IPART
New South Wales

Independent Pricing and Regulatory Tribunal

Modelling local development contributions in a present value framework

Local Government — Technical Paper
February 2016

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1 Executive summary

In determining the contribution rate in a contributions plan, councils have the option of using a net present value (NPV) methodology. The NPV methodology involves the use of a discounted cash flow model. In a discounted cash flow model, the contribution rate is calculated so that the present value of anticipated revenue is equal to the present value of anticipated expenditure. This approach recognises that today's dollars are of greater value than dollars received in the future.[1]

This Technical Paper outlines our recommended approach to calculating the discount rate and other aspects of modelling development contributions using an NPV methodology.

We first published a Technical Paper on modelling development contributions in September 2012 and revised the paper in June 2015.[2]

The 2015 Technical Paper updated our recommended approach to calculating the nominal and real discount rates used in modelling. These changes brought our recommended approach more in line with related methodologies that IPART uses in other pricing reviews.

In this current version of the Technical Paper we have added advice on the escalation of contribution rates. We have not changed any of the existing recommendations in the 2015 Technical Paper.

In summary, we recommend that in a present value framework for development contributions plans:

1. The nominal discount rate should be based on a market-based estimate of the cost of debt for the local government sector. We have done this by taking the risk free rate (10-year Commonwealth bond yield), adding a debt margin which we estimate to be half the spread between the yields on 10-year Commonwealth bonds and 10-year non-financial corporate bonds with an 'A' credit rating, and adding debt-raising costs of 12.5 basis points. This provides a conservative estimate of the risk premium above the risk free rate to reflect the cost of borrowing that local councils are likely to face.

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1 Because current consumption is preferred to future consumption, lenders demand compensation for postponing their consumption. The opportunity cost of current consumption then becomes the interest that borrowers are prepared to pay. In numerical terms, if you want to have $100 next year with interest rates at 5%pa you only need to invest $95.24 today. The corollary being that the present value of $100 next year is $95.24.

2 IPART, *Modelling local development contributions – Technical Paper*, September 2012; IPART, *Modelling local development contributions in a present value framework – Technical Paper*, June 2015.

2. The nominal discount rate should be adjusted for inflation in order to derive a real discount rate, if councils are using a real model. We have used an inflation forecast based on the geometric average of the Reserve Bank of Australia's (RBA) forecast for headline inflation for the first year, and nine years of the midpoint of its target inflation range of 2.5%.
3. The development contribution rate should be escalated each year at the council's opportunity cost of capital. The opportunity cost of capital is equal to the discount rate as outlined in this Technical Paper.

We accept that councils can use either real or nominal modelling approaches provided either approach uses realistic and observable changes in cost indexation. In the case of nominal models they must also incorporate realistic assumptions of inflation.

We do not insist that councils use an NPV approach when modelling development contributions, just that if they do, they consider following our recommended approach.

We plan to publish on our website the latest recommended nominal and real discount rates biannually (in February and August each year).

2 How local infrastructure is funded by development contributions

A council may require developers of an area to make either a financial or in kind contribution towards the new local infrastructure and land that will be needed for the area.

Section 94 of the *Environmental Planning and Assessment Act 1979* (EP&A Act) has traditionally been the principal method enabling councils to levy contributions for public amenities and services required as a consequence of development.[3]

2.1 Establishing contribution rates in section 94 plans

Section 94 contributions plans (s94 plans) establish contribution rates to recoup the infrastructure costs in the plan, based on tests related to nexus (ie, that the development will contribute to the demand for the relevant infrastructure) and reasonableness (eg, that the cost estimates are reasonable and reasonably apportioned to the relevant development).[4]

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3 Department of Infrastructure, Planning and Natural Resources, *Development contributions Practice notes – July 2005, Financial management of development contributions,* p 3.

4 Section 94A or "flat levy" plans are an alternative to s94 plans and allow a simple percentage rate to be applied to new development without such tests to be satisfied. Councils also have the option of entering into a voluntary planning agreement with a developer to specify infrastructure provision and contributions under s93F of the EP&A Act.

