CHAPTER 1 INTRODUCTION, AIMS AND APPROACH OF THE STUDY

1.1 *The Nature of the Problem*

Urban infrastructure, such as water, sewerage, drainage, roads and open space, fulfils a vital, if unheralded, role in economic development. Until the 1950s, this infrastructure was financed by local council property rates, grants from higher levels of government and, where applicable, direct charges for connection and use of a service. In the mid-1950s, this situation began to change. It gradually became a requirement for developers to provide basic infrastructure, like sealed roads, gutters, footpaths and drainage, in their development subdivisions (Neutze 1995*b*:20). This form of finance has expanded until in recent decades it has become common for developers in some states to contribute substantially to both on-site and off-site infrastructure required to service development. New South Wales appears to be leading other states in using developer finance for local urban infrastructure, although legislation recently passed in two states (Tasmania and Victoria) and recent reviews of infrastructure financing in another (Queensland), suggest that these states are poised to embrace this form of funding to a similar extent.

The main difficulty with the increasing use of developer charges to finance local services is that these charges are levied in the absence of any coherent philosophy as to their rationale, other than their obvious revenue raising function. There appears to be a vague yet common acceptance that developer charges are in some sense a 'user pays' charge whereby development pays for its own servicing requirements, but exactly how this is effected is rarely spelt out. This is not to say that those responsible for policy, such as the Department of Urban Affairs and Planning in the case of New South Wales, have not put considerable effort into reviewing charging practice and recommending methods to ensure greater accountability, consistency and transparency of procedures. But the objectives of charges and the charging methodology have not been placed into a theoretical context. In particular, one basic question which seems to have been avoided altogether is the precise nature of the economic theory behind advocacy of user pays and how this theory applies to the unusual context of developer charges; that

is, to where a one-off capital charge for an infrastructure service is payable at the time of development consent.

When it is possible to charge a price for use of an infrastructure service, like water, and hence fund the service through a user charge, economists have provided a vast literature on how this form of financing should be implemented (see, for example, Chapter 3 of this study and a survey of the theory of marginal cost pricing by Bös (1986)). If local infrastructure is funded by property rates, economists have again developed theories as to the impact of such local taxes on the location of factors of production (see, for instance, Tiebout 1956 and Rubinfeld 1987), and offered advice as to the appropriate rate base (e.g. how property values should be assessed) and rate structure (see, for example, Musgave and Musgrave 1984:464-476). If grants from higher levels of government contribute to urban infrastructure funding, then economists have also developed theories on the rationale for intergovernmental grants (see, for instance, Oates 1972:65-118 and Hulten and Schwab 1997), on aspects of grant design, such as how to equalise fiscal capacities (see Mathews 1980), and on how to avoid unsought spending or revenue raising responses on the part of recipient governments (see, for example, Gramlich 1977, King 1992:31-41, and Hyman 1990:654-663). Surprisingly, however, developer financing of infrastructure, despite its growing popularity, has failed to capture the interest of economists to any similar extent. Questions such as the efficiency objectives of charges and the implications for charge design and calculation have generally been neglected.

There have been several studies of developer charges in Australia undertaken from a planning perspective (see, for instance, Planning Research Centre (PRC) 1994, Cox 1991 and Briggs 1992, 1990), but it appears that only a few economists have written on the subject. The focus of the economic commentary in the literature has been mainly on how charges impact on equity objectives (Neutze 1997:117-125, Industry Commission 1993), or how they compare broadly with other alternatives (Neutze 1995*b*, AURDR 1995*b*, Industry Commission 1993, Kirwan 1990). Researchers have examined the administrative efficiency of policy, focussing on practical implementation difficulties (Barnes and Dollery 1996*a*) and recommending

measures, such as the adoption of an *ad valorem* tax by smaller councils, to lower the transaction costs of policy (Barnes and Dollery 1996*b*). A number of government reports have suggested a set of pragmatic principles for setting developer charges for water (Brett 1993, Draper *et al.* 1996, New South Wales Government Pricing Tribunal 1995*b*, IPART 1997), but these are not given any explicit theoretical justification. In the international literature it appears that the focus of research has been on model development to show how impact fees or exactions (as developer charges are usually termed in the north American literature) compare with other funding alternatives (see, for example, Brueckner 1997) or to investigate the incidence of impact fees (see, for instance, Yinger 1998; Singell and Lillydahl 1990; Skaburskis and Qadeer 1992 and Delaney and Smith 1989). Levine (1994), Peiser (1988) and Snyder and Stegman (1987) do address issues in the design of impact fees, but their main concern is with equity issues and no awareness is shown of the economic efficiency consequences of charges as a whole or of alternative methods of calculation. Lee (1988) does at least recognise the economic efficiency implications of impact fee design, and Lee (1988) and Downing and McCaleb (1987) do briefly employ some basic microeconomic theory.

1.2 *The Aims of This Study*

This study has two major objectives. To attempt to redress the apparent neglect by economists of a theoretical basis for developer charges, the first task is to examine the economic theory which recommends user pays policies and to attempt to formulate a theory which is applicable to the context of developer charges. From these theoretical underpinnings, the potential efficiency objectives of developer charges will be identified, a set of principles to guide the design of charges will be proposed, and a method for calculating rational developer charges suggested.

The second major task is to evaluate the practice of determining developer charges in New South Wales. In undertaking this task it is important not only to note where practice departs from economic principle, but also to assess the practicality of the principles themselves. From this perspective, a critique of policy advice currently

being given to practitioners will be provided and improvements and refinements to current practice suggested where possible.

Some objection might be anticipated on the need for a formal theoretical analysis of developer charges. The policy itself has been in place for a number of years in New South Wales. In broad terms it is accepted by developers and methods of calculation of charges which are derived from intuitive analysis and accounting principles are being recommended by consultants to councils. However, in the absence of a coherent theoretical framework, there is little to guide practitioners on matters where intuitive analysis cannot provide definitive answers. A policy environment of unnecessary uncertainty and wide diversity of practice across councils can result. In interviews conducted for the purposes of the present study, testimony has highlighted the frustrations of attempting to conduct policy in an 'academic vacuum' (Jardine, D. 1997, Tweed Shire Council, pers. comm., 13 February).

In order to achieve the major objectives for this study, a number of subsidiary questions will have to be addressed. These include the following:

- What is the economic theory behind advocacy of 'user pays' pricing techniques? Which type of services is it appropriate to fund this way? Can this theory be applied to circumstances where an upfront lump sum payment is required?
- If so, what does the theory imply about the efficiency objectives of developer charges and how charges should be calculated? (For example, should charges be based on short run marginal cost or long run marginal cost? What characteristics of real world leviable infrastructure affect the method of calculation and how?
- How amenable to real world application is the ideal method of calculation of developer charges? Can the data required be found readily in local government databases? If not, what are the effects of choosing compromise methods?
- In addition to economic efficiency principles, what guidelines as to how to design developer charges policy (and particularly calculation methods) are suggested by other important economic evaluative criteria (such as equity concerns, environmental considerations and administrative efficiency)?

- How does the current practice of designing and calculating charges measure up against the theoretical requirements? What are the practical and conceptual problems encountered when attempting to apply efficiency principles? Do the problems vary with different types of infrastructure and, if so, what particular attributes of individual infrastructure services cause this? Can improvements be suggested so that, given its real world context, the developer charging system promotes efficiency as far as possible?

1.3 *The Approach of the Study*

This study embodies a normative approach to the economics of developer charges. It can be regarded as an exploration of the implications of neoclassical microeconomic theory for the problems of efficient resource allocation which are presented by raising revenues through charges on developers. From a formal theory of calculation of developer charges, which this study derives from marginal cost pricing theory, principles are determined which suggest how charges could and should be set. Real world practice is examined and suggestions made as to how efficiency might be promoted as far as possible.

The normative approach of the study, and its firm reliance on microeconomic theory, is not meant to imply that economic efficiency conditions should have any natural priority over legal, political, or equity considerations in the policy process (Weimer 1991, Weimer and Vining 1992). Nor does it indicate that the critiques of welfare economics are not acknowledged. These include the uncertainties created by the theory of second best (see, for instance, Lipsey and Lancaster 1956 and Oates 1972:121); the possible overstatement of the objectivity of economic efficiency conditions compared to other perspectives used in policy analysis (see, for example, Jenkins-Smith 1991:28; Bromley 1990; Sen 1987:29-58); the 'nirvana fallacy' (Demsetz 1969); and the recent challenges in the literature to the fundamental assumptions of microeconomic theory (see, for example, Jenkins-Smith 1991; Bromley 1990; Mishan 1980; Etzioni 1988; Hamilton 1994).

The approach to developer charges taken in this study can be justified on the grounds that the relative neglect of this field by economists has meant that few economic views are being presented *at all* in policy analysis, let alone taking priority in that process. Hence, as economists, it is argued that we ought to 'act as if there were an eager demand for the kinds of normative principles we develop' (Rees 1984:iv), at the same time as being alert to the techniques or assumptions of analysis which call for cautious assessment of the claims being made. Not to present the welfare economists' perspective at all on an issue may well be 'to let the case go by default, to leave the field clear to the obfuscations and fudges of accountants and the special pleading of particular interest groups' (Rees 1984:iv-v). Developer charges policy may be especially susceptible to these influences.

The particular features of the local environment in which developer charges policy is implemented (such as development ventures involving large sums of money, local politicians, possibly with vested financial as well as political interests, complex planning legislation requiring specialist expertise, and the likelihood of local opposition from anti-growth groups) suggest that a perspective of *political* efficiency (see, for example, Magee, Brock and Young 1989) from public choice theory, rather than *economic* efficiency from neoclassical microeconomic theory, may have provided far more illuminating insights into the motivations of the key players and real world policy outcomes at the local level. However, the defence of the current line of inquiry rests on the fact that there is, as yet, little to guide policy makers as to how charges ought to be set if they are to be economically rational, even if positive public choice theory can offer promising explanations of how charges are actually set in a real world context (see Wagner 1991 for a comprehensive study of user charges and earmarked taxes from a public choice perspective).

1.4 *Data Sources*

Various sources of data are used for the empirical component of this study. To evaluate current practice for setting water and sewerage charges, the study uses secondary sources for the review of procedures in metropolitan areas across Australia. No similar sources were available for the non-metropolitan areas of New South Wales.

However, the (then) New South Wales Department of Public Works had issued guidelines to councils as to how charges might be calculated, and a copy of these guidelines was obtained and then a sample of developer charges policy documents of some non-metropolitan councils, chosen randomly, was selected to examine the extent to which the guidelines were actually followed. For water and sewerage, since a change of procedures is imminent for both metropolitan and non-metropolitan councils, it was necessary to obtain information on the proposed reforms. This was obtained by attending a workshop on the new procedures held by the Independent Pricing and Regulatory Tribunal (IPART) in Sydney in 1997, and from official IPART source documents as well as unofficial communications with IPART officers.

To examine the current practice in setting 'Section 94' charges (that is, developer charges levied under Section 94 of the New South Wales *Environmental Planning and Assessment Act 1979* which authorises levies on infrastructure other than water and sewerage), the developer charges 'Contribution Plans' of 25 individual councils were gathered. Moreover, the Section 94 officers of 17 of these councils were interviewed (Appendix A to this study lists the officers interviewed).

Three factors influenced the choice of which councils' Contributions Plans to obtain from a possible 175 councils in New South Wales. First, the papers from a PRC sponsored conference in 1995 gave examples of Section 94 practice in some councils (PRC 1995*a*). Secondly, an interview with the Director of the PRC research indicated further councils to consult. And thirdly, the interviews with Section 94 officers in individual councils frequently referred to interesting approaches used by other councils. Due to length limitations on this study, it was possible to use only the most pertinent of the Contribution Plans collected as illustrations of current practice.

1.5 *Assumption of this Study: Developer Charges Will Continue to be an Important Source of Local Government Revenue*

It is important to emphasise at the outset that this is a study of how the current system of raising revenues via developer charges can be made more efficient. It is not a study of how developer charges compare in efficiency terms to alternative means of

raising revenues to fund urban infrastructure. The latter is a fundamentally different task requiring detailed examination of the efficiency consequences of feasible alternatives to developer charges. The concluding chapter to this study does briefly review some alternatives to developer charges, but the underlying assumption of the study is that it is simply not realistic to assume that councils will revert to funding infrastructure as they did in the past (through general rates), even if economists could point to greater efficiency benefits, or that they would replace developer charges with some other form of funding on economic efficiency grounds.

If anything, developer charges are likely to increase in importance. To date, they have proved to be an increasingly lucrative and relatively painless source of revenue to councils. They have some distinctly appealing attributes for those considering how to raise funds, as Altshuler and Gomez-Ibanez (1993:9) point out when attempting to explain the strong growth in the use of exactions on developers in the United States:

> The great appeal of exactions is that they generate revenue for achieving publicly defined purposes without offending any organized blocs of voters. Although developers would prefer not to be saddled with exactions, they generally are few in number, disinclined to mobilize against officials who can deny their permits, and optimistic about being able to pass exaction costs onto their customers. So long as they believe that exactions play an essential role in mitigating local skepticism about growth, that their competitors are bearing similar burdens, and that the market will support both exaction costs and healthy profit margins, they have every reason to go along.

There seems little doubt that these features are first and foremost the greatest attraction of developer charges to local councils in New South Wales. As we argue in Chapter 2, an increase in the use of developer charges in other states also appears imminent. Thus it is certainly timely, and perhaps even urgent, that the economic consequences of existing practice be studied carefully.

1.6 *Structure of This Study*

Chapter 2 of this study provides background information on the revenue and expenditure functions of local government in the Australian federal system, the history

of developer charges in New South Wales, and the reasons why this source of revenue has grown in recent decades. The chapter also surveys the evolution of developer charges policy of other Australian states.

After Chapter 2, the structure of the study follows broadly the questions identified in section 1.2 above. Chapters 3, 4, 5, 6 and 7 comprise the central theoretical core of the study. Chapter 3 commences the exploration of the economic theory behind user pays pricing techniques. This chapter poses the following question: on what grounds is user pays pricing justified? In answering this question we find that behind the simple intuitive rationale for marginal cost pricing lies considerable theoretical complexity and controversy. One important issue from the point of view of a study attempting to derive pragmatic guidelines on efficient charging can be phrased in terms of the following question: is it the short run marginal cost (SRMC) or the long run marginal cost (LRMC) to which charges should be set? This issue has a long history and an extensive literature beset with controversy. The chapter reviews some of this literature and describes the conventional wisdom on efficient pricing. An important next step undertaken in the chapter is to examine the points of departure between the assumptions of the standard theory and the dimensions of the problem in the context of developer charges and realistic assumptions about the nature of urban infrastructure services being considered.

Chapter 4 takes up one of the major conclusions of Chapter 3; namely that efficiency benefits of developer charges will not derive from pricing according to marginal costs of *using* a service (which is the focus of most of the conventional literature on the efficiency benefits of marginal cost pricing), but may obtain when charges are set to the marginal cost of *access* to a service. Chapter 4 examines the theory underlying claims that the potential efficiency benefits of developer charges lie in their ability to signal locational variation in costs.

How the incremental costs of providing access to a service might be assessed and what theory underlies this measurement forms the subject matter of Chapter 5. Chapter 6 then tests both an ideal method of calculation of charges identified in Chapter 5, and

several compromise methods which use data which is likely to be obtained more readily from local government financial data. A simulation model is set up whereby the charges calculated using the various methods can be compared under different circumstances. Sensitivity tests of the effect on charges of changes in key parameters are also performed.

Chapter 7 summarises the basic principles derived from allocative efficiency considerations in the earlier chapters. The chapter then attempts to provide a broad overview of the issues which arise if charges are designed to incorporate other evaluative criteria, such as equity, environmental and administrative considerations.

