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Funding Local Government Infrastructure:

The Case of Developer Charges and Public Open

Spaces in New South Wales, Australia

by

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Abstract

Local governments in Australia, like their counterparts in developed countries abroad, have been exploring alternative methods of funding local urban infrastructure. In New South Wales, Australia, "developer charges" are becoming a popular source of funds. Whilst a good deal of effort has been devoted to designing policy which is administratively efficient and satisfies "nexus" requirements, there appears to be surprisingly little interest in the literature in the economic theory underlying developer charge calculation methods for different items of infrastructure. Using the calculation of charges for public open space as an example, this paper attempts to demonstrate that an understanding of the particular economic attributes of an urban infrastructure service can guide policymakers towards more appropriate methods of calculation.

Key Words: developer charges, public open spaces, urba infrastructure

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The development of urban infrastructure in advanced industrialised societies absorbs a substantial proportion of public investment. For example, in Australia Neutze (1997, p. 2) has estimated that

> in 1991-92, 55 per cent of gross fixed capital formation by state and local governments was in water, sewerage and drainage, fuel and energy, and road and rail transport. In the same year, 65 per cent of total gross fixed capital formation by all governments combined was on the above services, together with communication and other forms of transport.

Given the enormous demands on the public exchequer in virtually all OECD countries, governments everywhere have long been exploring alternative methods of infrastructure funding. At the local government level, development charges have become a popular means of obliging private developers to contribute towards the cost of providing local infrastructure.

In essence, development charges are lump-sum charges designed to recover the public costs incurred in the provision of urban infrastructure from the beneficiaries of that infrastructure. Development charges are typically levied on the owners of land rather than the occupants of land or users of specific services. In different parts of the world development charges have a common purpose but often carry different names; for example, "contributions for betterment", "impact fees", "land readjustment", "special assessments", "valorisation contributions" and, in the Australian state of New South Wales, "developer contributions".

It is possible to identify three main reasons for imposing development charges. Firstly, development charges augment the income of urban governments. Secondly, it is economically efficient for development charges (which reflect the costs involved in infrastructure provision) to be levied on those people responsible for the development in question so that infrastructure costs are

included with other costs when decision-making takes place. And thirdly, it is equitable to charge those individuals who benefit directly from the infrastructural improvement.

The present paper seeks to explore the theoretical and practical difficulties involved in the design and implementation of developer charges policy in contemporary urban environments by examining practice in New South Wales, Australia. It is apparent that there is a substantial literature examining developer charges from various perspectives (see, for example, Nelson 1995, 1988; Alterman 1988; Downing and McCaleb 1987; Snyder and Stegman 1987) but there appears to be surprisingly little interest in the economic theory underlying alternative calculation methods. A central contention of this paper is that an understanding of the economic attributes of a particular infrastructure service can guide policymakers to design more appropriate developer charges. We attempt to demonstrate this using the specific case studies of "open space" developer Contributions Plans employed by the Hornsby Shire Council and the Lake Macquarie City Council. It is hoped that an analysis of these problems in the specific institutional milieu of New South Wales will yield at least some insights of interest to an international audience.

The paper itself is divided into five main parts. The first section outlines the legislative basis for developer charges in New South Wales. The dimensions of public open space arrangements in New South Wales are described in section two. Section three focusses on the economic attributes of public open spaces. The determination of developer charges for public open spaces is examined in section four, with special emphasis on actual practice in Hornsby and Lake Macquarie. The paper ends with some general comments and criticisms of public open space developer charges policy in New South Wales which may have wider ramifications.

Nature of Developer Contributions in New South Wales

In terms of Section 94 of the New South Wales (NSW) *Environmental Planning and Assessment Act* of 1979 local governments acquired the legal rights to levy developers for the provision of infrastructure, services and amenities attendant upon some new development. However, due to various legislative complications associated with Section 94 of the Act, these levies, known colloquially as "developer contributions", have only been fully utilised since 1989. Moreover, in accordance with a recommendation of the 1989 Simpson Inquiry, as of

17 December 1992 local governments were required to have a complete Section 94 Contributions Plan in place before they could impose developer contributions. A Contributions Plan should "... contain an implementation program for contributions and a fiscal strategy to enable efficient, economic and equitable administration of Section 94" (NSW Department of Planning, 1992, p.1).