Councils must prepare contributions plans in accordance with the *Environmental Planning and Assessment Regulation 2000* and the *Development Contributions Practice Notes – July 2005*.[5] A council must submit a plan to IPART for review if it proposes a development contribution above the current cap and it intends to apply for an alternative funding source for any revenue shortfall arising from the cap. IPART reviews plans against the criteria set out in the *Revised Local Development Contributions Practice Note for assessment of contributions plans by IPART*.[6]

A council's s94 plan must set out the infrastructure and land that will be needed by the future residents and businesses of the area that is to be developed. These plans include information about the area, such as:

- the projected future population of the area
- the number and size of housing lots and the types of houses that will be built
- the estimated cost of local infrastructure that will need to be built, and
- the estimated cost of land needed for local infrastructure.

Councils use information in the contributions plan to calculate the financial contributions that must be paid by developers. The calculations rely on council projections and since the plans may be drafted several years before an area is developed, the cost estimates may need to change over time for inflation or if any of the cost assumptions change.

2.2 Using a Net Present Value methodology

In determining the contribution rate in an s94 plan, councils have the option of using an NPV methodology. The NPV methodology involves the use of a discounted cash flow model. In the discounted cash flow model, the contribution rate is calculated so that the present value of anticipated expenditure is equal to the present value of anticipated revenue. This helps to ensure that a council collects sufficient revenue to cover its anticipated expenditure.

Box 2.1 shows a general formula for calculating development contributions using an NPV model. (For simplicity, we have not shown the escalation in the contribution rates over time.)

5 Department of Infrastructure, Planning and Natural Resources, *Development contributions Practice notes – July 2005*.

6 Department of Planning and Infrastructure, *Revised Local Development Contributions Practice Note for assessment of contributions plans by IPART,* February 2014. Councils may seek funding through the Local Infrastructure Growth Scheme or a special rate variation.

Box 2.1 Formula for calculating the NPV of contribution rates

$$PV\ (Costs) = PV\ (Revenue)$$

$$PV\ (Costs) = N_1 * DC + \frac{N_2 * DC}{(1+r)} + \cdots + \frac{N_t * DC}{(1+r)^{t-1}}$$

Where:

- N(i) is the number of hectares in year i
- DC is the development contribution per hectare
- r is the discount rate
- t is time in years

Councils are not required to use an NPV approach to modelling development contributions, and most do not. Instead, they:

- estimate the total cost of land acquisition and construction in current dollar terms
- apportion an amount of the costs to the development area
- divide this amount by the relevant units being serviced by the development (eg, net developable area (hectares) or estimated residential population), and
- index the contribution rates payable each year by a relevant index (eg, the Consumer Price Index).

This could mean that these councils do not collect sufficient revenue to cover what they spend on land and works over the duration of a plan, due to the mismatch between the timing of expenditure and receipt of contributions revenue This is explained further in section 3.1. However, councils may choose to mitigate this risk by regularly reviewing their contributions plans rather than using an NPV methodology. The regular review of plans does not involve the complexities of using an NPV methodology. These complexities may include the setting of, and subsequent revision to, forecast population growth and infrastructure requirements.[7]

[7] Ku-ring-gai Council submission to IPART Consultation Paper, March 2015, pp 1, 2.

3 Our recommended approach for NPV modelling

Within our recommended approach to modelling development contributions in an NPV framework, we are considering:

1. The choice of a discount rate.
2. Whether NPV-based contributions plans should be modelled in nominal or real terms.
3. The escalation of costs and revenue.

The most significant issue for stakeholders is the first element, related to the choice of the discount rate. This is because the level of risk can have a significant bearing on the level of the discount rate, which in turn, can affect the size of the development contributions.

3.1 Our recommended discount rate

An important component in the application of an NPV methodology is the choice of discount rate. The discount rate should take account of both the time value of money and the risks that councils face in providing infrastructure in the development contributions system.

