674,284
10	674,284	38,998	11.64%	78,462	117,460	635,286
11	635,286	40,969	12.04%	76,491	117,460	594,317
12	594,317	43,500	12.44%	73,959	117,460	550,817
13	550,817	46,688	12.85%	70,772	117,460	504,129
14	504,129	50,650	13.25%	66,810	117,460	453,479
15	453,479	55,530	13.66%	61,930	117,460	397,949
16	397,949	61,506	14.06%	55,954	117,460	336,443
17	336,443	68,794	14.46%	48,665	117,460	267,649
18	267,649	77,664	14.87%	39,796	117,460	189,985
19	189,985	88,444	15.27%	29,016	117,460	101,541
20	101,541	101,541	15.68%	15,918	117,460	0

Figure 2 Comparison of annual opening asset bases with different treatments of depreciation.



Choice of cost of capital

42. Under the implied depreciation approach, the choice of the rate of return on capital also affects the amount of depreciation (whether or not the rate of return is constant in each year). Unlike straight-line or another predetermined depreciation methodology, the rate of return on capital and the return of capital cannot be separated.

43. Commenting on the appropriate cost of capital for CIAL is beyond the scope of this report. However, it is straightforward to see that the higher the cost of capital, the lower will be the implied depreciation in any given period since a greater proportion of revenues will be allocated to return on capital. In turn this will lead to a higher asset base and higher prices in future pricing periods, everything else equal.

44. With this in mind it is worth noting that CIAL is proposing to calculate implied depreciation in PSE2 using its target post-tax WACC of 9.76%, which is well in excess of the Commission's assessment of the acceptable WACC range from 6.6% to 7.6% over the PSE2 period. Using the spreadsheet model provided by IEC,[7] the effect of this choice of WACC on the implied depreciation calculation can be tested. Under the assumption of 9.76% WACC, the total implied depreciation for PSE2 is $75.7 million. If for example the middle of the Commission's acceptable range (7.1%) is used instead, total implied depreciation increases by just over $55 million to $130.7 million, with an equal reduction in the asset base at the start of PSE3.

45. Regardless of whether or not the implied depreciation methodology is reasonable, by using a WACC outside the Commission's acceptable range in its implied depreciation

[7] *Implied return of capital for PSE2_Subst Customers.xlsx.*

calculation, it can be argued that CIAL is seeking to inflate its asset base during PSE2 relative to what would be acceptable to the Commission. Given that this inflation is achieved through a reduction in depreciation rather than a normal revaluation, there will be no offsetting revenue reduction, and CIAL will receive a windfall gain relative to its position if it was effectively constrained by information disclosure regulation.

Rebate of pre-PSE2 revaluation gains

46. Another issue dealt with in the IEC memoranda is the treatment of pre-PSE2 revaluation gains that were not rebated during PSE1. A rebate of these gains was calculated so that the present value over PSE2 is equal to the value of the revaluation ($33.46 million).

47. There is a question as to whether this rebate should be spread only over the five-year period of PSE2, or over the entire 20-year period that CIAL has used in its levelised pricing model. The IEC memorandum of 6 August and accompanying spreadsheet example demonstrates that in terms of pricing from PSE3 onwards, it does not matter whether this rebate is spread over five or 20 years, provided that the rebate is correctly calculated and the unrebated amount is carried forward into future pricing periods.

48. However as IEC note, there are administrative advantages to spreading the rebate over a five year period, as it simplifies the pricing in future periods and the rebate can be dealt with in a more transparent manner. Furthermore, rebating over a shorter period reduces the risk that the rebate will not be fully passed through to customers due to future errors in the price setting process, or if the pricing methodology and/or regulatory regime changes. For these reasons it appears preferable that the rebate of pre-PSE2 revaluation gains be allocated entirely to the PSE2 period.

Treatment of CPI inflation

49. In CIAL's pricing model, assets are revalued at the rate of CPI inflation. For the purpose of price setting an inflation forecast must be used, but at the end of the pricing period assets will be revalued using the actual rate of inflation over the period. Land assets may also be revalued at the end of a pricing period because their underlying real value has changed.

50. Although New Zealand's monetary policy regime constrains CPI inflation to a relatively narrow range, there will always be some differences between forecast and actual inflation in each pricing period. IEC's memorandum of 6 August proposes that asset revaluation for inflation is undertaken using actual rather than forecast inflation, and that no adjustment is made to required revenue for the difference between the actual and forecast, on the basis that this "reduces the prospect of revaluation-related windfall gains or losses" and that this is "consistent with a conventional application of CPI-X regulation".[8]

51. As IEC demonstrates in their Appendix B, indexing asset values and/or revenues to inflation will protect the asset owner against "windfall gains and losses" arising when

[8] See section 2.4 of the IEC memorandum of 6 August.

actual inflation differs from forecast inflation. In other words the asset owner is protected against any risks associated with incorrect CPI forecasts. While indexing the RAB but not revenues to actual inflation leaves the asset owner exposed to some CPI forecast risk, IEC demonstrate that this reduces the variance of the asset owner's returns relative to the case where indexing is done on the basis of forecast inflation (see their Table 7 in Appendix B).