A great deal of time and effort has been invested in improving the procedures involved in the implementation of Section 94. The NSW Department of Urban Affairs and Planning produced a *Section 94 Contributions Manual* over 1992/1993 which has been widely used by all the parties involved. Moreover, some research has also been directed at the efficacy of contributions levied under Section 94 (Barnes and Dollery, 1996*a*) and various proposals put forward for improving on existing methodologies, including the adoption of an *ad valorem* tax by small councils (Barnes and Dollery, 1996*b*). [See also, for instance, the Industry Commission (1993) and Kirwan (1991)]. Recently a new *Section 94 Contributions Plans Revised Manual* was prepared for the NSW Department of Urban Affairs and Planning by Scott Carver Pty Ltd (1996). This has now been transformed into a new *Section 94 Contributions Manual* by the NSW Department of Urban Affairs and Planning in 1997, which provides guidelines as to how municipal councils should administer Section 94 policy.

The *Manual* itself places particular emphasis on four basic principles of policy: the demonstration of the "*nexus*" (between the type of development and the demand for additional public facilities); the requirement for "*reasonableness*" in determination of the contribution (comprising, according to the Manual, "fairness, equity, sound judgement and moderation" (New South Wales Department of Urban Affairs and Planning, 1997, s.12)); "*apportionment*" of costs of a public facility (such that "the contributing population only pays for its share of the total demand" (New South Wales Department of Urban Affairs and Planning, 1997, s.13)); and the necessity for "*accountability*" of public funds (requiring, for example, clear and informative documents, maintenance of appropriate financial records, and public participation in decision making).

Dimensions of Open Space Arrangements in NSW

Developer charges for open space are substantial in terms of the revenue involved. Australian Bureau of Statistics data (ABS) indicate that open space contributes around 26 per cent of total

developer charges raised in New South Wales, slightly more than roads (at 24 per cent) and water and sewerage (at 23 per cent) (McNeill, 1998). Across all municipal jurisdictions, open space is also the most frequently occurring contribution item (Planning Research Centre (PRC), 1994, p. 121; Barnes, 1995, p. 53). Barnes' (1995) survey of all municipal councils in New South Wales showed that open space is the most popular contribution item, levied by over 50 per cent of councils in the state.

In 1994, the NSW Department of Urban Affairs and Planning commissioned the Planning Research Centre (PRC) to undertake a review of the first "generation" of Contribution Plans prepared by local councils. In the subsequent report (PRC, 1994, p.130) the PRC judged open space Contribution Plans as performing at a "poor-fair level" compared with Plans for other items of infrastructure. The PRC (1994, p. 130) noted that 'given that Open Space is levied for more than any other type of amenity or service, it would be expected that a better system of contributions would be in place'.

The worst performing aspects of Open Space Contribution Plans, according to the PRC (1994, p. 130), were the demonstration that the amenities were provided to serve new development (or the nexus) and the presentation of formulae. On the question of demonstrating a nexus, the PRC (1994, p. 132) criticised the fact that demand was more likely to be established by relying on past practice than by reference to background studies, and also that background studies tended not to be used even for establishing current population characteristics or the availability of existing facilities. This aspect of Plans was singled out as particularly 'questionable planning practice' (PRC, 1994, p. 132).

Clarity, coherence and consistency of documentation were also classified as only 'poor-fair'. On the question of whether Open Space Contribution Plans mentioned efficient pricing, the PRC found that 83 per cent of those Plans surveyed did not. However, 50 per cent of Plans assessed did embody equity and consistent application considerations.