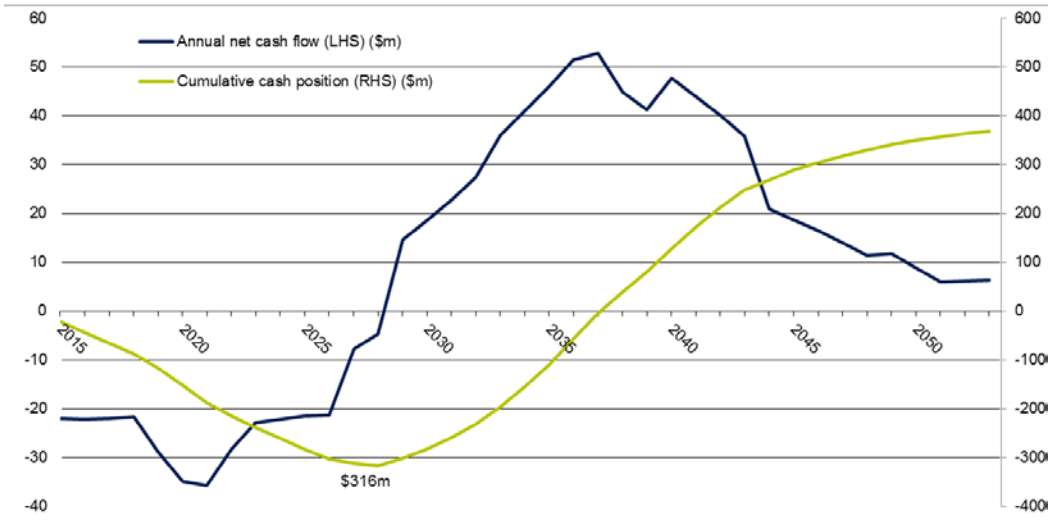
A major risk in infrastructure development is associated with the timing of expenditure and revenue, where councils spend money ahead of receiving contributions revenue. This occurs because most local infrastructure must be provided before residential or commercial development can proceed.

This means councils may have to borrow money (including from funds accumulated in other s94 plans or in other council reserves), and there are costs associated with borrowing. Councils can be compensated for these costs (ie, the cost of debt) through the use of an appropriate discount rate when modelling development contributions using an NPV approach.

If development contributions are collected by the council ahead of its development expenditures, a different discount rate may be more appropriate. We do not explore this case in this paper.

Figure 3.1 illustrates an example of the extent of the timing issues that a council can face in financing infrastructure ahead of contributions collections. It shows the estimated net cashflow projections and cumulative projected cash position over the life of the plan for one of the contributions plans that we have reviewed. The figure also demonstrates that the shortfall the council would have had to fund (ie, borrow) peaks at $316 million at around 2027-28.[8]

Figure 3.1 Cashflow projections in a typical contributions plan



We have also considered other financial risks that a council might face in providing infrastructure in the development contributions system.

For example, over the life of a contributions plan councils may not receive the revenue that they expect from contributions revenue because of:

- a general weakening in the housing market that causes delays in construction
- delays in other parties' provision of enabling infrastructure (eg, by water utilities), leading to delays in construction, and
- population or housing densities not reaching estimated levels for the relevant area.

Risks leading to delays in construction (and therefore receipt of contribution revenue) can be addressed through escalating the contribution rate at the same rate as the discount rate. This is explained further in section 3.4.

The risk of population or housing densities not reaching estimated levels for the relevant area can be addressed by regularly updating plans.

8 At the end of the plan's life, the council would reach a cumulative net cash flow position in undiscounted dollar terms of around $370 million. When discounted, the present value of this cumulative net cash flow is zero.

On the cost side, major risks are possible due to increases in the real cost of infrastructure items (ie, increases not due to inflation) and changes to the planned timing of expenditures.

Councils seek to account for the risk of real increases in costs by including a contingency allowance in the cash flows and by regularly reviewing contributions plans. In our 2014 *Local Infrastructure Benchmark Costs* report, we recommended a range of contingency allowances for the four main categories of infrastructure corresponding to the relevant planning and design stage of the project.[9]

In our 2012 and 2015 Technical Papers we also recommended that plans be reviewed every five years. This would enable a council to capture any changes to expected timing of expenditures. (If circumstances changed significantly, it is likely that a review should occur anyway, regardless of the time period.)

