CHAPTER 7 EFFICIENCY PRINCIPLES AND EQUITY, ENVIRONMENTAL AND ADMINISTRATIVE ISSUES IN THE DESIGN OF DEVELOPER CHARGES POLICY

7.1 *Introduction*

The preceding chapters have examined the conceptual foundations for a rational developer charges policy based on allocative efficiency considerations. In this chapter some of the main findings of the earlier chapters are brought together. To this end, the chapter seeks to provide some answers to particular questions in developer charges policy design which have been raised in the literature. More specifically, we address issues raised in the Planning Research Centre's (PRC 1994) study of New South Wales developer charges policy documents. As we saw in Chapter 2, the PRC study is the most comprehensive review of New South Wales 'Section 94' policy since the Simpson Inquiry (1989), although it was undertaken primarily from a planning rather than an economic perspective. The approach adopted by the PRC was to identify some of the more difficult questions after examining the 'current state of debate on developer contributions' and also undertaking a preliminary examination of the Contribution Plans of a number of local governments (PRC 1994:20). With these issues defining the scope of the study, the PRC then investigated some of the conceptual and practical problems which arose in each policy area and how these were currently being dealt with by councils. In matters of administration of policy the PRC report offers advice on how to improve the clarity, consistency, accessibility and accountability of information. It also suggests ways to improve compliance with 'the policy intent' of the legislation in areas such as the establishment of nexus (PRC 1994:170). However, on economic issues, particularly with regard to cost definitions and calculation procedures, the report is silent. This may well be a reflection of the fact that after airing some of the more difficult and contentious issues in the initial report, a second report had originally been intended by the PRC (PRC 1994:170). However, the absence of a second report leaves a significant gap in the literature and in the advice being provided to councils. It is to this gap that the guidelines outlined in section 7.2 are addressed. Asking the same questions as in the PRC report, section 7.2 proposes answers using the analytical

framework of economic efficiency principles. Questions which did not raise economic issues have been omitted.

The focus on economic efficiency principles in this study reflects the emphasis in microeconomic theory generally with the definition and refinement of the conditions of allocative efficiency. It need hardly be added that this excludes other important criteria for evaluating infrastructure financing methods, prominent amongst which are equity, environmental and administration considerations. Following the review of efficiency principles, we provide an overview of the issues which arise in developer charges policy if charges are designed to incorporate these additional evaluative yardsticks.

Equity issues are discussed in sections 7.3 to 7.6. In section 7.3, an attempt is made to forestall confusion in the analysis of equity issues by examining various meanings attached to 'equity' and then identifying some of the assumptions which are often implicit in the central arguments. Section 7.4 examines one of the most important of these assumptions: namely, the economic (as opposed to statutory) incidence of developer charges. Section 7.4.1 appraises the relevant theory; section 7.4.2 reviews the empirical evidence; and, finally, section 7.4.3 examines the views of developers themselves on the economic incidence of charges.

Section 7.5 focuses on the controversial issue of the impact of charges on housing affordability. This is followed in section 7.6 by consideration of four other types of equity argument; notably equity between new home buyers and home owners of an earlier generation when developer charges did not exist (section 7.6.1); the issue of the regressivity or progressivity of charges (section 7.6.2); designing equity neutral calculation formulae (section 7.6.3); and regional horizontal equity (section 7.6.4).

Section 7.7 deals with developer charges and environmental objectives, and in section 7.8 we examine the requirements for efficient administration of policy. Section 7.9 attempts to specify the policy implications of the aforegoing discussion for developer charges.

7.2 *Statements of Principle in Response to Items Listed by* PRC (1994) *as Issues in the Operation of Section 94 Developer Contributions Policy*

In response to each of the issues identified in the sub-headings below, the following broad statements of principle can be suggested. The principles are drawn from the discussion conducted in earlier chapters.

7.2.1 *'When is it appropriate to levy' developer charges* (PRC 1994:21) *and 'which items should be levied for'* (PRC 1994:26)

Only those assets which fit the criteria for a user pays system should be levied. User pays is appropriate when the benefits of a service can be confined to those who participate in it and when it is economically feasible to identify and charge users (Chapter 3). In the context of developer charges, a key difference with typical user pays systems is that the users are 'charged' indirectly by way of a higher price for the land or a higher rental for homes in a residential development or a higher rent for shop or office space in a commercial development (see section 7.4 of this chapter). Accordingly, it is necessary to be more precise and stipulate that those to whom the charge is passed on, must also use, or at least benefit from, the infrastructure service occasioned by the development. In other words, developer charges as a user pays system implies that there should be a clear 'nexus' between the development, which pays the charge, and the infrastructure service that is required. It also implies that only that proportion of an asset's service capacity which actually services the development should be levied. Capacity servicing users from other urban areas should thus be 'apportioned' out.

Where councils have 'backlogs' of capital works (i.e. works which are needed to bring areas developed earlier up to a similar service standard), there is no nexus to new development. Developer charges derived from new development should not therefore be used as a source of funds for these backlogs.

7.2.2 *'The definition of catchments used to assess new demand is an issue'* (PRD 1994:24)

In principle, the catchment area of an infrastructure service required by a new development would be defined by identifying, both geographically and temporally, those who have occasioned the need for the extension of the service (Chapter 3). That is, the users may be current or future users of the service. For non-excludable services, such as open space or community facilities, the catchment area should be defined by estimating the location of potential users of these services. For excludable services, such as water and sewerage, the catchment area represents a discretionary choice of the service provider. In this case the catchment should increase in both size and numbers of users until providing the service from another source is more cost effective (Chapter 4). Local government boundaries should not constrain this general principle. That is, where efficient catchment size overlaps two or more council jurisdictions, the councils should cooperate to avoid inefficient duplication of service.

7.2.3 *'The cost of items is an issue'* (PRC 1994:34)

The question of the appropriate principles to apply in connection with the costing of capital items covers a number of salient issues. Perhaps the most important principle involved here is that, as far as possible, the levy should reflect the marginal capacity cost (MCC) of extending or supplying the service to the development (Chapter 5). The question of whether the recurrent costs of service should be included is less a matter of principle than of expediency; that is, given that the recurrent costs of operating an asset cannot usually be predicted reliably over long time periods it makes more sense to cover these as they emerge.

A second problem is whether headworks should be included in costs. We have argued in this study that they should certainly be included for at least two reasons. Firstly, some headworks catchments for certain types of infrastructure assets are not nearly as large as, say, that for a dam (it follows that development sites within the single catchment area of a dam may still be served by different headworks for water treatment or sewerage treatment - Chapter 6). And secondly, even where catchments are large, it may still be efficient to signal *regional* variations in costs of providing

services (Chapter 4). On the question of which formula to use to attempt to calculate MCC, we have seen in the earlier theoretical discussion that it will be important to ascertain some of the key physical characteristics of the items for which charges are being levied. These include whether the service is divisible (i.e. can it be provided incrementally according to expansion in demand) and whether excess capacity exists; and, if it does, is it planned or unplanned (Chapter 3). It is also important to ascertain whether demand for the service is expected to grow over time, thus requiring planned extensions to the scale of the infrastructure service. For example, if a service has unplanned excess capacity and demand is not expected to grow sufficiently to absorb this, then there will be no MCC and a zero levy should obtain (Chapter 3). If a service (e.g. a new road) necessarily entails some excess capacity, but after servicing a few sites is not expected to require any further expansion, then the MCC formula is only required to reflect an equitable distribution between sites of the initial cost and any holding costs to full capacity. Strictly speaking, the formula will generate an average MCC. Finally, if demand for a service is expected to grow continually over time, planned excess capacity does exist now and in the future further expansions are planned, then the best way to calculate MCC will depend on the data available. If the demand and cost data on future expansions is reliable, the PWISC or TLRIC methods might be used. If reliable data is not available, then AAM can still provide an adequate estimation of MCC (Chapter 6). As outlined in Chapter 6, the formula for AAM is:

$$\frac{PW(I)}{PW(O)} \tag{6.3}$$

where

I = the current cost valuation of the infrastructure asset;

O = the take-up rate of excess capacity expressed in units of demand for the output of the infrastructure service (e.g. a standard residential unit's (SRU) demand for water).

Finally, with regard to the estimates of the cost of asset construction (e.g. the methods of construction and the cost and standard of the attributes of the asset) it is essential that only minimum technically efficient costs be included. For large monopoly service providers (where competition does not provide incentives to lower costs) the

cost estimates should be transparent and available to developers. 'Benchmarking' of the costs of providing the same service in different councils should also assist here. Where a strong case can be presented that an asset was not constructed at minimum technically efficient costs, a discount on the developer charge may be appropriate.

7.2.4. *'Apportionment of historic costs of existing facilities and current costs of new facilities is an issue'* (PRC 1994:25)

As noted in section 7.2.1, in attributing the costs of an infrastructure service to new demand created by a development, it is important to offset against those costs any extensions to capacity which are required because of growth in demand for the service by existing users. In Section 94 terminology, this requirement is termed 'apportionment'. Similarly, the capital costs of a pre-existing service (where sufficient excess capacity has been included in expectation of new development) will have to be apportioned between capacity attributable to existing users and the share of capacity required by the new development. (The apportionment principle is examined further in Chapters 9 and 10 where a rewording of current advice to councils is suggested.)

7.2.5 *'Where councils seek to recoup costs, the basis of the costs used to determine levies (historic or current) is an issue'* (PRC 1994:25)

Where a facility containing planned excess capacity has already been built and councils seek to recoup the costs over the period until new development absorbs all the capacity of an asset, then calculation of the marginal capacity cost attributable to new users should be based on the current cost economic valuations of the assets concerned, rather than the historic costs of the asset.

In calculating the developer charge for this type of asset, it is important to remember that the period in which an asset reaches 'full capacity' is not fixed in time. In terms of the number of extra users allowed into a system, full capacity will be reached when the operating costs of the current number of users (including congestion costs imposed on consumers) match the first year amortisation and operating costs of the next lump of investment (Chapters 5 and 6).

For assets where the demand is not expected to grow and replacement or expansion of the facility is unlikely, then recoupment of the historic cost plus an equitable share of the interest costs of holding excess capacity is sufficient. In New South Wales Section 94 policy, the decision in the case of *Allsands v Shoalhaven City Council* (see Chapter 6) has created some confusion on this issue. The decision taken in the Allsands case (on strict legal grounds) meant that councils should only ever recoup historic cost plus interest. On economic efficiency grounds this decision is in error.

7.2.6 *'The appropriateness of standards is an issue'* (PRC 1994:29)

Economic theory suggests that the optimum size of facility is determined when the demand curve intersects the LRMC curve. At this point, the costs of supplying a marginal unit of capacity will be equal to its incremental benefits (i.e. demand) for it. Put differently, an appropriate standard should be ascertained by examining the costs of supplying the service at varying standards in relation to knowledge of how much people are prepared to pay for different standards (Chapters 3 and 4).

7.2.7 *'Should standards or a "needs based" study approach determine the level of provision?'* (PRC 1994:27)

A pre-existing standard of service (e.g. a specified number of hectares of open space) need not necessarily be optimum. The preferences and willingness to pay of consumers may change, both geographically and over time. The major difficulty with the principle that standards should be judged by relating costs to demand requires that for new development, the population which will ultimately use the service is not yet known. In this case, the preferences of the incoming population will have to be guessed, perhaps by surveying communities who are likely to have the same demographic profile.

7.2.8 *'The demonstration of the nexus is an issue* (PRC 1994:30)

In practice, proving a nexus between a development and the need for a particular service, may be difficult, but as discussed in section 7.2.1, it is perhaps the most basic principle of a user pays theory that the prospective payers for the service (i.e. buyers of land in the new development onto whom the charge is passed) must also be the users or beneficiaries of that service. More simply, if any given development is to be charged for a service, then it must be demonstrated that it will need or use it.

7.2.9 *'The reasonableness of contribution rates is an issue'* (PRC 1994:38)

Under New South Wales Section 94 legislation, the fact that a contribution rate must be 'reasonable' seems to embrace a wide range of factors including 'fairness, equity, sound judgement and moderation' (New South Wales Department of Urban Affairs and Planning 1997:12).

Discussion of fairness or equity in the Section 94 Manual (New South Wales Department of Urban Affairs and Planning 1997:12) seems mostly to depend on whether rates will have an impact on housing affordability. This issue will be discussed in detail in the discussion of equity impacts of developer charges in section 7.5 of this chapter. Many of the other aspects of the 'reasonableness' of charges appear to relate to administrative considerations, although it is clear that 'reasonableness' is widely interpreted (Appendix E to the revised Section 94 Manual lists some 56 questions all of which test the 'reasonableness' of contribution rates - see New South Wales Department of Urban Affairs and Planning 1997:App. E, 93-95). Among other things, these tests of reasonableness appear to aim at limiting the making of unsound assumptions, unfounded projections, or inadequate documentation. Requirements for the efficient administration of policy are discussed in section 7.8 of this chapter.

7.2.10 *'Variations of levies between councils is an issue'* (PRC 1994:40)

Levies which are set to reflect the MCC of infrastructure service provision will vary between councils if there are significant differences in the costs of supply between councils. A more efficient pattern of urban settlement is likely to result if charges are varied in this way (Chapter 4).

7.3 *Equity Issues: Potential Sources of Confusion in Arguments as to the Equity Impacts of Developer Charges*

When developer charges policy is designed as far as possible according to economic efficiency principles such as those listed above, the question which must now be addressed is: will the charges be equitable? The range of plausible standards by which any policy might be judged as inequitable or unfair is extensive. Wolf (1988: 79-80) describes some examples as follows:

> Consider, for example, the wide differences and ambiguities that result from interpreting equity according to each of the following criteria: equity evaluated as equality of opportunity; equity as equality of outcome; equity as perfect equality of outcome *unless* departure from equality is an essential precondition for securing advantages for those who are least favored; equity as a categorical imperative specifying that no personal or individual action is fair unless it can be applied as a general maxim to govern the behavior of others; equity in the senses of "horizontal equity" (treating equally situated people equally); equity as "vertical equity: (treating unequally situated people in appropriately unequal ways); equity as Marxian equity ("from each according to ability, to each according to need"); equity according to the Old Testament ("an eye for an eye"); or equity according to the New Testament ("turn the other cheek") (original emphasis).

However, in the developer charges literature, most arguments about equity are based on four main equity constructs. Two of these are the 'horizontal equity' and 'vertical equity' concepts as defined above by Wolf. Horizontal equity appears to have a number of applications to developer charges. For example, equal distribution of the burden of interest costs in calculating charges for assets which have significant excess capacity is one issue which has arisen in the literature. Equal treatment of citizens in different regions in terms of standards of public services for similar tax burdens, is another horizontal equity issue which arises in connection with developer charges. Vertical equity is the principle relevant to charging people according to ability to pay criteria. In debates on developer charges vertical equity arises in discussions about whether charges are progressive (poor households pay a lower share of income than rich households) or regressive (poor households pay a higher share). Two additional

conceptions of equity important to developer charges are benefit equity (ensuring that those who benefit from the supply of infrastructure bear an equivalent share of the cost, as discussed in Chapter 3) and access equity which attempts to ensure that those who do not have adequate means to pay, gain access to at least a socially desirable minimum supply of infrastructure (Kirwan 1991:34).

It is clear that discussion of the equity impacts of developer charges may degenerate into claim and counter claim unless the sense in which the word 'equity' is being used in each case is clearly defined. For example, as we have seen in Chapter 3, it is often argued that development levies are equitable because those who generate the need for the infrastructure services are those who will be paying for them. The conception of equity in this argument is benefit equity. Set against this, one of the most common arguments against developer charges for infrastructure is that they are inequitable because they cause the price of houses to rise and hence indirectly deny access to home ownership to those on low incomes. This argument implicitly has a variant of access equity in mind.

In addition to the confusion which may arise because the sense in which the word equity is being used is not specified, there is a further potential source of confusion in discussions about the equity impacts of charges when commentators do not make clear at least two implicit, yet critical, assumptions, in their arguments. The first of these is: what is it that is being assumed about the economic incidence of charges? The second assumption is: with what alternative methods of funding infrastructure are developer charges being implicitly compared when statements are made about equity impacts?

The argument outlined above regarding the effects of developer charges on access to home ownership contains an implicit assumption that charges will always be passed forward into the price which consumers pay for residential (or industrial) land. This assumption is also implicit in the arguments about the benefit equity of developer charges and it is also, of course, implicit in the view that charges are a form of user pays (from which we began, in Chapter 3, to explore a theory of developer charges). Not spelling out this assumption can cause confusion. For example, it is not uncommon

to find in the literature uncertainty being expressed as to the economic incidence of charges at the same time as charges are being described (and accepted) as a user pays levy (e.g. see Peiser 1988:40, Simpson 1989:51-59). Where the burden of charges ultimately resides is a central issue in considering the equity of charges and one to which we shortly turn.