Chapters 8, 9 and 10 form the empirical core of this study. These chapters examine current practice and current policy advice on a range of leviable urban infrastructure. Chapter 8 examines water and sewerage; Chapter 9 investigates open space and roads; and Chapter 10 discusses drainage and a diverse range of other types of Section 94 levies.

Chapter 11 summarises the main results of this study. It also proposes a step-by-step method for the calculation of charges which attempts to avoid some of the pitfalls evident in current practice. The chapter concludes with a brief review of the opinions expressed by various commentators on the desirability of funding infrastructure by developer charges relative to other feasible funding options.

CHAPTER 2 LOCAL GOVERNMENT: FUNCTIONS AND FINANCES

2.1 *Introduction*

Australian local governments, unlike most of their counterparts overseas, have a relatively limited range of public sector responsibilities. Whilst outlays from the local tier of government comprise only five per cent of total public outlays in Australia, Walsh (1989:119) points out that local government in Europe and North America on average account for three times this percentage.

The Australian statistics understate the role which local government plays in capital formation in the economy. Currently local government contributes around 15 per cent of gross fixed capital expenditure (Australian Bureau of Statistics 1995) thereby maintaining a role in this sphere which has been important historically. Cutts (1989:5) has made this point as follows:

> Nevertheless, for well over fourteen decades local government has been responsible for more than a quarter of the public sector capital formation undertaken within this country and (with the exception of railways and defence installations) participates in all forms of construction activity undertaken by the public sector. Between 30 to 40 per cent of all construction expenditure on electricity distribution, roads and highways, water distribution and sewer systems is undertaken by the Local Government sector.

Lang (1991:viii, 15) has argued that local government plays a significant role in the provision and management of urban infrastructure and notes that capital outlays represent about 40 per cent of the total outlays of local government. This compares with a figure of 20 per cent for state governments and five per cent for the Commonwealth. However, she emphasises that the scope of this role has not been recognised and that detailed data is difficult to obtain (Lang 1991:viii):

> In the work on infrastructure financing to date, it is surprising that Local Government's role has not been recognised. There are only very rough estimates available from the States, of Local Government's role and the percentage of the costs which it bears. To engage in an informed debate on equitable and efficient forms

> of urban infrastructure provision, there needs to be accurate data on what the true costs are and who is bearing them.

This dearth of data is a problem encountered in this study when we attempt to establish the significance of developer funding of infrastructure.

The purpose of this chapter is to provide an overview of the role that local government plays in the Australian federal system: that is, exactly what it is that local governments do and how they finance their functions. This will then form a prelude to the second objective of the chapter which is to describe the evolution and growth of developer financing of urban infrastructure.

The chapter is organised into five main sections. In section 2.2 we describe the evolution of local government in Australia. This is followed in section 2.3 by a description of local government powers in the federation and recent reforms taking place in local government. An examination of the functions of local government is undertaken in section 2.4. The principal means by which these activities are financed is reviewed in section 2.5, leading to the discussion of the origins and growing use of developer charges in section 2.6. After a general introduction (section 2.6.1) this discussion focuses in particular on developments in New South Wales (section 2.6.2), and concludes with a brief survey of the extent of use of developer charges in other states of Australia (section 2.6.3).

2.2 *The Evolution of Local Government in Australia*

The evolution of local government in Australia occurred mostly during the second half of the 19th and in the early 20th centuries. Events in each state were quite different, and the enthusiasm for local self-government varied, it seemed, both between and within states. Three common factors tend to recur. These are:

- the ambivalence of the colonial government during the first efforts to set up local government;
- local taxpayer reluctance to the idea (because local government requires local finance); and

- the primacy of financial considerations as the costs of economic development of Australia rose.

Early European settlement of Australia was governed by the British imperial government. Australia was a convict settlement, and evidently its origins as a 'British gaol' strongly influenced the attitude of its governors (Jones 1981:2). The first attempts by colonial authorities to impose a system of local government failed to consider local opinion or appreciate local conditions. Attempts to impose rules regarding voting rights and other regulations met with fierce local opposition. In New South Wales, the result of the early experience with attempts to introduce local government in 1842 was that the state did not embrace local government with any degree of enthusiasm for several decades.

A second restraint on movements towards local control was the fact that the most powerful and articulate members of local communities were often landholders who, unsurprisingly, were reluctant to pay the taxes required for local government. So long as either the British or the colonial governments continued to provide the necessary services, there appeared to be no need to change the system in any case. However, by the middle of the late 19th century, major demands were being placed on these increasingly reluctant governments. The need to find extra revenue became paramount.

Conditions in Australia were harsh. The difficult terrain, climate and vast distances between centres meant that infrastructure, such as railways, roads, bridges, wharves and jetties, was costly to provide. The British were keen to pass on some of this financial responsibility and, notwithstanding the local reluctance to foot the bill, the need for economic development and the desire of local communities to overcome isolation underscored the importance of acquiring the crucial infrastructure. 'Wresting a living from the land' and overcoming 'the tyranny of distance' were pragmatic forces motivating communities to organise locally (Balmer 1989:1). Those forces also encouraged cash-strapped colonial governments to cede some responsibilities. The

provision of roads especially was the most urgent need and became the primary responsibility of early local governments.

In the early townships, threats to general health and personal safety added an extra dimension to the need to organise locally. Unsafe building practices and the need for sewage disposal, drainage and clean water became important considerations from the middle of the 19th century onwards. In the event, services like water supply and sewerage (and later gas, electricity and transport) initially supplied by local government, were later taken out of the realm of local government in most states and given to specifically constituted utilities. The reasons for these decisions lay partly in the fact that by the time these services became important priorities in the cities, so many small local authorities had been created that economies of scale could not be gained by small-scale provision of these services requiring large capital outlays. The other reason these services were removed from local government was that the early local governing bodies were evidently not good at co-operating with one another (Balmer 1989:2).

One of the questions which arises when considering the origins of Australian local government is why were the local governments which were established so small? The vast distances and dispersed populations suggest an answer, because these factors meant that outside the cities, there were many relatively isolated local communities of only small numbers of people. Within the cities, a number of institutional factors may have had an influence in the 19th century. For example, for a time in New South Wales, a municipality could be created by a petition of only 50 ratepayers. By contrast, Victoria required 'not less than 300 people living in an area of not more than nine square miles' (Jones 1981:34). In all states, grant assistance was offered to encourage areas to become incorporated and it is possible that, as indicated in one Victorian report of 1862-63, grant assistance was encouraging the formation of uneconomic municipalities (Jones 1981:35). Whatever the reasons, there is little doubt that by the end of the 19th century many commentators held the view that there were too many local authorities in Australia. Pressures to amalgamate small municipalities have been fiercely resisted ever since and have been largely unsuccessful until very recently (see

Dollery 1997*b* and Vince 1997 for an analysis of recent developments in local government amalgamations).

One point of striking similarity that did emerge during the evolution of local governments in all states was that they all ended up with a large range of homogeneous and mostly minor functions. This had much to do with their 'services to property' orientation in a vast and difficult environment. It is often said that the finer points of self-government philosophies, which might have motivated local communities to seek control over education and health services, had to be overlooked due to the enormity and urgency of the task of developing the country (Balmer 1989:1). At the same time, it is a fact that colonial governments were reluctant to pass down these sorts of functions in any case.

2.3 *The Powers of Local Government*

At the time of Federation in 1901 the pattern of local government across Australia was largely already established. The size of local authorities was small, the range of functions relatively minor, their sources of revenue (mostly rates on property) limited, and they were firmly under the control of respective state governments. Perhaps this is why local government was ignored during the federation process, or possibly it was simply the preoccupation with the need to define the role for the new federal government. Either way, local government was not recognised at all in the new Australian Constitution.

Local governments in Australia thus continue to derive their powers solely from state legislation. Most of these powers are contained in a Local Government Act in each state. But there are other Acts which confer a specific function or power to local government as part of legislation addressing a particular problem. For example, in New South Wales, current legislation which confers specific powers are the *Environmental Planning and Assessment Act 1979*, the *Public Health Act 1991*, the *Roads Act 1993*, the *Noxious Weed Act 1993*, the *Impounding Act 1993* and the *Water Supply Authorities Act 1987* (Pearson 1994:232). Similar legislation exists in other states.

The primary powers and functions contained in the Local Government Acts in each state have been re-enacted recently as all states have revised extant legislation. For example, in New South Wales, the new legislation, the *Local Government Act 1993*, is quite different from the *Local Government Act 1919*, which it supplanted. The old Act attempted to prescribe powers exhaustively and specifically. Over the years as responsibilities and technologies evolved, it was necessary to keep amending the legislation until eventually it became unwieldy and almost unworkable. This was apparently the situation in the other states as well. In commenting on the inadequacies of the earlier Acts, the Australian Council for Intergovernment Relations (ACIR) noted that these Acts became complex and difficult because of 'their size, the frequency with which they [were] amended and the infrequency with which they [were] completely revised' (ACIR 1984:112). New Acts passed in each state tend to be much less prescriptive. For example, in New South Wales, instead of a detailed list of functions, it is left to the council (in consultation with the community) to determine what it will undertake, subject to resource constraints. The crucial idea is that a council will decide to undertake an activity according to whether it has the community support and resources to do so, rather than whether or not it has the requisite legal power (Pearson 1994:233, 235). The powers and functions of local government can now move more in accordance with the expectations of the community.

Despite recent changes in local government legislation in all states, the states still retain fully their absolute powers over their local governments. In some ways local governments could be viewed as just another part of a state's administrative apparatus (such as ordinary government departments and public authorities), except that local government is multifunctional and created to serve local needs, and its 'directors' are elected by the public. They also have the power to initiate legislation (by-laws) and to levy property taxes (rates). This gives them higher status than most administrative units of the state, but in respect of both these powers they are subject to state supervision and oversight. For example, in New South Wales since 1977, the government has sought to limit the increases in Councils' overall rate revenues by 'pegging' rates to a maximum permissible annual rate increase.

In addition to the reforms to local government Acts in recent years, both state and federal governments have exerted increased pressure on local government to undertake a range of changes designed to make local government more efficient. Two salient examples are the deregulation of the local government labour market and the initiation of a Local Approvals Review Program. The latter aims to make more efficient the approvals process for housing and other urban development (Aulich 1997:195). More recently, the principles of the *Independent Committee of Inquiry into a National Competition Policy* (the 'Hilmer Report') have been formally accepted by each state and territory, and a program of reform based on these has begun to affect local government. Local government is required to apply competitive principles to their functions and business activities. This will involve *inter alia* ensuring that all costs are taken into account when charging for services, reviewing local government regulations which restrict competition, and examining the potential for structural reform of local government monopolies (IPART 1997*a*:11). For example, in New South Wales, the state government has released a policy statement on how National Competition Policy is to apply to local government. The statement emphasises the need for councils to adopt a policy of competition and specifically encourages them to measure performance, undertake benchmarking, contract out and review both regulatory processes and service provision generally (IPART 1997*a*:11).

2.4 *The Functions of Local Government*

The most economically important functions of local governments in Australia characteristically possess the 'services to property' orientation with which local governments began. Examples include roads, drainage, sewerage and water supply (where these are not supplied by single function authorities), waste management, footpaths and flood mitigation works. Local governments still do not have responsibility for any of the major social policy services of local interest, such as schooling, hospitals or police, which local governments in many other federations have. For example, in the United States, in addition to possessing all the functions of Australian local councils, municipalities also generally have sole responsibility for primary and secondary education (that is, local schools), they are the major funding

sources for the police force, health care and hospitals, and they also contribute significantly to social security spending (Ferris 1992:94). By contrast, Australian local governments have moved into a wide range of relatively minor welfare and other 'services to persons' in recent decades, but not to any significant degree.

To account for their five per cent of total outlays in Australia, local governments have, in addition to the infrastructure services mentioned, a large range of relatively minor functions. The Australian Bureau of Statistics (ABS) regularly publishes tables on local government expenditures (ABS Government Financial Statistics, Australia, Catalogue No. 5512) but it is difficult to get an idea of the actual functions performed by local authorities from the broad classifications given. By adding data from Commonwealth Grants Commission (1991), Table 2.1 below attempts to provide some examples of functions performed by local governments under the ABS's main groupings. Table 2.1 indicates a considerable breadth of relatively minor functions.

Table 2.1: Examples of Local Government Functions Performed Under ABS Classifications

ABS category	Functions
General public services	Includes expenditures relating to council members and council staff (including superannuation benefits), the cost of administration of the financial affairs of government, management of personnel and other general services
Public order and safety	Includes support of fire protection services and fire brigades, animal protection, life saving, beach patrol, beach inspection
Education	Includes operation of preschools, kindergartens, adult education courses, support of student hostels, provision of scholarships, transport of school children
Health	Includes expenditure on baby health centres, community health centres, women's health centres, centres for handicapped, mothercraft clinics, health inspection services, immunisation clinics, school dental programs, school health services, health education programs

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Table 2.1 (continued)

ABS category	Functions
Welfare	Includes support for play centres, creches, day and occasional care centres, after school care, holiday care emergency care services Also includes outlays in support of neighbourhood centres, services for the aged such as nursing homes, hostels and other accommodation, senior citizens' centres, community transport, sheltered employment workshops and other facilities/ activities for handicapped, women's refuges, counselling services (for example marriage, youth counselling), tourist information bureaus
Housing and community amenities - including • housing and community development	Includes provision of housing for the general community and people with special needs, housing for use by council employees, administration costs for urban planning (such as administration of zoning laws, development control laws and other regulations on land use), new sub-division planning
Water supply	Includes outlays on water supply services (including those financed by grants) for expansion or operation of water systems, for community information on water management, for research into conservation or distribution of water
Sanitation and protection of the environment	Includes expenditure on household garbage and industrial waste disposal, disposal of dangerous wastes, street cleaning and cleaning of recreation areas and foreshores, anti-litter enforcement campaigns, maintenance and construction of urban stormwater drainage systems, flood mitigation works, outlays on sewerage collection, treatment and disposal systems, effluent drainage systems, septic tank cleaning and inspection services, outlays on air quality and noise level monitoring, control and prevention of erosion of beaches and outlays on other environmental protection research
Other community amenities	Includes outlays on design, installation, upgrading and maintenance of street lighting, outlays on public conveniences, bus shelters, cemeteries, cremation
Recreation and culture including • recreational facilities and services	Includes outlays on public recreation halls, civic centres, indoor sporting complexes, swimming pools, beach and pool dressing sheds and other beach support services, outlays on football and cricket grounds, tennis courts, golf-links, recreational parks and gardens, playgrounds, BBQ areas, walking and cycling paths

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Table 2.1 (continued)

ABS category	Functions
Cultural facilities	Includes costs of library services, museums, art galleries and cultural festivals
Fuel and energy	Includes costs of electricity and gas supply
Transport and communications	Includes outlays relating to road and bridge construction and maintenance, street parking, parking attendants and inspectors

Sources: Derived from ABS Catalogue No. 1217.0, 1989, *Classifications Manual for Government Finance Statistics, Australia* and Commonwealth Grants Commission (1991), *Report on the Interstate Distribution of General Purpose Grants for Local Government*, pp.136-142.

Like all governments, local authorities spend for current purposes (that is, on goods and services which are used almost immediately, like wages), and they also spend for capital purposes (that is, on such things as buildings, sewerage and drainage systems etc. which are intended to provide services for many years.) Table 2.2 indicates how much of the spending within each broad ABS category went on providing a current service and how much went into capital works in the year 1993-94. As one might expect, those categories which have the highest capital components of total spending are Transport and Communications (e.g. roads), Housing and Community Amenities (e.g. sewerage, stormwater drainage) and Recreation and Culture (e.g. sporting complexes, libraries). Table 2.2 also indicates that local governments' contribution to Health and to Welfare, on the other hand, consists predominantly of provision of current services rather than to building structures to house these services. Combining capital and recurrent outlays shows that in terms of overall significance, Transport and Communications (which mainly comprises roads expenditures) is still the most important category of local spending. Following closely behind are Housing and Community Amenities, Recreation and Culture, and General Public Services. The latter is the cost of running the business of local government and it is with an eye to reducing the costs in this category that many of the reforms mentioned earlier are focussed.