Economic Attributes of Open Space

A distinguishing feature of open space compared to other kinds of leviable infrastructure, such as drainage or roads, resides in the fact that it represents an asset for which the target community can express diverse preferences about the desired form of open space. There are a surprisingly wide

range of options for providing open space. Examples include formal gardens, small parks/playgrounds, large parks, bushland, undeveloped land, ancillary land (like land adjacent to road corridors), beachfronts, foreshores, river frontages, outdoor sports facilities, bike paths, walking tracks, and civic spaces (such as in shopping malls). However, since there is often no direct usage charge for these facilities, there is seldom a market mechanism in which preferences can be directly elicited for the type and quantum of open space which should be provided. By contrast, for roads or drainage, there is usually little scope for the exercise of consumer preferences in any case and these infrastructure services often have prescribed health and safety standards. Not meeting consumer preferences (i.e. not having knowledge of the demand curve) is clearly much less of a problem for these services than for open space. Indeed, the need to ascertain the nature of the demand curve for open space poses the central challenge for the determination of an efficient developer charge.

An additional economic attribute of open space resides in the fact that there is a significant capital cost attached to providing the asset (a substantial component of which will be the opportunity cost of the land), but almost a zero marginal cost in using it. However, there is a recurring maintenance cost which may vary marginally with use but most of this maintenance cost will occur irrespective of the extent of use of the facility. Marginal usage costs will cease to be negligible if facilities begin to become congested, but until this point is reached, usage costs will not be a significant component of the cost of open space. Not being able to levy a usage charge (i.e. a charge which increases the more people use open space) will not mean, as it would for a service like water, that important signals for calculating optimum capacity are lost. In the case of open space though, it does place all the more emphasis on the need to know the preferences of consumers at the time of construction in order to provide the 'optimum capacity' of open space.

A further attribute of open space is that by its nature it must be provided in "lumps" and hence may contain excess capacity for a period. In this respect, open space is typical of other urban infrastructure assets, such as water supply, sewerage and roads, where the determination of a charge requires an estimation of the final "demand" or the final population of users of the service. There will usually be two types of circumstances applying here: either the demand for the service (like water) is expected to grow over time as the population expands, so that extensions to capacity will be

required in the future; or alternatively, existing capacity is expected to suffice indefinitely. If the demand for the service is growing over time, then the estimate of the 'final number of users' will be determined by computing the period to full capacity (and hence the demand at full capacity). On the other hand, if existing capacity is expected to suffice indefinitely (such as a road to a specific site with little additional traffic potential), then the "final number of users" is simply an identification of the present and future demand for the service, which will probably be less than the full capacity service potential. For some types of open space, like sporting facilities with regional appeal, growth in use may continue as the population expands, but for more local open space, it is most likely that the final number of users will be fewer than the facility could have served at full capacity. The basic reason for this is that the demand for local open space tends to be limited to the number of people within geographical reach of the asset. For example, local playgrounds will be used most if they are only a few minutes walking distance away from their intended beneficiaries.

However, there is another dimension to the propinquity of open space and the benefits from it, which complicates the issue of determining the final number of users of open space. This is the fact that non-users (that is, people who do not actually visit the space) can still derive an "amenity" benefit since open space tends to enhance the beauty and livability of an area. Using terminology drawn from environmental economics, it can be argued that open space offers "existence value"; that is, a benefit without any direct use being made of the asset (see, for example, Hamilton, 1997, p. 43) This unusual feature of open space complicates the calculation of the 'final number of users' and may suggest that it could be appropriate to make an estimate of final users or beneficiaries by delineating a specific geographical area most likely to use or derive amenity benefits from an open space asset.

These considerations raise the question of how far does the benefit region of specific types of asset extend? In this respect it is apparent that a hierarchical structure of supply of open space can be identified. The hierarchy of facilities and the type of facility at each level is dependent upon information as to how far people are willing to drive or walk to different types of facilities. Following the NSW Department of Planning (1992, pp. 8-9), a regional facility is one where users are prepared to drive 'significant' distances (like a national park); a district facility is one to which users will not normally drive more than 15-30 minutes (such as a sports stadium); and a local facility is one which caters to an area where people predominantly walk or cycle to reach the facility. The

geographical extent of the appeal of different types of open space, as identified by the Department of Planning (1992), suggests an appropriate delineation for catchment areas for the calculation of charges for each type of open space.

