



Developer contributions and the containment of urban expansion in Sydney

Philip Brogan and Brian Watters

Maunsell Australia Pty Ltd; Roads & Traffic Authority

Abstract

Transport infrastructure in Sydney and NSW has traditionally been provided through Commonwealth, State and Local Government allocations and through developer charges and user pays charges. Developer charges in Sydney have mostly been restricted to local transport infrastructure, but with a few examples of contributions towards the cost of regional transport. User charges have enabled several privately funded toll roads to be built in Sydney over the past decade, generally with wide community acceptance.

There is now a need to look more closely at the benefits and disbenefits associated with the introduction of a regional contributions regime. This need stems from:

1. A rejection of public 'subsidisation' of metropolitan expansion.
2. Micro-economic reform which seeks to increase overall public sector efficiency.
3. An increase in the involvement of the private sector in the provision of public infrastructure and the acceptance of the user pays approach.
4. Constraints faced by the State in funding road and rail infrastructure with public finances due to:
 - i) The desire to limit State debt, and
 - ii) Slowing in the rate of growth of general revenue and the tax base.

This Paper considers the benefits and disbenefits associated with the introduction of a scheme which levies proponents of development for contributions towards the costs of providing higher order infrastructure and services for new urban development in Sydney. The Paper concludes that the case for regional development contributions rests largely on the ability to retard the continued outward expansion of cities such as Sydney, and reduce the 'subsidisation' of this less sustainable development. In this regard, developer contributions are considered one of several management tools available to Government to achieve a more equitable distribution of land use and sustainable movement throughout the city.

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Contact author

Philip Brogan

Director, Maunsell Australia Pty Ltd

PO Box Q410 QVB Post Office NSW 1230

Ph: direct: 02 8295 3610 Email: philip.brogan@maunsell.com.au

Introduction

There has been a sea change over recent years in the way different levels of government plan for the release and development of land in Sydney. *Transport Management and Accessibility Plans* are fundamental to this new approach. Several have been prepared with a view to achieving a more thorough appraisal of the transport and accessibility needs of major developments. After an initial assessment phase, a package of build and non-build measures is identified, assessed against agreed criteria and then costed. Funding responsibility for the identified measures is then apportioned to the proponents of development and government via legal deeds of agreement or other mechanisms.

In this regard, the major development and master planning processes have been infrastructure-led with transport, accessibility and funding needs identified earlier in the planning process.

Presently, Energy Australia, Sydney Water and local councils only, have the legislative backing to levy developer contributions to assist with infrastructure funding. The success of the new infrastructure-led approach outlined above will depend upon the willingness of the State Government to legislate similar powers to the transport infrastructure providers in NSW: the Roads and Traffic Authority (RTA), Rail Infrastructure Corporation (RIC) State Rail Authority (SRA) and Transport NSW. In this regard the approach that has taken hold under the current State Labor Government, now in its seventh year in office in NSW, is experimental and in time may prove to be partisan.

Regional transport embraces higher order transport infrastructure traditionally funded by the State. It includes heavy rail lines, stations and associated facilities; light rail; transitways; busways; arterial roads; motorways and the like.

Funding of transport infrastructure in Australia and NSW

Australia is a federation of six states and a number of internal and external territories. There are three levels of government; Federal, State and Local. The Federal Department of Transport and Regional Services (DoTRS) has sole financial responsibility for the planning and funding of the 18,400 kilometre National Highway System and those roads considered to be of national importance. The Federal Government also provides funds to local government authorities. Maintaining and improving the total road network cost all governments \$7.0 billion in 1997-98 or about \$27 million every working day (Austroads, 2000). Recent roads related expenditure across the three levels of government is summarised in Table 1.

Table 1: Government funding of road related expenditure, Australia, 1988 – 1999 (A\$Million)

Government	1988-89	1989-90	1990-91	1991-92	1992-93	1993-94	1994-95	1995-96	1996-97	1997-98	1998-99¹
Commonwealth ²	1232.3	1358.0	1595.9	1720.4	2177.0	1552.2	1535.5	1601.7	1622.8	1635.8	1711.7
State ³	1602.7	1907.8	2223.8	2046.5	1877.8	2207.1	2264.3	2616.5	2904.9	3378.5	na
Local ³	1431.4	1635.1	1556.2	1570.4	1705.6	1636.5	1503.1	1654.3	1845.0	1999.7	na
Total	4266.5	4900.9	5375.9	5337.3	5760.4	5395.8	5302.9	5872.5	6372.7	70140.0	na

Source: Bureau of Transport Economics (1999)

Note: na not available

Note 1: Commonwealth Budget Estimates

Note 2: Figures provided by the Department of Transport and Regional Services (DoTRS)

Note 3: Figures provided by ABS

In September 2000, a new taxation system was introduced throughout Australia under federal legislation and referred to as the GST or Goods and Services Tax. Under the new tax system, all tax revenues from the GST collected by the Federal Government are distributed to the states. The states allocate the tax revenues as they see fit, supplementing these with road user charges such as licence and vehicle registrations fees. Prior to this, the Federal Government made untied grants to the states and territories, about \$400m of which was for state arterial roads.