The second often implicit assumption, as to the nature of the alternative funding system in mind, can also create confusion if it is not clearly specified. Most commonly it is the pre-existing infrastructure financing method (usually property taxes) which is in mind when statements are made about the fairness of the economic burden of developer charges. But if this is the case, then there are two important points to consider. Firstly, if on-site developer contributions and off-site charges have been in existence for many years (as in New South Wales) then one-off 'windfalls' to groups in the community caused by changes in relative prices at the time of introduction of charges would have worked their way through the system some time ago. For example, Neutze (1997:121) has pointed out that because existing and new housing are close substitutes, existing home owners derive a capital gain when the price of new housing rises as a result of the introduction (and pass through) of developer charges. Although this is 'unambiguously inequitable' (Neutze 1997:121) it is not an on-going inequity. As Neutze (1997:121) has observed, monetary and in-kind developer contributions have been in force in New South Wales for '25 to 40 years by the mid-1990s so that many of the equity effects of the transition have worked themselves out'.

The second reason for being explicit about the alternative system of finance with which charges are being compared when discussing winners and losers under developer charges is that it makes a great deal of difference to the analysis what the realistic alternative might be (i.e. the opportunity cost of change). For example, if a council decides that politically an increase in general rates is not possible, it may be that the only alternative is to allow the new development to go ahead, but instead of expanding facilities, allow a degree of congestion and deterioration in standards of existing services. In this case, the costs of development will be borne by those unable to avoid the congestion and drop in standards. Alternatively, councils may decide to restrict

new development altogether by implementing 'growth management' controls. Those seeking new homes will now bear the burden of such a policy.

With these caveats in mind to avoid confusion in discussions about the equity of developer charges, we can now examine the issue of who pays developer charges.

7.4 *Equity Issues: The Incidence of Charges*

7.4.1 *Equity Issues: The Incidence of Developer Charges - Tax Incidence Theory*

To discuss where the burden of developer charges falls, it is important to distinguish between the statutory incidence of the charge and the economic incidence. The statutory incidence of a tax or charge falls on those on whom the legal liability for the charge rests (Musgrave and Musgrave 1984:250). For developer charges it is the developers who are legally liable to pay the charges and hence it is they who bear the statutory incidence. However, those on whom the statutory liability rests may avoid the payments by cutting back on the activity or they may attempt to shift the burden to others. Those to whom it is shifted initially may themselves be able to pass it further. As a consequence, the final distribution of the burden, the economic incidence, may differ greatly from the statutory incidence (Musgrave and Musgrave 1984:250). In principle, if the general equilibrium of the economy before the imposition or change in developer charges could be calculated, and then recalculated afterwards, the changes would provide a description of the economic incidence of the charge (Atkinson and Stiglitz 1980:160). Since a calculation of the altered position of every single individual in the economy cannot be done, tax incidence tends to be analysed using a partial equilibrium approach which focuses on the main groups likely to be affected by the tax or charge (Atkinson and Stiglitz 1980:160). How these groups are affected will depend on the conditions of demand and supply in the markets in which the transactions occur; and by the time period allowed for adjustments to occur (Musgrave and Musgrave 1984:268).

If we apply partial equilibrium tax incidence theory to developer charges, the three groups primarily affected by the introduction of charges into a region are the

original landowners who sell developable land to developers; the developers themselves, or the home buyers (or retailers in the case of commercial developments) who buy the land from developers. Therefore there are three possibilities for who might bear the economic incidence of the tax: the charge might be passed backwards to the original landowners in the form of a reduced price for the land; it might be passed forward if the developers are able to raise prices by the extent of the charge and still sell as much land as before or it might be paid from developers' own profits. Each of these possibilities can be examined systematically.

If we consider the market in which developers conduct their transactions, the first proposition which can be advanced with some confidence is that in the long run it is unlikely to be the developers who pay the charge (Altschuler and Gomez-Ibanez 1993:98-99). Land developers will remain in the business only if they can earn returns to capital invested in development at a comparable rate to returns earned in a different region or in a different line of business. If development returns are threatened by higher costs and these are likely to be permanent imposts, developers will leave the industry and invest elsewhere. *Ceteris paribus*, we can surmise that if sufficient numbers do withdraw, the supply of land and houses for sale will contract, prices will rise and, in effect, the charge (or at least a part of it) will have been passed on in any case. This reasoning does not rule out the possibility that if in the short run a developer is caught with a large supply of developed land for sale at the time charges are imposed (or raised), and demand is weak, then it is a strong possibility that the increased costs will be borne by the developer. However in the long run it is most unlikely that developers will take the reduction in profits permanently, so long as there are other investment opportunities in the economy.

Whether the charge is passed back to the original landowners, or forwarded to land buyers will depend on the elasticity of demand and supply in the local development market at the time charges are introduced or raised. Simple manipulation of demand and supply curves suggests that the more inelastic the demand curve for land relative to the supply curve, the more of the charge will be passed forward to land buyers. Alternatively, the more inelastic the supply curve relative to demand curve, the

more the charge will be passed backward to landowners (see, for example, Mankiw 1997:126 for a simple example of lump sum tax incidence and relative elasticities of supply and demand).

It seems likely that supply of developable land will be relatively elastic. This is because, as the Industry Commission (1993:216) argue, if the supply of developable land is relatively unrestricted, then its selling price will be governed by its value in its next best use, usually rural use. If developer charges threaten to reduce the return to development of the land, then it will simply be held in its current use for longer. (If the supply of developable land *is* restricted then it is, of course, even less likely that the charge will be passed back). Underlining the tendency for landowners to withhold land is an empirical finding by Snyder and Stegman that landowners tend not to think in terms of the time value of money and, in the words of one developer, they 'don't have a sense of opportunity costs' and 'will sit on their land until they can get their price' (Snyder and Stegman 1987:100).

On the other hand, demand is likely to be relatively inelastic especially for home buyers. As the final consumers of development, they have the most limited capacity to evade developer charges. Where charges are applied in all regions, have been in place for some time, and tend not to vary significantly with dwelling type, the buyer can do little to adjust their purchases to avoid the charge. Neutze (1997:118) argues that demand is likely to be inelastic for homebuyers because 'servicing costs are only part of the cost of land, land is only a minor part of the cost of housing, and the demand for households for separate dwellings is itself relatively inelastic'. The inelasticity of separate dwellings seems plausible if the elasticity of demand for housing is viewed as comprising two parts: a demand for separate dwellings which is likely to be inelastic and a demand for quantity and quality of housing per dwelling which is likely to be elastic (Neutze 1997:257 n.3). This view on the inelasticity of housing demand is supported by Kirwan (1991:106) and also by the Industry Commission (1993:225) which estimated the price elasticity for residential land in Melbourne of only –0.13 and for Sydney –0.11.

For developer charges on commercial developments it is more difficult to determine the final economic incidence. Purchasers of the retail outlets (or office space), unlike home buyers, have the option of evading the charge by passing (at least some of) it on to renters of the space, who in turn may shift it onto final consumers in the form of higher prices for the goods or services sold. Whether, and to what extent a charge is passed on will depend on conditions prevailing in the commercial space and individual product markets. These conditions will probably change over time. In sum then, with developers unlikely to bear the charge in the long run, and the demand for housing likely to be less elastic than the supply, tax incidence theory suggests that most of the developer charge will be passed forward. These conclusions appear to be supported by the empirical evidence.

7.4.2 *Empirical Evidence on the Incidence of Charges*

Surveys of the empirical studies on the incidence of developer charges have been undertaken *inter alia* by Industry Commission (1993:215-219), by Altschuler and Gomez-Ibanez (1993:102-103) and by Yinger (1998:229). Of the studies reported, three appear to have been comprehensive; notably, Singell and Lillydahl (1990), Skaburskis and Qadeen (1992) and Delaney and Smith (1989).

Singell and Lillydahl (1990) examined the city of Loveland in Colorado which increased impact fees by $1 182 per lot in July 1984, to include fees for 'library, general government, parts and recreation, fire protection, museum and law enforcement' in addition to the pre-existing water and sewerage fees (Singell and Lillydahl 1990:86). Data on housing prices and characteristics of homes sold were collected for 429 homes traded in Loveland during an 18-month time period both before and after July 1984. Using a relatively simply conceptual model and ordinary least squares estimation, Singell and Lillydahl (1990) estimated that the average price of a new home increased by $3 800 after the $1 182 rise in fees. There was also evidence to suggest that lot size decreased after the increase and that some developers may have left the market (Singell and Lillydahl 1990:90).

One particular difficulty with such studies is finding a way to isolate the upward pressure on prices caused by tight market conditions. In Singell and Lillydahl's (1990) study, the Colorado housing market was buoyant at the time the study was done. They did attempt to control for this factor by including a separate dummy variable for each month in the sample period (Singell and Lillydahl 1990:87). However, it appears that explanations which have nothing to do with development fees cannot safely be ruled out (Yinger 1998:230).

A somewhat smaller increase in prices as a result of the imposition of impact fees was found by Skaburskis and Qadeer (1992). They studied the price of new vacant lots sold in three Toronto suburban municipalities during the period from 1977 to 1986. Using standard regression analysis they attempted to identify the differences in prices that can be attributed to differences in development impact fees. Differences in impact fees were significant and the overall conclusion of the authors was that 'development impact fees directly increased lot prices by approximately 1.2 times the size of the fee' (Skaburskis and Qadeer 1992:653).

Delaney and Smith (1989) examined the housing market in Dunedin on the Florida peninsula. In July 1974 Dunedin imposed an impact fee of $1 150 per single-family housing unit and Delaney and Smith (1989) examined new housing prices from three years before to nine years after the event. The Dunedin study is interesting insofar as it had three neighbouring cities which had either no fees, or much lower fees, and which were close substitutes for Dunedin. Nevertheless, they concluded that developers and landowners had been able to pass on the fee to buyers and that the price increase was two to three times the amount of the fee (Altshuler and Gomez-Ibanez:103). However, after six years the size of the differential declined.

To our knowledge there appear to be no empirical studies of the incidence of developer charges in Australia. The Simpson Inquiry into developer charges in New South Wales did investigate the issue of whether section 94 contributions increased the price of land and lamented the lack of 'authoritative literature or long term studies' (Simpson 1989:147). Simpson (1989) did conclude, after hearing evidence and

submissions, that 'whilst Section 94 contributions may not always increase the price of land in the short-term, they, in association with other government charges, tend to do so in the long-term' (Simpson 1989:148).

New South Wales had a limited experience with a development levy which also appeared to confirm that such charges are passed on. The levy was known as the 'Land Development Contribution' and was introduced in New South Wales in 1969. The design of the levy was quite different from the current developer charges. The 1969 levy was intended to capture some of the increase in land value which arises as a result of town planning decisions (e.g. when land is rezoned from rural to residential land). This is sometimes referred to as 'betterment' or 'planning gain'. It was envisaged that the proceeds of the contribution would be used to fund water supply, sewerage and other essential urban infrastructure. The Sydney 'Betterment Levy', as it became known (Archer 1976:339), rekindled a lively debate on whether or not levies payable by landowners (who were also developers in many cases) would be passed forward. At the time of the introduction of the levy, the state government argued that it would not be passed on (for a critique of the arguments presented then, see Pullen 1971). However, in 1973 the same government abolished the levy citing the fact that it *was* being passed on as one of the reasons for its decision (Archer 1976:341). If the levy was being passed forward it does, of course, cease to be a levy on betterment as such (Pullen 1971:9).

7.4.3 *The Views of Developers Themselves*

Snyder and Stegman (1986:97-99) considered the issue of whether or not impact fees are passed forward by interviewing private developers from a number of United States cities. They concluded that 'with few notable exceptions, the private developers and local officials with whom we spoke believed that the ultimate incidence of development fees is on those who buy new houses' (Snyder and Stegman 1987:97).

This view is also confirmed by developers where 'a developer's perspective' is included in literature on impact fees (see, for example, Soble 1988). In the Australian literature, two papers (Sears 1997 and Taylor 1997) recently presented the property

development industry's perspective of a methodology for developer charges for water, sewerage and drainage proposed by the New South Wales Independent Pricing and Regulatory Tribunal (IPART). Both papers focus primarily on the adverse effects on affordability of houses as a result of the pass through of increases in developer charges.

It should perhaps be noted that if developers assert that they pass the charge forward and it is passed through in the form of a higher price, then this constitutes reasonable prima facie evidence that charges are passed forward. However, in the short run at least, the position may not always be clear. For example, if developers are obliged to hold on to housing stocks for six months to a year longer than they otherwise would have, then they have forgone the interest they would have earned on the funds over this period if sales had taken place earlier. This implies developers would bear part of the burden of higher charges in this case. Similarly, if fewer houses are sold overall following an increase in charges, there may be the opportunity cost of houses or land not sold to take into account.

Whilst both factors may complicate the issue in the short run, it nevertheless seems sensible after taking into account anecdotal evidence from developers, the limited available empirical evidence and theoretical considerations, to conclude that: while the incidence of developer charges and other contributions at any particular time will depend on the characteristics of the market, it is most likely in the longer term that it will fall on the purchasers of developed land (Industry Commission (1993:219)). Accepting that charges will pass through to house prices brings us to the most dominant issue in the equity debates about impacts of charges, namely their effect on the affordability of housing.

7.5 *Equity Issues: The Affordability of Housing*

Ceteris paribus it appears that a substantial increase in developer charges in a region would increase house prices, and therefore the size of the initial deposit and/or loan required to buy a home. Because commercial lending agencies tend to use fixed rules, such as repayment commitments should not exceed, say, 30 per cent of a household's income, the minimum monthly income required for a loan must also

increase if a larger loan is needed. This could price a number of previously qualified homebuyers out of the market. It is in this sense that the term 'affordability' is commonly used when concerns are expressed about equity in housing.

In principle, if developers and local councils can borrow at the same interest rate, then affordability of homeownership is not necessarily affected by whether infrastructure is paid for in an upfront charge or a recurrent charge of the same lump sum present worth. That is, potential homeowners will need to find the same amount of money over time whether the charges are paid for in advance and then serviced through the mortgage loan, or whether a household contributes higher rates in order to finance a local council's servicing of a loan for the infrastructure. So too, banks should agree to a larger loan (to finance a developer charge) because the expected reduction in future recurrent charges by public utilities and local councils providing infrastructure would imply a greater ability to repay the loan. However, in practice it appears that, at least in the past, banks may have been inflexible in applying lending rules, thus making it more difficult for those on low incomes to obtain a loan. The real problem here is, of course, not the developer charges as such, but the lack of flexibility of the lending agencies. The Industry Commission (1993:221) came to a similar conclusion:

> In principle, the timing of charges should make little difference to the burden of infrastructure finance. In practice, mechanical lending rules used by banks, the uncertainty created by the potential for public authorities to alter charges, and actual or implicit government guarantees on the borrowings of public authorities may create extra burdens for purchasers of developed land.

Typically, the arguments presented by developers and others concerned about affordability are based on data which show the number of households in a given income bracket and the increase in numbers who would be 'excluded' from being able to borrow if the cost of housing rose by a given amount (see, for example, Taylor (1997) and Urban Development Institute of Australia (UDIA) in Industry Commission (1993:231-232)). This calculation is based on assumptions about the deposit requirement, interest rate, length of loan and repayment rules used by lending agencies.

For example, at a 20 per cent deposit requirement, an interest rate of 12 per cent, a loan of 25 years, and the rule that repayments should not exceed 30 per cent of income [actual figures submitted to the Industry Commission by the UDIA] for each $5 000 cost increment in the cheaper housing, 'over 130 000 families ... [are] unable to afford a home' (Industry Commission 1993:231).

Such statistics suggest that a large increase in developer charges, if applied extensively across a state, together with the sort of bank lending practices assumed, would deny a significant number of people access to a loan for home purchase. However, it must be pointed out that the inference that the $5 000 increase in cost results in 130 000 families being denied access to home ownership may be overstating the case. The Industry Commission (1993:231) notes that:

> Most families already live in houses - many as owner occupiers. Indeed, home ownership in Australia is amongst the highest of all OECD countries ... For each $5 000 increment to deny owner-occupation to 130 000 families, it would be necessary to start from a position where no families owned their own homes.

Nevertheless it seems fair to conclude that, other things being equal, some additional number of families will be unable to borrow money for home ownership if developer charges were to increase consistently across a state and inflexible commercial lending procedures applied. But one problem with trying to ascertain the seriousness of the problem is simply that the *ceteris paribus* clause seldom applies. Some of the factors which do vary appear to have a far greater impact on accessibility to housing than developer charges. The Industry Commission (1993:232) maintains that other factors such as immigration policy, government land release processes, planning delays and a general improvement in the quality of housing can have significant effects on house prices. But even the effects of all these may be relatively minor compared with the impact of interest rates (Industry Commission (1993:232)). For example, interest rates were relatively volatile in the latter half of the 1980s but since 1989 there has been a marked downward trend in real interest rates which has greatly improved housing affordability. Even in 1992, the Commonwealth Bank (reported in Industry Commission 1993) observed that: reductions in mortgage interest rates and relatively

weak house prices have combined to see housing affordability improve to its best level since late 1985.