The final economic attribute of open space which should be noted is the fact that, in some instances, the 'technology' of service provision is such that two or more infrastructure services might be combined using the same infrastructure. For example, it may be possible to combine drainage and open space services in a single land area, provided quality of open space is maintained. Other possible 'joint technologies' might include bushfire protection reserves with open space or wildlife corridors with open space. Optimal charges will be lower where these opportunities can be exploited.

Determining Developer Charges for Open Space

The Identification of the Demand Curve

As we have already observed, identifying "demand" for open space is one of the central issues in the determination of an efficient charge. There is little opportunity to reveal preferences through a market by indicating willingness to pay a price for the service, whereas at the same time there is a wide range of choices and standards for open space assets. One pragmatic approach to this difficulty would be for councils to use general studies of consumer preferences for open space options and/or undertake their own surveys of preferences within their jurisdictions. Clearly it will not be possible to ascertain the preferences of people who have yet to move into the area, so it will be necessary for municipalities to rely on studies of areas with expected similar population characteristics.

Zanon and Wheatley (1995)

One example of such a general study is provided by Zanon and Wheatley (1995). They analyse the recreational demand for urban parks in Melbourne. By surveying both households and park users, Zanon and Wheatley (1995:2) sought to answer questions about the composition of visitors to parks, how far these visitors are prepared to travel, what facilities and services they prefer and why, and how often they visit the parks. Some 17 park attributes (picnic tables, walking tracks, etc.) were

identified and visitors were asked to rank these in terms of importance. Zanon and Wheatley (1995) also constructed a model to predict visitor numbers based on characteristics of actual visitors to various parks and on the various attributes of 13 urban parks in Melbourne.

Zanon and Wheatley (1995) appear to have produced some useful insights for park management. For example, it is found that there are "increasing returns" (to use the economic terminology) to improving the services in parks. To maximise visitation, they argue that "it is better to put resources into fewer well serviced parks than have more poorly serviced parks" (Zanon and Wheatley, 1995, p. 4). Other findings of the study include the proposition that there is an inverse relationship between distance from a park and visits to it. For instance, the first 100 000 people in the surrounding population (for a park sized 74.3 ha and offering a "75 per cent standard of service") creates most of the demand for the park. Increasing the size of a park brings diminishing returns in terms of visitor numbers. Moreover, in general people do not seem to want to travel long distances to visit an urban park (Zanon and Wheatley 1995:4-5).

Developer Charges in Hornsby, NSW

The Section 94 Open Space Contributions Plan for the shire council of Hornsby provides an example of the use of a study of the open space preferences of the shire population. However, it should be noted that the Hornsby case is far from the common practice in determining developer charges for open space. Before we turn to the Hornsby case study a few preliminary observations are necessary.

The (then) NSW Department of Planning (1992, p. 18) noted at the time of issuing planning guidelines for outdoor recreation and open space that "it was not possible to locate a case where a council had undertaken a needs based approach (to open space requirements)". It appears that by far the most common practice of determining open space provision (and hence developer charges) in an area has been to apply a simple traditional standard of 2.83 hectares of open space per 1000 population (New South Wales Department of Planning, 1992, p. 17). This standard is believed to have been adopted from the British standard of seven acres per 1000 population used in the early 1900s. The British standard was based on the idea of providing adequate "space for play and gymnastics for children" (NSW Department of Planning, 1992,

p. 17). Its acceptance in Australia has been encouraged by the judiciary which has upheld the standard when challenged by developers. As the NSW Department of Planning (1992, p. 17) has observed, "the planning and legal professions have to date shown a reluctance to question this standard, even though there is clearly no logic in the Australian context for its application".

One of the problems noted by the NSW Department of Planning (1992, p. 18) and others (e.g. Duffield, 1995) with regard to the common 2.83 ha standard is that the focus on a quantity standard has led to the neglect of *quality* of open space. For example, Duffield (1995) has emphasised the importance not only of size of open space but also accessibility in terms of site characteristics (slope, drainage, quality of vegetation) and the services offered (bushwalking, play equipment, sporting fields). Duffield (1995, p. 4) recommends a "points system" where such features of open space are evaluated and "performance standards" are derived.