52. Indexing asset values against actual inflation thus translates into a reduction in risks faced by the asset owner and should therefore translate into a reduction in their cost of capital, which should in turn flow through to pricing. Quantification of the size of this effect on the cost of capital is beyond the scope of this report, but it will depend on the size of the average error in CPI forecasts.

53. Even if an appropriate adjustment to the cost of capital is made, the apparently new proposal by CIAL and IEC not to correct for the difference between forecast and actual inflation will create problems. In particular it requires that the inflation forecast be unbiased, ie to have an equal probability of under- or over-estimating actual inflation during any given pricing period. The inflation forecast will thus become a contentious issue during price setting because manipulation of this forecast can generate either revaluation gains for CIAL that do not need to be rebated, or generate additional rebates for CIAL's customers that CIAL cannot subsequently recover. These problems can be avoided by the standard approach of setting prices using forecast inflation but then making a correction for the difference between forecast inflation and the actual revaluation of the asset at the end of the pricing period.

54. Furthermore, if assets such as land are revalued at a rate higher than inflation due to changes in their underlying real value then a corresponding rebate will need to be calculated. Revaluation rebates during the pricing period will have been calculated using forecast inflation, and if there are additional revaluations then an additional rebate needs to be calculated at the end of the period to account for the difference between the actual revaluation and the CPI forecast. If instead the rebate is calculated using the difference between the actual revaluation and actual CPI inflation, the difference between actual CPI and forecast CPI will end up not being rebated.

55. It appears that CIAL and IEC are proposing that revaluation rebates be based on the difference between the actual revaluation and actual CPI inflation. It is not clear why this complexity needs to be introduced. Instead, the basic principle is that all asset revaluations are rebated, regardless of cause. This means that, at the end of the pricing period, it is only necessary to consider the difference between the actual revaluation of the asset during a pricing period and the forecast inflation at the start of the period.

56. Furthermore, changing the treatment of revaluations part way through PSE2 is of concern. In particular, CIAL's customers had a legitimate expectation that all unforecast asset revaluation gains during PSE2 would be rebated in future pricing periods. If the treatment of inflation-related unforecast revaluations is changed at this point, there is the potential for CIAL to earn windfall gains during PSE2 that are not rebated.

Cashflow timing assumption

57. IEC's implementation of the implied depreciation calculation assumes that the return on capital is calculated using the opening asset value in each year. In contrast, in its pricing model CIAL used the average of the opening and closing asset values.

58. CIAL's original approach is more representative of cashflows that occur throughout the year, however it poses a problem for the implied depreciation calculation. Specifically, the amount of implied depreciation in a year depends on return on capital in that year, but if return on capital depends on the closing asset value then this will also depend on the implied depreciation.

59. The implied depreciation equations are linear, so it is possible to resolve this circularity. Implied depreciation d_t in year t is calculated as

$$d_t = R_t - Z_t - O_t - T_t + V_t$$

where R_t is revenue, Z_t is return on capital, O_t is operating expenses, T_t is tax and V_t is revaluations. Suppose that return on capital is calculated using the average of the opening and closing asset base as

$$Z_t = \frac{r}{2}(A_t + A_{t+1}) + \rho C_t$$

where r is the cost of capital, A_t is the opening asset base, $\rho = (1+r)^{\frac{1}{2}} - 1$ is the equivalent half-yearly cost of capital, and C_t is capex.

The asset base roll-forward equation is

$$A_{t+1} = A_t + C_t - d_t + V_t$$

This implies that

$$Z_t = \frac{r}{2}(2A_t + C_t - d_t + V_t) + \rho C_t$$

And so we have

$$d_t = R_t - \frac{r}{2}(2A_t + C_t - d_t + V_t) - \rho C_t - O_t - T_t + V_t$$

Or

$$d_t = \frac{R_t - \frac{r}{2}(2A_t + C_t + V_t) - \rho C_t - O_t - T_t + V_t}{1 - r/2}$$

This gives the implied depreciation in each year as only a function of the opening asset value and other variables that do not depend on implied depreciation.

60. Using the above formula for implied depreciation rather than IEC's approach leads to a reduction in the asset base at the end of PSE2 of around $2.2 million (or 0.5%). While this is a relatively small amount, it is preferable that the implied depreciation methodology is as consistent as possible with the approach used by CIAL to set prices for PSE2. If such consistency is not maintained then CIAL effectively has an opportunity to make unilateral changes to its pricing model part-way through a pricing period.

61. In addition, the above is another example of the complexities created by the implied depreciation approach and suggests that a simpler, pre-determined approach to depreciation may be preferable for transparency and implementation reasons.