In short, it appears that 'housing affordability' at any particular time depends on the interaction of a number of factors: the role played by the level of developer charges may not be decisive. The Simpson Inquiry in New South Wales concurred with this perception. Simpson (1989:150) held the view that although charges were passed forward, they were not a significant component of increased prices:[1]

> I am satisfied that Section 94 contributions like other costs of production must increase the price of the finished product here, developed land. However, such contribution costs judged on examples of increases in the cost of englobo land over the past two years in the local government areas adverted to cannot be said to have had a significant effect on land prices.

It seems reasonable to conclude that it would be irrational to remove potential for achieving efficient patterns for urban settlement by eliminating *all* developer charges (or planned increases in charges) on the grounds that there may be a group of low income earners affected by it, especially when there are other factors which can have a much more decisive impact on affordability at any particular time. In other words, if concerns about affordability are genuine, there appear to be other potentially more effective measures which might be taken than lowering developer charges, not least direct subsidies to low income earners. It seems especially unwise to contemplate removal of higher charges when sites are chosen which will clearly require higher servicing costs and these are unlikely to have cheaper homes built on them (e.g. steeper sites with views).

It will always be possible for a local council particularly concerned about the possible impact on 'affordability' of a planned increase in charges, to discount the charge in areas where it is most likely that lower cost homes will be built. A common objection of economists to such measures is that it may be unwise for local jurisdictions to attempt to engage in distributional policies of this sort (see Kafoglis 1977:5-7 for a

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[1] It should be emphasised here that the Simpson Inquiry referred only to developer *charges*, not on-site developer contributions.

discussion of the history of this idea). The rationale for this argument resides in the assumption that local governments are not well placed to succeed in redistributional policies since citizens may well 'vote with their feet' (Tiebout 1956). Moreover, local governments may not be in a good position to monitor and judge the final effects of the full range of factors impinging on an issue, such as those already mentioned here on affordability. Economists typically argue that distributional objectives are best met at the level of central government by direct income transfers. With the problem of distributional equity out of the way, goods provided publicly at the local level can be financed by some variant of benefit taxation. Thus, Kafoglis (1977:6) argues that equity achieved at the federal level, provided it is strong enough, would make it possible to emphasize economic efficiency at the local level.

It seems clear that the Tribunal responsible for determining developer charges for water, sewerage and drainage in New South Wales (IPART) believes that infrastructure service pricing policy should not be constrained by distributional policy. For example, representatives of IPART (Reid 1997:5) note that:

> Inappropriate pricing decisions may lead to poor development decisions and the Tribunal would consider that it is more appropriate to address any consequential financial hardship through explicit government social justice programs and housing assistance programs than allow the efficient pricing signals to be distorted.

Kirwan (1990:186) and others (e.g. Draper et al. 1996:48, Bird and Slack 1983:230) have also made the point that infrastructure pricing policy is a blunt instrument for attempting to achieve equity objectives because it is not well targetted and may well benefit both 'the deserving and the undeserving'. Yet despite what appears to be a high degree of consensus amongst economists on the general question of local government pricing and distributional objectives, there seems no doubt that in practice councils see political merit in adopting such policies (e.g. subsidised user charges for pensioners). Where a council does decide to discount developer charges as a result of concerns about housing affordability, then it is important that the subsidy is transparent in the financial accounts of the council (see section 7.7 of this chapter).

7.6 *Other Equity Issues*

The literature contains at least four other classes of equity argument in relation to developer charges. The first of these has a number of variants but is basically concerned with fair treatment of new homebuyers versus existing home-owners. In an unusual use of a term normally used to refer to equity between the present and future (i.e. children and unborn) generations, new owners versus existing owners arguments have also been termed 'intergenerational equity' arguments in the literature. The chief assumption appears to be that newcomers to the housing market are at least a generation younger than existing homeowners. A further class of arguments relates to the issue of the progressivity or regressivity of charges. A third area of argument relates to the equitable distribution of interest costs in developer charges calculation formulae. A final equity argument is concerned with horizontal equity between regions. Each of these types of argument will be discussed in turn.

7.6.1 *Equity Between Newcomers and Existing Homeowners*

Aside from the affordability issue, the other most frequently raised equity argument relating to developer charges is the benefit equity argument mentioned earlier in section 7.3. Used by proponents of charges, the argument holds that it is fair that those benefitting from the use of infrastructure should be the ones paying for its provision. A typical statement of this view is contained in the New South Wales draft revised manual for Section 94 Contribution Plans (New South Wales Department of Urban Affairs and Planning 1996:33) where it is observed that:

> However, the longer term merits of not levying are arguable and the burden of providing the necessary public facilities remains with the council and ultimately by the whole community. This raises concerns of equity and fairness whereby the whole community must contribute to the provision of facilities, the demand for which has been created by one sector.

An implication of this argument is that if newcomers did not pay their own way, then existing homeowners would have imposed on them, in some sense, an inequitable burden. A more explicit version of the same argument suggests that the burden on the

existing homeowners has become excessive because of 'rapid growth' (Snyder and Stegman 1987:29) whilst another variant suggests that the primary cause of the burden is higher development costs attributable to factors such as decreases in federal and state assistance and increases in construction costs (Snyder and Stegman 1987:29).

At least two studies have made creditable (although, as argued here, misdirected) attempts to explore the substance of the view that 'rapid growth' places an unfair burden on existing homeowners when infrastructure is financed by general property taxation rather than developer charges. In the first of these studies, Snyder and Stegman (1987) attempted to define a 'fair share' of infrastructure costs for existing homeowners. They assumed this to be an amount equal to the equivalent annual average cost (EAC) of facilities defined as the annuitised cost per household of the infrastructure over the lifetime of the facilities sufficient to return the initial construction cost (Snyder and Stegman 1987:40). This cost was presumed to measure the benefit derived from the use of facilities, hence its purported fairness as an upper limit on the amount to pay. The central question to be investigated was: under what conditions of growth would the existing generation of occupants bear a share of financing burden disproportionate to the costs they impose on the system? (Snyder and Stegman 1987:40-48). The authors constructed an idealised model of urban growth where the critical assumptions were that growth was continuous at a constant rate and infrastructure requirements were also continuous and incremental (as opposed to 'lumpy'). With the fair share defined as the EAC, this amount was then compared to the annual average debt service (ADS) for all households which was taken to indicate the payment from each household (Snyder and Stegman 1987:41). Snyder and Stegman found *inter alia* that when population growth rates are higher than real interest rates, ADS exceeds EAC, and impact fees could be used to restore equity in the system (Snyder and Stegman 1987:42-43). This conclusion was challenged by Levine (1994) who developed a model based on tax capitalisation theory to examine the same question. Levine's (1994) objections to Snyder and Stegman's model included the fact that differences between EAC and ADS could arise if the financing period was not aligned exactly with the economic life of the asset, a requirement which is rarely fulfilled in infrastructure finance (Levine 1994:213). Moreover, Levine's own model

did not have to assume that the benefit of infrastructure to a property corresponded exactly to the average cost. For Levine, the gross benefit of infrastructure is the amount by which the value of the property would rise in the absence of any anticipated changes in taxes needed to finance the infrastructure. In Levine's (1994:218) words: 'The difference of these two counteracting effects becomes the amount by which the original landowner is able to raise the land's price due to infrastructure and taxation changes under the full capitalization assumption'. One of the main conclusions of Levine's model was that, contrary to Snyder and Stegman's (1987) argument, high growth rates do not necessarily lead to an excess burden on existing homeowners when growth-induced property tax increases are correctly anticipated. Therefore there is no 'equity-based rationale for the imposition of impact fees' under these circumstances (Levine 1994:221).

One obvious difficulty with Levine's (1994) conclusion is his presumption that the market will anticipate correctly the amount of tax increase per property needed to finance the infrastructure. Moreover, it is necessary to clarify why it is that increased growth rates *per se* necessarily lead to higher property tax increases *per household* at all as distinct from higher costs of infrastructure arising, say, from the necessity to locate headworks further from supply sources. The answer, as both Levine (1994) and Snyder and Stegman (1987:49) acknowledged, resides in the fact that there is an implicit assumption that financing periods for infrastructure are shorter than facility life because this is 'common municipal practice' (Levine 1994:221).

A further limitation of Levine's study lies in the fact that 'lumpy' investments were excluded from the model (Levine 1994:221). As Snyder and Stegman (1986: 45-46) had earlier noted, the attempt to make burden assessment models more realistic in this manner considerably complicated the analysis.

The conclusions from both studies on the burden borne by both existing and new homeowners under property tax financing of infrastructure must surely be that in real world circumstances it would be difficult to determine whether high population growth rates were imposing a greater burden on existing homeowners. In any case, it seems

that a more relevant question for contemporary policy would have been to ask whether, and to what extent, new infrastructure is built at higher cost and, if so, how might this affect the comparative financing burdens of new and existing homeowners under alternative financing assumptions.

In marked contrast to those whose sympathies lie with existing homeowners because of a possible unfair burden on them if developer charges did not exist, are those who argue that it is unfair to require newcomers to pay their own way when existing homeowners already had their infrastructure subsidised. Different versions of this argument exist. In one form, Neutze (1995*b*:26) refers to the current generation of homeowners as 'reneging on an implicit intergenerational contract'. Before developer charges, each generation of homeowners contributed to their infrastructure costs by paying rates or user charges which were used to finance long term loans. As Neutze pointed out (1997:120-121) 'each cohort of first-homeowners was assisted by previous cohorts who shared the cost of the provision of urban infrastructure, and in turn it assisted following cohorts'. Home-owners of the late 1950s had been assisted in this way, but now the new generation of homeowners was being expected to pay all of their infrastructure costs upfront in the price of the home (or, if passed through to renters, in the amount of rent paid). This inequity, like the windfall rise in the price of existing homes at the time developer charges were introduced, contributed to the 'unambiguous inequity' of the effects of the transition, but as Neutze (1997:121) also points out, this is a 'long time' (i.e. several generations of homeowners) ago.

A second version of the argument about the equity of different generations of home buyers embodies an implication that those buying homes on the fringe and hence being subjected to developer charges (unlike those buying inner suburban homes) are less well off than homeowners elsewhere (see, for example, Collignon 1991:117). The issue is largely an empirical one. In Australia, the Industry Commission (1993:235) argued that their examination of the data did not support the view that fringe developments have a high concentration of disadvantaged groups. They found that in Sydney and Melbourne all zones had a wide range of household types (Industry Commission 1993:56).

Another issue in the equity of treatment of new home buyers and existing homeowners is the matter of what is often referred to as 'double dipping'. Under double dipping, newcomers are charged a developer charge in the price of their house to pay for the share of the capital costs of urban infrastructure they will use, but they still have to contribute to amortising the loans which financed the capital cost of infrastructure used by earlier home buyers because annual (or quarterly) rates, access charges, and user charges are not adjusted downwards accordingly. The practice may be still quite common (see Chapter 9) and appears distinctly inequitable.

7.6.2 *Progressivity or Regressivity of Developer Charges*

A further equity consideration of developer charges concerns the extent to which they may be regressive and hence impose a disproportionate economic burden on lower income households. Because developer charges tend to be assessed as a relatively fixed lump sum per household (or SRU), if they are passed through to buyers in the same way, then it is likely that poorer households will pay a higher proportion of their income towards these charges. If SRU's are used, less regressivity of charges may be involved if, say, poorer people living in smaller homes pay less than wealthier people living in larger homes. Much would depend on how developers pass the charges forward - a matter on which there appears to be little information. One can speculate that there may be opportunities in what are described as 'hot markets' (i.e. low elasticity of demand and limited land supply) for developers to 'cross subsidise' other areas by charging what the market will bear. If that is the case it would depend entirely on the local circumstances as to how regressive charges might be. Whilst developer charges may be regressive, it should be noted that alternative forms of funding, property rates and user charges also appear to be at least mildly regressive revenue raising measures in themselves (Altschuler and Gomez-Ibanez 1993:107; Neutze 1995*c*:129).

Concern about the regressivity of impact fees has prompted at least one American commentator to examine alternative ways of structuring charges so that they might become less regressive. Nicholas (1992:517) expressed some disquiet about the

growth of impact fee finance in the United States, given a general consensus amongst experts that they are regressive. His study focused in particular on impact fees for recreational and open space in Florida and examines the question of whether the fee should be based on the value of construction authorised in a building permit, the number of bedrooms per home, or the square footage of the home unit. Using data on family incomes in Florida and their correlation coefficients with the number of bedrooms, home size and other factors, Nicholas (1992) concluded that basing fees on the square footage of home unit size is the least regressive option (Nicholas 1992:523). His study may be useful as a guide to councils in devising a SRU fee structure.

7.6.3 *Equity Neutrality in the Calculation Formula for Developer Charges*

When urban infrastructure typically exhibits economies of scale as described in Chapter 3, one factor which may get overlooked is the interest cost which accumulates over the time period to full capacity. The equitable distribution of the interest burden is a key issue which arises in the calculation of charges.

In Chapter 6 it was demonstrated that the AAM method of calculating charges spreads the holding costs of carrying excess capacity equally amongst all the (estimated) number of SRU's at full capacity. An alternative to this method was PWU, in which the developer charge increased each year as the interest cost accrued. Under the latter method, the burden of the interest cost of excess capacity is borne by the later arrivals to an area, and it was noted in Chapter 6 that one of the problems with this method is that higher charges may eventually stifle development.

In the relevant literature, the study by Peiser (1988) is widely cited as drawing attention to the problem of how to calculate charges in an equitable manner. Peiser's (1988) study sought to show how different methods of calculating impact fees determine who bears the major burden of the interest cost of carrying excess capacity. As we saw in Chapter 5, Peiser (1988) argued that whilst larger scale water and other infrastructure did bring the benefits of lower unit costs at full capacity, these benefits could be absorbed by the interest cost incurred in the waiting time to full capacity (Peiser 1988:39).

Peiser (1988) demonstrated four alternatives (A to D) for calculating impact fees using real world cost data for water and sewerage infrastructure from a form of special district financing known as Municipal Utility Districts (MUDs) in Houston, Texas. (Under special district financing designated areas pay for, and use exclusively, an infrastructure service. Records on water and sewerage costs and capacities in the Houston MUDs were apparently complete). For ease of explanation, simplified take up rates were assumed. Alternative A (like the PWU method mentioned above) calculated an upfront fee which demonstrated how all of the burden of holding costs could fall on future residents. Alternative B showed, on certain assumptions, the calculation of an upfront fee which was constant for all participants. Alternative C calculated an annual impact fee in which existing users bear the full burden of carrying excess capacity and Alternative D calculated an annual fee which consisted of a base payment and a surcharge which distributed holding costs equally amongst users. Alternative D was the method recommended by Peiser (1988), but it must be noted that neither C or D are upfront charges. In the United States institutional context impact fees can be paid annually by homeowners over the life of an infrastructure asset. Alternative B, the constant upfront fee, embodies a method which appears to be similar to AAM, although Peiser (1988:41) is actually quite unclear in his description of how Alternative B was calculated, as the following quotation illustrates:

> For Alternative B, I assumed inflation is zero and that all residents pay the same fee in present value terms discounted at the inflation rate. That leads to an equitable solution so long as later residents can use the facilities for the same length of time as early residents. However as inflation increases, more of the burden falls on early residents because the value of the impact fee declines in real terms.

Peiser (1988:47 n.7) qualifies this observation by noting that the method is strictly only equity neutral on assumptions of zero inflation and infinite economic life (Peisner 1988:47 n.7). However, as demonstrated in Chapter 6, the problem of inflation can be avoided by calculating an annuity at the estimated real interest rate over the requisite period and then indexing charges to apply in any year by inflation in that (or the previous) year. Moreover, as Chapter 6 has shown, whilst infinite economic life (or

perpetual maintenance of an asset) is a convenient (and not unrealistic) assumption, even if an asset is due for replacement shortly, the AAM method of calculating the MCC of providing a permanent output increment to a development site will value the current asset at its replacement cost and annuitise this over all the years to full capacity (including years gone by), so that infinite economic life is not a necessary assumption for a theoretically correct and equitable (in the distribution of holding costs) calculation method.

7.6.4 *Regional Horizontal Equity*

The Urban Development Institute of Australia (UDIA 1997:5) has argued *inter alia* in a recent report that any tax or charge which funds physical or social infrastructure for new development should pursue equity in a regional sense as well. The UDIA (1997:13) argue that the tax or charge 'should result in the provision of community facilities and services of the same standard across the region'. They then assert that superior facilities exist in new areas, but older areas have 'missed out'.

As a matter of principle, it should be recognised that whilst a unitary government may choose to provide services of a similar standard across all areas within its jurisdiction for equity reasons, the central economic argument for a federal structure of governance rests on the welfare enhancing effects of sub-national governments satisfying diverse preferences at the state and local levels whilst national governments provide equal amounts of essential national services (see Oates 1977 for a discussion of the economic case for federalism). In other words, if citizens in a local government area have a strong preference for higher standards in some areas (e.g. extensive library facilities) then it is appropriate that they have the better facilities so long as they are prepared to pay for them. The argument is, of course, similar in principle to the Industry Commission's position on urban consolidation issues discussed in Chapter 4, where the Commission argues that homebuyers should have the type of housing they prefer providing they are willing to pay for it (Industry Commission 1993:3). Stating this position more broadly, the Commission (1993:3) has said:

> Policies for urban settlements need to emphasise flexibility and to conscript market mechanisms wherever possible. The real

> issue is ... about what people want from their cities, and ensuring that decisions about where and how they live reflect the wider costs and benefits.