Hornsby shire encompasses an area of 510 sq kms and its population (of 132 000 in 1993) enjoys a high level of open space (Hornsby Shire Council, 1997, p. 16). Open space areas include a national park (Kuring-gai Chase), several regional parks under council control and local open space and recreational facilities also managed by the council. Prior to the Open Space Contributions Plan, Hornsby shire had used the historical standard to determine open space contributions. For example, in the case of residential apartment development, a developer charge for open space was assessed on the basis of 2.8 ha per 1000 population and the quantity of land so assessed was computed at the value of land in the immediate area. This procedure applied notwithstanding the fact that the funds were often employed to embellish existing open space and sometimes not even in an area capable of being used by future occupants of the residential apartments (Hornsby Shire Council 1995:4).

Other problems with the use of the quantitative (rather than qualitative) standard which were noted by Hornsby Shire Council were that at the local reserve level, a substantial number of reserves were less than 0.5 ha in size. These had been offered as land dedicated by developers but "the sites have often been on steeper, less developable land, frequently fulfilling a drainage role, or affected by an overhead cable easement" (Hornsby Shire Council, 1997, p. 16). Opportunities to enjoy the asset were therefore limited.

In 1991, Hornsby Council commissioned a study of the open space and recreational needs of the population of the shire. The objectives of the study were to assess the existing provision and distribution of open space and recreational facilities, identify the characteristics of the existing and expected future population, and find out the community's preferences for open space and recreational activities (Hornsby Shire Council, 1995, p. 6). Some of the more important findings of the study were that bushland settings were "extremely popular" throughout the community; that passive recreational activities (such as picnics, walking and visiting parks and gardens) were more popular than organised team activities and that recreational opportunities for youth were held to be high priority by the community but in new development areas these facilities were lacking (Hornsby Shire Council 1995:7).

This study was then used as background information for the preparation of the Hornsby Open Space Contributions Plan. For the purposes of the Plan, the shire is divided into nine districts and the population increase and population profile in each district over the five year period of the Plan is estimated. It appears that the additional open space and recreational requirements in each district were then identified using two main steps. Firstly, the *quantity* of open space required was determined by applying the existing shire-wide standard (4.5 ha per 1000 population) to the new population. Secondly, effort was made to determine the *type* of open space asset on the basis of the needs study. Capital works programs were identified which involved both the purchase of additional land and the embellishment of existing open space. The justification given for the first step (i.e. the use of the 4.5 ha per 1000 standard (which is significantly higher than the historical standard)), is that in the needs study residents expressed the view that the existing level of open space was an important reason for choosing to live in that shire and hence there was a "community expectation" that this standard would be maintained "to meet the needs of the future population without compromise to the existing population" (Hornsby Shire Council, 1995, p. 10). In the second step (i.e. the identification of the nature of the capital works required) it must be said that it is not always clear in the 1997 Plan which works involve upgrading existing areas to a more equitable geographical distribution of open space within the shire and which works are attributable to new population only.

The final contribution rate for each of the nine identified residential areas depends on the works and land acquisition required within any one area. All areas contribute to requirements (identified as "regional" and "district" level), but contributions for local works apply only in the area to which they relate. This produces a significant variation in contribution rates. For example, for residential area D_8 which includes most of the new release area in the shire, contribution rates are assessed as $1778.44 per person whilst in area D_5, rates are $663.33 per person (Hornsby Shire Council, 1997, p. 9).

With regard to the actual contribution calculations, the Hornsby Plan indicates that for acquisition of land the following formula was used:

$$\text{Contribution (per person)} = \frac{\text{Cost of acquisition of land}}{\text{Population increase in the next five years}}$$

Thus, if the cost of sites to be acquired in area D_1 is $416 000 and the expected increase in population over five years is 1079, then the contribution rate is calculated as $385.54 per person.