Apart from their direct contribution to economic activity in Australia, it should be noted that there are many other less tangible ways in which local governments can

influence the nature and extent of local economic development. For example, local governments' land use planning powers, particularly zoning laws (which control the nature of development within a zone) can affect economic activity, in common with the development control powers of local councils. Under the latter, councils can attach certain 'conditions' to approval of a development application. Included amongst these might be the requirement for a payment towards the cost of infrastructure a development will use; that is, the developer charges which are the subject of this study.

Table 2.2: Current and Capital Outlays by Local Government Within Major ABS Groupings 1993-94 ($ million)

	Current	Capital	Total
General Public Services	1 211	181	1 392
Public Order and Safety	120	8	128
Education	37	6	44
Health	156	5	160
Welfare	358	36	394
Housing and Community Activities	773	628	1 400
Recreation and Culture	918	405	1 323
Fuel and Energy	1	26	27
Transport and Communications	1 150	1 070	2 220

Source: Australian Bureau of Statistics, *Government Finance Statistics 1993-94*, Catalogue No. 5512.

2.5 *How Local Governments Finance Their Functions*

When discussing revenue raising in the Australian federal system, one of the most significant and controversial features is the marked vertical fiscal imbalance. This refers to the fact that over the years since Federation, the Commonwealth has come to command financial resources well in excess of its expenditure needs, whilst the independent revenue sources available to the states are inadequate to enable them to discharge their Constitutional responsibilities (Mathews and Grewal 1997:26). For example, in 1993-94 the Commonwealth Government raised 74 per cent of total taxation revenue and was responsible for some 53 per cent of total public sector outlays (excluding intergovernmental transfers). By contrast, the states raised only

21 per cent of taxation revenues but accounted for 42 per cent of public sector outlays (Australian Bureau of Statistics 1995, Commonwealth Government 1996:12). Whilst the effects of the financial dominance of the Commonwealth Government manifest themselves in a variety of subtle (and perhaps undesirable) ways in intergovernmental financial relations as a whole (see, for example, Mathews and Grewal 1997:766-772) and in financial relations with local government (see Walsh 1989 esp. p.120, 125), local government itself is less dependent on funds from the Commonwealth than state governments. In 1993-94 local government raised from its own sources just over four per cent of total public sector outlays and spent some five per cent of public sector outlays (ABS 1995, Commonwealth Government 1996:12). It is local government's ability to raise revenues from rates on land which largely accounts for this lesser fiscal dependence.

In New South Wales in 1995-96, rate revenue comprised 47.2 per cent of local government receipts, with grants from other levels of government at 18.7 per cent, user charges 18.1 per cent, interest and 'other operating revenue' 6.7 per cent and developer charges accounting for the remaining 9.5 per cent[1] (Jollife, D. 1998, ABS, pers. comm., 4 March). The reliance on rate revenues versus grant revenue varies quite significantly between councils within New South Wales. Grant revenues are far more important to councils in rural and remote areas, whilst metropolitan areas are proportionately more dependent on rate revenues (Australian Urban and Regional Development Review (AURDR) 1994:77). About three quarters of the grant revenue comes from the Commonwealth and about 60 per cent of this is general untied assistance.

The reliance on developer charges revenue also varies by council. Calculations from a table supplied in Barnes and Dollery (1996*b*:Table 1, p.123) indicate that smaller councils in New South Wales (those with populations of less than 7 000) comprise 39 per cent of councils in the state but raise only 4 per cent of developer charges revenue. Medium size councils (those with populations between 7 000 and 40 000) comprise 37 per cent of councils and raise 25 per cent of developer charges

[1] Percentages add to 100.2 per cent due to rounding.

revenue, whilst the larger councils (populations over 40 000) accounting for the remaining 25 per cent of councils raise no less than 69 per cent of developer charges revenue.[2]

Further analysis of the significance or growth in developer charges as a form of infrastructure financing is severely constrained by data limitations. The ABS has just begun to collect data on developer contributions and charges and the reliability of this data is affected by the change in local government accounting systems from cash accounting to accrual accounting. When accounts were kept in cash accounting format, the value of assets contributed in-kind and transferred to councils, did not need to be included. Thus a substantial component of capital expenditure by developers was not brought to account (see Bishop 1997 for a discussion of the impact of the introduction of accrual accounting in local government). The ABS does not yet publish the data it has been collecting.[3] This means that year on year growth in this form of funding is therefore not ascertainable. Nor it is possible to gauge the significance of the stock of capital assets provided, or contributed to, by developers since the policy began. However, it is possible to get a broad indication of the proportion of capital expenditures of local government financed by developers for the single year 1995-96. Using a figure of $299m. for the item 'contributions for capital purposes', as supplied by the ABS for this study, the proportion of developer financed capital expenditure to total capital expenditure in New South Wales for that year is 28 per cent. However, this figure does not include $132m., almost half as much again, for 'contributions for operating purposes' (e.g. cash contributions and developer charges for recurrent funding of roads) since these latter amounts are classified as current (rather than

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[2] The method of assessing total developer charges collected in New South Wales in 1993 by Barnes and Dollery (1996*b*) is not comparable with data provided by the ABS for 1995-96 for the purposes of this study, due to the introduction of accrual accounting in local government since 1993. Nevertheless the Barnes and Dollery (1996*b*:123) estimate can be used as a broad indication of the spread of charges between councils of different size.

[3] Data on cash contributions for Section 94 charges in 1993 was supplied for the purposes of this study in March 1997 (see Appendix B to this thesis). It has been used only to indicate broadly the relative importance of Section 94 items. The ABS expressed strong reservations at that time about the quality of data being supplied to the ABS from the financial statements of local councils.

capital) receipts.[4] Clearly, a higher significance of developer contributions is indicated. (For a discussion of the problems of estimating the significance of developer contributions in 1995, see Neutze 1995*b*:22-24).

2.6 *Growth in the Use of Developer Charges to Finance Urban Infrastructure*

Even though the trend cannot be quantified with any degree of precision, it is apparent that the use of developer charges in New South Wales has been growing steadily, and that greater use of this form of finance is highly likely in all four eastern states of Australia. Accordingly, we shall provide an overview of the origins of developer charges and then survey the developments in each state. However, the major part of our analysis will concentrate on developments in New South Wales.

2.6.1 *The Origins of Developer Charges*

As noted in Chapter 1, financing the provision of basic urban infrastructure, such as water, sewerage, drainage, roads, open space, electricity and telecommunications, was accepted as the responsibility of local authorities or the relevant public utilities prior to the 1950s (Housing Cost Inquiry 1978, Vol.3:473). Infrastructure was financed directly from rate revenue (or public utility rate revenues), or by loans serviced by rate revenues and partly by assistance from other levels of government. The responsibilities of developers were generally limited to providing cleared, graded (but unsealed) roads, registering their subdivision, and marketing the land (Neutze 1995*b*:20, Housing Cost Inquiry 1978, Vol.3:473). Because there was little financial risk for developers, the Housing Cost Inquiry (1978) notes that developers tended to be over-ambitious in their assessment of demand and in many cases serviced land was under-utilised for long periods.

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[4] The estimate of 'contributions for capital purposes' ($299m.) and 'contributions for current purposes' ($132m.) in 1995-96 were supplied by the ABS in March 1998 (Jollife, D. 1998, ABS, pers. comm. 4 March) - see Appendix B to this thesis for a table of the data supplied. The proportion of capital expenditure financed by developer contributions is calculated by dividing the ABS supplied $298.8m. by a capital expenditure (purchase of assets) figure of $1 086.0m. supplied in Independent Pricing and Regulatory Tribunal (IPART) 1997*a*, p.8. The latter figure is sourced to a 'Department of Local Government database'. Since an independent assessment of either figure cannot be made, it is not advanced with confidence although total revenues for 1995-96, as supplied by ABS, are of similar magnitude to total expenditures as indicated in IPART (1997*a*, p.8). The uncertainty and frustrations surrounding the attempt to obtain an estimate of the significance of developer contributions are a consequence of a recent downgrading by the ABS of priority for local government statistics generally.

The major difficulty with this arrangement, according to the Housing Cost Inquiry (1978, Vol.3:473), was that councils and utilities were vulnerable to a substantial capital commitment over which they had little control, and gradually during the late 1950s and 1960s they began to use planning powers to induce developers to provide some of the services. In the post war period of buoyant demand, developers offered little resistance to these requirements and in some cases they volunteered to fund service extensions in order to reduce delays in marketing fully serviced lots (Housing Cost Inquiry 1978, Vol.1:89). By the early 1970s, it was commonplace for developers to meet the full cost of on-site infrastructure (roads, drainage, water, sewerage, electricity, street lighting, footpaths and open space and recreation areas) and by the late 1970s contributions for off-site infrastructure were also being sought. According to the Housing Cost Inquiry in 1978, charges were then being levied for off-site major works for roads, drainage, water and sewerage, and charges towards the costs of headworks for these services also applied in all states, except South Australia, Tasmania and the Australian Capital Territory (Neutze 1995*b*:21). Subsequent developments in each state have seen New South Wales emerge as the state to make the greatest use of developer financing of local infrastructure. It is apparent also that New South Wales is leading the way in terms of the lessons to be learned in the implementation of policy. Policy guidelines recently established in Victoria and Tasmania (and discussed further below) are similar in many respects to the New South Wales model.

2.6.2 *The Evolution of Policy in New South Wales and the Increasing Popularity of Charges*

The Evolution of Policy

One advantage of the infrastructure financing arrangements which had evolved during the 'boom' periods of the 1960s and 1970s (apart from the fact that developers seemed prepared to part with the finance indeed, as noted, sometimes initiating the payments) was that developers were less inclined to seek development away from the major utilities and a 'more rational and efficient pattern of development' emerged (Simpson 1989:18). An attempt was made to formalise the arrangements in an

Environment Planning Bill in 1976 which subsequently lapsed following a change in government. In the event, it was the *Environmental Planning and Assessment Act 1979* (EPAA 1979) and, in particular, section 94 of the Act which 'codified' the existing developer financing practice (Simpson 1989:19). During the 1980s, the range of items for which contributions were sought began to widen. The application of contributions continued to be 'relatively unfettered' (Simpson 1989:21) so that by 1989 there was a considerable breadth in the type of facilities for which developer charges were levied. Table 2.3 indicates the items for which councils either were levying charges or intending to levy them as at 1989 (Simpson 1989:74-75). Ten years after the enactment of the EPAA 1979, the Simpson Inquiry was commissioned in response to growing concerns about the accountability of councils for the money received from developers (Shankie-Williams 1992:33). Moreover, differences of opinion were being expressed as to whether limits should apply to the amounts or type of service being levied and also as to the impact of Section 94 on the price of land (Simpson 1989:7; Vipond 1990:2). The Commissioner addressed these issues as well as a wide range of other matters in connection with the application of Section 94. One of the main findings was that accountability of developer charges did need to be improved and a recommendation was made that councils prepare specific plans (now called 'Contributions Plans') before charges could be levied. An open, public plan-making process was designed to improve accountability (Shankie-Williams 1992:33), as were various requirements within Plans, such as establishing clearly the need for development ('the nexus'), indicating how the need would be satisfied and over what time period, and what formulae would be used (Simpson 1989:5).

Simpson (1989) recommended against the imposition of a limit on the amount of the contribution which could be levied. He did so on the grounds that a limit was not consistent with his view that Section 94 was a special 'user pays' type of charge (Simpson 1989:4). Hence it would contravene attempts to reflect in the charge a variation in costs attributable to different locations. Simpson also sought not to confine the purposes for which levies were sought so long as levies are 'properly nexus tested, ... fairly and reasonably apportioned, effectively operated and publicly accountable' (Simpson 1989:132).

Table 2.3: Leviable Items Listed in the Simpson Report

- Community facilities such as
  - child care facilities
  - youth group and activities
  - family services and activities
  - aged persons facilities
  - multi purpose community based services
  - cemetery expansion
  - libraries
  - district level facilities
  - civic centres
  - swimming facilities
  - indoor recreation facilities
  - theatres
  - arts and crafts centres
- Roads, arterial and sub-arterial
- Cycle tracks
- Pedestrian ways
- Public toilets
- Town centre pedestrian mall and landscaping
- Boat ramps
- Flood mitigation works
- Tree planting
- Bushfire service facilities
- State emergency service facilities
- Soil conservation works
- Beach and foreshore protection works
- Airport facilities
- Pollution control of urban stormwater run-off
- Erosion control
- Trade waste disposal facilities
- Mobile facilities:
  - mobile library
  - communal transport
- Public housing
- Recurrent costs and maintenance costs
- Major refurbishment costs
- Associated study costs

Source: Simpson (1989: 74-75).

Five years later in 1994, the New South Wales Department of Urban Affairs and Planning commissioned the Planning Research Centre (PRC) at Sydney University to conduct an independent assessment of the quality of the Contribution Plans which had been inaugurated by Simpson. In particular, the objective of the review was to 'assess current practice in all aspects of Section 94 plan making administration and

implementation (except accounting) and to assess the extent to which the 'policy intent' of Section 94 was being met (PRC 1994:6). The PRC surveyed 99 Contribution Plans from 24 councils which were representative of inner urban, fringe, coastal, rural, urban and small rural councils (Toon 1995*b*:3). The PRC found that there were some important areas where most councils performed quite poorly. For example, little effort was focussed on demonstrating nexus between additional development and additional demand for services and facilities. Recommendations were made as to how to enhance such areas as well as how to improve the presentation, clarity, accessibility, and authority of information provided. It is evident from the Contribution Plans collected for this study that the post PRC review Plans (those amended in 1996 or 1997) are presented at a markedly higher standard than some of the earlier Plans (see, for example, Hornsby Shire Council, 1997 and Tweed Shire Council, 1997). A *Section 94 Contributions Plan Manual* which is issued by the New South Wales Department of Urban Affairs and Planning was revised in 1997 to reflect many of the recommendations of the PRC review.

A further development in policy in New South Wales has been that Section 94 was amended in 1993 to remove from the EPAA 1979 the ability to levy for water and sewerage (New South Wales Department of Urban Affairs and Planning 1997:16). Authority to levy for water and sewerage is now contained in Section 64 of the New South Wales Local Government Act 1993. This change is discussed further in Chapters 8 and 10.

Explaining the Popularity of Developer Charges in New South Wales

The Industry Commission (1993:144) offers three reasons for why the 'trend toward developer contributions' has been 'accelerating': governments have sought to limit borrowing, user pays principles have become more widely accepted; and 'costs have been increasing (for example, from having to meet higher environmental standards)'. Similar explanations are offered by Simpson (1989:1) and the Housing Cost Inquiry (1978, Vol.3:312).

Although the Commission offers no elaboration in support of these reasons it is clear that all three reasons are plausible explanations. As far as borrowings by local governments are concerned, these are determined by their respective state governments and, in turn, state government borrowing programs fall within the purview of the Commonwealth Loan Council. Under new arrangements introduced in 1993 (which replaced the previous 'global limits' system), states are allocated a Loan Council Allocation (LCA) by the Loan Council according to a state's fiscal position and the borrowing requirements and fiscal positions of all other governments including the federal government. Although the new arrangements were supposed to give greater freedom and responsibility to states, Mathews and Grewal (1997:599) argue that 'the whole approach is essentially an exercise in fiscal restraint'. The recent contraction of the borrowing programs of the states (and local authorities) continues a trend which began, in fact, in the mid 1980s (see Mathews and Grewal 1997:594). Table 2.4 demonstrates the impact of this trend on borrowings by local government authorities.