In 1991 the then Federal Labor Government simplified the complicated funding regime through the 1991 Inter-governmental Agreement on Roads. The agreement sought to reaffirm that:

1. The Federal Government is responsible for the funding of the national highway network and roads of national importance;
2. The State Governments are responsible for funding main or arterial roads; and
3. Local Councils are responsible for funding regional and local roads.

Roads related expenditure by State and territory between 1988 and 1998 is shown in Table 2.

**Table 2: Road related expenditure by state, Australia, 1988 – 1998
(A\$Million)**

	1988-89	1989-90	1990-91	1991-92	1992-93	1993-94	1994-95	1995-96	1996-97	1997-98
NSW	1475.5	1768.8	2238.4	2219.8	2089.3	2030.6	1585.2	2019.1	2314.7	2428.5
VIC	960.2	995.0	944.8	945.7	1130.9	1005.6	1119.0	1059.1	1112.9	1179.6
QLD	851.4	995.3	1054.3	1041.6	1209.3	1147.9	1189.3	1394.8	1632.6	1824.8
WA	400.7	438.4	445.0	480.6	580.6	498.5	504.3	688.9	597.5	741.8
SA	294.2	326.5	340.7	322.9	374.8	359.9	346.9	395.4	391.1	506.1
TAS	154.4	164.4	147.6	142.3	170.2	156.7	157.2	173.3	181.2	178.7
NT	130.1	103.4	107.2	84.8	119.6	129.5	92.8	107.7	111.5	119.6
ACT	-	109.2	97.9	99.6	85.8	67.1	35.2	34.2	31.2	34.9
Total	4266.5	4900.9	5375.9	5337.3	5760.4	5395.8	5302.9	5872.5	6372.7	7014.0

Source: Bureau of Transport Economics (1999)

Note: Owing to rounding, figures may not add to totals

During May 2002 the Federal Government announced changes to the development and funding of Australia's land transport infrastructure. The new plan, AusLink, provides for the Government sourced project bids from the states and territories, local government, regional development bodies and the private sector. The separate and inconsistent treatment of road, rail and intermodal investments will be abandoned under the plan and the Government will amalgamate its land transport funding programmes. The establishment of a national advisory body to assist in the development of the national infrastructure plan is also proposed.

Private sector funding and the growth of tolled roads in Sydney

A number of privately funded tolled motorways have been constructed in Sydney over recent years. Pressures on State Government finances during the 1970s, 1980s and early 1990s led to renewed interest in the private sector's provision of transport infrastructure in Sydney. Whilst private sector involvement has resulted in the construction of transport infrastructure earlier than would have otherwise been the case, it has favoured the provision of motorways rather than heavy rail, light rail or other public transport due to the greater profit making potential of the motorways. Several Build, Own, Operate & Transfer (BOOT) projects have been completed over recent years including the M4, M5 and M2 Motorways and Eastern Distributor road tunnel. The largest of the private sector rail projects was the Transfield - CRI New Southern Rail link between Sydney Airport and Central Railway Station, built at a total cost of over \$900m.

Many of these projects would not have been built if not for the availability of private sector funds. Others argue that the private sector has benefited disproportionately from the profits generated by this private sector funding strategy and that the community has lost by virtue of these projects serving to strengthen Sydney's car dependency (Searle, 1999).

A sample of the Sydney community was asked to comment on a range of possible futures for the Sydney Metropolitan area as part of the University of Sydney Warren Centre's sustainable cities research program in 1999. A clear majority of people nominated extensive new rail and public transport systems funded by a special transport levy as their preferred future for the city. The option with the lowest support was roads funded by tolls.

Growth of Sydney 1950 – 2000

The success of a regional transport contributions regime should be measured against two principal criteria. Firstly, the ability to recoup the transport related costs of fringe development and secondly the spatial land use and trip making benefits stemming from a reduction in the demand for fringe development. Increasing the proportion of costs borne by the private sector better positions government to increase expenditure on sustainable transport infrastructure and services where they are most needed. Such an assessment requires an understanding of the forces influencing the growth of the city and the nature of travel within it. A snapshot is provided below.