For augmentation of works, a similar formula is employed where:

$$\text{Contribution (per person)} = \frac{\text{Cost of augmentation}}{\text{Population increase in the next five years}}$$

A number of general comments can be made on the Hornsby procedure for determining developer charges for open space. Firstly, the attempt to identify the preferences of the community is a significant advance on earlier procedures in Hornsby (and evidently on most common practice in other councils). However, efficient charges require that preferences be elicited given the explicit costs of alternatives and it is not stated in the documents whether this important information was included in surveys. Nevertheless, it is interesting to note parenthetically that a stronger preference was indicated for natural bushland as compared to formal gardens, which are presumably significantly more expensive to maintain. Secondly, the definition of nine local catchments and consequent geographic variation in charges accords with economic principles. If correctly calculated, charges should signal relative costs appropriately.

With regard to the formula used by the council, the period over which charges are calculated is five years. The implicit assumption here is that "final demand" for all open space facilities will be reached within five years. This implication is not discussed explicitly by the Council, indicating that the choice of a five year period is more a matter of convention. Clearly, a more transparent calculation process which discussed explicitly the reasons for choosing a given charging period would be desirable.

A second problem with the formula used by the council is that it is apparent that the time value of money is not being taken into account. Although involving only a five year period, this may not leave the council significantly short of funds, but it nonetheless seems sensible to suggest that the technically correct formula be used, namely; the present worth (PW) of the capital cost (of acquisition or works) divided by the "present worth" of the population, that is:

$$\frac{PW(I)}{PW(D)}$$

where   I   =   the capital cost of land acquisition or capital works; and

          D   =   population increase over the period.

This formula will calculate a constant marginal capacity cost (MCC) per unit of demand or output (in this case indicated by population) which, when multiplied by the demand in a year and summed over all years, will in principle return an amount equal to the present worth of the construction or acquisition costs. The amount calculated by the Hornsby formula will fall short of this sum. Even if the charge calculated using the Hornsby formula is indexed each year to reflect increases in costs, at the end of the five year period, the value of contributions collected by the formula will not cover the real interest costs of the capital outlay required. The only additional information required to use the technically correct formula is an estimate of the population increase each year. For ease of estimation, a constant yearly population increase can be assumed. An annual percentage increase in population (in each district) has been assumed in any case in order to arrive at the single denominator in the Hornsby formula (Hornsby Shire Council, 1997, p. 19).

A final observation on the Hornsby procedure concerns the issue of "double dipping". Double dipping refers to the practice of charging new residents "twice" for the infrastructure they will use:

first, by means of the developer charge which is passed through into the price of the land, and second by means of a local government rate which is not differentiated from the rate paid by existing residents. The latter reflects the loan servicing costs of infrastructure used by existing residents, prior to the introduction of developer charges. The Hornsby Open Space Contributions Plan identifies nine areas where varying increases in population are expected over the next five years. Where developer charges apply (to recouping new development's share of existing spare capacity), and these facilities are still being financed through general rates, then the new population should be identified in each area and an appropriate offset made to the general rates bill. The Hornsby Plan makes no mention of this issue, but their procedure for determining developer charges, commendable in many respects on efficiency grounds, does bring to light the problematic issue of double dipping. A further illustration of this is suggested by the following paragraph from Hornsby Shire Council (1995, p. 15):

> Part of the contribution assessed within individual planning districts is directed to Shire-wide regional facilities where, on an apportionment basis, no more than 9.03 per cent of the cost may be reasonably charged against new development [9.03 is the percentage increase in population expected over the planning period]. Regional recreational facilities are primarily funded through general funding and grants.

To the extent that regional facilities *are* funded by loans serviced from 'general funding' (rate revenues) then the new population that have already paid their 9.03 per cent share in the form of a developer charge would have to be identified and excluded from the general arrangements applying to most of the population. The administrative complexities which might be required in order to avoid the problem of double dipping begin to become apparent.

Developer Charges in Lake Macquarie, NSW

Lake Macquarie, a coastal council lying between Newcastle and Wyong on the central coast of NSW, is interesting because it has a provision of open space of 17 ha per 1000 population, substantially greater than the standard of 2.83 ha per 1000 population and more than three times the

Hornsby standard. Notwithstanding this high quantitative standard, it is evident that the Lake Macquarie Council perceives a need for Section 94 levies as a means by which the quality and accessibility of open space can be improved for new development (Lake Macquarie City Council, 1993).