Table 2.4 New Money Borrowings by Local Government Authorities 1984-85 to 1993-94 ($ million)

	1984-1985	1985-1986	1986-1987	1987-1988	1988-1989	1989-1990	1990-1991	1991-1992	1992-1993	1993-1994[a]
Total new money	819.5	748.5	718.4	622.9	654.0	558.7	580.8	625.5	564.0	562.9
% of GDP	0.4	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.1	0.1

[a] Estimate. Later figures not available.

Source: Adapted from Mathews and Grewal 1997, Table 12.11, p.608.

Figures for later years are no longer available, but data supplied by the ABS, specifically for the purpose of this study (see Appendix B to this study), confirm a marked downward trend in debt levels for all states (except Queensland). For example, in New South Wales, local government gross debt has fallen (in nominal terms) from $2 888 m. to $1 845 m. (Nicholson, D. 1997, ABS, pers. comm., 5 August).

Limitations on borrowings is part of a wider policy of fiscal restraint which has affected all payments to the states and local governments. As Neutze (1995*b*:25) has

observed in attempting to explain the rising popularity of developer charges, this policy reflects a 'growing ideological view that government authorities are inherently inefficient in their use of resources and in particular they over invest'. On this view it follows that 'fewer resources should be allocated to public authorities, in order to place greater financial pressure on them to force greater efficiencies ... leaving more resources available for the supposedly more efficient private sector' (Neutze 1995*b*:26).

The second reason advanced by the Commission for the growth of developer charges, namely, the increasing acceptance of user pays principles, appears to be another manifestation of the same ideological viewpoint described by Neutze (1995*b*). Acceptance of developer financed infrastructure (viewed as user pays finance) is part of the wider acknowledgement of the increasing private sector role in infrastructure provision generally. This has manifested in public asset sales to the private sector in recent years, as well as various contracting out or privatisation arrangements under which the public sector involves the private sector in infrastructure provision (National Commission of Audit 1996:182).

Regarding the third factor put forward by the Industry Commission (1993:144), namely the increasing costs arising from causes such as having to meet higher environmental standards, it is apparent that there are few quantitative studies on the size of this cost impact but there can be little doubt that there has been a substantial increase in the environmental management responsibilities of local governments over the last decade or so. In New South Wales, examples include the increasing number of State Environmental Planning Policies (SEPPs) which add to council responsibilities. For instance, SEPP 14 (preservation of coastal wetlands), SEPP 19 (preservation of bushland in urban areas), SEPP 26 (preservation of littoral rainforest), SEPP 33 (prevention of hazardous and offensive development), SEPP 46 (protection of native vegetation) and SEPP 44 (koala habitat protection) are all examples of increased responsibilities attendant upon issuing development consent. For example, SEPP 44 requires local councils to prepare a city wide Koala Management Plan in areas where koalas are known to inhabit. Moreover, new provisions in the New South Wales *Local*

Government Act 1993 reflect the increased role of councils in the protection of the environment. For example, the annual reports of councils must now include a state of the environment report on the following matters (Pearson 1994:286):

(i) areas of environmental sensitivity;

(ii) important wildlife and habitat corridors;

(iii) any unique landscape and vegetation;

(iv) development proposals affecting, or likely to affect, community land or environmentally sensitive land;

(v) polluted areas;

(vi) any storage and disposal sites of toxic and hazardous chemicals;

(vii) waste management policies;

(viii) threatened species and any recovery plans;

(ix) any environmental restoration projects;

(x) vegetation cover and any instruments or policies related to it, including any instruments relating to tree preservation.

Pearson (1994:288) describes limited financial (and human) resources as a major constraining factor inhibiting local governments' role in environmental management. This is also the view of Lipman (1991:ix), whose study identifies regulatory powers formerly exercised by state government which have been recently devolved to local governments. The areas include responsibility for heritage protection, social planning under EPAA 1979, and pollution enforcement under the New South Wales *Environmental Offences and Penalties Act 1989*. All this apparently devolves 'enormous responsibilities with few resources' (Lipman 1991:ix).

A further factor which may have predisposed New South Wales, in particular, to alternative revenue raising options, such as developer charges, resides in the fact that councils have been subject to rate pegging legislation since the 1977 rating year. The permissible variation in a council's revenue from rates and charges is specified by the relevant New South Wales Minister and, for any particular council, the variation permitted may be as a specified increase, a decrease or no change (Pearson 1994:134). Each year, councils have increased rates to the maximum extent possible under the rate capping arrangements (Industry Commission 1993:332).

Recent changes to state subsidy arrangements to local councils in non-metropolitan New South Wales for water and sewerage infrastructure are also likely to lead to greater use of developer charges. Subsidies from the state government towards the capital cost of providing this infrastructure have been abolished. Under reforms to the scheme, councils are now expected to finance new capital works from their own sources, including developer charges (New South Wales Government Pricing Tribunal 1993*a*:205).

Aside from the abolition of subsidies, it seems inevitable that pressures on local council finances will continue. Together with the particular political advantages of this type of revenue raising as mentioned in Chapter 1, it is likely that developer charges will retain, if not increase, their current role in infrastructure finance in New South Wales. Commissioner Simpson (1989:29), in his review of section 94, was clearly of the same opinion:

> I am of the view that, as overseas, and as already evidenced in New South Wales, and trends gradually surfacing in other states, there will be a considerable increase over time in the number and type of "public amenities and public services" in respect of which private sector contributions will be levied. This will occur by reason of both the cost and restriction of capital to councils and increased public expectations and demand in regard to public amenities and public services (Simpson 1989:29).

With reference to international trends, there is little doubt that Simpson had in mind the remarkable increase in the use of exactions on developers in the United States. Analysing these trends, Altshuler and Gomez-Ibanez (1993:124-5) note that before 1960 only about 10 per cent of American localities imposed exactions, but by the mid-1980s, approximately 90 per cent did so. They attribute this growth to several influences, most of which have parallels in Australia. Examples include the growing influence of environmentalism, cutbacks in federal aid, rising concern about infrastructure shortfalls, and increased local activism (see, for example, Altshuler and Gomez-Ibanez 1993:20-33).

2.6.3 *Developments in Developer Charges Policy in Other States*

Queensland

In Queensland, developer charges practice was reviewed recently as part of a wide-ranging report on methods of funding fringe development (AURDR 1995*b*). Detailed information on current practice is not given, but the report does provide a brief critical commentary on existing policy. Developer contributions are governed by the *Local Government (Planning and Environment) Act 1990-91* which contains an 'apparently open ended power' (AURDR 1995*b*:68) by which local governments can levy for contributions. However, the charges must be 'reasonable and relevant'. The Act mentions that charges can be levied for water, sewerage, roads infrastructure, and other works 'associated with the development of the land' (AURDR 1995*b*:68).

Methods of calculation of charges for water and sewerage are apparently framed in terms of a calculation of total infrastructure cost divided by some measure of total development yield. The intention appears to be one of relating the costs of new development to those requiring it (AURDR 1995*b*:69). However, the report notes several weaknesses in the existing guidelines to councils. Firstly, the guidelines do not insist that policy documents need to be transparent as to cost derivation and methods of calculation. The guidelines state that (AURDR 1995*b*:70):

> This supporting information might or might not form part of the overall policy statement, and this is a matter for the local authority to decide. In this regard, the Department considers there is no need for the supporting information to form part of the policy document which is to be available for public inspection, but that it should be assembled in the form of one or more reference documents which can be produced as supporting evidence should the need arise.

Secondly, the guidelines foreshadow the possibility of cross-subsidy but they exhibit a 'particularly inconsistent understanding of equity' (AURDR 1995*b*:70). They suggest that a council might deliberately choose to subsidise fringe development (so that existing ratepayers would subsidise new ratepayers) but they also express concern that cross-subsidy should not exist from one development to another. The overall assessment by AURDR (1995*b*:70) is that:

> The consequence is a concomitant absence of concern for considerations either of equity or efficiency in infrastructure provision. The recommendation in the guidelines that policy documents not include their supporting analyses reinforces the potential for these inequities and efficiencies to become endemic.

Victoria

A new system of 'development levies' is currently being introduced in Victoria as a result of a review undertaken between 1993 and 1995. Prior to the review, it appears that not all councils levied for development although many were intending to do so. Of those that did, there was a wide range of approaches as to the type of infrastructure charged, the methods of charging and the magnitude of charges (Victorian Department of Planning and Development 1994:6). The problems which were caused by this existing system were summarised by the Victorian government (Victorian Office of Planning and Heritage 1995:2) as follows:

> • being inconsistent in application between councils and between residential and commercial development;
> • leading to a rapidly increasing range of infrastructure being funded by levies and increasing the developer's contribution;
> • lacking certainty, in that it was difficult for developers to predict their costs and for councils to budget for infrastructure;
> • providing inadequate justification for the items of infrastructure included in the levy, their amount and time of payment;
> • lacking clear accountability for the expenditure of contributions.

The review recommended a two-tiered system of infrastructure financing of which upfront developer charges are one component. These charges are to be used for physical infrastructure which is 'subdivision and development' related (Victorian Department of Planning and Development 1994:iv) and which is required to be in place early as development commences (e.g. roads, water and sewerage). The second component of the new system is a 'community infrastructure' levy. This is for social infrastructure which is generally required later as the community grows or changes. It is to be paid by the owner of property (residential, commercial or industrial) prior to the issue of a building permit. Both levies require preparation of a Development

Contributions Plan which identifies the impact of the development, the works that will be required, and the links to existing infrastructure.

As of 31 May 1997, all local councils levying developer charges must switch to the new system of infrastructure finance. Before they can levy contributions, councils must have a Development Contributions Plan in place (Watkins, A. 1997, Infrastructure Research Unit, Victoria, pers. comm., 8 September). With regard to the need for Development Contributions Plans and other management and accountability mechanisms, the Victorian scheme is similar to New South Wales Section 94 policy. However, the idea of the community levy is new and has not been modelled on New South Wales policy.

Tasmania

The power to levy developers for contributions towards the cost of development was first introduced into Tasmania only in 1993. The legislation was described then as 'very much ... a first step in the development of policy in this area' (Victorian Department of Planning and Development 1994:40). As at 1997, councils are still not levying charges under this legislation, although some councils are extracting contributions as part of agreements between local authorities and developers under other legislation. It is expected that councils will levy charges under the 1993 Act once other resource management requirements, such as the preparation of strategic plans as required under a new local government Act, are in place. The amalgamation of councils from 49 to 26 in 1994 (with a further reduction to 15) also induces a complicating factor for Tasmania (Churchill, B. 1997, Tasmanian Department of Environment and Land Management, pers. comm., 8 September).

Western Australia

The literature on developer charges contains little information on practice in Western Australia other than at the Western Australia Water Authority, which is considered in Chapter 8. It would appear that whilst some councils do levy some charges, this is done under varying legislative authority depending on the purpose of the levy, rather than under any one systematic charging policy (Fraser, S. 1997,

Western Australian Department of Local Government, pers. comm., 8 September). According to the Victorian Department of Planning and Development (1994:40) there is an '*ad hoc* and uncertain' development environment in Western Australia.

South Australia

The arrangements for infrastructure planning and funding in South Australia are distinctly different from elsewhere because of the land banking activities of the South Australian Urban Land Trust (SAULT). Most of the 'greenfields' land is held in public ownership through SAULT. Infrastructure is provided as part of joint venture arrangements between SAULT and private developers and, for some types of infrastructure, local government is also included in the arrangements. Apparently the cost of infrastructure is borne (at least initially) by SAULT as part of the joint venture arrangements. For areas which are outside the SAULT arrangements, the use of developer contributions seems to be limited (Victorian Department of Planning and Development 1994:40).

To sum up this review of the functions and finances of local government in Australia, it is apparent that the local tier of government do have a considerable breadth of relatively minor social functions, but they also still have the 'services to property' orientation with which they began in the late nineteenth and early twentieth centuries. This means that they do play an important role in the provision of local economic infrastructure such as roads, water, sewerage, drainage and open space. In New South Wales in recent years there has been a considerable expansion in the use of developer charges to finance this infrastructure. This has occurred as user pays financing appears to have become more widely accepted; local government costs have been increasing; and governments have sought to limit local government borrowing. The increasing popularity of developer charges in New South Wales appears to parallel (with a lag) a similar trend for similar reasons in north America. In Queensland, Tasmania and Victoria, recent reviews of infrastructure financing in each state indicate that these states too, are poised to embrace developer charges. With these developments in mind, it is timely to examine the economics of this form of funding infrastructure.

CHAPTER 3 MARGINAL COST PRICING THEORY: SRMC OR LRMC?

3.1 *Introduction*

It is desirable that advice to policy-makers on how to design charges should be based on theoretical propositions which can be set out in full. This is what is missing in the literature to date and forms one of the central tasks of this study. The present chapter commences the exploration of economic theory which might inform calculation of an efficient developer charge.

The chapter comprises eight main sections. When considering a possible theoretical basis for developer charges, the relevant theory to examine will differ depending on whether one views developer charges as a tax on the proceeds of development or as a 'user pays' price to pay for services provided. An important first step then, is to clarify what it is that the designers of developer charges policy intended in this regard. This matter is addressed in Section 3.2.

Having argued that developer charges are intended as a user pays charge, the next question which arises is what exactly *is* user pays theory in economics? When is it appropriate to employ user pays pricing techniques, on what grounds is it justified, and what guidance does microeconomic theory give as to how charges should be structured?

There are two grounds on which conventional economic theory sanctions user pays charges. The first is that they can satisfy the criterion of 'benefit equity', which means that those who benefit from a service bear a proportional share of the cost (Kirwan 1991:34). Section 3.3 discusses the benefit equity criterion and how it can also be used to answer the question of when user pays pricing techniques should, or should not, be employed and on which type of infrastructure. The second reason for sanctioning user charges is that they can be economically efficient, if set to marginal cost. Section 3.4 describes the simple intuitive explanation for why marginal cost pricing is efficient. However, as we noted in Chapter 1, there is considerable theoretical complexity and controversy behind this simple reasoning. One important

issue from the point of view of a study attempting to derive guidelines on efficient charging, is: is it the short run marginal cost (SRMC) or the long run marginal cost (LRMC) to which charges should be set? This issue has a long history in the extensive literature and is beset with controversy. Section 3.5 reviews the central arguments of this debate.

The conventional wisdom on efficient pricing recommends SRMC pricing, also known as congestion pricing, but the context assumed in the conventional argument is quite different from the specific circumstances in which developer charges are being considered. One important difference is that the assumptions of constant returns to scale and perfect divisibility of plant size which make SRMC pricing work well, are not realistic when considering local urban infrastructure. In section 3.6 we describe the nature of the typical urban infrastructure on which developer charges are levied, drawing out in particular, the 'non-standard' or unconventional attributes.

These characteristics fundamentally affect the costs of supplying the infrastructure services and since understanding the nature of these costs is essential to designing developer charges, section 3.7 examines four important cost implications of infrastructure which exhibits non-standard attributes. These are: that definitions of long run costs need to be clearer (3.7.1); that costs will vary by location and that attempts to signal locational variation may conflict with congestion pricing (3.7.2); that, in reality, there is not one, but many marginal costs (3.7.3); and that the existence of planned excess capacity poses some awkward problems for SRMC pricing (3.7.4). Section 3.8 sums up the discussion.

3.2 *Developer Charges: A Tax or a Price?*

To decide which branch of economic theory is relevant to developer charges it is necessary to clarify what these charges are intended to be. If developer charges are intended to be a tax on development, the relevant economic theory to explore in search of a theoretical basis for the design of a charge would be quite different than if developer charges are intended as a user pays charge. Economists define a tax as a payment for general revenue raising purposes which does not usually entitle the payer

to any tangible benefit (ABS 1989:59, 70). Thus a development tax would not be linked to the purposes for which the revenue is being raised in the same way as a user charge would, and theories of costs and cost measurement would not be relevant.