We note that the provisions for contingencies and regular reviews should be applied equally to all contributions plans, not just to those set within an NPV framework.

3.1.1 Pricing risk in local government contributions plans

A challenge in selecting a discount rate is determining how much councils should be compensated for the types of risks that they may encounter.

IPART's general practice in its pricing reviews is to use a commercial model to compensate regulated entities for such risk and estimate a rate of return for the industry. In doing so, we disregard government ownership of, for example, State-owned corporations (SOCs). This ensures competitive neutrality between potential commercial competitors attempting to compete in this market.

We do not recommend the use of a commercial, risk-adjusted rate of return for modelling local development contributions largely because council services are less contestable than market-based services.

Instead, we recommend calculating the discount rate used in NPV models based on an estimate of the cost of council debt. This can be done by using both risk-free borrowing costs and an allowance for risk, based on an estimate of the debt margin applicable to local councils.

9 IPART, *Local Infrastructure Benchmark Costs - Final Report,* April 2014, chapter 7, pp 50-59.

3.1.2 Use of debt by local government

Many councils have not traditionally borrowed externally to fund s94 expenditures, although we note that concessional funding arrangements have been offered by the State Government.[10] Instead, councils either:

- borrow and repay funds accumulated in other s94 plans or in other reserves, [11] and
- delay expenditure until sufficient contributions have been received (usually not feasible in greenfield developments because stormwater is required before other housing development can occur).

3.1.3 Estimating the cost of debt

For the utilities IPART regulates, the cost of debt is calculated as the nominal risk free rate plus a debt margin. This debt margin represents the level of compensation lenders require and takes into account things such as the probability of default of a borrower and the duration of the debt. We use the benchmark debt margin which applies to all businesses in one industry sector.

To use the same methodology for councils to determine their cost of debt, we would ideally use the debt margin likely to be charged to local councils which borrow in their own names. However, no such data are available. Since we cannot directly estimate this benchmark, we use a proxy based on a benchmark credit rating and term-to-maturity. To illustrate the methodology, we have applied it to the latest available data.

We considered the yields on credit-rated non-financial corporate 10-year debt (ranging from A+, A, A- to BBB) and their spreads to 10-year Commonwealth or NSW Treasury bond yields.[12] The data are published by the RBA. The midpoints of these rates, averaged over 10 years and two months, are shown in Table 3.1.

10 The NSW Local Infrastructure Renewal Scheme offered interest subsidies on loans for infrastructure that facilitated the provision of new housing.

11 By drawing on the balances shown in s94 and s94A reserves in successive Annual Financial Statements, Note 17.

12 This approach has also been recommended for the cost of debt for a regulated Australian energy network with a credit rating of BBB to BBB+ in Lally, M. *Implementation Issues for the Cost of Debt*, 20 Nov 2014, available at www.aer.gov.au.

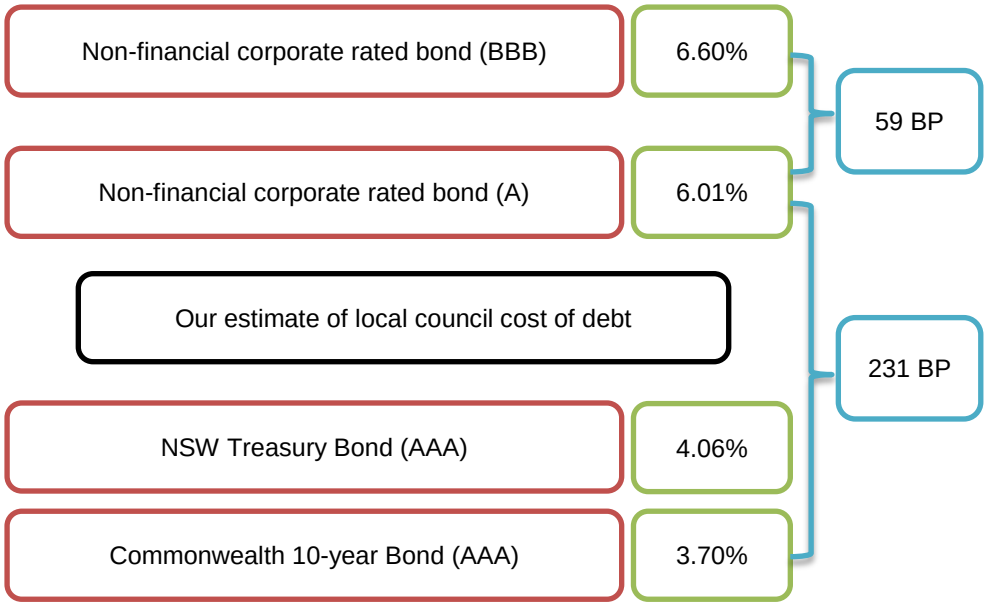
Table 3.1 Yields on selected 10-year bonds (%)