The Lake Macquarie Open Space Plan notes that developers have generally preferred to offer land rather than monetary contributions and that "this is frequently a means by which land least suited to development can be 'excised' at no cost to the developer" (Lake Macquarie City Council, 1993, p. 15). As a result, and in common with Hornsby, the donated open space is small in size (less than 0.5 ha), often contains a creek line or drainage facility, is frequently relatively inaccessible, and would be costly to maintain if access was improved.

Reasons given in the Plan for levying for open space include the fact that the distribution of open space varies throughout the council; access to open space opportunities can be improved by linking existing open space areas (for example, to provide bikeway routes around the Lake foreshore); and there are instances when "large single residential developments (e.g. of more than 30 allotments) may create a need for local open space currently not available in the vicinity of the site" (Lake Macquarie City Council, 1993, p. 16). The Plan identifies land acquisitions for such purposes. However, for the most part, the existing level of reserves is considered adequate and developer charges are sought "to augment existing reserves to a standard that matches anticipated demand of the new population, at a basic facility level" (Lake Macquarie City Council, 1993, p. 16). The works identified and the estimated costs of each are listed in a schedule at the front of the Plan.

The developer charge calculation procedure consists of projecting the number of new parks that will be required over the next five years if the same ratio of persons to parks as currently exists (1,648 persons/park) were to continue to apply to the new population estimated to move into the area. For example, if the population is expected to increase by 8,800 over the next five years and if the existing standard of persons/park is to be maintained, then some 5.3 district parks and 27.7 local parks will be required. The cost of the new parks is estimated at $3,466,673 and the developer charge is calculated by dividing $3,466,673 by the 8,800 estimated increase in population over the next five years. This produces a basic charge of $394 per head of population. The basic charge is

then translated into per lot or per dwelling charges, assuming a given rate of occupancy per lot or dwelling.

While this presents only a brief sketch of the Lake Macquarie procedure, it is nevertheless clear that one of the central problems facing the council is justifying a levy when such a high quantitative standard of open space currently exists. The council has outlined reasons why some works are still necessary and has adopted the basic position that the existing (quantitative) standard of open space should continue to apply to new residents. The Plan makes no mention of a user preferences survey similar to Hornsby, but it would seem advisable that some kind of survey be done in order to establish in the Plan the importance of open space to residents especially if such a high standard of open space is to be maintained. Toon (1995, p. 2) has argued that Lake Macquarie's position might be difficult to sustain under challenge. Simpson (1989) appeared to take the view that standards higher than 2.83 ha per 1000 population were acceptable provided the need for this level of service, especially the nexus, was adequately documented (see, for example, Simpson 1989, p. 77 and p. 86). Economic efficiency requires that the area be provided with a standard of service that residents have indicated a willingness to pay for. These considerations reinforce the suggestion that Lake Macquarie Council would be advised to undertake supporting studies when revising the current open space Contributions Plan.

In common with the Hornsby Shire Council, the formula used by Lake Macquarie to calculate charges does not take into account the time value of money. In Lake Macquarie's case, the levy does not vary by area according to works required. Some implicit cross-subsidisation between areas is thus contained in the formula.

Concluding Remarks

This paper has analysed some of the conceptual problems in the application of developer charges to open space, examined real world practice and suggested some ways in which developer charges policy might be improved. For example, for open space, the need to support developer charges policy with studies determining the preferences of residents, especially where cost options have been included, has been stressed.

Aside from such specific observations, two more general problems are apparent from the examination of examples of calculation procedures, even where, as is the case for Hornsby Council, many other aspects of their policy are exemplary. The first problem concerns the formulae used by councils to calculate charges and the second is the problem of double dipping. With respect to deficiencies in the formulae, it is apparent that formulae do vary between councils, they are not tailored to the attributes of the infrastructure being considered and they do not take the time value of money into account. None of this is surprising, given that the Section 94 Manual emphasises only general principles and contains limited advice on specific formulae.