The Sydney Statistical Division (SSD) embraces an area of 12,500 square kilometres and extends from the southern shores of Lake Macquarie in the north to Waterfall and Bargo in the south and as far as Bell and Mount Victoria in the west (Figure 1). The SSD is used by the ABS to report Census data every five years. Recently released data from the ABS indicate that in 2001 the population of Australia was about 19.7m persons, NSW 6.4 million and Sydney about 3.97 million persons.

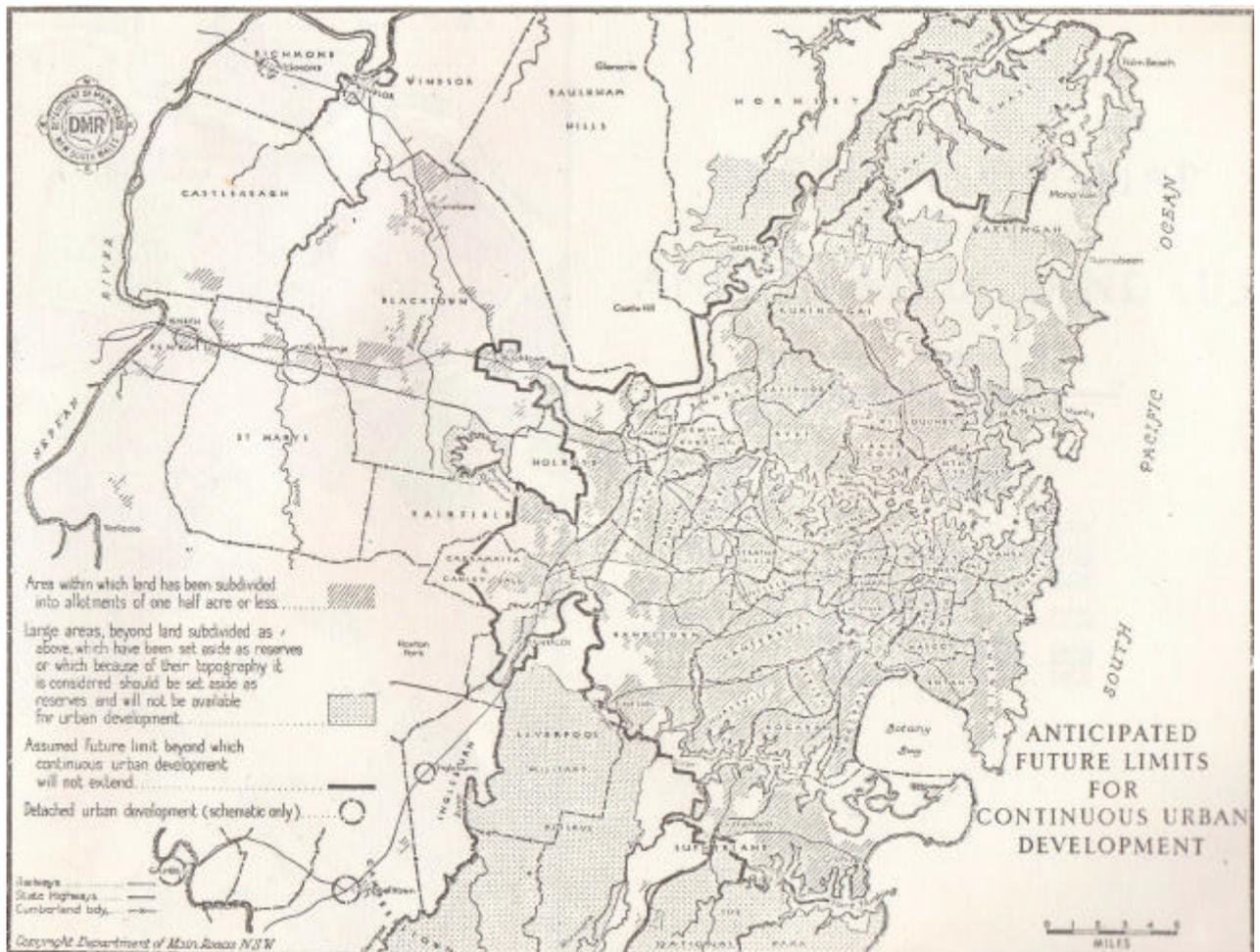
Figure 1: Sydney statistical division



Metropolitan change in Sydney over the last fifty years has been influenced to a small degree by a succession of big picture plans beginning with the County of Cumberland Plan in 1951. Few practitioners in Sydney would be aware that the early investigations underpinning the 1951 Plan were in fact undertaken more than a decade earlier by the then Department of Main Roads.