	Commonwealth 10-year bond yield	NSW Treasury 10-year bond yield	Non-financial corporate 10-year bond with A credit rating	Non-financial corporate 10-year bond with BBB credit rating
Average of last 10 years (to January 2016)	4.605	5.112	6.664	7.547
Average of last 2 months (to January 2016)	2.794	3.010	5.362	5.691
Midpoint	3.700	4.061	6.013	6.619

Source: Bloomberg (Commonwealth bond rates and NSW Treasury bond rate for 2-month average); Reserve Bank of Australia Statistical Tables F2 (NSW Treasury bond rate for 10-year average); Reserve Bank of Australia Statistical Tables F3 (corporate yields).

The midpoint measures of each of the bond rates are shown in Table 3.1, and the relevant spreads in basis points (BP) between them, are shown in Figure 3.2.

Figure 3.2 Selected debt instruments, latest yields and spreads



Note: The yields in this figure are the midpoints between the 10-year and 2-month averages, shown in Table 3.1.

Source: Bloomberg, Reserve Bank of Australia Statistical Tables F2, Reserve Bank of Australia Statistical Tables F3 (corporate yields).

It is highly likely that the councils that would want to issue debt would be both well managed and financially sustainable. We consider they would be likely to have a credit rating considerably better than BBB.[13] We assume that councils would be most likely to bear a AA credit rating, for which no specific data exist.

In the absence of this data, we propose halving the spread between 10-year Commonwealth bond yields and non-financial corporate A rated debt. Based on current data, that would make the yield 4.857%.[14] In effect, this is the best proxy we have for the cost of borrowing by local governments (with an assumed AA credit rating).[15]

We also propose adding IPART's standard allowance for debt-raising costs of 12.5 basis points so that, based on the latest data available, the current nominal discount rate under this methodology would be 4.982%. Finally, we round this to one decimal place to derive a nominal discount rate of 5.0%. This calculation is summarised in Table 3.2.

Table 3.2 Calculating the nominal rate (%)

Averaging relevant rates	Commonwealth 10-yr bond yield	Corporate A-rated 10-yr yield	Spread
Average 10 years	4.605	6.664	
Average 2 months	2.794	5.362	
Midpoint	3.700	6.013	2.314
Calculating the discount rates			
Commonwealth 10-year bond yield (midpoint)	3.700		
+ Half of spread	1.157		
+ Debt-raising costs	0.125		
= Nominal discount rate	4.982		
Nominal discount rate (rounded to 1 decimal place)	**5.0**		

Note: The periods over which the averages are calculated are to January 2016.
Source: Bloomberg (10-year bond rates), Reserve Bank of Australia and Statistical Tables F3 (corporate yields).

13 We infer this from the descriptions of credit ratings used by Standard & Poor's.
- AAA - has extremely strong capacity to meet its financial commitments.
- AA - has very strong capacity to meet its financial commitments. It differs from the highest-rated obligors only to a small degree.
- A - has strong capacity to meet its financial commitments but is somewhat more susceptible to the adverse effects of changes in circumstances and economic conditions than [AAA and AA] obligors.
- BBB - has adequate capacity to meet its financial commitments. However, adverse economic conditions or changing circumstances are more likely to lead to a weakened capacity of the obligor to meet its financial commitments.