All this means that the costs or tax price of providing services to different areas must indeed be set to reflect the real costs of service provision. This can occur in an efficiently designed developer charge as earlier chapters of this study have argued. But a serious potential equity concern of the use of the market mechanism in this way (and this may be the underlying reason for the UDIA's unease about different service standards also) is that significant regional inequality may result. That is, clusters of affluence may begin to develop and contrast markedly with lower income areas.

Unlike North America, where regional inequality is said to be quite marked (see, for example, Gramlich 1984), Australia has consistently given regional equalisation priority in public policy at both state and local level. Since the early 1970's, the federal government has paid grants to local councils which are distributed on an equalisation basis by specially constituted state local government grants commissions. Broadly speaking, these state commissions assess the fiscal capacities of councils and allocate grants between them in a way designed to offset any inherent fiscal advantages a council might have. For example, in New South Wales, the Local Government Grants Commission allocates thirty per cent of the federal funds to each council on a per capita basis and then distributes the rest according to the fiscal equalisation principle laid down in the federal Act so that:

> each local governing body in a State is able to function, by reasonable effort, at a standard not lower than the average standard of other local governing bodies in the State, and that takes account of differences in the expenditure required to be incurred by local governing bodies in the performance of their functions and in the capacity to raise revenue (*Commonwealth Local Government(Financial Assistance) Act*, 1995, Section 6(2)).

The wording of the fiscal equalisation principle could lead one to observe that equalisation might fundamentally contradict any potential efficiency benefits obtained by encouraging councils to signal geographical differences in costs in infrastructure

charges. Indeed, the principle implies that no council should have to charge more for the same level of service as occurs elsewhere. Councils experiencing higher costs would receive higher grants.

It may be true that equalisation means that councils do not have to charge as much as they otherwise might and this dilutes locational signals which would otherwise allocate resources more efficiently, but there are at least two reasons why fiscal equalisation at the local level in real world practice fails to achieve the intended full fiscal equality between councils. Firstly, the capital expenditure needs of councils are, for the most part, *not* included in assessments. And secondly, and importantly for our present purposes, developer charges are not included amongst the revenues for which a capacity to raise revenue is assessed (see New South Wales Local Government Grants Commission 1996). The reasons for the omission of both areas are complex, but essentially practical, and need not concern us here. However, as it stands it is indeed possible for a council which has an advantage in raising funds through developer charges (for example, in areas which are in high demand) to provide a standard of facilities which is higher than elsewhere.

It could be argued that this 'hotch potch' of partial equalisation and partial locational signalling serves neither purpose well. In an ideal world, local councils would be unrestrained in their pursuit of economic efficiency through locational signalling of costs whilst grants commissions would act as a safeguard in equalising local fiscal capacities (expenditures and revenues) to enable some ***minimum*** acceptable standards of service to be provided. However, it must also be accepted that including capital expenditures in assessments entails the complex task of evaluating the infrastructure needs of all councils and would be a significant change to current practices, as would deciding on what might constitute a 'minimum acceptable standard of service' (as opposed to the easier task of equalising to an average standard of service, which is currently the case). At the same time, the exclusion of capital expenditures or developer charges revenues from equalisation procedures does 'free up' one important area where there are potential benefits for geographical differentiation in charges. It could thus be argued that the 'muddling through' (Lindblom 1959) on both

equalisation and efficiency counts might allow scope for some efficiency improvements in urban patterns whilst still providing safeguards against the appearance of significant regional inequalities in government services.

To sum up the discussion on equity considerations relevant to developer charges, it is apparent that the issues are complex, and that apart from satisfying the central notion of benefit equity (which is essential also to efficient charges), there is not a compelling case in favour of developer charges on other equity grounds. On close examination, the issue of the effect of charges on housing affordability is not as straightforward as it is sometimes presented and there is a strong logical appeal in the argument of many economists that such matters are best addressed at the federal level leaving local jurisdictions to concentrate mainly on efficiency of service provision. On other equity issues, it seems that charges are likely to be regressive and they may also lead to some regional inequities in the standards of local public service. On the specific issue of equitable distributions of holding costs in the calculation formulae, methods such as AAM and PWISC, which calculate efficient charges, can also distribute the interest cost burden equitably.

Without doubt, the most incontrovertible issue in the equity of developer charges is the inequity of charging newcomers 'twice' for infrastructure. Equity appears to demand that councils adjust downwards the rates which homeowners who have already paid developer charges pay in ongoing annual or quarterly bills. This is essential for as long as the ongoing bills continue to pay for infrastructure not used by the new homeowners.

7.7 *Developer Charges and Environmental Objectives*

The manner in which urban development evolves (e.g. where it takes place, on what type of slope and soils, involving what type of commerce and industry, in what sort of climate, etc.) has a major influence on the nature of the infrastructure systems required to service it. In turn, the infrastructure systems chosen to accommodate development, together with the nature of that development itself, will determine its environmental impact; for example, the extent of private automobile use, wastewater

run-off, landfill requirements, noise and air pollution, etc. The question which arises is how should the method of financing the infrastructure assets, in this case developer charges, deal with the environmental effects of development?

Mitigating the level of environmental impact has assumed a greater importance as environmental costs have become more apparent. New considerations have emerged which, in the past, have been ignored. Examples include the requirements to restrain diversion of water from rivers in order to maintain environmental flows; the need to monitor nutrient and pollutant levels in urban run off into water sources, as well as monitoring other pollutant sources, such as lead and other vehicle emissions, noise levels, and leachates from landfill; reduced opportunity for landfill generally and loss of amenity in the urban environment because of contracting areas of bushland or other green space.

The seriousness of some of these externalities of growth and development seems undisputed as evidenced in recent official reports (for example, Council of Australian Governments 1995*a*, 1995*b*, 1994, Industry Commission 1992). On urban sewage treatment assets alone, the Industry Commission (1992:153) has reported an estimate of $2.5 billion is needed to be spent on treatment assets to provide improvements in nutrient levels.

Environmental economics theory suggests that excessive environmental damage occurs during economic growth because the costs of the damage is not reflected in the market prices of the goods responsible for the harm done (Pigou 1920; Cropper and Oates 1992:675; Diesendorf and Hamilton 1997:39). One of the central recommendations of the theory is that externalities can become internalised if a 'Pigovian' tax, a tax which measures the damage done, is included in the price of the good or service (Pigou 1920). Applied to the context of urban infrastructure the theory would suggest that the costs of externalities should be internalised into the charges which consumers pay to have the capital assets provided or into the usage charges as the service is used. Environmental efficiency would be achieved if economic efficiency principles are properly pursued. Recent reports to the federal government on urban

infrastructure management appear to be unanimous on this point (see, for example, National Commission of Audit 1996:177, AURDR 1995*a* and 1995*b*, BIE 1995, Council of Australian Governments 1994, 1995*a* and 1995*b*, Planning Research Centre 1995*b*, Industry Commission 1993 and 1992 and Kirwan 1991). However, the main difficulty is that exhortation to include the environmental costs into the prices or charges for services is seldom followed up by practical advice acknowledging the difficulties (and sometimes impossibility) of doing so and suggesting workable alternatives (Hamilton 1997).

Applying the standard methods by which environmental effects can be incorporated into price (see, for example, Jacobs 1991:134-139) to the particular context of developer charges, three main options can be suggested:

(i) The costs of mitigating the damage can be ascertained and added directly to the developer (or user) charge so that councils will have the funds to pay for the 'after effects';

(ii) The damage can be prevented beforehand by installing upgraded or alternative technologies which will treat or otherwise mitigate the effects. In this case consumers pay a higher developer charge (if large scale systems are still cost effective) or a higher user charge to cover the costs of new facilities;

(iii) Regulations can be introduced which simply outlaw the damaging activity altogether, or allow it up to some tolerable level.

All three forms of internalising externalities can be regarded as applications of the Pigovian tax or 'polluter pays' principle. In (i) a developer charge would be similar to mitigation impact fees in the United States where developers may be required to contribute to rectifying damage identified in environmental impact statements (Collignon 1991:118). In (ii), the developer pays directly (and passes on) the costs of preventative measures whilst in (iii) the polluter does not pay directly but has to 'pay' by being forced to adjust behaviour. Whilst these policy options are clear in principle, the difficult practical issues for councils are deciding how to trade off the benefits of allowing certain levels of an activity against the costs of the environmental damage, and estimating an appropriate payment. Scientific uncertainty as to the full extent of

environmental effects coupled with the lack of a 'market price' for environmental assets and a range of difficult ethical issues (e.g. discounting the preferences of the unborn, the role and value of other species - see Hamilton 1994) all greatly complicate the valuation of environmental damage.

It is likely that there will always be some dispute as to the costs which must be factored into developer or user charges and some guesswork will be involved, but where harmful impacts are apparent, the goal must be policy effectiveness in mitigating damage rather than theoretical perfection in measuring it. Even crude approaches are likely to be effective (see Quiggan 1988 reported in Industry Commission 1992:165) and an important aspect of implementation would seem to be ongoing monitoring of the results of different policies in different councils and adapting policy over time or 'policy learning' (see Davis and Weller 1993:16). This may be what the National Commission of Audit (1996:177) meant by recommending 'best practice allowance for spillover or externality effects'.

In the longer run, the benefits of internalising some of the external costs of infrastructure systems through higher charges will create incentives to explore new and less damaging systems - a phenomenon described in the literature as 'technology forcing' (Jacobs 1991:154). Recent research in the Australian Capital Territory (Centre for International Economics 1997:viii-ix) used both contingent valuation and choice modelling techniques to elicit the finding that on the whole Australian Capital Territory consumers are 'very willing to adopt water saving technology' even if they have to pay more for it. What consumers did not want to do was adjust their lifestyle, as in, for example, restricting internal household use of water. This suggests that option (ii) above for internalising external costs is preferable to option (iii).

Where alternative techniques for urban infrastructure assets involve smaller scale systems (see, for example, 'Small scale systems halve water use', Water Management and Engineering 1996:18-21), there might not be a need for developer contributions at all. Troy (1996:176-177) presents an idealistic manifesto for urban living which entails

domestic scale systems for water storage, run off retention, sewage treatment and waste recycling, and no developer charges for these services.

In sum, environmental considerations require action which is consistent with the basic allocative efficiency principle that all costs (including environmental costs) of providing a service be included in the marginal cost to consumers. Where damage is difficult to value, crude estimates of charges may be necessary but the basic objective is either to prevent damage or to secure the funds to mitigate it. Switching to new technologies (and charging accordingly) may be more successful than forcing unaccustomed adjustments to lifestyle. Including environmental costs in developer charges for water, sewerage and drainage may obviate the need for these charges altogether in the long run.

7.8 *Developer Charges and Administrative Considerations*

If the costs of administration of developer charges policy are excessive, any savings effected by improving allocative efficiency will soon be dissipated. Poorly administered policies may impose excessive compliance costs on developers. If the 'paper-work' requirements of developers are unnecessarily cumbersome, unclear, untimely or inconsistent, then these costs offset efficiency gains elsewhere. Poor policy administration may also impose cost burdens on ratepayers. For example, if council bureaucrats mismanage developer contribution funds, or if the documentation procedures necessary to avoid mismanagement of funds are overly prescribed and inflexible, then these inefficiencies will be paid for by ratepayers.

Guidance on how to design administration of policy to avoid these types of failures is available from several literatures. There is the X-inefficiency literature (see, for example, Lebenstein 1976 and Frantz 1988); the strategic management literature (e.g. Ansoff 1979, Fredrickson 1990) and the policy implementation literature (e.g. Lynn and Wildavsky 1990). An interesting aspect of the last two fields of expertise is that although they emerged from different starting points (the strategic management literature from the private sector and the policy implementation literature from the

government sector), there is a consensus and congruency in the views expressed (Davis and Weller 1993:19).

These various branches of literature suggest that, generally speaking, the requirements for administratively efficient policy which might apply to a policy area such as developer charges should cover the following issues:

(i) a clear statement of policy objectives and policies based on 'sound and direct theories of causation' (Davis and Weller 1993:19);
(ii) legibility, transparency, accessibility and accountability in policy documentation (Shankie-Williams 1992);
(iii) documentation which acknowledges and facilitates the possibility of prediction error (Weimar and Vining 1992:336);
(iv) regular reviews of policy but reviews which are not too hasty in judgements (Davis and Weller 1993:19); and
(v) case-studies or 'benchmarking' of least-cost policy administration (National Commission of Audit 1996:vii).

With the possible exception of (i) and (v) above, 'Section 94' developer contributions policy in New South Wales has, at least in recent years, given particular emphasis to the requirements for efficient implementation of policy. Although coming somewhat late with its first review of policy, the New South Wales government invoked the Simpson Inquiry (1989), ten years after the introduction of charges, to investigate, *inter alia*, problems which had arisen with the administration of policy. These are described by Shankie-Williams (1992:33) as follows:

- inadequate demonstration of the nexus or link between a new development and the service or facility to be provided;
- no clear justification of how contribution amounts were arrived at;
- expenditure not being within a reasonable time - or indeed no expenditure at all; and

- the use of interest earned on contributions for unrelated purposes so that the real value of contributions becomes eroded over time.

Many of the recommendations of the Inquiry were addressed to administrative issues, especially the requirement for Contribution Plans to be in place before charges could be levied after 1992. Two years later, the then New South Wales Department of Planning sponsored an independent assessment of the quality and content of Contribution Plans (PRC 1994). Following the findings of the assessment that a majority of councils were only 'poor-fair' in satisfying key requirements of Plans (PRC 1994:2), the Department has issued revised guidelines for Section 94 policy (New South Wales Department of Urban Affairs and Planning 1997). As noted in Chapter 2, states which are currently planning to introduce or expand use of developer charges appear to have used New South Wales as a basic model for policy (e.g. Victoria and Tasmania). Features such as adequate documentation, nexus justification and responsible financial administration appear to have been emphasised in the policy plans for Victoria and Tasmania to date (see Victorian Department of Planning and Development 1995 and Tasmanian Department of Environment and Land Management 1997).

7.9 *Concluding Remarks and Policy Implications for Developer Charges*

The first part of this chapter summarised the allocative efficiency principles derived in earlier theoretical chapters. This was done by suggesting answers to policy questions which were asked, but not answered, in the most recent study of Section 94 developer charges policy in New South Wales. In addition to the efficiency principles, the chapter has presented an overview of the issues which arise if developer charges are also to meet equity, environmental and administrative efficiency criteria.

The equity issues involved in developer charges policy are complex and diverse. Developer charges can meet some types of equity; for example, benefit equity and equity in the distribution of holding costs in the calculation formula; but they cannot meet other types of equity; for example, progressivity in impact (although this can be ameliorated to some extent). On still other equity matters, such as housing

affordability, and regional horizontal equity, it is difficult to take a definitive stand. Housing affordability is a politically difficult issue notwithstanding the logic of arguments that it should not constrain policy, whilst on the regional equity versus allocative efficiency problem, it is argued here that what has been described as a 'muddle' of present equalisation procedures may, in fact, serve equity and efficiency reasonably well. As to councils charging practices, 'double dipping' has been identified as unfair.

Environmental objectives are more likely to be met if, as far as possible, the principle is followed that consumers 'pay' the marginal environmental costs of a service in addition to normal direct costs of service. With regard to administrative issues, the basic principle of policy should be that the costs of implementation of policy should not exceed the benefits of the policy itself.

To sum up the practical policy implications for developer charges arising from the examination of equity, environmental and administrative criteria, the following guidelines might be added to the list of efficiency principles:

- in general, charges set to cover the cost of providing a service to an area should not be constrained by affordability concerns (although a council may choose to direct particular problem areas to the attention of the appropriate body at a higher level of government);
- in determining the SRU equivalence scale, councils should exploit the opportunity to structure the scale in a way which is progressive as well as reflecting the likely demands on the system (e.g. larger homes incur higher charges);
- calculation methods should be adopted which spread the burden of holding costs equitably over the period to full capacity of the infrastructure asset;
- councils should structure upfront and recurrent charges so that double dipping does not occur;
- as far as possible, contributions towards the cost of preventing or mitigating environmental externalities should be included in the marginal capacity or marginal operating costs charged to consumers; and

- policy administration systems which emphasise features such as clear statement of objectives, transparency of and accessibility to calculation procedures, clarity and consistency of application of policy and ongoing review, should be adopted.