The investigations were detailed in a report entitled Main Road Development Plan for Sydney Metropolis and County of Cumberland – Part 1 Investigations Relating to the Present and Future Extent and Pattern of the Metropolis (DMR, 1940). On the basis of national and Sydney population forecasts of 11.5m and 2.5m persons, respectively by 2000, the report established the assumed future limit beyond which continuous urban development would not extend within Sydney (Figure 2). When the 1951 Plan was eventually released it retained aspects of the original DMR study in an effort to retard the most obvious excesses of unbridled sprawl (Sandercock, 1977). The Plan had a green belt intended as a permanent check on the urban expansion of the city.

Figure 2: Bounds of future expansion within Sydney – 1940



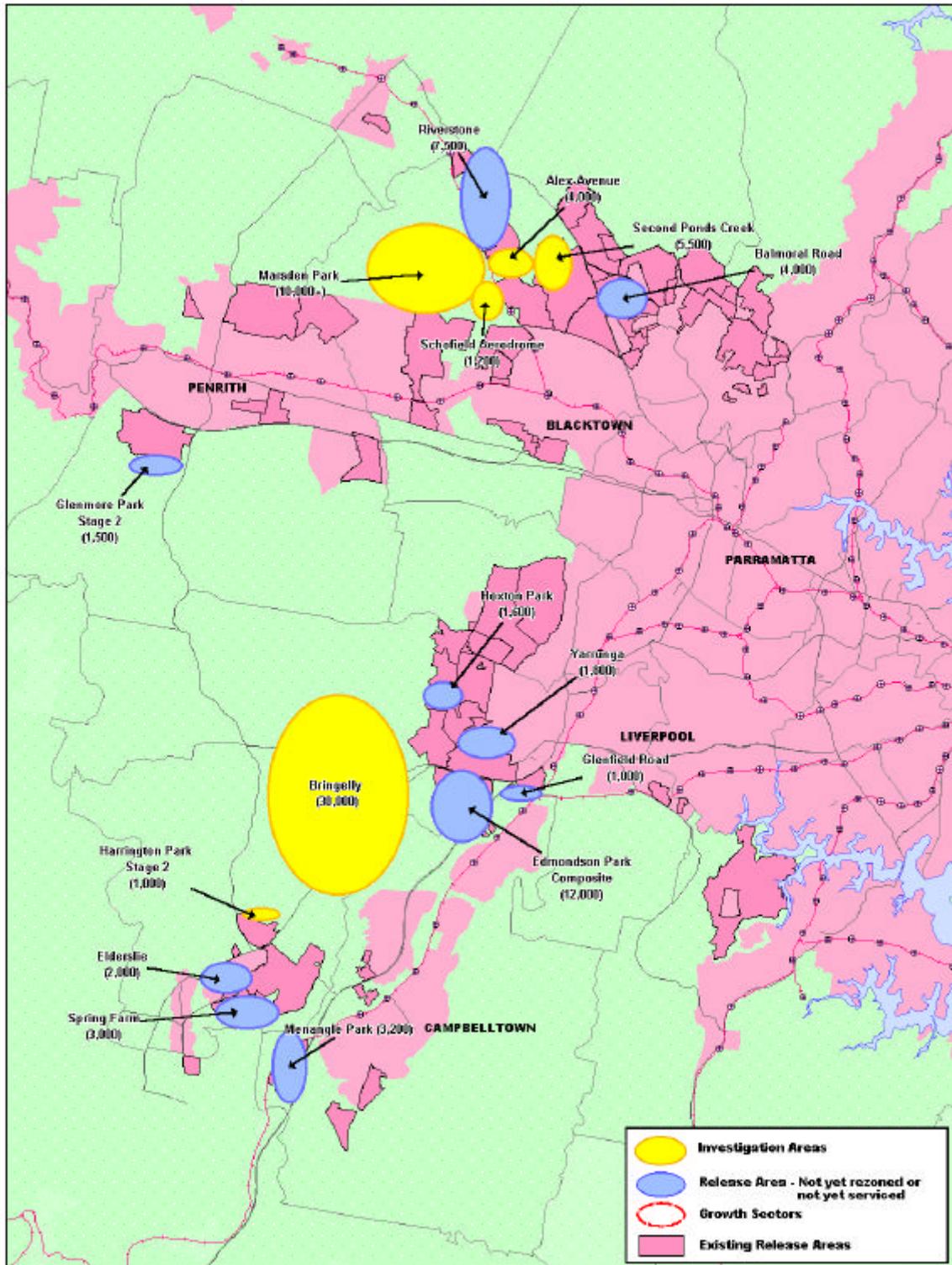
Source: DMR 1940

This compares with the extent of urban expansion today as illustrated in Figure 3.

By the early 1960s political and property pressures were such that the green belt was breached on multiple fronts.