14 Half the spread of 231bps is added to the 3.700% of the unrounded 10-year Commonwealth bond yield.

15 This compares with the current yield of 4.061% on the 10-year NSW Treasury bond which was the financial instrument we recommended in our 2012 Technical Paper.

Key advantages of this approach are that:

- it is consistent with IPART's WACC methodology (in determining the cost of debt for utilities)[16]
- it has a strong market basis (based on an assumed credit rating for the sector)
- it is relatively simple to administer, and
- historical data are available on the relevant margin.

In recommending this approach we also considered stakeholders' responses to our March 2015 consultation paper.

3.1.4 Implications of a higher discount rate for the size of development contributions

The implication of using the 10-year Commonwealth bond yield plus the margin as proposed, means that based on the latest available data, the current nominal discount rate would be 5.0%. This compares with a rate of 4.1% if it were based on the NSW Treasury bond yield (see Figure 3.2).

In the context of contributions plans, generally the higher the discount rate the higher the required development contributions. The contribution rate increases with the discount rate because we assume that revenues are received later than costs over the life of the plan. Hence, an increase in the discount rate will result in a greater reduction in the present value of the revenues compared to the present value of the costs. To offset this, the contribution rate increases to allow the present value of both to remain equal.

The effect of a higher discount rate on contributions depends on the extent of the mismatch between the timing of costs and revenues.

To illustrate, we present a hypothetical scenario. In this scenario, we assume that the discount rate is increased by 50 basis points under two different development paths (Table 3.3).

[16] In the 2012 Technical Paper, IPART recommended calculating the discount rate by taking the 20-day average of the 10-year NSW Treasury bond yield. This method of calculation (not the particular bond) was consistent with the WACC methodology at the time. IPART now calculates the risk free rate based on the midpoint method above to better balance long-term yield trends with short-term ones. This is also more consistent with the long-term nature of contributions plans.

Table 3.3 Effect of 50bps rise in discount rate on contribution rates

	25-year development	40-year development
Contribution rate per hectare (at discount rate of 4.5%)	$911	$1,063
Contribution rate per hectare (at discount rate of 5.0%)	$930	$1,126
Percentage increase in contribution rate	2.1%	5.9%

Source: IPART calculations. The dollar amounts are illustrative only.

In the first case, we have considered the effect on the contribution rate when the development plan is assumed to span 25 years. The increased discount rate increases the contribution rate by 2.1%.

In the second case, we have assumed that the plan spans 40 years and revenues are collected later than under the 25-year plan. As a result, at the same discount rate, the contribution rate is higher than under the 25-year plan ($1,063 compared to $911). Further, the effect of a 50 basis point rise in the discount rate is more pronounced in reducing the present value of contributions and so the contribution rate would increase more, by 5.9%.

However, this is a hypothetical scenario only, and any variation in contributions will ultimately depend on a number of different aspects of the plan, such as the expected development path and the expenditure profile over the plan. Therefore, the exact extent of the increase in contributions associated with a higher discount rate can only be estimated within the context of a specific contributions plan.

3.2 Real versus nominal NPV models

The 2005 Practice Note gives councils the flexibility to model contribution rates using either nominal or real values.[17] Modelling in real terms means that inflation assumptions are not included within the model. Modelling in nominal terms means that the council includes inflation or escalation assumptions within the model.

A benefit identified by councils was that nominal models were easier to explain to their stakeholders and to integrate into overall council financial frameworks, such as the long term financial plan.[18]

Constant dollar (real) NPV models on the other hand clearly show the changes in costs and revenues excluding inflation and therefore are generally more transparent.

[17] Department of Infrastructure, Planning and Natural Resources, *Development Contributions Practice Notes* – July 2005, *Financial management of development contributions,* p 3. The Practice Note does not specify whether councils should use real or nominal modelling NPV approaches.

[18] Ku-ring-gai Council submission to IPART Consultation Paper, March 2015, p 1.