There is a strong case for arguing that developer charges are intended to be a user pays charge. This is certainly the case for New South Wales where the wording of the legislation specifically refers to the payment of monetary contributions towards the recoupment of costs of existing 'public amenities' or 'public services' or towards actually providing these where it can be demonstrated that they are likely to be required. For example, Section 94 of the New South Wales *Environmental Planning and Assessment Act* 1979 (EPAA 1979) includes the statements that:

> ... where a consent authority is satisfied that a development ... is likely to require the provision of or increase the demand for public amenities and public services within the area, the consent authority may grant consent to ... the payment of a monetary contribution. (s. 94(1)(b)

and further that

> ... where a consent authority has ... provided public amenities or public services ... and development ... will ... benefit from the provision of those public amenities or public services, the consent authority may grant consent to ... the payment of a monetary contribution towards recoupment of the cost of providing the public amenities or public services. (s. 94(2a)(b))

If developer charges were viewed as a tax (in the economic sense of this word) then it is likely that the legislation would attempt to define the conditions under which there was seen to be a capacity to pay on the part of the developer or landowner (e.g. where, as a result of a change in zoning, an increase in development value results).

Unfortunately, William Simpson, Commissioner of the inquiry into Section 94 developer charges in New South Wales (and a lawyer) chose to define developer charges as a 'special type user pays tax' (Simpson Report 1989:3). However it is clear that it is the user pays aspect of charges which he saw as important because of the

emphasis he placed throughout the report on the link between the charge and the services required by development ('the nexus'). Simpson repeatedly stressed the importance of the nexus. For example he says:

> It is my view and I have so recommended that the Section 94 contribution system being a special type user pays tax should be so structured and administered to ensure ... need created by development (user) is identified ... (Simpson Report 1989:3)

and that:

> These cases demonstrate that the "nexus" test is critical to determination of whether the sought contribution is within power pursuant to Section 94. (Simpson Report 1989:120)

and also that:

> In the event of an expansion of the Section 94 contribution system an even greater need than at present will exist to ensure such a tax method is properly nexus tested ... (Simpson Report 1989:132)

Commentators on Section 94 in New South Wales have also viewed the charges as user pays levies (see Glazebrook 1992:156, Shankie-Williams 1992:33, and Vipond 1990:2). Vipond, for instance, argued that the review of Section 94 in New South Wales in 1989 was predicated on economic principles and that the user pays orientation of Section 94 would create efficiencies for at least two reasons: firstly, the willingness to fund facilities will be more closely related to the need for them. Secondly, the tier of government raising the funds will also be that which expends them (Vipond 1990:3). In the documents supporting the new developer charges systems in Victoria and Tasmania these charges are referred to as user pays charges (see Victorian Office of Planning and Heritage 1995:3 and Tasmanian Department of Environment and Land Management 1997, App. A:12). Overseas writers frequently refer to development exactions as a means by which new development 'pays its own way' (Snyder and Stegman 1987:5). And Simpson has observed that the concept of nexus is as 'basic and integral' to exaction systems overseas as it is to the New South

Wales developer charges system (Simpson 1989:129). Overall, there seems little doubt that developer charges are intended to be a user pays charge.

It is important to note that for developer charges to be a user pays charge there is an important assumption being made which is seldom stated explicitly in the literature. Since the developer does not use the services as such (although s/he may certainly benefit financially from their supply), strictly speaking, viewing developer charges as user pays requires the assumption that the charges are passed through to the home buyers who ultimately use the service. Only if charges are passed forward can those who use the service also be those paying for it. To make sense of developer charges being a user pays charge it is necessary to establish whether this is, in fact, a correct assumption. The question of the incidence of charges is examined in Chapter 7, but the conclusion can be pre-empted here. It appears that it is almost certainly the case that in the long run developer charges are passed through to ultimate purchasers.

Accepting that the intention of the legislation implies that charges should be viewed as a price, or user charge, rather than as a tax payable into general revenue, the questions which naturally arise are: what exactly is a user pays system? When is it appropriate and why could it be efficient? What does this imply about the structure of developer charges if they also are to be efficient? These questions are considered below.

3.3 *When to Use User Pays and the Benefit Equity Justification of Developer Charges*

Public finance theory defines a pure public good as one which is non-rival and non-excludable in consumption (Musgrave and Musgrave 1984:48-49). Charging the users of such goods a direct price is impossible because of the free rider problem. Citizens who do not pay for the good cannot be excluded from its benefits. In reality, publicly provided goods and services exhibit varying degrees of 'publicness'.

Dollery (1997*a*:11) suggests a six part classification to illustrate the range of characteristics of publicly provided goods. These are indicated in the first column of Table 3.1. Examples of government functions which might fall within the Dollery (1997*a*) categories have been added. The categories range from private goods (rival in consumption and excludable) through price excludable public goods (goods which are excludable, such as water and sewerage, but for which provision also confers external benefits to the community at large, for example, health benefits such as containment of contagious diseases as occurred when water and sewerage was first provided to townships in the 19th century (Balmer 1985:2)); congestible public goods (facilities subject to congestion and exclusion is possible but sometimes only at high cost); public goods (non-rival in consumption and excludable only at high cost); local public goods (non-rival in consumption but benefits can be contained to an identifiable area or population subgroup); and merit goods ('goods which society wishes to encourage' (Dollery 1997*a*:10)).

Whether or not user pays charging is feasible for goods in these categories will depend on whether it is possible, at low cost, to identify and charge users and to exclude non-users. Thus, in examining Table 3.1, user charges are not appropriate for public goods (category d) or merit goods (category f); they are certainly feasible for private goods (category a); they are feasible for price excludable public goods (category b) and also for local public goods (category e) because by definition the benefit areas of these can be clearly defined; and they may be feasible for some congestible public goods depending on the cost of exclusion. For example, swimming pools and libraries could introduce user charges, but this would be more difficult (but not impossible) for roads and sporting grounds.

It may be noted that even where charging a direct price is not feasible, category e demonstrates that provided the benefit region can be clearly identified (e.g. for small local playgrounds) a user pays charge is still feasible by means of a one-off charge which averages the total cost of the good or service among beneficiaries.

Table 3.1 Characteristics of Publicly Provided Goods

Characteristics of the Good or Service	Is User Charging Feasible?	Examples*
a. **Private Goods** No externality; benefits entirely private; low-cost exclusion	Yes - by direct pricing for use or purchase of the service.	After school care; local child care centres; local government owned caravan parks; government courier services.
b. **Price Excludable Public Goods** External benefits when produced or consumed; low-cost exclusion	Yes - but if the positive external benefits are large, something less than full price is justifiable.	Water and sewerage, public hospitals, public schools
c. **Congestible Public Goods** Collectively consumed benefits subject to crowding; possibility of exclusion	Not in all instances - for services where it would be costly to exclude non-payers, user charging is not feasible.	Swimming pools; libraries; roads, open space; street parking; sporting grounds and other recreational facilities; baby health centres; beach patrol and life-saving.
d. **Public Goods** Collectively consumed benefits not subject to crowding; high-cost exclusion	No - but in some instances (e.g. environmental protection) 'polluter pays' may be appropriate.	Public radio and television; national defence; health inspection and education services; immunisation clinics; flood mitigation works; preservation of species habitat; prevention of beach erosion; other environmental protection.
e. **Local Public Goods** Collectively consumed benefits for sub-set of population	Yes - because the benefits can be confined to the population sub-set.	Street lights; street cleaning; local policing; bushfire protection; local open space.
f. **Merit and Demerit Goods** Large externalities; may or may not be excludable	No.	Beautification of city malls and roundabouts; public statues.

* Issue might be taken with some of the suggested allocation of services to specific categories. In many cases the choice is not clear-cut. For example, local government owned caravan parks may offer a significant external benefit to a town by preserving the visual amenity of an attractive site; whilst also providing access to low cost tourist accommodation for low income groups.

Source: The classification of the characteristics of publicly provided goods and services is taken from Dollery (1997*a*:11).

While excludability is a prime consideration as to whether user pays charges are *feasible*, whether or not they are *desirable* may depend on distributional concerns. If low income groups may be denied access to an important government service when user charges are introduced then either the charge should contain an explicit subsidy to fulfil what are known as community service obligations (CSOs), or the service should be funded by means other than user charges.

Provided that developer charges do charge (through a higher land price) only those, and all of those who benefit from a service, it is clear that they could be seen as a user charge, and they could be sanctioned on benefit equity grounds. Whether or not it is appropriate to levy developer charges on certain types of infrastructure and not on others will again depend on the same basic guidelines. That is, it will depend on whether it is possible to identify the users of the service (new development); whether the benefits are largely confined to the users; whether other users of that service can be excluded; and whether the charge prohibits access by low income earners to the service. Thus a developer charge which levies one development the full cost of facilities which subsequent developments in the area will also draw on would be inappropriate. Levying a developer charge on an area for facilities which may confer social benefits to a wider area is also contrary to the guidelines suggested by theory. For this reason, it is often suggested that such social infrastructure should be funded from general rate (or tax) revenues (see, for example, Neutze 1995*b*: 27).

3.4 *The Economic Efficiency Justification of User Pays: First Principles*

Apart from their benefit equity justification, user charges can also be advocated on the grounds that they promote allocative efficiency. That is, charges set to marginal cost provide information to consumers and service providers to enable them to effect a more efficient allocation of resources. The first principles of the efficiency justification of user pays, as described in this section, are intuitively straightforward. But delving deeper into the theory in section 3.5 takes us into more 'complex theoretical waters' (Bird and Slack 1983:227).

Neoclassical microeconomic theory states that an efficient charge or price is one where the price paid by users of the good or service closely reflects the marginal (or opportunity) costs of producing that good or service.. The broad rationale for marginal cost pricing can be stated simply: the price is efficient because it indicates 'correct' signals to consumers and producers of the good or service. That is, the price signals reflect the relative scarcity of the good or service.

Signals to Consumers

It is assumed that rational consumers will only use a service if the benefit to them is at least equal to the price they pay. If the price charged is higher than the real resource costs of supplying the last (marginal) unit, then some consumers who might have been prepared to buy the service at its 'true' cost will be denied the benefits. On the other hand, if the price paid is less than its real costs, consumers will be encouraged to consume more of the service, using up resources for which the benefits they derive are less than the costs of producing it. An alternative allocation of resources could be made where the same resources would be valued more highly.

Signals to Producers

When consumers pay the marginal cost of supply, service providers are in a position to gauge more accurately the correct plant size at which to operate. If the service is being supplied at less than cost, for example, then the excess demand could cause 'political pressures' for capacity to be expanded prior to the optimal time to do so; that is, before the benefits at least equal the costs.

In addition, how public infrastructure service providers price their output can have an important impact on the pricing and investment decisions of private firms using the service as an input. Water and transport services, for example, are often an important input into the production process of other firms. If the charges for such services exceed their marginal cost, this will act as a tax on the businesses and affect their ability to compete in other markets. If such services are underpriced the businesses are, in effect, being subsidised.

To finance subsidies for underpriced services, other firms are usually paying higher taxes or other users (say, businesses compared to residents) are paying higher charges. Firms using underpriced inputs benefit in terms of competitiveness at the expense of others which might be more efficient. The users of products of firms being charged above the full costs of supply will be discouraged from consuming the service. This may inhibit the development of new products or the use of alternatives which might meet user needs at a lower overall cost to the community (Industry Commission 1989:13). Overall, the structure of production across the economy will reflect such distortions and inefficiencies. In short, national product will be less than it could have been.

3.5 *SRMC or LRMC?: The Predominant View in Optimal Price Theory*

The simple intuitive explanation of efficient pricing masks a good deal of theoretical complexity evident in an extensive literature on public utility pricing (see Ruggles 1949, Ruggles 1950, Coase 1970, Hirschleifer 1984, Bös 1986, Wagner 1991). One of the major debates which has continued for many years is whether an efficient charge for a service is one which is set at the short run marginal cost (SRMC) or whether it is set at the long run marginal cost (LRMC).

The central arguments are briefly reviewed here. Much of it turns out to be not directly applicable in the context of setting developer charges. Nevertheless, it is important to understand how the dimensions of the problem of designing an efficient developer charge differ from the literature on what constitutes an efficient price, or charge, for a service.

The discussion in this section begins with the origins of optimum pricing theory and why the short run or long run marginal cost issue arises. It then moves to an explanation of the current consensus on the issue. This is one which favours SRMC pricing, and the exposition of Treasury (1990) and also Ng (1987) are used as representative of contemporary opinion. The differences between the assumptions of this view and the circumstances in which developer charges are set, will be discussed in sections 3.6 and 3.7.

Neoclassical economics states that in a perfectly competitive market economy it is a property of the long run equilibrium position that no transfer of resources could increase the satisfaction of any one participant without diminishing that of another. Put differently, a Pareto optimal allocation of resources exists in perfectly competitive long run equilibrium. Simple textbook presentations of this assume a comparative static model, a single product firm, perfect divisibility of factors and other assumptions about the production function and factor-supply curves which yield a set of U-shaped short and long run average total cost curves (SRAC, LRAC). The SRAC curves are derived by assuming that at least one factor (plant size) is fixed. The U-shaped LRAC curve will envelop the set of U-shaped SRAC curves (see Figure 3.1). Corresponding to each possible plant size there is a short run curve which cannot lie below the long run curve (otherwise the long run curve would not be a minimum cost solution), but it can lie above the long run curve for a part of its length. At the optimum output for any given SRAC, LRAC and SRAC will coincide. The SRMC, which is the change in total

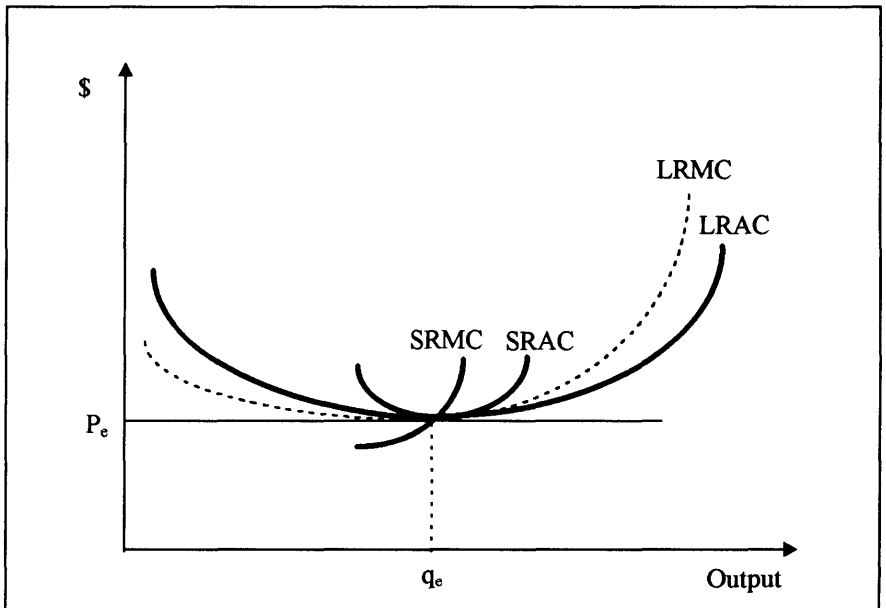

Figure 3.1 Perfectly Competition Equilibrium

variable costs to produce one extra unit of output when plant is fixed, will pass through the minimum point of the SRAC. The LRMC, which is the change in total

costs to produce one extra unit of output when plant capacity can be altered, will likewise pass through the minimum point of LRAC.

A large number of firms freely entering the market when quasi-rents are being made will cause industry output to rise, price to fall and cost curves to rise (as factor inputs are bid up) until price is tangent to the minimum point of LRAC at equilibrium. It is also a property of this point that price equals LRMC and SRMC. This equality of marginal cost and the price of the product representing the 'ideal' situation, came to be proposed as a general rule in socialist economies (Wiseman 1937:37) and eventually for public utilities everywhere.