As recently as December 2001, the NSW Labor Government announced investigations into the feasibility of releasing a number of large, essentially rural, landholdings on the fringe of the city for future urban development. These areas are illustrated in Figure 3. Together the Bringelly, Edmondson Park, Glenmore Park, and Marsden Park releases would have the capacity to accommodate in excess of 100,000 dwellings and a population approaching 300,000 residents.

Figure 3: Proposed urban release investigations areas – Sydney 2001



Source: Planning NSW, 2001

At the same time the Urban Land Releases Infrastructure Funding Task Force began examining viable funding mechanisms to facilitate the delivery of transport infrastructure to the new urban release areas. The task force concluded that the total cost of providing transport infrastructure for the south western corridor releases (Edmondson Park, Bringelly and Camden) would exceed \$2.4 billion of which about \$1.5 billion could be attributed to the release areas themselves. Cabinet resolved that Sydney's forecast housing demand would be met by a combination of urban consolidation (increased densities and brownfield development in the established inner and middle zones of the city) and urban release. It also reaffirmed that the transport infrastructure needs stemming from the future release areas will be substantially funded through developer contributions as well as privately financed arrangements or other mechanisms. The mechanism outlined in section 9 of this paper is a sustainable means by which government can recoup all or part of the costs of fringe residential development in Sydney.

The extent to which the Sydney metropolis continues to expand is, like all cities, linked to government policy and rates of population growth which in turn is a function of changes in fertility rates, trends in international and internal migration and household size.

Growth factors

The national fertility rate in 2000 was 1.75 births per woman, down from 1.91 in 1991. The fertility rate for females residing in NSW was 1.81 in 2000 which compares with a rate of 1.63 for Victoria, 2.0 for the United States and 1.8 for the UK (ABS, 2002). In Sydney the high fertility rate of recent first generation immigrants from the Middle East and Vietnam contrasts with the lower rates of the females of southern European origin in Melbourne and parts of Sydney.

In the year ended December 2001, migration into Australia totalled about 110,000 persons of whom slightly in excess of 40,000 settled in Sydney. NSW exhibited positive growth (6.5%) in the five years between 1996 and 2001 despite comparatively high negative interstate migration (-19,000 in 2001). Natural increase and net overseas migration remained consistent contributors to total population growth. The consistently high net interstate migration losses from NSW to other states over recent years stems in part from the high land and house prices fuelled by an inadequate supply of serviced residential land and high demand. Residents are departing Sydney in order to purchase more affordable dwellings in Brisbane and Melbourne.

The ABS, taking into account the abovementioned trends, forecasts that by 2021, Sydney will gain another 950,000 people in 550,000 households at 2.45 persons per household. The average household size in Sydney in 2001 was about 2.7 persons. Despite the government's desire, the vehement opposition to urban consolidation and increased densification in existing urban centres in Sydney will ensure that a lesser portion of households are provided within inner

and middle zone areas. Moreover, the proposed Western Sydney Orbital Motorway will exacerbate development pressures on the city's fringe.

Research undertaken by the Urban Development Institute of Australia (UDIA, 2001) indicates that in 2000 there were about 7.2 million occupied private dwellings in Australia. The ABS forecast the need for another 9.4 to 10 million new dwellings by 2021 to accommodate population growth forecasts.

Table 3: Residential land costs, Sydney fringe 1992 –2002 (Blacktown) (\$ per lot)

Item	1992(*)		2002(**)		Real Percent Change
	Amount	Percent of Land Cost	Amount	Percent of Land Cost	
Acquisition	18,052	34%	37,700	43%	70%
Direct Servicing	13,068	17%	25,250	16%	57%
External & Indirect Authority Requirements	1,490	2%	2,000	1%	9%
Government Taxes and Charges	19,348	25%	31,750	20%	33%
Financial and Management	10,725	14%	18,800	12%	42%
Selling Costs	4,236	5%	7,880	5%	51%
Total Development Costs	78,902	100%	159,380	100%	64%
Net Selling Price	83,000		191,256		
GST (remitted to ATO)	Na		11,795		
	% of package		% of package		
Gross Land Price	83,000	54%	203,051	60%	99%
House Price	72,000	46%	135,000	40%	52%
House and Land Package	155,000	100%	338,051	100%	77%

Source: UDIA, 2001

*The Sunrise at 120 square metres.

**The "Owen" built by New Harvest Homes. Total area of 177.8m², 4 bedrooms, 2 bathrooms, family room and an integrated double garage.

UDIA data (Table 3) indicates that the cost of bringing residential lots on to the market in the fringe areas of Sydney is significantly greater than in other capital cities. In all the capital cities examined the development costs (acquisition, direct servicing, authority requirements, government taxes, financial management and selling fees) exceeded the costs of the raw land. In Sydney development costs accounted for 50 percent of the total land cost. In the period 1992 – 2002 development costs had increased by 41 percent in Sydney compared with 13 and 6 percent in Brisbane and Adelaide, respectively.