CHAPTER 8 DEVELOPER CHARGES POLICY IN PRACTICE: AN EXAMINATION OF POLICY WITH RESPECT TO WATER AND SEWERAGE CHARGES IN NEW SOUTH WALES

8.1 *Introduction*

In Chapter 3 it was apparent that challenging conceptual problems are posed by the application of textbook marginal cost pricing theory to the design of developer charges for assets such as water and sewerage, which are supplied in a network structure, have long lives and are efficiently provided only in large 'lumps'. Drawing on Turvey's (1968*a*, 1969, 1971, 1976) theoretical analysis of public utility pricing under circumstances where infrastructure exhibits these characteristics, a theory of measurement of incremental cost in the context of developer charges was devised in Chapter 5. Testing ideal and proximate methods of calculating this cost formed the task of Chapter 6 from which it emerged that the AAM method was the most feasible technique.

We come now to evaluate the actual practice of setting charges. In this chapter we commence with the present practice of determining charges for water and sewerage infrastructure, one of the largest categories of developer charges revenue. As noted in Chapter 2, the ABS does not publish statistics on developer contributions because of the unreliability of figures supplied by councils due to recent changes in accounting methods. However, data supplied by the ABS specifically for this study does enable at least broad comparisons to be drawn. For 1995-96, water and sewerage accounted for 23 per cent of revenue from developer charges in New South Wales, exceeded marginally by roads (24 per cent) and open space contributions (26 per cent). These figures exclude valuation of the significant amount of 'on-site' contributions in kind provided by developers.

The importance of water and sewerage infrastructure is also confirmed by Industry Commission (1993:99) data. The Commission provided information on capital expenditures on different types of infrastructure for a typical fringe lot in suburban Perth. These figures included estimates for developer-provided on-site infrastructure, local government supplied economic infrastructure, and state and federally provided

electricity, telecommunications and social infrastructure. The statistics are shown in Table 8.1 below:

Table 8.1 Capital Expenditures on Different Types of Infrastructure for a Fringe Lot in Perth 1991 ($ per lot)

Infrastructure item	Costs	Per cent of total costs
Economic infrastructure		
Water Supply	7 750	17.1
Drainage	3 087	6.8
Sewerage	5 961	13.2
Water resource management	74	0.2
Roads	6 689	14.8
Electricity and gas	7 361	16.3
Telecommunications and post	3 688	8.1
Transport	1 922	4.2
Social infrastructure		
Education	6 678	14.7
Recreation	761	1.7
Community health	862	1.9
Welfare	445	1.0
Total	45 278	100.0

Source: Industry Commission (1993:99)

The Commission figures indicate that capital expenditures on water and sewerage combined account for 30.3 per cent of all infrastructure typically supplied to an urban lot.

The first task of the present chapter is to examine the current practice of determining developer charges for water and sewerage. Section 8.2 focuses on describing how charges are determined by the major metropolitan water agencies in all states which levy charges. Although this study is primarily concerned with New South Wales, practices in other state agencies are included in this section because it contributes to one of the major conclusions of the chapter; namely, that present practice is not consistent and is not guided by any coherent theory. Following this, section 8.3 presents a broad description of procedures which are typical in non-metropolitan areas of New South Wales. In section 8.4 we critically evaluate the

methods described in the two earlier sections. As we have observed, New South Wales is planning to make significant changes to existing practices both for metropolitan and for non-metropolitan areas. The proposals for reform emanate from the Independent Pricing and Regulatory Tribunal (IPART) in New South Wales. Because these changes are imminent, it is important that they be incorporated into the current examination of policy. The second main task of the chapter is therefore to evaluate the proposals for reform. In section 8.5, ten of the major guiding principles of IPART's recommended approach to determining developer charges are described. This is followed in section 8.6 by a critical evaluation of these recommendations, examining each of the guidelines in turn. The main conclusions of the chapter are summarised in section 8.7.

8.2 *Current Approaches to Developer Charges: Metropolitan Areas*

Some of the main features of the methods of calculation of developer charges used by the major metropolitan water agencies which levy charges in Australia are presented in Table 8.2. Further description for each agency in Table 8.2 is provided below:

8.2.1 *Sydney Water Corporation (SWC)*

The SWC levies developer charges for major works, such as large water trunk mains and sewer carriers, but in the past has not levied for headworks (Brett 1993: 25-27; Draper *et al.* 1996:49-58); the New South Wales Government Pricing Tribunal (1993*a*:201-203)). At one of the more recent urban developments, Rouse Hill on the north-west fringe of Sydney, some changes were introduced to SWC policy. Headworks, such as water treatment plants and sewerage treatment plants, were included for the first time and so too were drainage facilities. The intention was to raise the cost recovery rate to 100 per cent of capital costs (New South Wales Government Pricing Tribunal 1993*a*:202). The SWC recovery rates had hitherto ranged from 60 per cent to 100 per cent, averaging around 85 per cent.

The SWC attempts to identify the assets serving a particular development and bases charges on the cost of any new works plus the actual cost of construction of the

Table 8.2 Comparison of Methods for Calculating Developer Charges: Major Water Authorities, 1993

	Sydney Water Corporation (SWC) (b)	Hunter Water Corporation (HWC)	Melbourne Water (MW)	Water Authority of Western Australia (WAWA)	Brisbane City Council (BCC) (b)	Department of Public Works (NSW Non-Metropolitan)
Assets subject to developer charges	Water and sewerage distribution works. Drainage not included. Intending to include water and sewerage headworks (except dams)	Water and sewerage headworks and distribution works. Drainage not included	Sewerage headworks, water and sewerage distribution works (including drainage)	Water and sewerage headworks and distribution works (including drainage)	Water and sewerage treatment and distribution works (excluding trunk water mains)	Water and sewerage headworks and distribution works
Financial basis for calculating infrastructure costs	Historical costs of works constructed in the last 25 years - inflated each year by price index	Replacement value of assets	Charges based on a ten year capital works program	Replacement value of infrastructure (statewide)	Current replacement costs of works	Indexed historical cost less depreciation or current cost if available of all assets minus outstanding debt
Number of separate charging zones	32	Water distribution 15 Water treatment 3 Wastewater distribution 100 Wastewater treatment 21	8	4	Water 13 Sewerage 5 Water and sewerage zones 66	Individual councils choose policy
Cost recovery	100% (target)	70-80%	100%	60%	60-70%	100%
Variation between zonal charges - water	High $10 454 Low $2 235	High $2 764 Low $584	High $2 950 Low $875	High $3 172 Low $1 945	High $1 493 Low $441	n.a.
Variation between zonal charges - sewerage	(a)	High $3 390 Low $1 102	High $3 095 Low $625	High $2 555 Low $1 346	High $1 594 Low $672	n.a.

Source: Adapted from Draper *et al.* 1996, Table 5, p.51 and Table 6, p.54 and IC (1993), Chapter B4, Table 1, p.169.

(a) Only combined water and sewerage charge is quoted.

(b) Draper *et al.* 1996 note that in Sydney and Brisbane, developer charges are levied on the basis of land area. For comparability, Draper *et al.* (1996:50) have converted the Sydney and Brisbane figures to $ per lot after making assumptions about the number of lots per hectare.

n.a. means not applicable.

identified assets, provided they were built within the last 25 years. The historical construction costs of these assets are then adjusted to current values using a price index. A return on capital at a rate of interest that compensates for the time value of money is not included. Charges are calculated on an area basis rather than per lot to encourage compact development (New South Wales Government Pricing Tribunal 1993*a*:202). The attempt to allocate assets to some 32 separate charging zones results in considerable locational variation in charges. For example, in 1993 water and sewerage charges ranged from a high of $10 454 per lot to a low of $2 235. [Area charges were converted to per lot charges for the purposes of comparison in the Table]. The SWC appears to have the highest charges of the major water authorities in Australia (see Table 8.2). The calculation of the charge takes no account of the funds which new development will be contributing to the cost of capital in annual bills: that is, the SWC appears to be double dipping.

8.2.2 *Hunter Water Corporation (HWC)*

The HWC levies charges for distribution works and for some headworks, and has recently begun moving towards recovering all headworks costs (Brett 1993:27). The Corporation has by far the largest number of separate charging zones. Apparently, many of the HWC's sub-catchments are relatively discrete systems which can be identified more readily than the older more integrated systems (Draper *et al.* 1996:52).

Since 1992, the HWC has been developing and gradually implementing a new methodology for calculating developer charges. The Corporation refers to its method as a financial modelling approach whereby all the potential cash flows associated with a development are assessed in the same way that one would approach a feasibility study of new development. It is important to appreciate with regard to the model that the maximum price the HWC can charge for water is determined by IPART. The price which is so determined includes a portion which is set to recover capital costs. Thus to fix an upfront developer charge which fully recovered capital costs would involve the HWC in double dipping. The HWC has a specific approach to avoid this.

The HWC begins by undertaking engineering design and costing of infrastructure required for new development, including an estimation of future operating costs. This analysis yields a stream of costs over a twenty year period which can then be compared with the expected stream of revenues, given the price path as determined by IPART and assumptions about the future demand for water. Both cost and revenue streams are discounted to present values at a rate which reflects 'both the time value of money and the risk associated with the business (the opportunity cost of capital)' (Brett 1993:28). The shortfall between the costs of new development and anticipated revenues is the required amount of the developer charge.

The Industry Commission Report on *Taxation and Financial Policy Impacts on Urban Settlement* (Industry Commission 1993) drew attention to the HWC method of calculation of charges and considered that there was merit in its procedures (Industry Commission 1993:145). The method also became the inspiration for the establishment of a Working Party on Developer Charges convened by IPART in 1993 (Grantham, K. 1997, pers.comm., 18 March). Since the HWC method has only minor differences compared with the proposals for reform of calculation of charges which emerged from the IPART Working Party, comment on this method will be reserved for section 8.6 below.

8.2.3 *Melbourne Water (MW)*

MW levies developer charges on distribution works for water supply and sewerage and for sewerage headworks but not for water headworks (Draper 1996: 49-58 and Industry Commission (1993:169)). Distribution works are defined to include collection sewers, zone and regional distribution water mains and main drainers. Charges are calculated as a cost per lot and are based on a ten year capital works program expressly designed to service new growth. Only eight separate charging zones are identified but there appears to be a significant difference in costs indicated in certain areas. For example, sewerage charges range from $625 per lot on the Mornington Peninsula to $3 300 per lot in the Plenty Corridor (Draper *et al.* 1996:58). MW applies a cost recovery rate of 100 per cent. MW procedures do not appear to take account of the problem of double dipping.

8.2.4 *Water Authority of Western Australia (WAWA)*

Both headworks and distribution works are subject to developer charges by the WAWA (Draper *et al.* (1996:49-58)). The method of calculating charges is different from practice elsewhere in Australia since the WAWA assesses the replacement value of *all* its fixed assets (statewide) and then divides 40 per cent of the replacement value by the number of standard residential equivalents (SREs) in Western Australia. Thus this method calculates an average cost of the system as a whole for all users and reduces this by 40 per cent. However, it is important to note that the 40 per cent reduction has not been determined by assessing the proportion of capital cost contributions that will be recouped in recurrent charges. New users pay the same level of recurrent charges as existing users even after paying the developer charge so it appears that new development subsidises the costs of use by existing consumers. WAWA has four different charging zones but the vast majority of residential developments in Western Australia face a uniform developer charge (Draper *et al.* 1996:50).

8.2.5 *Brisbane City Council (BCC)*

Only limited information is available on the BCC methodology in the literature. It appears that developer charges are levied on some distribution works and on headworks, but trunk water mains are excluded. Draper *et al.* (1996) report the cost recovery rate to be between 60 and 70 per cent. There appears to be a significant degree of inter-zonal variation between charges (e.g. between $441 to $1 493 for water) and a relatively large number of different zones.

8.3 *Current Approaches to Developer Charges: Non-Metropolitan New South Wales*

In this section we attempt to explore the way developer charges are calculated in non-metropolitan New South Wales. Comment on the methods is reserved for section 8.4.

Until July 1993, all non-metropolitan councils in New South Wales levied developer charges for water and sewerage under Section 94 of the New South Wales *Environmental Planning and Assessment Act 1979*. After 1993, councils were obliged to levy charges for water and sewerage under section 64 of the New South Wales *Local Government Act 1993*. Section 64 of the *Local Government Act 1993* empowers non-metropolitan councils to collect charges as if they were water authorities under the New South Wales *Water Supplies Authorities Act 1987*. A key consequence of the change in legislative authority is that the right to legal appeal against water and sewerage charges no longer exists. It formerly applied under the *Environmental Planning and Assessment Act 1979*.

Guidelines on the methodologies non-metropolitan councils might use in calculating developer charges for water and sewerage, for pre and post 1993 charges, were issued by the then New South Wales Department of Public Works (PWD) now Department of Land and Water Conservation (DLWC). New guidelines are currently being formulated along lines similar to the new IPART proposals for reform of charges. These are discussed in Section 8.5.

The original guidelines issued by the PWD are based on a view that new entrants should pay existing ratepayers for a share of 'equity' in the water and sewerage infrastructure (Brett 1993:32). The elements of the PWD formula are as follows:

Developer charge per equivalent tenement	=	Portion of the asset value of each component serving the development	+	Share of capacity for future for all components	–	Share of Debt
		(1)		(2)		(3)

By deducting the share of debt from the charge (element (3)), the formula attempts to avoid 'double dipping'. Unfortunately, the logic of the other two elements is not apparent. Element (2) allocates an average cost of future capacity to the developer but this average is not determined by a denominator which estimates the number of users at full capacity. The denominator comprises only the number of *present* users. Element (1) allocates to the developer an average cost of the system as a whole (i.e. the value

of current capacity plus capacity available for the future). This time the denominator is the number of ETs at full capacity. A simplified example is given by the PWD to show how the formula works (Brett 1993:Appendix E2):

Asset being allocated is a dam:
- asset value: $10 m.
- full capacity: 15 000 ET
- ET capacity currently in use: 10 000 ET
- debt on dam: $4 m.
- fraction of supply of asset to development: 1

$$\text{Developer charge} = \frac{\text{asset value of dam}}{\text{capacity of dam}} \times \text{fraction of supply to new development provided by dam}$$

$$+ \frac{\text{asset value of dam}}{\text{capacity of dam}} \times \frac{\text{capacity for future}}{\text{present ETs}}$$

$$- \frac{\text{debt}}{\text{present ETs}} \qquad (8.1)$$

$$= \frac{\$10\text{m.}}{15\,000} \times 1 + \frac{\$10\text{m.}}{15\,000} \times \frac{(15\,000 - 10\,000)}{10\,000} - \frac{\$4\text{m.}}{10\,000}$$

$$= \$667 + \$333 - \$400$$
$$= \$600.$$

In real world circumstances, water systems will have headworks like dams, major treatment and distribution works (reservoirs, pumping stations and trunk mains) and also pipework dedicated exclusively to the development site. To deal with these more realistic circumstances the PWD suggested that the headworks and major works can be regarded as serving the whole area so that the equation for the calculation of the developer charge is:

$$\text{Developer charge} = \frac{A_H}{C_H} + \frac{A_D}{C_D} + \text{Sum of } \frac{p_1 A_1}{C_1} \text{ (\textit{for all pipework components})}$$

$$- \frac{1}{n}(D - \text{Sum of } A_1\left(1 - \frac{N_1}{C_1}\right)) \text{ (\textit{for all pipework components})} \qquad (8.2)$$

where

A_H = asset value of headworks

A_D = asset value of major distribution works

A_1 = asset value of pipework component no. 1

C_H = capacity of headworks

C_D = capacity of major distribution works

C_1 = capacity of pipework component no. 1

p_1 = fraction of supply to new development provided by component 1

n = present number of equivalent tenements supplied by scheme

D = outstanding debt

N_1 = present demand (in equivalent tenements) supplied by component no. 1.

The Appendix to this chapter contains a worked example, supplied by the PWD, of how the formula might work in more realistic circumstances. It is included here to demonstrate both the level of complexity which real world problems can exhibit and the degree of specification of assets required in order to implement the formula.

It cannot be said with any certainty how many councils in New South Wales follow the PWD formula to the letter. From the council Contributions Plans examined for the purposes of this study, it is evident that some councils do attempt to do so, at least in broad terms. For example, the Greater Taree City Council (Greater Taree City Council 1992:2.6) follows the PWD recommended formula for sewerage contributions. Tamworth City Council (Tamworth City Council 1992:57) repeat the PWD general formula for calculating contributions for water, but the actual calculations, including assignment of parts of pipes to development, etc. are not shown. Only final results are presented.

Other councils calculate contributions using a variety of methods, none of which follow PWD guidelines. For example, Eurobodalla Shire appears to follow a method similar in concept to the Sydney Water Corporation method illustrated in Chapter 6. The method lists headworks completed since 1982 and inflates these by an 'inflation index' to the current year. Forward planned works for the next ten years are then added, but neither the completed works nor the planned works are calculated in present value terms. The future capacity of the planned works is then added to the capacity created by the completed works and divided into the cost of works to calculate an average cost of all works, planned and complete (Eurobodalla Shire

1990:73-74). No mention is made in the policy document of steps taken to avoid double dipping.