A monopolistic public utility firm faces a downward sloping market demand unlike its perfectly competitive firm counterpart. Nevertheless, if the managers of a public utility could accurately forecast demand and long-run costs, and also adjust all factors so as to build the optimum scale of plant, a price set equal to SMRC would provide the correct signals for efficient resource use, and as well as covering all variable and fixed costs. An immediate difficulty with the simple theory arises if public utility managers do not accurately forecast demand or, if for any other reason, the utility is not at optimum scale (or, indeed, if it is difficult to ascertain whether the scale of operations is optimum). Short run and long run marginal costs will diverge and the question will now arise: is it SRMC or LRMC to which price should be set?

The answer to this question according to the prevailing view (see Ng 1987, Mayo 1989, Treasury 1990, BIE 1995, Maddock and King 1996*b*:48-52) is to price at all times so that demand just meets available capacity. This is termed SRMC or congestion pricing. The economic return resulting from this strategy is then monitored in order to gauge whether adjustments to capacity are necessary.

The procedure involves first setting a desirable rate of return for the business or service concerned. The desired target rate of return could be based on a 'risk adjusted' government bond rate. The bond rate embodies 'an appropriate minimal risk benchmark which can be seen to reflect the pooling of current market sentiment

concerning required returns from planned investments' and the risk adjustment loading should be set to reflect the nature of the particular public undertaking (Treasury 1990:30). After choosing a desired rate of return price is then set at all times on the basis of SRMC and the economic return resulting from this strategy signals required capacity changes: if the actual return is above the desired target for sustained periods then capacity should be expanded; alternatively, if the actual return is less capacity should be reduced. The desired target rate of return is not just set passively into the price structure. Instead, services are priced flexibly so that available capacity just meets demand at all times and the target rate of return is used for comparison purposes only. It is capacity, not price, which is adjusted according to the signals given.

According to Treasury, such a pricing strategy should apply to the various 'profit centres' or business units within an enterprise and the process is analogous to retail space within a private enterprise being reallocated in the light of changing demand as between, say, sporting goods and manchester, or between squash courts and aerobics classes (Treasury 1990:37). Another example would be the pricing of parking areas at various distances around an office complex: the most sought-after zones close to the complex would be priced highest and other zones priced variously so that as often as possible all zones were just filled by cars. If such a strategy produces sustained high returns above the target rate of return, expansion of parking space is indicated. Sustained returns below the target rate would indicate the reverse. When capacity is optimal, this will be confirmed by actual returns approximating the requisite target return.

The arguments of the Treasury hold well for infrastructure services which have constant returns to scale and where capacity is perfectly divisible. Where public utilities are subject to decreasing costs (even if only for a time) and where capacity can be extended only by large 'lumps' of investment, particular difficulties arise. The Treasury argued that if the business units did exhibit declining LRAC then there would be problems with their procedure, but they suggest that the number of genuine declining cost situations is limited. Telecommunications is cited as an example of an industry

where technological developments, such as mobile phones, undermine the applicability of declining costs to telecommunications networks (Treasury 1990:36).

However, the attributes of large 'lumpy' assets, decreasing costs and low variable costs may prevail in much of the new urban infrastructure which is the focus of this study (see, for instance, Bureau of Industry Economics 1995:15, Larkin and Dwyer 1995:76, Neutze 1997). Amongst other problems which these attributes pose for the standard view, one which was a major preoccupation of much of the earlier literature on public utility pricing is the so-called 'natural monopoly' case; that is, the likelihood that SRMC pricing under decreasing costs will yield insufficient revenue to cover total costs (see Ruggles 1950, Industry Commission 1989 App. J).

Two early influential views on the problem of revenue losses were put forward by Hotelling (1938) and Coase (1946). Hotelling's seminal 1938 article stimulated many economists to write on the subject. In essence, Hotelling (1938) recommended a system of short run marginal cost pricing on welfare grounds, suggesting that the deficits incurred by decreasing cost industries be financed by revenue sources which would not impair the optimal marginal conditions. The type of revenue sources suggested were income taxes, land taxes and inheritance taxes. Meade (1944) was the first to point out that the amount of income tax which might be necessary to finance the losses of decreasing cost industries may distort the marginal conditions between work and leisure (Ruggles 1950:113). However, it was Coase's (1946) objections to Hotelling that dominated the subsequent debate. In his 1946 article, Coase recognised the allocative efficiency case for marginal cost pricing but was concerned that total cost would also have to be covered by a charge on users if there was not to be a redistribution of income in favour of the consumers of products in which fixed costs formed a high proportion of total costs. Financing losses through income taxes, Coase also noted, imposed a tax on effort. The charge recommended by Coase was a multi-part charge on users.

In a restatement of his views many years later, Coase (1970:113) summed up the major concerns about the marginal cost pricing principle as follows:

> In the 1930s and 1940s the view came to be held that the right policy was to make public utility prices everywhere equal to marginal cost, even where marginal cost was less than average cost and a government subsidy was required to maintain production. This policy proposal had serious weaknesses. It did not take into account the stimulus to correct forecasting of having a subsequent market test whether consumers were willing to pay the total cost; it ignored the probable effects on the administrative structure, with state enterprise superseding private enterprise and centralised operations superseding decentralised operations; it involved a redistribution of income in favor of consumers of products produced in conditions of decreasing cost; it failed to take into account the misallocation of resources resulting from the additional taxation necessitated by the subsidies.

In drawing attention to the potential for inefficiencies in government supply of services Coase is expressing a view with which Rees (1979:11) and many writers in the government failure literature identified in the ensuing decades (see, for example, Niskanen 1971, Borcherding 1977, Wolf 1988 and Vining and Weimar 1991). Rees is particularly concerned with instances where forecasting errors result in excess capacity and marginal cost pricing means the losses must be made up from general taxation revenues. 'Appraisal optimism' (or over-investment) is a widely prevalent feature of public sector investment decisions (Rees 1979).

Whether losses are incurred through the forecasting inaccuracy of appraisal optimism or through genuine decreasing cost structures, the lack of financial discipline inherent in covering shortfalls from general taxation revenue is now widely acknowledged. Meeting losses automatically from general taxation revenues blunts incentives for financial managers to search for cost savings by finding more efficient processes of production. Multi-part tariffs, as recommended by Coase (1970), which consist of a lump sum charge and a variable charge designed to reflect marginal costs, or forms of Ramsey pricing (which price discriminate amongst users) are widely used in real world public utility pricing.

A paper by Ng in 1987 challenged the traditional view on the likelihood of financial losses arising. Basically Ng (1987) argues that even where excess capacity exists for a time in an infrastructure service, such as water supply, short run pricing is still appropriate because intertemporal losses will be covered. Figure 3.2 below

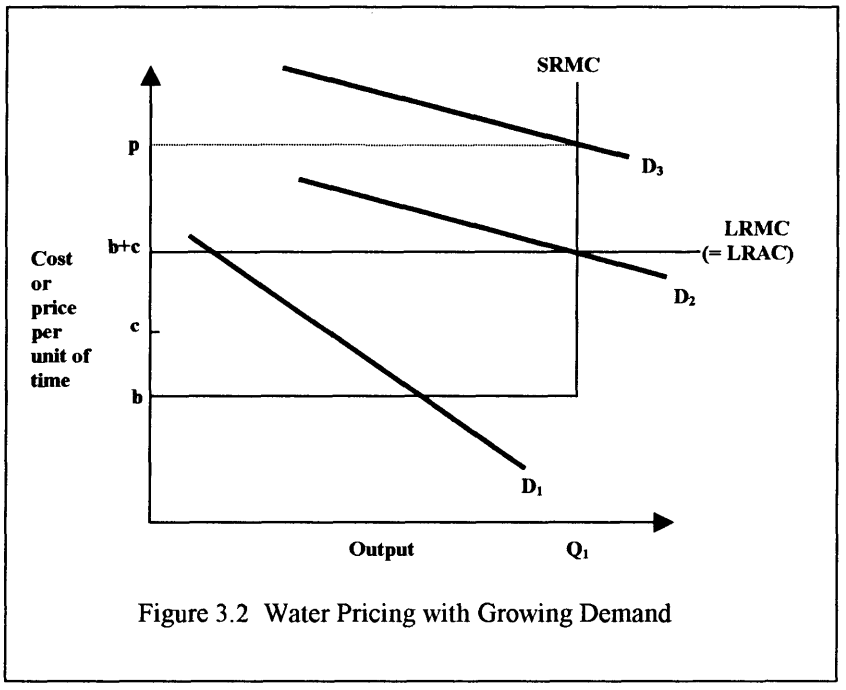

Figure 3.2 Water Pricing with Growing Demand

Source: Adapted from Treasury (1990; Figure 4:35).

illustrates Ng's (1987) argument. Simplifying assumptions of Figure 3.2 are that both operating and capacity (capital) costs of the public utility's service remain constant with increasing output and no additional costs are incurred as the capacity limit is approached. Operating costs are measured by b and capacity costs by c. D_1, D_2 and D_3 may be envisaged as growth of demand over time. D_1 demonstrates demand intersecting the capacity constraint below SRMC. Efficient pricing requires that marginal costs at least be covered so pricing at b becomes operative. D_3 intersects the capacity limit above LRMC. Consumption is now limited by capacity and the opportunity cost of water consumption is not the SRMC curve, but the 'marginal demand price' as Ng (1987) terms it (sometimes also termed the 'rationing price'). That is, the opportunity cost of consumption at the limit is *not* the short run supplier cost of providing the service, but the forgone price of the consumer who was prepared to pay

the most for consumption of this unit. Returns from price p will earn surpluses. The question Ng (1987) investigates is whether the later surpluses will cover the early losses.

Examining some real world influences on cost curves and demand elasticities, Ng (1987) argues that technological progress, for example, will tend to lower the costs of construction and bring forward the date at which extension of capacity becomes feasible. The effect will be to shorten the period during which surpluses are earned (Ng 1987:27). On the other hand, an opposite influence, which Ng (1987) observes is often overlooked, is the fact that water supply authorities face increasing costs of capacity expansion over time. This is because, as Neutze (1997:40) also argues, as a city's demand for water grows, it is necessary to harvest water from more costly and more remote sites. The higher the cost of capacity expansion, the longer the length of time spent at the 'rationing' price when surpluses are being earned. Taking all considerations into account Ng (1987) believes that the early deficits will be covered and that economic efficiency and financial viability are compatible objectives for public enterprises.

Ng (1987) appears to be one of the few authors who have drawn attention, however implicitly, to an important potential confusion between theory and reality. This is the fact that *within* an existing system (for example, construction of a dam or reservoir) decreasing costs may occur for the time that excess capacity exists, until population growth reaches the design capacity. This is commonly referred to confusingly as 'economies of scale' even though there is only *one* scale of operations applying. At the same time, recognition that extending capacity to build a new dam or reservoir involves *increasing* costs indicates the presence of decreasing returns to scale in the water supply system as a whole. This has important implications, as Ng (1987) has shown, for the revenue effects of efficient pricing because the higher the cost of extending capacity, so the longer the time spent at the surplus producing rationing price. We return to this issue. Ng (1987:27) himself contends that the influence of the cost of capacity expansion has been missed in recent official reports in Australia which do not distinguish between 'microtheoretical and actual cost curves'.

To sum up the prevailing view on what constitutes an efficient price or charge, congestion pricing is recommended whereby price is set flexibly (but no lower than operating costs) so that available capacity just meets demand at all times. The returns from this strategy are then monitored against a target return and capacity is adjusted accordingly. The procedure works well for assets which are perfectly divisible and have constant costs, but in 'natural monopoly' situations the concern was that congestion pricing would lead utilities to make losses. Ng's (1987) contribution was to point out that with an infrastructure service like water, which exhibits decreasing costs for a period then increasing costs, the congestion or SRMC pricing strategy need not necessarily lead to losses and could produce surpluses.

3.6 *Points of Departure from the Standard View in the Context of Marginal Cost Pricing of Developer Charges: The Attributes of Urban Infrastructure*

There are immediate and obvious difficulties in translating the conventional wisdom on efficient pricing (or charging) into the specific circumstances of developer charges in the context of local government. Among other things, it is most obvious that an ongoing direct price for use of a service which can be charged by a public utility has quite different properties to a price passed through in a one-off charge to house and land buyers. Moreover, as we have already seen, the question arises: is there an analogous sense in which one can even have SRMC or LRMC developer charges? We argue in this study that there is, but before discussing this it will be useful to first analyse some of the other key differences between the world where developer charges are set and that assumed in the conventional view of efficient pricing. Notably, we examine the attributes of real world local economic infrastructure. These typically do not exhibit the perfect divisibility of plant size or versatility of use assumed in the literature. Since these 'non-standard' attributes of local infrastructure have a profound influence on the costs of the service we begin by describing these attributes clearly in section 3.6 and then examine the implications of these characteristics on the costs of service in section 3.7. We can then draw conclusions as to the type of efficient resource allocation signals a developer charge can indicate in section 3.8.

Networks of Service Provision

Although individual services vary, it is useful to understand the total service system as comprising some, or all, of the following:

(a) *Headworks and major works.* These are usually major fixed assets. In the case of water supply, sewerage and drainage, headworks and major works are dams, ocean outfalls, sewage and water treatment plants, large sewer carriers and trunk mains, water and sewage pumping stations, etc.;

(b) *Feeder and trunk mains to the development site.* Examples here are water mains or arterial roads; and

(c) *On-site lead in pipes and other requirements for on-site distribution, such as on-site roads and on-site drainage.* These assets are usually funded directly by developers.

Figure 3.2 illustrates the typical headworks, major works and on-site distribution assets for water and sewerage infrastructure networks. Water and sewerage services provide a good illustration of all three components of a network. Other types of infrastructure services may not have all three components. For example, open space could be regarded as entirely headworks, whilst roads may comprise mainly distributional assets.

Locationally Specific, Task Specific and Long-lived Assets

Local infrastructure service assets tend to be quite specific to a task and also to an area. Open space, roads, and some water service assets are an example. These services cannot be transported elsewhere. The assets cannot readily be put to alternative uses, and the service life of the asset can often be quite long.