Travel and trip making trends in Sydney

Information sourced from the NSW Transport Data Centre (TDC) suggests that in the period 2000 – 2001, there were a number of factors that impacted travel trends in Sydney (TDC, 2002). These included:

- The introduction of the GST.
- Increases in the price of petrol.
- The Olympic Games in September 2000.

This manifested itself in a slight flattening out of trip rates and trip making during the 2000 – 2001 period compared to previous years.

Over the longer period, the trend has been consistently one of steady growth in trip rates, trip lengths and vehicle kilometres travelled.

Between 1991 and 2000 the total kilometres travelled by Sydney residents on an average weekday increased by about 2% each year. Similarly, the growth in private car use grew at 2.7% per annum. The average distance travelled per person is about 36km, up from 32km in 1981.

Table 4: Travel characteristics of Sydney statistical division

Key Transport Indicator		1981	1991	1999	2000	Annual % Change 1991-99*	%Change 1999-2000
	Population (Millions)		3.57	3.92	3.97	1.2%	1.3%
	No. of households (Millions)		1.29	1.44	1.46	1.4%	1.3%
TOTAL TRAVEL	No. of trips, av. weekday (Millions)	12.07	13.1	14.9	15.0	1.6%	0.4%
	No. of trips, av. weekend day (Millions)	10.06	11.4	12.9	12.7	1.5%	-0.9%
	Trip rate per person, av. weekday	3.60	3.68	3.81	3.77	0.4%	-0.9%
	Trip rate per household, av. weekday	9.97	10.17	10.35	10.25	0.2%	-0.9%
PURPOSE SHARE** Av. weekday	Social/recreation	19.7%	20.6%	21.5%	21.7%		
	Commuting	21.2%	17.9%	17.9%	18.0%		
	Serve passenger	16.0%	15.8%	17.7%	17.6%		
	Shopping	18.1%	17.7%	16.4%	16.3%		
	Other work related travel	10.1%	10.6%	9.7%	9.9%		
	Education/childcare	8.5%	8.6%	8.8%	8.6%		
	Personal business	6.3%	8.2%	7.9%	7.7%		
	Other	0.1%	0.6%	0.1%	0.2%		
MODE SHARE Av. weekday	Vehicle driver	46.1%	46.2%	48.0%	48.0%		
	Vehicle passenger	21.6%	20.7%	21.7%	21.7%		
	Train	4.6%	5.0%	4.9%	5.0%		
	Bus	5.6%	6.7%	6.2%	5.9%		
	Walk only	19.7%	19.6%	17.4%	17.4%		
	Other modes	2.4%	1.8%	1.8%	1.9%		
KILOMETERS TRAVELLED	Total kms travelled, av. weekday (Millions)	-	119.9k m	139.8k m	142.1k m	1.9%	1.7%
	Av. total kms per person, av. weekday	-	33.6km	35.7km	35.8km	0.8%	0.4%
	Av. trip length, av. weekday	-	9.1km	9.4km	9.5km	0.3%	1.2%
	Total vehicle kms travelled, (VKT), av. day (Millions)	-	60.2km	74.3km	75.4km	2.7%	1.5%
TRAVEL TIME Av. weekday	Av. duration of work trips	29.3mins	31mins	32mins	33mins	0.5%	0.8%
	Av. duration of non-work trips	18mins	17mins	18mins	18mins	0.6%	1.0%
	Total travel time per person	75mins	73mins	79mins	79mins	1.0%	1.0%

Source: 1981, 1991: 1991-92 Home Interview Survey

1999: Pooled Household Travel Survey data set for the years 1997/98, 1998/99 and 1999/2000

2000: Pooled Household Travel Survey data set for the years 1998/99, 1999/2000 and 2000/01

Notes: *Average annual growth rate 1991 to 1999.

**Trips to return home are allocated to the priority purpose.

Figures in the table are rounded, but percentages are calculated from original unrounded data.

The recently released census data shows:

- Total kilometres travelled by Sydney residents across all modes increased by about 2 percent annually from 1991;
- A fall in the number of bus trips by in excess of 4 percent between 1999 and 2000;
- Share of walking trips fell from 20 percent in 1991 to the current 17 percent;
- Private vehicle usage was 70% of all trips in 2001 up from 67 percent in 1991;
- Average trip to work is around 16 kilometres, more or less constant since 1991;
- Average household size down from 2.8 to 2.7 persons between 1991 and 2001;
- Number of vehicles per household up from 1.3 to 1.4 vehicles in the same period;
- Vehicle occupancies for journey to work trips down from 1.16 in 1991 to 1.14 in 2001.