Armidale City Council provides an example of another method of calculating charges. Armidale seeks to recoup past expenditures only and includes headworks and major works augmentation of water and sewerage undertaken in the mid-1980s, but excludes pre-existing headworks, such as the Malpas dam. Rather than using historical construction costs of the included works, it appears that the method calculates the value of the assets by estimating the amount already paid towards existing assets plus estimated future debt costs which will be incurred until the original borrowing is repaid. Past debt servicing costs (including principal repayments), together with future scheduled interest and repayments, are then transformed into present values using a nominal interest rate of eight per cent (Armidale City Council 1993, Appendix B). These costs are then divided by the number of extra equivalent tenements (ETs) which the capital works made available. The Armidale policy documents do not state whether (to avoid double dipping) the annual charges for new development are reduced by the share of future debt which new development will have already paid in the developer charge.

Coffs Harbour City Council provides an example of yet another calculation procedure. In the Contributions Plan for a new release area, North Boambee Valley, the formula indicated for the calculation of water supply charges includes a per capita cost of identified works needed for the area, plus a 'current contribution rate for Coffs Harbour General Area reticulation', plus an unexplained headworks charge of $514 per person (Coffs Harbour City Council 1995:18). The latter is apparently 'subject to review'.

8.4 *Critique of Current Practice*

As far as the metropolitan water agencies are concerned, it is clear that the current practice of calculating developer charges encompasses a wide variation in approaches. Differences in calculation procedures include: items which are included (e.g. some state agencies levy for headworks, some do not; others levy for some

headworks only, whilst others exclude parts of distribution works, etc.); the way assets are valued for the purposes of estimating charges (e.g. indexation of historical cost, replacement values, indexation with depreciation, etc.); the time span of assets to be included in the asset base for calculation of charges (e.g. assets of vintage 25 years, the value of the next 10 years of future works, etc.); the extent to which local cost variation is reflected in charges for different areas; and the extent of recovery of costs. (e.g. cost recovery policies range from 40 per cent to 100 per cent).

The same variation in approach is apparent with regard to non-metropolitan New South Wales, where some councils appear to follow the PWD guidelines, at least broadly, whilst procedures in other councils are often quite different. Moreover, there is often a lack of transparency about actual calculation methods in the documents of councils in non-metropolitan New South Wales. It is usually difficult to know exactly how a cost estimate was derived.

The wide variation in policy practice in both metropolitan and non-metropolitan New South Wales signifies a lack of cohesion as to the exact nature and objectives of developer charges. No statement of objectives accompanies documentation and certainly so single philosophy underlies the procedures used. The need for 'efficient' charges is sometimes recognised but this is not defined in source documents. The lack of a theoretical rationale for charges appears to have produced *ad hoc* calculation practices. The time value of money is often not incorporated into costs comparison between years; and asset valuation procedures always assume the unlikely possibility that minimum efficient cost prevails in the techniques of service provision. There is no discussion of the holding costs of excess capacity or any principles as to how these might be allocated across developers. With the exception of HWC and the PWD guidelines, there is frequently no explicit adjustment to charges to avoid double charging newcomers.

The PWD formula in New South Wales does have an apparent logic in that it seems to imply that developers buy 'equity' in the infrastructure system. The formula appears to be designed such that new users buy a 'share' of the existing assets, plus a

'share' of spare capacity, minus a 'share' of the outstanding debt. However, the basic idea that new customers buy equity in the water authority appears to be misplaced. Brett (1993:41) expresses this point forcefully:

> ...[D]eveloper charges no more comprise a purchase of 'equity' by customers than an agreement to license an item of software from Microsoft entitles the customer to a share in Microsoft. Equity holders carry risk, and customers of a water authority carry no risk associated with the business of the water authority.

The PWD do observe in the first sentence of their guidelines that developer contributions for water supply and sewerage 'should reflect, as far as practical, the costs imposed on the system' (Brett 1993:E1). However, this would require the identification of the incremental costs attributable to the development which the 'equity' approach certainly does not do. In fact, the way the formula in equation 8.2 works is almost at odds with marginal cost theory.

In the marginal cost theory considered in this study, the 'theory' is mainly preoccupied with formulating a measure for 'marginal cost', in the presence of excess capacity, whereas for the smaller distribution pipework where costs are much smaller in any case and individual pipework may be cumbersome to identify, the use of average cost will suffice. The PWD formula, on the other hand, appears to carefully allocate to the development correct proportions of the smaller pipework but uses simple averages for the larger items of headworks and major works.

When the PWD formula calculates cost shares on the basis of indexed historical costs, the formula looks backwards rather than signalling future capacity expansion costs. Moreover, it would appear to overcharge newcomers by requiring payment of the average costs for the system as a whole ($\frac{\$10\ \text{M}}{15000\ \text{ET}} \times 1$ in the example given earlier) plus the average costs of unused capacity in the system ($\frac{\$10\ \text{M}}{15\,000\ \text{ET}} \times \frac{15\,000\ \text{ET} - 10\,000\ \text{ET}}{10\,000\ \text{ET}}$ in the example). Subtraction of the amount of outstanding debt has some logic insofar as it would avoid double dipping if access

charges and usage rates were set the same for new and existing users in annual (or quarterly) bills. However, recurrent charges also require a return to equity in the system; so if new and existing users do pay the same annual charges, then it could be argued that this element of double dipping will remain.

In sum, it appears that what is lacking in all of the approaches described here is an underlying rationale or statement of objectives indicating an endeavour to calculate the incremental costs of development and guidelines which describe a technically defensible set of procedures, with assumptions noted and parameters explained. The one area which appears to be particularly difficult and which is certainly the most non-systematically treated, is the calculation of incremental costs when there is excess capacity in existing assets.

Just such a set of standardised procedures is what is being proposed by IPART for water, sewerage and drainage developer charges in New South Wales. It is to these proposals we now turn our attention.

8.5 *Proposals for Reform of Charging Practice in New South Wales*

8.5.1 *Institutional Background*

Under the New South Wales *Independent Pricing and Regulatory Tribunal Act* 1992, IPART is empowered to either determine maximum prices, or a methodology for setting maximum prices, for specified government monopoly services in New South Wales. The Tribunal determines maximum prices for water for the four metropolitan water agencies (Sydney Water Corporation, Hunter Water Corporation, Gosford City Council and Wyong City Council). In the case of developer charges levied by these four agencies, the Tribunal has chosen to determine a methodology for fixing maximum 'prices' (charges). This has been done because determining a methodology rather than an actual charge enables charges to reflect the differing costs of servicing developments in different areas (Reid 1997:1).

The institutional processes to devise a methodology for developer charges began in 1993 with the establishment of a Working Party on Developer Charges. In September 1994 the Tribunal published Discussion Paper No. 8 entitled *Developer Charges in the New South Wales Water Industry*, which reflected the considerations of the Working Party. In June 1995 the Tribunal set up a further body, the Water Industry Forum on Developer Charges, to advise on the practical implementation issues of using the methods suggested by the Working Party (Grantham 1997:1).

A firm set of principles and procedures was finally handed down in December 1995 in *Determination No.9 - Sydney Water Corporation, Prices for Developer Charges for Water, Sewerage and Drainage Services*. Similar determinations were given to the Hunter Water Corporation, Gosford City Council and Wyong City Council in 1996. A primary requirement of implementing the new methodology is the preparation of formal Development Servicing Plans by each agency. These are currently being prepared. In February 1997, IPART held a public seminar for the benefit of all interested parties to explain the methods being proposed to calculate charges. The views of the development industry were also expressed at that seminar. IPART representatives stated at the seminar that the implementation of the proposals would be an evolutionary process (IPART 1997).

For non-metropolitan New South Wales local water authorities, IPART was requested by the State Premier to examine the feasibility of establishing a set of principles for the pricing of water which, if adopted, would standardise the pricing practices of these authorities (New South Wales Government Pricing Tribunal 1995:1). A report on pricing principles was presented to the Premier in September 1996. This report contained were recommendations regarding developer charges. In particular, the report recommended that local councils use an approach similar to that being considered for metropolitan authorities. A working party comprising representatives of the New South Wales Department of Land and Water Conservation (DLWC) and representatives of local government has been established to facilitate implementation of IPART's recommendations (Samra 1997). It is expected that DLWC will issue

guidelines to local authorities in the near future. (These will replace the PWD guidelines discussed in sections 8.3 and 8.4).

8.5.2 *A Description of IPART's Proposed Principles and Procedures*

The main objectives of the new methodology proposed for New South Wales by IPART have been set out by Warner (1997:2, 14) as follows:

> [D]eveloper charges should:
> - involve full net cost recovery from the beneficiary;
> - reflect variations in the cost of servicing different development areas;
> - avoid 'double dipping' or charging new entrants twice;
> - cover infrastructure expenditures which can be clearly linked to the development in question and are able to be reliably forecast;
> - include ancillary costs;
> - be applied to existing and fringe areas alike;
> - be calculated in a clear and transparent manner so that developers can understand and assess the calculated charges.

Some of the key principles and procedures to be followed in the implementation of the methodology are described below [New South Wales Pricing Tribunal (1995*b*:5-22)]:

1. Only efficient costs to be recovered.

Developers are to be charged only for the technically efficient cost of supplying water and sewerage services. If there is reason to believe that technologies are not efficient, an adjustment must be made.

2. Demand management and water conservation assumptions.

IPART's guidelines require that projections of demand for water per household (or wastewater discharge per household) should take into account the demand management objectives of the water authorities (New South Wales Government Pricing Tribunal 1995*b*:7). Where developments incorporate features which reduce demands on water, sewerage and drainage infrastructure, developer charges should be reduced accordingly. Examples of such features are the design of on-site systems, the inclusion of development or special building covenants, etc. (New South Wales Government Pricing Tribunal, 1995*b*:7-8).

3. Development servicing plans

Water authorities levying charges are to prepare 'Development Servicing Plans' (DSPs) for each catchment or geographic area in their jurisdiction. DSPs are to include, among other things, the following information (New South Wales Government Pricing Tribunal 1995*b*:21):

- A summary of the contents of the DSP;
- relevant land use planning information;
- extent of the catchment/supply zone;
- extent of services required to be staged over the anticipated development period;
- estimates of future capital and operating costs;
- standards of service that will be provided and design parameters;
- estimates of lot and dwelling production including demographic assumptions;
- the calculated developer charge and how it is projected to move through time;
- a reference to other relevant DSPs.

The DSPs and the models used in calculating developer charges are to be made available to the development industry and the community generally.

4. Calculation of charges to use the Net Present Value approach.

An essential requirement of the guidelines is that future streams of revenues and costs be compared using net present value (NPV) techniques. Further details on procedures are provided below under 'Method of Calculation of Charges'.

5. Choice of discount rate

The Tribunal recommends that the appropriate discount rate to use in the NPV calculations in respect of assets which have yet to be built is nine per cent. For assets which have already been built but have not yet reached full capacity, the Tribunal recommends use of a discount rate of three per cent. In explaining this difference in the recommended discount rates, it is argued that the lower rate of three per cent 'reflects that these investments are sunk' (New South Wales Government Pricing Tribunal 1995*b*:7).

6. Identification of relevant assets

IPART guidelines state that water authorities may obtain contributions for 'providing, extending or augmenting services which the developments will, or are likely to, require' (New South Wales Government Pricing Tribunal 1995*b*:15). The DSPs are to demonstrate the nexus between the development and the assets required to service the development. The use of the word 'providing' conveys the intention that existing assets (that is, those 'already in the ground', and which contain excess capacity to serve the developments) are to be included in the charge.

There are three exceptions to this rule in the guidelines. Observing that a change in land use may mean some existing assets will have far greater service capacity than will ever be used, it is then specified (New South Wales Government Pricing Tribunal:7) that an asset is to be excluded if:

> • its capacity is unlikely to be fully utilised over its planning horizon;
> • the service capacity was created before 1970;
> • the service capacity was made available by changes in land use.

Where assets are to be shared between different development sites, or between existing users and new development, they are to be apportioned between users. The apportionment should be based on each group's expected utilisation of capacity.

IPART suggests that headworks should be included in the assets for which developer charges are calculated. The discussion of current practice in section 8.2 noted that some agencies did include headworks, some exclude them, and others include some components and exclude others.

7. Valuation of assets

Assets are to be valued at replacement cost. The replacement value should reflect the costs of continuing the existing service with a 'modern equivalent asset' (MEA method). The Tribunal argued that current costs should be used in order 'to better

signal the true costs of the services provided' (New South Wales Government Pricing Tribunal 1994:15)

8. Inclusion of holding costs

The IPART method of calculation proposes that the interest costs of funds used to finance an asset (and the interest forgone if equity finance is used) be treated as a cost of the project.

9. The method of calculation of charges

There are two stages in the method of calculation of charges proposed by IPART. The first stage is the calculation of 'the capital charge'. The mathematics of this stage are similar to the AAM method of Chapter 6. It is perhaps best demonstrated using a hypothetical example.

The following simple example is adapted from the IPART workshop on developer charges (IPART 1997; Paper No.7, pp.1-9). The assumptions of the example are set out in Table 8.3. The development for which a charge is being calculated is of size 250 ET. The infrastructure assets which will serve the development, as well as continuing to serve existing users, are listed in Table 8.3. The discount rate is assumed to be three per cent. The age of the asset is included in Table 8.3 to indicate that 'period to full capacity', one of the key parameters of the calculation, is not years from 1997, but years since the asset was constructed. For example, the dam has been in operation 19 years and has 21 years of use left, but the figure which is relevant to the calculation of a charge is the expected total period to full capacity of 40 years. Another point of possible confusion concerns the concept of the 'yearly asset take-up rate' compared to the development site take-up rate. The development site take-up rate is assumed to be constant at 50 ET per year. The asset take-up rate is different from this because these assets are shared with other users who will also take up ETs per year. The way to calculate the yearly asset take-up rate for any asset is to divide the full capacity of the asset by the period to full capacity. For example, the annual asset take-up rate of the first sub-main is $\frac{5\,000}{17} = 294.1$ ET per year.

There are two mathematically equivalent ways of calculating the capital charge. Because annual asset take-up rates are assumed constant, the first formula is:

$$\text{Capital charge per ET (X)} = \frac{\text{Capital annuity}}{\text{Asset ET take-up rate}} \tag{8.3}$$

where the 'capital annuity' is given by the annuity formula:

$$\text{Capital annuity} = \frac{Vi}{1-(1+i)^{-t}} \tag{8.4}$$

Table 8.3 Assumptions of Hypothetical Example to Demonstrate IPART Calculation Methodology

Development size: 250 ET

Development take-up rate:

Year	ETs	ETs to date
1996	50	50
1997	50	100
1998	50	150
1999	50	200
2000	50	250

Discount rate: 3 per cent.

Assets:

Nature of asset	Value of asset ($)	Period to full capacity (years)	Full capacity (ETs)	Age of asset as at 1997 (years)
Sub-main	1 000 000	17	5 000	2
Pump station	2 000 000	14	7 000	10
Pump station	2 000 000	23	10 000	8
Carrier main	2 500 000	14	7 000	10
Rising main	2 500 000	37	20 000	22
STP	40 000 000	14	30 000	10
Reservoir	7 000 000	15	20 000	0
Mains	10 000 000	25	20 000	10
Dam	60 000 000	40	400 000	19

Operating costs and revenues:
Income per lot ($) 250
Operating costs per lot ($) 175

Source: Hypothetical data adapted from IPART (1997: Workshop, p.1, 4)

where

V = asset value;

i = discount rate;

t = period to full capacity.

For example, the capital charge for the first sub-main (X^1), where V = \$1 000 000, i = .03, t = 17 and the annual asset take-up rate = 294.1 is:

$$X^1 = \frac{\$1\,000\,000 \times (.03)}{1-(1+.03)^{-17}} \div 291.4 = \$258 \text{ per ET}$$

Secondly, when take-up rates are not constant, a more generalised formula can be used to produce the same result. This formula can be explained thus: let n be the number of ET taken up in year j where j = 1,2,3,...,J, for the period to full capacity, J years (e.g. J = 17 for the first sub-main); we know that the developer charge (X) for any particular asset, such as the first sub-main is to be a constant dollar amount each year (X^1), then in order to recover the present worth of the value of the sub-main asset, V, over the full period:

$$V = \frac{n_1 X^1}{(1+i)^1} + \frac{n_2 X^1}{(1+i)^2} + \frac{n_3 X^1}{(1+i)^3} \cdots \frac{n_J X^1}{(1+i)^J} \tag{8.5}$$

which can be rearranged to give the generalised formula:

$$X^1\left(\frac{\$}{ET}\right) = \frac{V}{\frac{n_1}{(1+i)^1} + \frac{n_2}{(1+i)^2} \cdots \frac{n_J}{(1+i)^J}} \tag{8.6}$$

Since asset value, V, is the present worth of the asset, and n is the number of ETs or 'output' 0, in a year it will be noted that equation (8.6) reduces to:

$$X^1 = \frac{PW(V)}{PW(O)} \tag{8.7}$$

Equation (8.7) is precisely the same as the formula for marginal capacity cost (MCC) derived from theory in Chapter 6 (equation 6.3); that is,

$$MCC = \frac{PW(I)}{PW(O)} \text{ with } I = V.$$

Since the asset ET take-up rate is assumed constant, equation (8.3) can be used to calculate the capital charge for each asset in this example. However, equation (8.6) will calculate the same charge. For example, with V = $1 000 000, n = 294.1 ET per year and J = 17, equation (8.6) also calculates a capital charge of $258 per ET for the first sub-main in Table 8.2.