Generally speaking such properties of assets can have significant implications. For example, they can mean that the markets for these services are generally not contestable (see Neutze 1997:24). In fact, asset specificity as a whole (both in the public and private sector) is a factor which is, according to Williamson (1985), highly under-rated in terms of its influence on economic organisation. But for present purposes it may be noted that when assets are long-lived and are task and area specific, attempts to estimate correct capacities or scale of operations (an important influence

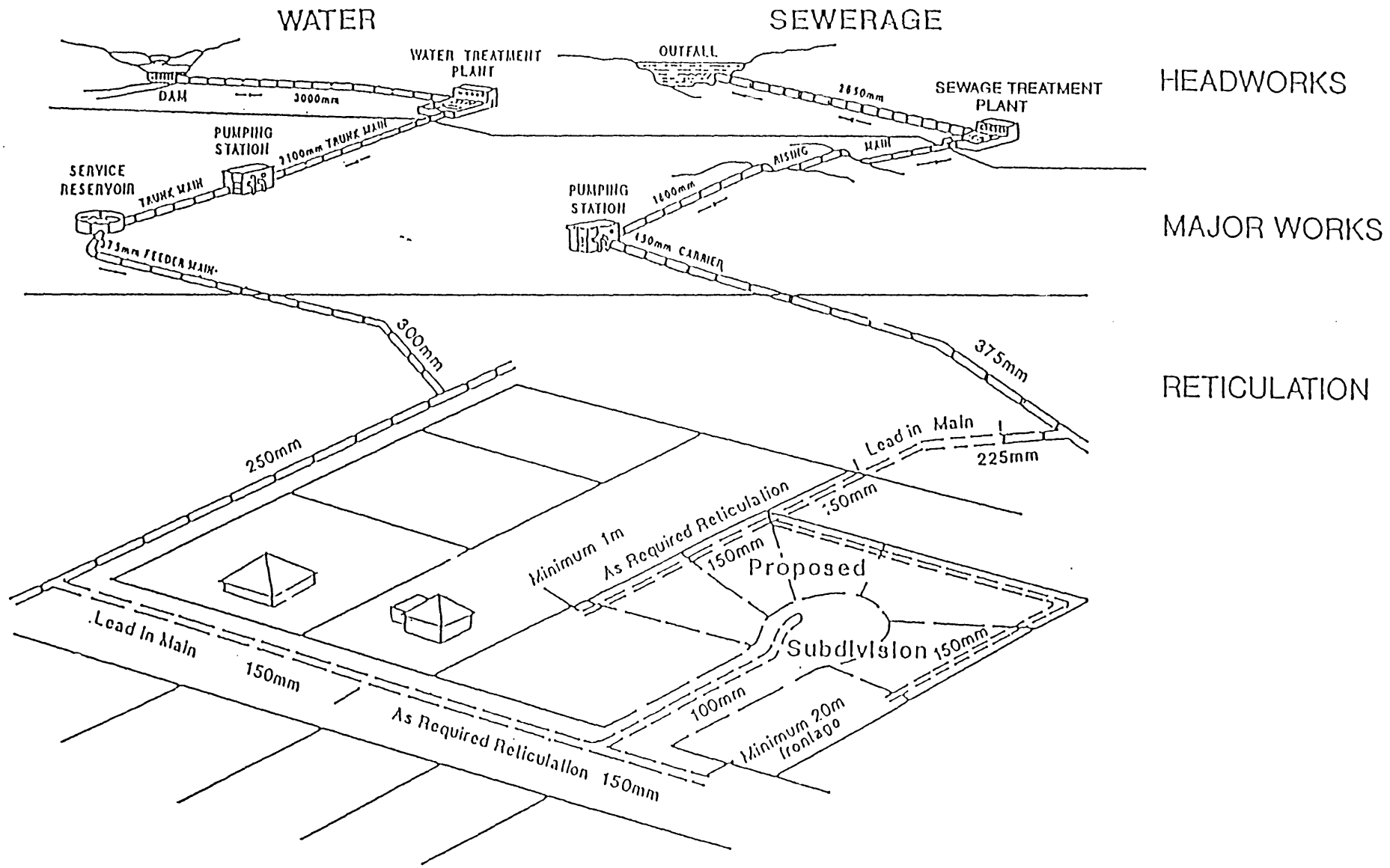

Figure 3.4 Illustration of Headworks, Major Works and Reticulation Assets for Water and Sewerage Networks.

Source: Sydney Water Corporation.

on the level of developer charge) must make long range forecasts of demand in an area and mistakes cannot be readily corrected.

Capital Intensity

Many urban infrastructure services tend to have high initial capital costs and low variable (or operating) costs. In water, sewerage, drainage, roads and recreational parklands, the capital costs are typically a high proportion of total costs. A water supply system, for example, consists of the high capital costs of the construction of dams, service reservoirs and distribution mains, whilst operating costs comprise only water treatment, pumping, asset maintenance, and administration of billing systems (Neutze 1997:23).

Lumpiness in Capacity

Unlike the perfect divisibility assumptions of standard economic models, it is usually efficient to add to the capacity of urban infrastructure systems in large 'lumps', rather than in small marginal increments. This feature means that there will be excess capacity present in a system, at least in the short run. Neutze (1997:25) lists four reasons why it may be more efficient to install larger than currently required plant now, rather than staging installation in smaller increments over time. These include:

- Economies of scale mean that it is 'cheaper to provide one pipe of capacity 2x than two pipes of capacity x' (Neutze 1997:25). Putting this another way, the economies of scale reflect the technical fact that doubling the diameter of a pipe (and hence the input costs) will more than double the capacity of a pipe;
- Once infrastructure is in place, the value of land rises. This increases the cost of acquiring it later in order to expand capacity. This factor is especially applicable to acquiring land for roads in already built-up areas;
- Aside from the effect on land values and the technical economies of scale, it is easier and cheaper to lay one pipe or road system initially than to have to dig up a pre-existing system and overlay a new one; and
- Extending capacity in built-up areas can disrupt public and private sector services during construction.

Economies of Scale

As we have seen, there are technical economies of scale in pipe provision (Neutze 1997:25). More generally, there are also decreasing costs (termed economies of scale) in capital intensive urban infrastructure systems since it is cheaper to serve residents of an area with only one water and sewerage system than having several competing systems which duplicate the infrastructure.

However, when the capacity of the infrastructure system as a whole has reached a maximum it may well be, as foreshadowed in the preceding discussion, that increasing costs (or decreasing returns to scale) obtain when it is necessary to expand capacity. This will be discussed further in section 3.7.1.

Economies of Scope and Multiple Products

There are often various dimensions or features of the one infrastructure service which provide a different type of service to different users. For example, a road provides an access service to residents located nearby, also it provides a through traffic service to commuters with destinations elsewhere, and where there is sufficient durability (in terms of thickness of road surface), the road could also service heavy vehicles.

Alternatively, the same infrastructure system can offer different services to the same users. For instance, a water supply system can be viewed as providing different services to the same user since it provides access to a minimum amount of clean water (e.g. for drinking and cleanliness) and it also provides water for use in large quantities (e.g. for gardens). As Neutze has observed (1997:98) the value of each of these services is quite distinct. Access to small amounts of water for essential purposes typically has a lower elasticity of demand than that for water in larger quantities for less urgent needs. Another distinct product of the water system is the requirement for a reliable supply of water at high pressure for fire fighting purposes. It makes sense to provide this requirement in the one water supply system, but the specific attributes

required for fire fighting are quite different to the necessary requirements for a clean drinking water supply system.

The major implication here is that when there are different products supplied in one infrastructure system, there may be different marginal costs associated with each product.

3.7 *Further Points of Departure from the Standard View - Cost Characteristics of Urban Infrastructure*

The presence of these special characteristics, which differ markedly from the simplifying assumptions of orthodox microeconomic theory, suggest that the standard assumptions about the nature and behaviour of costs must also be examined. In particular, the attributes analysed in the preceding section suggest at least four important implications for the nature of infrastructure service costs. All of these complicate the conventional theoretical model of marginal cost pricing. They are discussed below.

3.7.1 *Definitions of Long Run Costs Need to be Clearer*

In his analysis of the marginal costs of public utilities, Turvey (1971) pointed out that simple textbook notions of LRMC present certain difficulties. To draw such a curve it must be technically feasible to have plant of potentially varying sizes, and then to be able to forecast accurately on the basis of current prices and current techniques, the change in total costs which would result from a change in capacity for many years into the future. Turvey argues that such a theoretical construct is of no practical use and in particular overlooks the fact that public enterprises already exist. He argues as follows (Turvey 1971:54):

> An equally platitudinous consideration which needs to be borne in mind is that public enterprises exist. They can be expanded or contracted, but it would be wasteful to build a new one from scratch this year if an existing one has been inherited from last year. Hence talk about how costs would behave as a function of the size of a brand new one is pointless. This means that textbook long-run industry cost curves which reflect only today's technology and today's factor prices are no use. What matters

> are the costs of running and of expanding or contracting the hodge-podge we have got, the fossilization of past decisions taken by our predecessors.

In an analogous argument in the context of urban infrastructure, Neutze (1997: 38-39) points out that long run costs, or the lowest costs of producing an extra unit of service when capacity can be altered, could behave quite differently depending on the circumstances in which capacity is being extended. For instance, when new townships are being built on greenfield sites, alternative cost options of various capacity sizes can be estimated, and something akin to the textbook concept of the LRMC curve might be possible. However, even in these circumstances, the problem is complicated by the fact that headworks assets or current technologies have very long lives, so that the 'long run' becomes an impossibly long time to predict costs and assume given technologies.

A more common circumstance is that existing capacity has to be extended to cater for new development, either within the city or at the urban fringe. To distinguish between the textbook and the more realistic situations, Neutze (1997:38) terms the first case the 'planning' long run costs and the second circumstances the 'quasi' long run costs.

Clearer thinking about what it means to charge for a service at short run or long run costs must, then, take into account the more realistic circumstances in which the policy issue arises. If quasi long-run costs are the more common circumstance in the real world the question arises: how do these costs behave? Is it likely that they will behave differently to the simplistic textbook long run cost curve?

It is necessary to clarify why it is important to know the characteristics of actual cost functions. In the literature on public utility pricing, the nature of economies of scale is of considerable interest largely because it is relevant to the issue of whether losses (or surpluses) will arise. This was noted earlier in the discussion on Ng's (1987) paper where the nature of long run costs (especially economies or diseconomies of scale) influence the length of time spent at the (higher) rationing price. If extending

capacity is very expensive, the rationing price of the existing capacity will prevail for a longer period.

The issue of the adequacy or otherwise of *total* revenues is not a primary concern of policy design for developer charges. This is because, as we shall argue at length in Chapter 6, developer charges should be set to the long run marginal capacity cost of providing a service, in which case they can be combined with recurrent charging to cover operating costs. Large losses are therefore far less likely. But what is vital to developer charges is choosing the correct facility size or scale of operation. That is, it is important that developers are only charged for or required to build facilities at the correct (optimum) size - sometimes also referred to as the 'minimum technically efficient' scale of operations. For this purpose knowledge of the nature of long run cost functions (and of demand) is essential. It is sometimes suggested that engineers are disposed to favour big solutions rather than consider costs in relation to demand (see, for example, Hanke and Davis (1973:809) and Troy (1996:86). Troy (1996:86) has commented on this as follows:

> We should note here that the engineering of new dams, pipe installations and treatment plants has frequently been innovative and the introduction of telemetry and information technology to system control has been highly advanced, but the reliance on large-scale networks has rarely been queried. We have persisted with *big* engineering solutions and highly hierarchic organisations.

If the large engineering systems of current technologies do face increasing costs then perhaps smaller systems may be more efficient. Thus it is because of our concern that correct capacity decisions be taken that understanding the behaviour of costs is important to developer charges.

When an urban settlement is just starting on a new or 'greenfields' site, the marginal costs of adding new customers may well be less than the average cost. In the case of expanding an already substantial infrastructure capacity within an urban area, or even at the fringe of this area, there are strong arguments to suggest that diseconomies of scale might prevail. Technological progress may well be a factor

lowering long run costs, but there will also be other significant factors affecting the costs of expansion of service. One of these is the possibility that there is a limit to the capacity of the natural environment to continue to provide natural resources, such as water. Moreover, there may well be a limit to amount of the wastes of urban life which can be absorbed by the environment. More costly and higher standards of treatment facilities may be needed as more pollutants are generated. All this applies especially to sewage, the wastes carried in stormwater drains and to solid wastes, which must be delivered to sites further and further away from an urban conurbation (Neutze 1994:6). Many of these environmental problems of urban centres have been documented by Troy (1996:Chapt 3) and AURDR (1995*a*).

A further factor influencing the probability of long run costs increasing is the cost of obtaining land. As an urban area grows, so the cost of acquiring inner city land by local government for policy purposes like widening roads grows.

Other reasons why the costs of each additional capacity expansion might increase could be related to the growing complexity of ever larger systems. Lee (1988:298), for example, has argued as follows:

> Actual unit costs seem to rise, however, for several reasons. Investment is not planned and executed efficiently, and errors increase as the scale of the system increases. Political decision making becomes more complex, off-setting some of the potential cost savings of larger systems. Networks become more extensive to take advantage of greater treatment or supply capacity, so travel takes place over greater distances. Land, excavation and construction become more costly as an area urbanizes and becomes more dense.

In sum then, long asset lives and lumpiness of urban infrastructure are attributes of local government infrastructure which create analytical difficulties when attempting to apply standard textbook definitions of LRMC. To describe the more realistic circumstances of expanding capacity of a pre-existing infrastructure system, Neutze (1997:38) defines a 'quasi' LRMC curve. This curve is likely to exhibit diseconomies rather than economies of scale. The policy implications for developer charges is that

smaller scale less costly urban infrastructure systems may well be more appropriate. The selection of an optimum scale of facility is considered further in Chapters 4 and 5.

3.7.2 *Costs Will Vary by Location and a Possible Conflict with SRMC Pricing*

The costs of providing the headworks and distribution networks for urban infrastructure will, by its nature, vary by location. For example, topography will affect costs since it is generally more costly to service sites which have a steeper gradient. Similarly, the porosity of soils will affect sewerage costs. The distances that distributional networks must cover to reach a site will also cause costs of different sites to vary. The pattern of existing land use and density of population will also influence costs. For example, the higher costs of building roads or laying pipes in highly populated urban areas, for example, have already been noted. The need for closer monitoring of urban discharges in these areas can also be expensive. The presence or absence of excess capacity in the infrastructure which is already servicing an area will affect the costs of locating development in one area or another.

While all this may seem obvious, the difficulty it presents for urban infrastructure pricing policy is that there is very little in efficient pricing theory which deals explicitly with spatial variation in costs. This is, no doubt, a consequence of a general neglect of spatial variables in orthodox economic theory as a whole (Richardson 1971:1). Location theory, a branch of regional economics which attempts to explain, *inter alia*, the locational choices of producers, retail outlets and residents of a city, has evolved as a separate strand of theory and has rarely been integrated with mainstream economics, let alone public utility pricing (Richardson 1971:1). There is no doubt that in the idealised theoretical model, when all utilities or services have been built at their optimal capacity, SRMC will equal LRMC and any costs peculiar to the catchment area of the infrastructure service will be reflected in the optimum charge. Similarly, services in other areas will reflect costs relating to those areas. However, the difficulties are that because of some of the attributes of infrastructure discussed earlier, features such as excess capacity may be inherent or there may be other structural reasons why the scale of operations cannot be adjusted to demand. When, for whatever reason, capacity is not at an optimum a fundamental dilemma arises: SRMC may not reflect the locational

variation in costs. Pricing to reflect *locational variation* in costs may not always be consistent with pricing to ensure efficient *use* of infrastructure (i.e. use of spare capacity). It will be recalled that under the SRMC (or, more correctly, the congestion) pricing strategy, price is low (but above operating costs) in an attempt to encourage the use of all available spare capacity. The pricing signal being sent conveys information only about the extent of available capacity now at a site and nothing about relative costs of having to expand capacity at that site compared with an alternative site, when demand has grown sufficiently (and when residents have located to the former, rather than the latter, site).

The Industry Commission Report on *Taxation and Financial Policy Impacts on Urban Settlement* (Industry Commission 1993) noted the potential for conflict with capacity pricing. On this question the Commission (Industry Commission 1993:139) said:

> It is sometimes suggested that water from a dam - which is virtually costless once it has been harvested - should be priced to reflect only the cost of pumping it to consumers (and any recurrent costs) unless total demand exceeds total supply, at which times prices should be raised to ensure that water goes to its highest valued uses. Similarly road use may be virtually costless and so priced at very low level until congestion starts to occur.
>
> The conflict between pricing for efficient location (to recover total costs) and pricing for efficient use (to recover marginal costs) *is at the heart of difficulties that arise in determining prices for infrastructure services* (emphasis added).

The Commission appears to be confused over the theoretical cause of this conflict[1] but the essential point to which they draw attention, and which many other recent government reports on infrastructure pricing seem to gloss over or ignore altogether (see, for example, BIE 1995 and COAG 1995*a*, 1995*b*), is clearly of

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[1] It is not clear exactly what the Commission (1993:139) means by 'This is because pricing to reflect locational cost differences is related to the recovery of total costs'.

The Commission goes on to support in a footnote a submission to the Commission by Neutze advocating long run marginal cost pricing. As the analysis of marginal costs in Chapter 5 of this study argues, a correct notion of marginal cost is a forward looking cost so that it may not always be the case that LRMC pricing will recover total (historical) costs.

fundamental importance: at any one point in time, *which costs* should marginal cost pricing attempt to reflect?

Although it has not been made explicit in the theoretical literature, the main focus of that literature is on *congestion* or *usage* pricing alone. The implicit assumption is that the potential for inefficiencies which arise in the presence of less than optimal use of capacity is greater than the potential inefficiencies which might derive from ignoring spatial variation in costs. This raises the question of the importance of locational differences in costs and the consequences of ignoring them. These issues will be explored in Chapter 4.