Infrastructure contributions practice in New South Wales and Sydney

Detailed local area census data for the city has yet to be made available and as such it is difficult to draw conclusions as to any change in the revival of inner Sydney that had become evident during the mid 1990s. The 1996 Census revealed a dramatic shift in the long term growth trend of inner Sydney. Since the early 1900's inner Sydney had been characterised by consistent decline in relative and absolute resident populations. For the first time in almost 80 years the 1996 Census data demonstrated a reversal in this pattern with an absolute population increase of some 18,000 persons in the inner zone. A continuation of this trend coupled with the ageing of the population, an attraction to higher density inner city living, a resurgence in housing restoration in the inner zone and the higher property values in the inner city housing market could see the outward expansion of the city retarded by natural forces, negating the need for government intervention. These natural forces may, however, be insufficient to achieve continued sustainable growth of the city and a mechanism will be required to both recoup infrastructure costs and influence the spatial development of the city.

For over 50 years the NSW planning process, like that in the UK, has enabled approval authorities to require developers to contribute to the (development related) provision of public facilities at the local level. Legislation facilitating contributions towards the provision of public infrastructure was introduced as Section 94 of the Environmental Planning and Assessment Act, 1979 (EPA Act).

Under the Act, contributions can only be made towards:

- Capital costs including land acquisition costs.
- Public facilities which the Council has responsibility to provide.
- Public facilities which are needed as a consequence of, or to facilitate new development.

There are exceptions to the above. Councils can seek contributions towards road maintenance, the costs associated with planning studies required to establish a Contributions Plan and salary costs of Contributions staff.

In the majority of cases the contribution is imposed by way of a condition of development consent. The contribution can be:

- Dedication of land free of cost;
- Monetary contribution;
- Material public benefit (MPB); or
- Combination of some or all of the above.

Section 94 is the sole source of power for levying monetary contributions or requiring the dedication of land under the EPA Act. The application of Section 94 and the associated legislative requirements are based on four principal concepts:

1. Nexus.
2. Reasonableness.
3. Apportionment.
4. Accountability.

Under the current system in NSW, the bulk of public transport infrastructure is funded via the State Budget. Public transport expenditure also tends to be 'lumpy' especially where additions to existing infrastructure are made. The magnitude and 'lumpiness' of public transport infrastructure means that there is little scope to use Section 94 for contributions as is sometimes the case with higher order road network upgrades.

The Transport Administration Act 1997 does enable RIC to negotiate access fee with rail operators. These take the form of upfront fees or works in kind. RIC normally does this through formal deeds of agreement with the rail operator.

Transport infrastructure funding in Europe and the United States

There are a multiplicity of transport funding mechanisms in place throughout the western world. The Section 94 plan system in NSW is not dissimilar to the UK based Section 106 (Town and Country Planning Act 1990). The NSW system is yet to introduce a Local Transport Plan equivalent, which enables local authorities to direct funds to regional transport improvements. **Table 5** summarises the principal funding mechanisms.

Table 5: A sample of transport infrastructure funding mechanisms

Sector	Mechanism	Applied In
Local	▪ Section 94 Plans	NSW
	▪ Section 106 Plan	UK
	▪ Single Regeneration Fund	UK
	▪ Infrastructure Contribution Plan	VIC
	▪ Infrastructure Charging Schedules	QLD
	▪ Modal Share Agreements	US
Regional	▪ Sydney Water DSP	NSW
	▪ UK Development Corporation	UK
	▪ Developer Agreements	UK, NSW, US
	▪ Connection Charges	US
	▪ Impact Fees	US, UK
	▪ Transferable Development Rights	US
	▪ Infrastructure Bonds and Voucher Scheme	US
Taxation Based	▪ Tax Increment Financing	US
	▪ Betterment Taxation	US
	▪ Property Land Taxes	US
Private Finance Based	▪ Toll Roads	US, NSW
	▪ Shadow Tolling	UK, Spain, Portugal
	▪ PPPs	UK, NSW, Vic

The Sydney Water approach to infrastructure funding

At the present time in NSW, Energy Australia, Sydney Water and local councils have the capacity to levy developer contributions to assist with funding infrastructure costs. The Sydney Water Act 1994 allows Sydney Water to levy charges on those developments that will make use of Sydney Water's services. Developer charges are the means of recovering the cost of providing water and water related infrastructure to meet the demands of future development.

For each developer charge levied by Sydney Water, a Development Servicing Plan (DSP) has been prepared. A DSP details the costs incurred by Sydney Water in providing infrastructure to new developments, and the manner in which developer charges are calculated to recover these costs. A DSP contains information on the extent of services required, past and projected capital and operating costs, and estimates of future development.