The Manual addresses the issue of the formulae used to calculate contributions in two places: in section 4.5 of the main text of the Manual and in Appendix D, a "Sample Contributions Plan" (NSW Department of Urban Affairs and Planning 1997:p.42, 74). In the former, it is stated (p. 42) that:

> While the formulas (sic) used to calculate the contribution ... may be expressed in a variety of ways, its general structure may be expressed simply as:
>
> $$\text{Contribution Rate} \ = \ \frac{\text{Cost of Facilities \ (\$)}}{\text{Increased Demand}}$$

The explanation given for this "formula" does not say how the cost of facilities is to be ascertained, or recognise, for example, that only minimum efficient costs should be used. The word "incremental" is not used to specify which costs and, in fact, it is clear that this formula assumes the simplest possible case of a calculation of a charge. This is where the facility is perfectly divisible and new facilities can be built to the exact size to cater for the increased demand. This rarely applies to real-world urban infrastructure. The explanation accompanying the formula fails to address any implications of the fact that the increase in demand may take place over a number of years. The same is true of the formula in the Sample Contributions Plan. Here, under the question "what formula is used to determine the contribution?", the Manual (New South Wales Department of Urban Affairs and Planning 1997:80) suggests the following:

> The formulas used to determine the initial contributions are:
>
> Total Contribution (C) = $ Cap + $ Land − $ ECon − $ Grant
>
> THEN

$$\text{Contribution per person (CT)} = \frac{CT}{P}$$

OR

$$\text{Contribution per lot } (C_L) = \frac{CT}{L}$$

where:

$ Cap   - sum of capital costs for facilities which have been or which are to be provided.

$ Land   - sum of land costs which have been or are to be acquired to provide the required public facilities.

$ ECon   - sum of any existing contributions which have been previously paid towards the provision of the public facility.

$ Grant   - sum of any grants, subsidies or other funding source which may be available to fund capital works.

P   - anticipated increase in the total population for Mytown to the year 2005.

L   - anticipated increase in the number of lots to be created to the year 2005.

This formula correctly points out that any grants from other levels of government must be deducted, in common with any existing contributions collected, but again perfect divisibility of infrastructure facilities is assumed. Moreover, P and L are described as the increase in population or lots respectively to the year 2005, but it is not explained anywhere why the year 2005 has been chosen. It is clearly *assumed* to be the time to "build out" of the development site (expressed in terms of population or lots), or it could equally be the period after which new facilities will be needed. Either way, it is the estimated final demand (again, expressed in population or lots) for the facilities, and amongst which the cost of the facilities must be apportioned, but these assumptions are not stated anywhere. And again the time value of money factor is ignored.

Perhaps an even more serious deficiency in the formula advice in the Manual is the failure to provide any advice at all on how to calculate a developer contribution when it is intended for recoupment of the cost of facilities already built. This is an important omission because the Section

94 legislation states clearly that there are two situations when developer contributions can be exacted. These are: when the development requires new public amenities or public services to be provided (section 94(1)) - which is the circumstance assumed in the formula advice given; or when the development requires recoupment of public amenities or services which have been previously provided and will be drawn upon also by the development (section 94(2B)). A formula for the latter situation appears to have been avoided altogether. In sum, it appears that the formula advice given to local councils in the Manual is devoid of any theoretical context, omits recoupment issues altogether, and elsewhere fails to address some of the most obvious real world features or urban infrastructure.

The second general problem identified in the paper concerns double dipping. It cannot be predicted with confidence just how prevalent this problem might be. One aspect which does seem to be clear is that where funding of assets is mixed (between recurrent sources and developer charges) there will be an awkward problem of identifying those assets already partly paid for by new development in various suburbs across local government areas. Moreover, each time any new asset is built, to which new development will contribute but existing development will also pay a share (e.g. a sports stadium of council-wide appeal), then a mixed funding arrangement will result, requiring the separate identification of the asset, an estimate of the amounts paid by whom and from where, and appropriate offsets to the general rates bills. The fact that councils do not make mention of this problem in policy documentation, at the same time as it appears to be quite a complex problem to overcome, leads one to suspect that for administrative ease, and because of a possible lack of awareness on the part of new residents, the practice of double dipping is implicitly condoned.

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