3.7.3 *Multi-products Mean Multi-marginal Costs*

The recognition that any one infrastructure service can be viewed as providing more than one product raises the problem that there will be as many marginal costs as there are joint products. This is really a more generic version of the problem identified in the preceding section: if volume of use of a service can be viewed as only one of several possible products of a service, then each product will have its own marginal cost; the question is, to which marginal cost should price be set? Understanding the different dimensions of output assists in clearer thinking about 'marginal costs' but it becomes clear that the theoretical prescription for marginal cost pricing ceases to be simple. Neutze (1997:101) has summed up the issue as follows:

> It follows that the marginal cost of production of individual infrastructure services is not a simple concept nor a simple "price". There are marginal costs of each of the products the service provides, sometimes short-run and long-run marginal costs, and marginal costs which vary with time of day and year and with location. Because charges need to be simple, they need to be based on only a few of these cost determinants: the choice of which ones is an art not a science.

One way around this problem is to identify the most important costs associated with the most important 'products' of a service and devise a multi-part tariff. For example, for water supply services, the Organisation for Economic Co-operation and Development (OECD) has devised the following taxonomy (Herrington 1987: 37-38):

(a) Customer costs - These are costs associated with the piping and related costs necessary to connect customers to a system. They are incurred even if no water is consumed. These costs do not vary with the maximum demand (peak load) on the system.

(b) Commodity (Volume or Usage) costs - These vary directly with the number of units consumed.

(c) Capacity costs - These are costs of providing headworks, distribution works and treatment capacity costs. These costs *do* vary with the size of the expected maximum load on the system but not with individual units consumed; and

(d) Common costs - This is a 'catchall' term for costs not elsewhere included (such as administrative overheads).

The next step is to decide on a correct measure of the 'marginal' cost for each category (Herrington 1987:37-38). For example, the marginal cost of an extra unit of water consumed is straightforward, but how are marginal capacity costs to be measured? Discussion of this issue takes us to the work of Turvey (1968*a*, 1969, 1971 and 1976) in Chapter 5.

Downing (1977:438) similarly recommends a three-tiered pricing structure which is based on: a marginal cost of consumption of the service according to each individual's use of it; a lump sum charge (or tax) dependent on the availability of the service but not its actual use; and a distribution charge which differs for each site and is set to the long run cost of delivering the service to the site. The theory behind Downing's recommendations is discussed in Chapter 4. The main point to emphasise here is that a tiered pricing structure, or a repertoire of funding devices which includes developer charges as one component, affords the opportunity to provide cost signalling devices in addition to those provided in a single volume-of-use charge.

At this stage of our analysis, it has become patently clear that developer charges are not well suited to reflect volume of use costs. They are a one-off charge, usually paid early in the life of a new development. Since they are passed through to homebuyers or consumers in the form of a one-off loading onto the price of land, they

cannot reflect ongoing usage costs as they emerge. Moreover, they do not normally distinguish between the various infrastructure services for which developers have been charged; component services are usually summed into one charge per lot. Whilst the capital costs of providing a service could readily be (and, of course, are) paid as a one-off charge, to include estimated maintenance and usage in the charge seems hardly advisable.

It might be possible to estimate future recurrent costs and capitalise the estimate into a single lump sum value (as is done for roads, for example). However, it is not difficult to see that the pattern of consumption of a service may be different if estimated recurrent costs are capitalised and paid initially rather than continuously as they emerge. Water, for example, would appear to be 'free' if all charges were paid in a lump sum and its eventual use is likely to be higher than if consumption is monitored and charged accordingly. It is clear that where it is possible to charge directly for use this is a superior alternative to the attempt to capture usage costs in a developer contribution.

For some types of local government infrastructure, marginal usage costs are very low (or zero) whilst on-going maintenance charges could perhaps be forecast reliably. Roads and local open space are examples. Developer charges which included both capital and recurrent costs might be more acceptable in this instance. Indeed, for roads, the capitalisation of expected maintenance costs, together with capital costs, is acceptable within the guidelines issued for Section 94 charges in New South Wales (New South Wales Department of Urban Affairs and Planning 1997:32).

Since there is only one chance in the design of a developer charge to create the desired efficiency incentive, and on-going consumption of a service is one area which cannot be affected by developer charges, the question arises: what decisions can be affected by a developer charge? One obvious answer is the decision to locate in one area rather than another. Locational variation in the capital costs of construction of infrastructure plant is a signal which can be sent by a developer charge. Because capital costs are readily estimable at the time a charge is levied and because, as we noted

earlier, these costs tend to comprise a high proportion of total costs, such charges could be an important incentive to efficient location decisions. The potential role of developer charges to affect locational choice and other spatial aspects of the development decision such as pattern and density of development, is examined in Chapter 4.

3.7.4 *The Cost Implications of Planned Excess Capacity*

Perfect divisibility and adaptability of plant capacity to changing demand is not a characteristic feature in urban infrastructure, for reasons described in section 3.6 above. In particular, it was noted that there may be good reasons to build in excess capacity into a plant at the time of construction. The presence of built in excess capacity poses special problems for the SRMC pricing recommendations of the congestion pricing literature.

Congestion pricing theory suggests that prices should be lowered when excess capacity is present, so that demand just matches capacity at all times. The assumption of the theory is that there are no other costs associated with the use of currently idle capacity other than operating costs which will be covered in the price. It is thought that capacity costs are not incurred because they are sunk. However, practically speaking, it would seem most unwise to price so as to encourage the use of an infrastructure service to use up (built in) idle capacity now, with a view to discouraging this level of per capita use later when demand has grown sufficiently to reach the originally planned optimum capacity. Yet this is exactly what the recommendations of SRMC pricing theory would require. For one thing, this policy overlooks the fact that consumption habits are formed which may prove politically difficult to change later. It seems especially absurd in the case of water where public campaigns recommend long term conservation of water. The Australian Capital Territory Electricity and Water Authority (in Industry Commission 1992:63) summed up such objections when it commented on proposals to implement short run water pricing:

> For all members of the community it means adjusting their lifestyle which takes years of reinforcement ... Most members of our community are not economists and do not understand why water prices should vary so greatly. They will resent being

> forced to change their lifestyle to conserve water only to discover later that water is no longer scarce.

Moreover, it is unlikely that SRMC pricing in these circumstances involves no costs.

As Turvey (1971:57-58), Neutze (1997:141-42) and others have pointed out, long term investment decisions made on the basis of current prices (or expectations based on current prices) may prove mistaken if prices later rise. Moreover, Neutze (1997:141-142) argues that, with regard to water, there is good evidence to suggest that the long run elasticity of demand for water is considerably higher than the short run elasticity. His argument is worth quoting in full:

> The view that prices should equal SRMC assumes that decisions to consume water are predominantly short-term decisions such as how frequently to take a shower or how long to water the garden. Such decisions can be varied daily according to the price of water. But, in reality, the most important decisions which affect the level of use of water are long-term investment decisions such as the purchase of consumer durables like washing machines and dishwashers, the replacement of equipment which used large amounts of water with more water efficient equipment, and the size of lawn and other landscaping decisions. The evidence for this judgement is given in Chapter 4 where it was shown that in the long-run elasticity of demand for water is much higher, perhaps three times as high as the short run elasticity. These investment decisions are based on expectations about the future price of water. Long periods when prices are below the long run marginal cost of supply will encourage commitment to a high water use lifestyle which is unlikely to change during periodic short times of high prices. If consumption decisions are mainly long term decisions, they are more likely to be optimal if they are guided by a relatively stable price regime, and one which reflects the LRMC at all times.

The recommendation of congestion pricing theorists to modify prices to match demand with available capacity at all times also ignores any external costs which might prevail during consumption and which are not captured in the short run price. Environmental economic theory (see Cropper and Oates 1992) suggests that externalities be included in price, although it must be acknowledged that this is often difficult.

Finally, prices in the public sector are notoriously 'sticky' in any case. They are politically difficult to change once they are established. Even at the risk of under-utilising existing capacity, it is thus probably better to attempt to set prices at a stable long term level.

If we can conclude that in the context of real world local government infrastructure an efficient price or charge is more likely to be one that is set equal to LRMC, then there is a role for developer charges to be set to the marginal capacity cost component of LRMC. With a service like water, for example, capacity costs of extending supply to new development would be paid in a one-off charge when land is bought rather than as the fixed cost component of regular bills, but with the developer charges, there would be an opportunity to signal locational variation in capacity costs at the time the decision to locate is made.

We have not yet defined marginal capacity cost or considered how it might be measured and the efficiency potential of charges which reflect locational variation is, as yet, an article of faith, but there is a common circumstance which arises in developer charges policy for which, even with the analysis to date, we can begin to offer some guidance. The issue is analogous to the SRMC or LRMC debate and the example involves excess capacity in roads. David Johnston (1995:4-5) presents a policy dilemma which can be illustrated in Figure 3.3. Council receives a development application for a site in the city (site X) and this will generate additional traffic on Mamre Road and turning traffic into Bakers Lane. The amount of traffic generated is not quite sufficient to require an upgrade to the intersection. A little later, a second development application is received for site Y which has the same traffic generation patterns. However this is now sufficient to require the upgrade to be undertaken. The question is, says Johnston, which application generates the need for the improved facilities and how much should each developer be required to pay?

The SRMC-analogous solution would be a zero charge for site X and the full cost of the upgrade to be charged to Y. However, apart from the obvious inequity in the treatment of developers in this, there is another problem with the SRMC-analogous

solution. This is that it assumes that there is no cost in using up the presently available excess capacity, in the same way that SRMC pricing assumes that capacity costs are sunk. But in situations such as this where it can be expected that traffic will grow steadily over time as the city grows there *is* a cost of using up spare capacity now. This is that it causes the need for upgrading to occur earlier than would have happened in the absence of a development at site X.

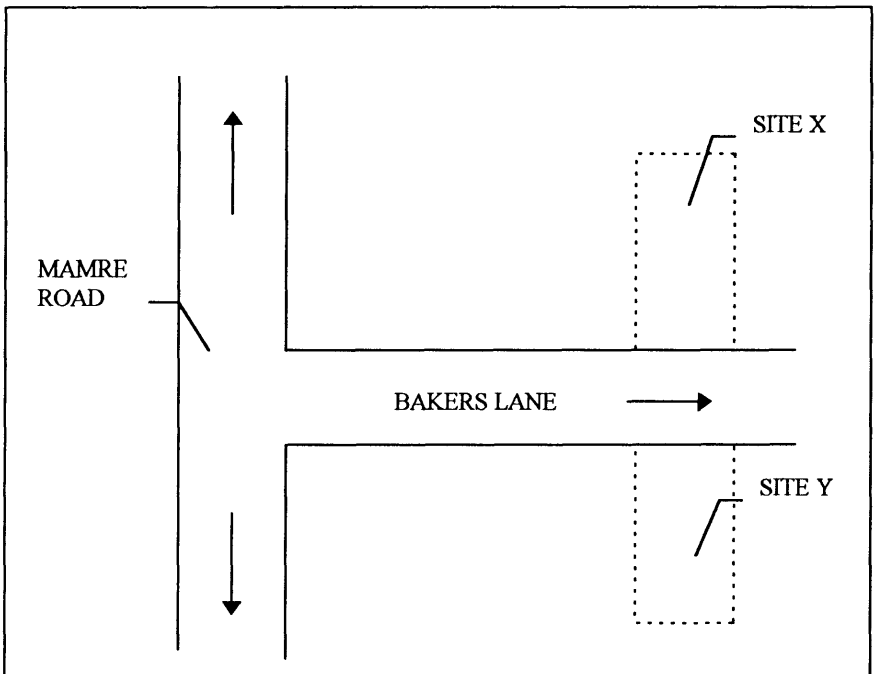

Figure 3.3 Example of a Developer Charges Policy Dilemma

Source: Adapted from Johnson (1995:4)

As we shall argue, it is this cost - the long run marginal capacity cost - to which charges for both developers should be set. We take up the matter of the definition and measurement of long run marginal capacity cost in Chapter 5, and return to the problem illustrated in Figure 3.3 in Chapter 6.

One question which remains to be asked is: are there any circumstances in which a 'short run' developer charge might be appropriate? Two circumstances suggest that a charge analogous to a short run price might be appropriate. In the first, the price would be zero, and in the second, a rationing price might be charged.

The first situation arises where unplanned excess capacity already exists in an urban area *and is expected to continue for a long period.* This might occur where demand was overestimated in the first place, or where changing population characteristics have reduced the load on an infrastructure service. In such circumstances there is effectively no marginal capacity cost as identified earlier. That is, there is no sense in which development now will bring forward the time when capacity expansions must be made.

The second instance is the opposite situation. In this case there is a shortage of capacity which, for political or other reasons is also expected to persist for a long period. In these circumstances it would seem appropriate to auction remaining capacity to the highest bidder. In an idealised competitive world, the developer prepared to pay the highest price should bring the project of greatest benefit to society (although there may be many a slip between theory and reality here).

In the absence of either of these circumstances, the general rule should be that the appropriate cost to reflect in a developer charge, given the policy objective that these charges are intended to be user pays, is the long run marginal capacity cost. The pioneering work in the analysis of such a cost and the attempt to find an operational measure of it is that of Turvey (1968, 1969, 1971 and 1976). In Chapter 5 we examine the theoretical development of this approach.

3.8 *Concluding Remarks: The Policy Implications for Developer Charges of the Review of Optimal Price Theory*

This chapter has examined the literature on efficient pricing to see if this theory can provide policy guidance on how to set an efficient developer charge. Generally speaking, we argued that this theoretical literature is not directly applicable to the context in which developer charges are set and is of limited usefulness. Four factors can explain this; firstly, standard assumptions, such as constant returns to scale and perfect divisibility of plant, simply do not apply to the typical urban infrastructure services with which this study is concerned. Secondly, this means that cost curves do

not behave in the standard textbook fashion and the concept of a long run cost curve in particular needs to be adapted to take account of real world circumstances. Understandably the nature of realistic long run cost curves has important consequences for decisions about the scale of infrastructure service to provide. In particular, if increasing costs obtain for a network system as a whole, notwithstanding that decreasing costs might prevail in large capital items within a network, then it may be more efficient to meet demand with smaller scale systems, and charge developers accordingly.

The third factor explaining the limited usefulness of orthodox views on efficient pricing is that the preoccupation of the literature with congestion pricing ignores other significant influences on costs, such as location.

It is the preoccupation of the optimal pricing literature with 'volume of use' as the main product of an infrastructure service which has led other important dimensions of output, such as access or location of a service to an area, or standard or quality of service provided, to be neglected. Recognition of the multi-product view of infrastructure services suggests a multi-level marginal cost approach to pricing is appropriate. Developer charges, by their nature, are not well suited to provide correct economic signals about *usage* costs, but they are able to signal *location* costs. For this reason they may be best confined to capital costs, especially when the option to charge a direct price (and hence charge for usage costs in this way) exists. An exception is that if marginal usage costs are zero and maintenance costs reasonably predictable then these could be capitalised into a lump sum charge without a significant loss of efficiency.

A consequence of the 'usage' focus of the standard literature is that it implicitly assumes that the inefficiencies associated with leaving capacity unused would be greater than the inefficiencies associated with ignoring locational variation. Chapter 4 explores this issue further.

The fourth problem with the orthodox view is that the presence of excess capacity in local government urban infrastructure poses particular problems for advocates of SRMC pricing. Excess capacity is a common circumstance of local infrastructure because it is often inherent in the nature of the service (e.g. open space) or because it is often efficient to deliberately build it in to plant capacity.

Overall the argument of the chapter favours LRMC pricing where there is a role for developer charges to signal locational variation in long run marginal capacity costs. How long run marginal capacity costs might be defined and measured is tackled in Chapter 5.