For these reasons, we accept both the real and nominal modelling approaches, provided either approach uses realistic and consistently applied assumptions in relation to the escalation of costs and revenues.

3.2.1 Adjusting a nominal discount rate to a real discount rate

The nominal discount rate we derived in section 3.1 can easily be converted to a real rate by adjusting for inflation. This conversion uses the formula in Box 3.1.

Box 3.1 Converting nominal rates to real rates

A nominal discount rate can be converted to a real discount rate by adjusting for expected inflation. This conversion uses the Fisher equation rearranged as follows:

$$r = \frac{1 + i}{1 + \pi} - 1$$

Where r = real discount rate
i = nominal discount rate
π = expected rate of inflation

There are various ways to estimate inflation. In our 2012 Technical Paper we recommended using swap market data. However, we updated our recommendation in the 2015 Technical Paper for consistency with our current approach to converting the nominal risk-free rate to a real rate in our WACC methodology.

IPART's WACC methodology uses a geometric average of the first year's headline CPI inflation forecast by the RBA and nine years of the midpoint of its target inflation range (2.5%).[19] At present, this average is 2.50%.

We consider that, in the context of a council modelling development contributions, the proposed inflation adjustment based on RBA data would be much simpler to replicate than the swap market data. Inflation data are accessible on the RBA's website. We also plan to publish the nominal discount rate, the inflation adjustment and the real discount rate biannually.

The conversion of the current nominal discount rate to a real discount rate is summarised in Table 3.4.

[19] See IPART, *New approach to forecasting the WACC inflation adjustment – Fact Sheet*, March 2015.

Table 3.4 Converting a nominal discount rate to a real discount rate

Nominal discount rate	**4.982**
Inflation forecast	2.500
Real discount rate	**2.421**
Real discount rate (rounded to 1 decimal place)	**2.4**

Source: IPART calculations based on Bloomberg (10-year bond rates), Reserve Bank of Australia, Statistical Tables F3 (corporate yields) and RBA Statement on Monetary Policy, November 2015 (CPI).

3.3 Escalating costs within a contributions plan

The costs of land or of different categories of infrastructure (eg, open space works vs stormwater management works) may increase at different rates. It is therefore reasonable for councils to use different rates of escalation for each cost category, if they wish to do so, provided there is evidence of the assumptions.

For example, in the case of CP15 – Box Hill Precinct, we considered that the escalation assumptions were reasonable because they were based on recent past growth rates of land and capital costs (measured by ABS indices of established house prices and producer prices).[20]

Both real and nominal models can make use of different cost indices. Whilst the established house price and producer price indices published by the Australian Bureau of Statistics are nominal indices they are readily convertible to real indices using the method described above for converting the discount rate.

3.4 Escalating revenue (the contribution rate) within a contributions plan

The last step in determining the development contribution in an NPV model is to select the rate at which the development contribution will escalate each year. IPART recommends escalating development contributions annually at the same rate as the council's discount rate as determined in section 3.1 of this document.

This recommendation is based on the principle that the developers are the impactors in this process and that councils should not bear the cost of any decision by developers to delay development. Only when the development contribution rate escalates each year at the same rate as the discount rate will the council receive a balanced outcome between the present value of revenue and the present value of costs. If the escalation rate is zero or set at CPI the council will incur a funding shortfall for each year development is delayed.[21]

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20 Box Hill Precinct s94 Contributions Plan, p 14. This Contributions Plan is reproduced in IPART, *Assessment of The Hills Shire Council's Section 94 Contributions Plan No 15 Box Hill Precinct,* December 2014.

21 The lower the escalation rate, the greater the potential shortfall. That is, a zero escalation rate leads to a larger revenue shortfall than an escalation rate of 2.5%.

Once the escalation rate is chosen then an NPV model will determine the contribution rate for the first year. When the escalation rate is set at the council's discount rate the developer charge will be lower in the early years and higher in later years when compared with an escalation rate set at either zero or CPI (usually around 2.5%). The important point being that, assuming relevant land is eventually developed as envisaged in the plan, the council will always receive sufficient revenue to cover its costs.