The capital charge for the other assets in Table 8.3 is shown in Table 8.4. Table 8.4 shows that the total charge per ET for all assets serving the development site is $4 530.

Table 8.4 Capital Charge - IPART Methodology

Nature of asset	Value of asset ($)	Period to full capacity (years)	Full capacity (ETs)	Capital charge ($)
Sub-main	1 000 000	17	5 000	258
Pump station	2 000 000	14	7 000	354
Pump station	2 000 000	23	10 000	280
Carrier main	2 500 000	14	7 000	443
Rising main	2 500 000	37	20 000	125
STP	40 000 000	14	30 000	1 652
Reservoir	7 000 000	15	20 000	440
Mains	10 000 000	25	20 000	718
Dam	60 000 000	40	400 000	260
Total charge:				4 530

Source: Hypothetical data adapted from IPART (1997: Workshop, p.4).

The second stage in the IPART calculation after the calculation of the capital charge is the calculation of what is termed a 'reduction amount'. The reduction amount is the amount by which the capital charge is reduced. It is intended to reflect the fact that any net operating surplus the agency makes in any year (that is, any surplus of income over operating costs) will be applied as a reduction against the total capacity costs. The reduction amount therefore attempts to estimate the present worth of the contribution to capital from recurrent income which will be made over the next 30 years and then reduces the developer charge by this amount. The aim of the procedure

is to avoid double dipping. Table 8.5 illustrates the calculation of the reduction amount.

From Table 8.5 the present worth of the difference between income and operating costs over the 30 years can be calculated as $160 953. Because there are only five years before all the ETs on the development site are purchased, we also need to calculate an annual amount per ET sold in a year, so that when added up over the five years it has a present value equivalent of $160 953. Using the formula at equation (8.6), where V = 160 953, n_1 = 50, n_2 = 100, n_3 = 150, n_4 = 200 and n_5 = 250 and the discount rate, i = 1.09, the reduction amount, R, calculates to $828 per ET. The final developer charge is the capital charge X reduced by R, the reduction amount. Thus:

$$\text{Developer charge}/_{ET} = X - R = \$4\,530 - \$828 = \$3\,702 \text{ per ET} \qquad (8.8)$$

This charge would be indexed each year by the consumer price index.

10. Housing affordaility

IPART notes that the NPV methodology will lead to some increase in the general level of developer charges above those currently being charged under existing approaches. It is not explicitly suggested that discounts be made on affordability grounds. Instead, IPART (1995*b*:10) repeats that 'Full cost recovery through developer charges gives the clearest price signal about the varying costs of developing in different areas and at varying densities and levels of service.' However IPART (1997:Paper No.9:9, 20) does mention that phasing in arrangements may be appropriate to manage impacts on housing affordability.

11. Dispute resolution

Developer charges for water and sewerage, as determined by IPART or under section 64 of the New South Wales Local Government Act 1993, are not subject to appeal. However, a developer who is dissatisfied with how a charge has been calculated can have the dispute arbitrated under section 31 of the *Government Pricing Tribunal Act 1992* (New South Wales Government Pricing Tribunal 1995*b*:8). IPART also suggests that a panel of mediators be established so that mediation may be attempted before a formal dispute is declared (New South Wales Government Pricing Tribunal 1995*b*:8).

Table 8.5 Reduction Amount - IPART Methodology

Year	Cumulative No. of ETs	Income ($)	Cost ($)	Net Operating Surplus ($)
1	50	12 500	8 750	3 750
2	100	25 000	17 500	7 500
3	150	37 500	26 250	11 250
4	200	50 000	35 000	15 000
5	250	62 500	43 750	18 750
6	250	62 500	43 750	18 750
7	250	62 500	43 750	18 750
8	250	62 500	43 750	18 750
9	250	62 500	43 750	18 750
10	250	62 500	43 750	18 750
11	250	62 500	43 750	18 750
12	250	62 500	43 750	18 750
13	250	62 500	43 750	18 750
14	250	62 500	43 750	18 750
15	250	62 500	43 750	18 750
16	250	62 500	43 750	18 750
17	250	62 500	43 750	18 750
18	250	62 500	43 750	18 750
19	250	62 500	43 750	18 750
20	250	62 500	43 750	18 750
21	250	62 500	43 750	18 750
22	250	62 500	43 750	18 750
23	250	62 500	43 750	18 750
24	250	62 500	43 750	18 750
25	250	62 500	43 750	18 750
26	250	62 500	43 750	18 750
27	250	62 500	43 750	18 750
28	250	62 500	43 750	18 750
29	250	62 500	43 750	18 750
30	250	62 500	43 750	18 750
			Present worth of the net operating surplus over 30 years	$160 953
			Annuity per ET which will repay $160 953 over 5 years	$828
			∴ Reduction amount	$828

Source: Hypothetical data adapted from IPART (1997:Workshop p.6).

8.6 *Evaluation of IPART Proposals for Reform from an Economic Efficiency Perspective*

The statement of the objectives of the design of charges, together with a set of principles and clearly specified procedures, provides exactly the guidance which appears to have been missing in the current practice of determining developer charges for water and sewerage. A uniform set of procedures throughout New South Wales

would provide greater certainty for developers and assurance for local authorities. Calculation methods following the guidelines would be more transparent and open to critical inspection by all parties.

However, the strongest argument in favour of the IPART proposals, at least from the perspective of this study, is the extent to which the methodology can be sanctioned by the theory of developer charges developed in Chapters 3 to 7. Except for the issue taken here with 'the reduction amount' and to a lesser extent with the discount rate (both matters discussed below), IPART's proposals are consistent with the recommended AAM method of calculation of incremental costs in Chapter 6. They also accord with many of the general principles derived from the requisite theory in Chapters 3 through to 6. A systematic examination of each of the ten guiding principles of the previous section confirms this.

1. *The recovery of efficient costs*

The Tribunal's methodology recognises the theoretical point that in the absence of competition, pricing arrangements which aim at allocative efficiency do not ensure technical efficiency or cost minimisation. Separate mechanisms (e.g. benchmarking) must be put in place to address technical efficiency in public monopolies (Treasury 1990:32, Saunders *et al.*, 1977:9). In the context of setting charges for developers, the fact that the construction cost estimates should be transparent and open to critical inspection may help identify the 'gold plating' of assets, or other inefficient procedures. Benchmarking studies may also assist. Where surplus capacity exists because of poor planning or investment decisions, it is clear also that these higher costs should not be passed on to new developments.

IPART recommends that 'adjustments' should be made when a degree of technical inefficiency in operations is suspected. One problem is that it would be inherently difficult to judge precisely the right size of adjustment to allow for inefficiencies. IPART reports the Sydney Water Corporation suggested in its 1994/95 submission to the Tribunal that an 'efficiency factor' should be applied to its assets built before 1990 to reduce charges relating to those assets by 25 per cent. It noted that 'the

purpose of an efficiency factor is to recognise the impact of substantial improvements in work practices and technological change' (New South Wales Government Pricing Tribunal 1994:28). In the event, the Tribunal determined that a reduction factor of 40 per cent is to be applied by SWC (New South Wales Government Pricing Tribunal 1995*b*:7). This issue is important because, as we saw in Chapter 6, asset values are the main determinant of the level of developer charges. This underlines the need for transparency of cost estimates.

2. *Consideration of demand management and water conservation objectives*

The guidelines recognise the potential inefficiency in the common practice of projecting water demands on the basis of existing demand at the current price. The economic theory of optimum scale (as discussed in Chapters 3 and 5) demonstrates the need to consider demand-side management (reducing the need for additional supply) equally with supply-side responses. This is to ensure that increments in supply are at least matched by consumer benefits. However, it appears that demand management is not often practised in Australia or North America (Robinson 1995:2). Hanke and Davis (1973:809) argue that one reason for this is that engineers are not trained to take allocative efficiency into account:

> Demand management through pricing has almost never been considered a means to control use and to influence investment patterns. Even when it is used, few water resource planners have realised the importance of pricing as a means to obtain information regarding the willingness of people to pay for water resource services. Three complementary factors contribute to this pervasive bias in water resource management and development in the United States. The first factor relates to the emphasis on engineering. Once 'requirements' are forecast, the engineer's task is to design the least costly system that will meet those requirements. An engineer is not trained to allocate resources between competing objectives but only to accept requirements. Therefore he may eliminate from the scope of his analysis concern for economic demands and nonstructural alternatives such as pricing policies... .

Other factors contributing to the neglect of the demand side, according to Hanke, were the mistaken view that gross benefits could be evaluated independently of pricing (and funding) policies, and the fact that institutional incentives were not designed 'to ensure

that results of public programs coincide with national efficiency objectives' (Hanke and Davis 1973:809).

However, it would seem that the situation is now changing and advocacy of demand management is becoming more widespread. For instance, Herrington (1997:25) lists eleven major documents published since the mid 1980s which expound the principles and practice of demand management.

The adoption of demand management principles for water and sewerage is likely to raise prices (especially if environmental costs are to be included in costs). This will reduce demand and provide incentives for the introduction of new less capital intensive technologies. Neutze (1997:187) and Troy (1996:82-90) argue that new technologies and new approaches to meeting demands are already being developed. For urban water, sewerage and drainage these include the use of rain water tanks, composting toilets, reuse of 'grey water', and on-site retention of stormwater.

Developer charges, if they are applied flexibly, can be an effective policy tool in influencing incentives to adopt technologies to conserve water or run-off. Lower charges will be justified in cases where development design will reduce the demands on infrastructure services. (In theoretical terms, marginal capacity cost will fall because planned expansions of capacity can be deferred). The fact that the IPART guidelines appear to allow for such incentives to be introduced is therefore of particular merit. However, perhaps the wording on this, that agencies should project demand for water in a way which has 'regard to corporate goals and objectives' (New South Wales Government Pricing Tribunal 1995*b*:7) of water authorities, could have been clearer and the implications more precisely spelt out.

3. *Development servicing plans (DSPs)*

The requirement to prepare DSPs containing the specified information, together with the access to calculation models which developers will have, should improve the transparency of the calculation of charges. Public scrutiny may assist in containing costs, whilst the information contained in plans will help developers in their location

choices. For the authorities and councils, the need to prepare a DSP imposes an inducement to more rational capital budgeting and planning. The linking of DSPs to other land use plans (Local Environment Plans and Regional Environment Plans) and to councils' corporate plans should aid local level financial planning generally. Because a development site involves service providers from all three levels of government in Australia, co-ordination between service providers at different levels of government may also be improved. This difficulty in coordination is a problem in infrastructure planning in Australia which has recently been the subject of another study (see PRC 1995*b*).

4. *The use of NPV in the calculation of charges*

As we have observed, there is little evidence of standard NPV (or 'present worth') techniques being used in the current practice of setting developer charges. Where cost or revenue streams do not take account of the financing costs or interest earned over the time periods concerned, charges cannot be accurately set to recoup asset values. The fact that the IPART approach will standardise a set of technically correct steps is therefore especially meritorious.

A recent study by the Planning Research Centre (PRC 1995*b*) appears to confirm a general lack of sophistication of basic investment appraisal techniques at the local government level. The PRC was investigating, *inter alia*, the impediments to greater state and local integration on infrastructure planning and investment in three Australian states. One of the findings of the research was that differences between state and local governments in areas such as the use of NPV techniques, investment appraisal criteria and planning horizons, among others, were 'even more extreme and severe' than between different state level agencies (PRC 1995*b*:119). It is evident in the table of techniques listed by the PRC that those used by local government had less rigour and sophistication (see PRC 1995*b*:Table 27, p.119).

5. *Choice of discount rate*

There are complex issues in the selection of an appropriate discount rate for the calculation of developer charges. In principle, the discount rate to use should reflect

the opportunity cost to the agency of financing the infrastructure assets. If a charge is being calculated to recoup a water agency's outlays on works for which all the funds were borrowed, then it seems reasonable and straightforward to use the interest cost of the debt as the discount rate. In practice this may involve some averaging of interest costs (and fees) over a debt portfolio of varying costs and maturities. However, if the agency uses its own equity to finance the infrastructure works, the question now arises as to what is the opportunity cost of using these funds? Is it the interest cost savings by not having to borrow the funds, or is it, as many have argued, 'the rate of return on assets commensurate with that achieved by firms in the private sector that have similar risk characteristics' (Commonwealth Joint Committee of Public Accounts *Public Business in the Public Interest*, p.112, quoted in Groom (1995:3)). If it is the latter, how is this to be ascertained?

Some have argued that the use of private sector rates of return is not logical. For example, Staunton and Hagan (1989:165) argue as follows:

> [T]he proposal [to pay dividends to governments based on rates of return to equity] implies that capital should only be expended on projects which generate a profit. This seems to contradict the very reason why the government is providing capital (to the exclusion of private investment) in the first place, i.e. government projects have a social purpose which renders them less profitable and unlikely to be securely supported by private enterprise. Logically, it is ridiculous to argue in terms of the opportunity cost of *private* capital. ... Realistically and logically, it is the opportunity cost of *other government* projects which is the concern of policymakers, i.e. the cost of *public* capital.

In a discussion paper prepared for the Water Industry Forum on developer charges, Groom (1995) adopts the line that the cost of equity can be estimated by reference to a margin over the risk free rate, such that:

$$\text{cost of equity} = \text{risk free rate} + \text{risk margin.}$$

The risk free rate is usually taken to be the yield on long term Commonwealth Bonds. The risk margin is determined by Groom using the Capital Asset Pricing Model (CAPM). It includes a *market risk premium* which is estimated from the average return

in the stock market to holders of listed stocks, and a relative risk factor which reflects 'non-diversifiable' risks, such as those that are driven by the general trends in the economy (Groom 1995:6). At the time, Groom's analysis recommended a floor for the real discount rate of seven to nine per cent (Groom 1995:7).

Although Groom's paper determines a discount rate with apparent objectivity and by reference to a widely accepted model (CAPM), it also draws attention to the fact that the analysis does not allow for the specific risks associated with the water industry. It is noted that there are differences in the risks of government-owned monopoly agencies and privately-owned companies in competitive markets. The former risks are identified by Groom. The discussion also raises the question of whether the discount rate for developer charges should really require the development of risk factors specific to new development, rather than those for the business of the water agency as a whole, or those identified through the CAPM method. If so, allowance would have to be made for the fact that more frequent calculation of developer charges lessens this risk.

It is clear that question of an appropriate discount rate is problematical. However, the two major concerns of the present study with the discount rate proposals of IPART are not related to either the method or even the number arrived at, but with the fact that *two* discount rates were deemed appropriate, and with the fact that the second of these emphasises *future* capital expenditures when the latter should not be in the calculation at all.

The justification given for two rates is that a lower rate can be used for past expenditures to reflect the fact that 'these investments are sunk' (New South Wales Government Pricing Tribunal 1995*b*:7). However, assets which have planned excess capacity which will be taken up in the future (as distinct from unforeseen excess capacity which is unlikely to be used) are not 'sunk costs' in the usual sense. There is no theoretical justification for a separate discount rate for 'sunk costs'. It is suggested here that the point is perhaps political obfuscation and that the real reason a three per cent discount rate was chosen was because of the 'added advantage' which IPART

itself notes: namely, that 'the lower discount rate assists in the management of the impacts of the new approach without adversely affecting future investment or locational decisions' (New South Wales Government Pricing Tribunal 1995*b*:7). Rather than confuse the issue by pretending to have a theoretical justification, especially when a supporting discussion paper has analysed extensively the issue of the choice of the discount rate making no mention of 'sunk' costs, it would be better for IPART to admit their concern to avoid sharp increases in developer charges.

The second problem relating to IPART's guidelines on the discount rate is the question of why *future* capital expenditures are included in the calculation of developer charges at all. For the calculation of the capital charge, IPART uses the AAM method, the theoretical origins of which were derived in Chapter 5. It will be recalled that AAM is an alternative approach to PWISC, the ideal measure of marginal cost expounded by Turvey. But whereas PWISC measures the difference between present worth of (least cost) future capital investment streams with and without the output increment, AAM reaches the same answer by estimating the amortisation of existing assets, correctly determined at their economic valuation. (Chapter 6 demonstrated that both methods will generate the same marginal capacity cost; that is, the same developer charge, under constant cost conditions.) The AAM method should not, therefore, include assets other than those pre-existing assets which the development site will use or those currently being built for use by the development.

As we saw in Chapter 6, it might at first be thought that if a development site was currently using an asset which was to be replaced in a few years by another asset, then the cost of the future asset might be included in the charge. However, on close analysis, it is clear that development must be charged *either* for the current asset *or* the future asset, but not both. To charge for both would be double counting. The key to understanding why this is so is to appreciate that so long as the asset which is being replaced is valued at its replacement value (or more technically, its Modern Equivalent Asset value) it will not make any difference which asset is used for the calculation, but it should not be both. The only justification which might be given for including future assets in the calculation, for a limited time period ahead, is to save the administrative

workload of having to recalculate charges each time new assets are brought on stream for new development.

In sum, IPART should recommend only one discount rate. It may be lower than an 'objectively' calculated one if there will be sharp rises in developer charges which would be better gradually phased in, and future capital works for a short time ahead should only be included in the charge if there are significant administrative savings from so doing.

6. *Identification of relevant assets*

The guidelines make it clear that pre-existing assets which contain planned excess capacity to serve development are to be included in the charge. In discussion of this issue (see New South Wales Government Pricing Tribunal 1994:11) the Tribunal first considers, then rejects, the argument that these assets should be excluded on the grounds that they are 'sunk costs' (despite what was said about the discount rate). The sunk costs argument is, of course, analogous to the SRMC versus LRMC argument considered in Chapter 3 and again in Chapter 5. SRMC was rejected in those chapters, particularly for lumpy urban infrastructure services, for a number of reasons, not least because it implies that there is no cost in the use of excess capacity when that capacity is already in place. This view fails to recognise that where excess capacity is deliberately planned because demand is growing over time, the cost of these assets is not 'sunk'. There is a marginal capacity cost associated with the use of such infrastructure, which is conceptually quite clear as Turvey has pointed out. It is, of course, the extent to which the output increment required by development necessitates a rescheduling or reoptimising of least cost investment plans; at the very least, the extent to which planned expansions must be brought forward in time.

The IPART discussion appears to recognise these points, although no formal theoretical attributions are made to Turvey. Emphasis is also placed on the need for forward looking price signals, a requirement which was stressed in the theoretical discussion of Chapter 5. For example, the Tribunal (New South Wales Government Pricing Tribunal 1994:12) noted that:

> As capacity of some system components is approached, the costs involved in bringing forward the next increment of capacity may exceed the costs of existing assets used by the development. If so, developer charges should reflect future incremental capital costs to provide a better locational cost signal.

Exceptions to the rule that pre-existing assets servicing new development should be included in charges are then specified in the guidelines. Although it is not stated explicitly by IPART, the conditions specified are exactly those for which the theoretical discussion of Chapter 3 argued there would be no Turvey-type long run marginal capacity cost incurred. That is, where excess capacity occurred by accident or unforeseen planning error, and it is unlikely that it will ever be taken up within the current planning horizons. (The exception to this is IPART's exclusion of pre-1970 assets which it is apparently doing for practical reasons).

The guidelines recommend the inclusion of headworks in calculation of charges. The justification given for this repeats one of the arguments outlined in Chapter 4 of this study; that is, the inclusion of headworks costs ensures that developer charges will provide better locational signals between regions (New South Wales Government Pricing Tribunal 1994:19).

7. *Valuation of assets*

Asset valuation methods for fixed water supply and sewerage assets involve either methods based on original construction (or historical) costs or those based on estimates of replacement costs (termed 'current' costs). *Economic* valuation of an asset, as Turvey's theory of marginal cost pricing in Chapter 5 demonstrated, has little to do with the historical costs of an asset. The economic life of an asset (and, in the case of developer charges, the period to full capacity - see Chapter 3) is influenced by trends in demand for the service, in development of new technologies, and in other influences on cost, such as environmental factors. The key notion which Turvey demonstrated was that asset value and amortisation of an asset depend on these future oriented variables. These will be captured only by valuation methods based on replacement costs. The method of asset valuation proposed by IPART is one such method. The value is assessed not by attempting to cost the same asset of similar size but by valuing the cost

of a modern version of the asset which would perform the same service. This allows both for technological change and a reoptimisation of the scale of the asset to the service required.

The derivation of principles of asset valuation from Turvey's economic theory for the purposes of this study is not meant to imply that the accounting profession is unaware of them. Modern accounting theory certainly accepts that the objective of asset valuation is to find the 'true economic value' of an asset (see, for example, Hodgson *et al.* 1992:71). However, it is evident that past practice has been biased towards historical cost based asset valuation (New South Wales Government Pricing Tribunal 1993*a*:209, Hodgson et al. 1992:82-83). The SWC, for example, changed the basis for valuation of its fixed assets from historic cost to depreciated replacement cost only in 1993-94 (Neutze 1997:193).

However, although the principle of the method of asset valuation is clear, the practice of arriving at an estimate can be anything but straightforward. Conceptual and practical difficulties do arise (see Staunton and Hagan, 1989:54-55 for a discussion of some of these conceptual problems with regard to water assets). Moreover, 'tricks' can be used to manipulate values (see Staunton and Hagan, 1989:51). It might be argued against both the IPART method for calculation of charges and the AAM method being suggested in this study that since asset valuation is the main determinant of the charge (see Chapter 6), the method is too vulnerable to subjective valuations. However, asset valuations are required for purposes other than developer charges calculations. They are essential for insurance purposes and they are increasingly employed as a tool for efficient financial management. For example, the calculation of economic income earned in a year and estimates of rates of return (see, for example, Treasury 1990). Rather than abandon efforts to base developer charges on economic asset values, it would seem to be more constructive to improve the estimates that are made.

8. *Inclusion of holding costs*

IPART's proposal to treat interest as a component of the capital cost of assets accords with the way interest was included in the measures of marginal capacity cost which

were compared in Chapter 6. As we saw in Chapter 7 in relation to equity issues, when holding costs are to be included in asset cost determination there are at least two ways of incorporating them. One alternative is to calculate a charge on the value of the asset when works are constructed and then escalate this charge each year by the assessed interest cost for that year. The charge will therefore increase over time the later a developer comes to a site. This approach was used in the PWU method described and then rejected in Chapter 6. The chief difficulty with it, as was discussed in Chapter 6, is that it may lead to what is termed the 'sterilisation' of land. Compared with the alternative approach of estimating the rate of take-up of lots and time to full capacity then spreading the total estimated interest cost equally among the expected number of developments, the former method has a lower initial charge and an increasing charge the longer the time to full capacity. Clearly, there may be a point at which no further development of a site occurs, even though there is planned capacity in the infrastructure service, because the initial charge of alternative sites is cheaper. For this reason and also simply for equity reasons, methods which spread the holding costs are to be preferred.

9. *The method of calculation of charges*

As has already been noted, the calculation of the capital charge in the IPART methodology (that is, the first stage of the two stage calculation) accords with the AAM approach suggested in Chapter 6. However, a significant point of departure occurs with the second stage - the inclusion of the reduction amount.

The estimate of the reduction amount requires that water prices be forecast thirty years ahead. It also requires, in theory, that the operating costs of assets attributable to users in the development site be separately identified. It is clear that the exercise of estimating the reduction amount cannot ever be anything more than a broad attempt to accommodate the important principle that new developments should not 'pay twice' for infrastructure capacity. But it is not the inevitable unreliability of the estimate that is the major concern. It is contended here that the reduction amount weakens the proposed method in a far more serious way.

There can be no doubt that the central objective of the proposed methodology (as has been emphasised throughout IPART's reports on developer charges) resides in 'giving the right locational signals to reflect development costs [which] encourages resources to be spent in areas where they produce the most efficient outcomes' (Warner 1997:1). This objective is repeated in the opening paragraph of the 1997 version of IPART's *Guidelines for Methodology to be used in Calculating Developer Charges* (IPART 1997:Paper No.6:1) where it is said *inter alia* that upfront developer charges need to:

> - provide better signals for resource allocation and usage;
> - provide better signals to reflect the environmental effects of urban development ... .

Throughout the discussion of the guidelines, where it is suggested that something should be done one way rather than another, this same underlying objective of the methodology is repeated. For example, when considering methods of asset valuation, it is argued that current costs should be used because these will 'better signal the true costs of the services provided' (New South Wales Government Pricing Tribunal 1994:15). Similarly, in discussion of methods of charging and the notion that charges should look forward, it is argued that 'developer charges should reflect future incremental capital costs to provide a better locational cost signal' (New South Wales Government Pricing Tribunal 1994:12). On the issue of lowering charges on the grounds of housing affordability, IPART again repeats that 'full cost recovery through developer charges gives the clearest price signal ...' and that it is inappropriate to 'allow efficient pricing signals to be distorted' (Reid 1997:5) by attempting to contain impacts on affordability.

Notwithstanding all the emphasis on efficient locational signals, the Tribunal suggests a reduction amount to deal with double dipping *which must significantly distort cost signals*. The estimation of the reduction amount involves parameters to which there attaches a good deal of unavoidable uncertainty. The size of the reduction amount will also depend on the size of the net operating surpluses a water agency *chooses* to run. Agency after agency across the state will reduce their 'carefully

calculated' locational signals by reduction amounts of varying sizes which will not relate in any way to the costs of service. There seems little point in carefully fine tuning the capital charge, which is supposed to be sending an economic message relative to other capital charges, if all water agencies can make individual policy choices which reduce the charge for their own area. Clearly, differences between charges will no longer reflect just cost differences between areas. They will reflect some amalgam of cost differences; differences due to forecasting assumptions in the estimation of the reduction amount; and individual council policy on how much of the asset costs are to be recovered by upfront versus recurrent charging.

It would appear that the central theoretical pillar on which the whole set of procedures is based is destroyed unless some way can be found either to deal with double dipping by alternative means or at least to standardise the reduction amount in some way. For the metropolitan areas, IPART independently determines income through the determinations issued on prices and they also monitor the costs of water agencies. It is possible that some standard policy on the reduction amount might evolve so that differences in developer charges between agencies will reflect relative (if not absolute) differences in costs. In non-metropolitan areas, the problem appears to be particularly difficult. There are more than 120 separate water agencies each with the power to set their own price levels which will in turn reflect the size of charges.

An alternative to subtracting a reduction amount off the capital charge is to subtract annually from the water bill to areas which have paid a developer charge, an amount which reflects the net operating surplus in a year. In an annual bill, the amount to be deducted would be ascertainable with a good deal more certainty. It could simply be deducted from the lump sum amount if water bills are structured that way, or offered as a rebate on user charges if there is no lump sum component. Dealing with double dipping in this way would initially place demands on the design of information systems which facilitate billing arrangements, but it is unlikely to be a technically daunting requirement given the capacity of current computing systems.

The advantage of calculating the reduction amount along IPART lines is that the calculation itself becomes a quick one off adjustment to the capital charge. It is accurate in principle, if not in practice, and no further administration is required. However, if that same administrative convenience weakens the primary theoretical justification for calculating charges in the first place, then it would certainly appear that alternative mechanisms for dealing with double dipping need to be explored.

10. *Housing affordability*

Housing affordability issues have been discussed along with other equity issues in Chapter 7. It was argued there that there is a compelling logic in the argument that the main concern of infrastructure utilities should be with efficiency issues in service provision and that distributive policy is best addressed by institutions which focus exclusively on equity issues. However, if subsidies are given it was argued that they must be transparent in the accounts of the agency. IPART has taken a similar approach in the guidelines. It is argued, for example, that any 'manipulation' of the charges to alleviate the impact on affordability must be done in a way which preserves the transparency of the calculation (New South Wales Government Pricing Tribunal 1994:22). It is also stated quite categorically (Reid 1997:5) that financial hardship matters are best addressed elsewhere, as was noted in Chapter 7.

11. *Other issues*

It may be argued against the IPART methodology that the degree of asset specification to particular development locations is not administratively feasible, either because lists of assets do not exist, or because they cannot be separated to particular sites. The alternative then would be to abandon an AAM approach altogether and attempt instead the AIC method considered in Chapter 6. However, as was noted in Chapter 6, when considering charges for sites served by a range of assets, the AIC averages costs across all assets, whereas AAM distinguishes costs relating particularly to one location. Since the major part of the rationale for developer charges depends on locational signals, any attempt to separate assets is worthwhile. Moreover, it must be said that councils have already been working with guidelines (the PWD guidelines considered in section 8.3.1)

which contain a high degree of asset specification (e.g. see the Appendix to this Chapter).

8.7 *Concluding Remarks*

This chapter has examined current policy practice with regard to the calculation of developer charges for water and sewerage and it has also evaluated the methodology which IPART has proposed for use in New South Wales to replace existing practice. It is apparent that there is a wide range of variability in the procedures currently used by metropolitan agencies across all states and also within the non-metropolitan areas of the state of New South Wales with which this study is particularly concerned. With the exception of the HWC in New South Wales, there is a distinct impression that this is a public policy area in need of a theoretical rationale, guiding principles, and some standardisation of procedures.

It is exactly these deficiencies which the IPART proposals for reform seek to redress. Moreover, there are many points at which the guidelines provided by IPART and the principles of economically efficient charges coincide. Examples include: the suggestion that adjustments to charges may be necessary so that only minimum efficient charges are reflected; (this recognises that allocative efficiency is not the same as technical efficiency); the exhortation to heed demand management and conservation objectives in water and sewerage agencies (so that flexible charging can reward developers for containing infrastructure service impacts in development design); the use of DSPs (which will greatly improve the transparency of existing practice and may also assist in improving coordination between service providers at different levels of government); the encouragement to councils to use improved investment appraisal techniques; the asset valuation methods suggested by IPART (which will capture, in principle at least, the economic valuation of assets as outlined by Turvey); holding costs will be spread equitably between developers in the method suggested by the Tribunal and possible sterilisation of land avoided; and finally, of course, the actual technique suggested for calculating the first stage of the charge is a theoretically valid method of calculating long run marginal capacity cost.

Despite this firm grounding in economic efficiency principles, the main area where IPART's recommendations are deficient is in the suggested approach to double dipping. Here, the recommended method will cause arbitrary and individually varying reductions to be made to the capital charges otherwise carefully calculated by councils. The approach appears to profoundly contradict the theoretical rationale emphasised many times in the IPART documents; that is, to improve the locational signals indicated by the size of charges in different geographical areas.

On a less important matter, issue has also been taken here with the rationale given for recommending two discount rates. We have argued that only one rate should be used. Moreover, future capital expenditures beyond those currently being built to service a development should not be included in the calculation.

APPENDIX TO CHAPTER 8

The following is an example of how developer charges were to be calculated under the previous guidelines recommended by the former Public Works Department. They applied to non-metropolitan New South Wales. They are included here to demonstrate the degree of asset specification required by this method and the complexity of the calculation. The 'theoretical rationale' for this method is criticised in the text of Chapter 8.

EXAMPLE OF HOW TO CALCULATE DEVELOPER CHARGE USING PWD FORMULA

Example Assumptions:

A_H = Asset Value of Headworks = \$10M
A_D = Asset Value of Distribution Works = \$6M
A_P = Asset Value of Pipework (Distribution Main 1, Distribution Main 2, Reticulation Pipework) = \$4M
N_H = Number of equivalent tenements served by Headworks = 15 000
N_D = Number of equivalent tenements served by Distribution Works = 15 000
N_P = Number of equivalent tenements served by Pipework = 15 000
C_P = Capacity of Pipework = 20 000 ETs
D = Net Scheme Debt = \$4M
n = Total number of equivalent tenements served = 15 000

Assume that no new pipework is required to serve the new development and that new development obtains 70% of its supply from Distribution Main 1, 30% from Distribution Main 2 and that existing reticulation pipework is unaffected.

say

A for Distribution Main 1 = \$1M, N for Main 1 = 7 500 ETs, C for Main 1 = 10 000 ETs,
A for Distribution Main 2 = \$1.2M, N for Main 2 = 7 500 ETs, C for Main 2 = 10 000 ETs,
A for Reticulation Pipework = \$1.8M, N for Reticulation Pipework = 15 000 ETs, C for Reticulation Pipework = 20 000 ETs.

Using the formula given in the text (equation 8.2) the following can then be calculated:

$$\frac{A_H}{N_H} = \frac{\$10M}{\$15{,}000} = \$\,667$$

$$\frac{A_D}{N_D} = \frac{\$6M}{15{,}000} = \$\,400$$

$$\text{Sum of p.}\frac{A_P}{C_P} = 0.7 \times \frac{\$1M}{10{,}000} + 0.3 \times \frac{\$1.2M}{10{,}000} = \$106$$

$$\frac{1}{N_P}\ \text{Sum of}\ A_p\left(1-\frac{N_p}{C_p}\right)=\frac{1}{15{,}000}\times\left[\$1M\times\left(1-\frac{7{,}500}{10{,}000}\right)+\$1.2M\times\left(1-\frac{7{,}500}{10{,}000}\right)\right.$$

$$\left.+\ \$1.8M\times\left(1-\frac{15{,}000}{20{,}000}\right)\right]=\$\ 67$$

$$\frac{D}{n}=\frac{\$4M}{15{,}000}=\$267$$

By substitution in equation (8.2)

Developer Contribution = $667 + $400 + $106 + $67 – $267

= $973 per equivalent tenement.