Sydney Water's calculation of developer contributions takes into account the following facets:

- The value of existing infrastructure;
- The value of new infrastructure;
- The costs of administration and maintenance of the infrastructure;
- The location of the development;
- The future likely expansion in the area.

The value of existing infrastructure is included to account for the use of existing infrastructure that will be used to service the area. This cost is distributed over all existing lots as well as future lots. The cost of providing new infrastructure is distributed only over lots in the new development.

The cost of maintaining and administering the new infrastructure is offset by the amount of revenue that the new infrastructure is expected to earn.

The future expansion of the area is forecast over the same thirty-year period and the total discounted cost is distributed amongst the households in the area. These costs are estimated and discounted over a thirty-year period. The average discounted cost per household over the thirty years is calculated and this is set as the development contribution per lot.

There are some fundamental differences between the service characteristics of a water reticulation network and that of a transport network. The principal difference is that any new water supply infrastructure provided for a new development is used only by that development. The use of existing infrastructure can also be reasonably precisely determined. With a transport network, however, it is not clear what parts of the new or existing infrastructure will be travelled by trips generated by a new development. Therefore, it is difficult to define with any accuracy the infrastructure that will service the new development.

While certain analogies might be drawn between dams and depots or termini, pipes and rail or road, water consumption and trip generation, the differences between water flow and traffic flow are too large to allow the direct application of Sydney Water's methodology to transport networks. Sydney Water's methodology, however, provides a useful framework within which to develop a Development Transport Infrastructure Contributions or DTIC scheme.

A suggested regional contributions method

The objectives of the regional contributions regime are these:

- Slow the pace of urban expansion in Sydney for environmental and economic reasons;
- Assist the State in recouping some or all of the costs borne in the provision of regional infrastructure to support Sydney's urban development;
- Influence the spatial distribution of land uses throughout the metropolitan area;
- Encourage more sustainable travel behaviour throughout Sydney;
- Discourage (by making it comparatively more expensive) development in areas not serviced by transport infrastructure and public facilities;
- Encourage (by making it comparatively less expensive) development in accessible areas.

The methodology suggested for calculating the developer contributions to transport infrastructure costs is based on Sydney Water's method but has, as its basis, a cost per trip generated by a development, separated into car trips, rail trips and bus trips. The methodology was applied to three case studies in Sydney's inner zone (St George UIP), middle zone (Cleveland Park development) and fringe (Bringelly land release).

The metropolitan region is divided into several Transport Infrastructure Regions (TIRs), possibly shadowing the ABS' statistical divisions. For the purposes of the three case studies, the areas have been defined so as to surround the Bringelly area, the St George UIP area and the Homebush Bay area. The ultimate purpose of the definition of Developers' Transport Infrastructure Contributions (DTIC) would be to cover the Sydney Metropolitan area and to produce a Development Transport Infrastructure Contributions Plan (DTICP) for each area. The bottom line of each DTICP would be a cost per trip generated by developments.

To estimate the number of trips generated in the region and by developments, the concept of an "equivalent generator" (EG) is suggested, analogous to Sydney Water's "equivalent tenement".

There are a number of fundamental measures for each area that need to be estimated or assumed. These include:

- The value of the existing infrastructure in each area;

- The value of annual maintenance, operating and administration costs of infrastructure in the area;
- The existing land use activity (in terms of trips generated) in each area.

For the purposes of the worked studies, it was assumed that the value of the infrastructure could be calculated on the basis of replacement at present day prices. For roads, this value was assumed to be roughly \$4m per lane km and rail was estimated at \$14m per kilometre of double track. Rolling stock was not included in the calculation of existing values.

For maintenance, operating and administration costs, a value of \$1,250 per lane km per year was assumed for roads and the value of the total annual subsidy for rail and buses for the Sydney Metropolitan area for 2000 were distributed on a vehicle-kilometre basis over the example areas.

For existing trip generations in the area, an estimate of residential households was made and the average number of trips generated by a household each day was increased by 50% to estimate the number of Equivalent Generators in the area. Approximate existing mode splits were assumed, based loosely on journey to work data for the areas.

The expansion of the areas in terms of development needs to be studied and forecast over a thirty-year period. For the purposes of the worked examples, it was assumed that Bringelly's full development of 30,000 households would be achieved by 2026. For the Cleveland Park area, it was assumed that development would take place at a rate equivalent to 400 households per year. For the St George UIP, the rate of expansion was assumed to be the equivalent of 800 households per year. The number of annual trips for each area was then calculated by assuming that the equivalent of 10 trips per household (or equivalent tenement) would be generated.

Costs of providing new infrastructure in each area for each year were estimated. The estimated costs for Bringelly were based on information supplied by the RTA and distributed over a number of implementation years. Maintenance, administration and operating costs were assumed to be constant over the thirty-year period.

The costs estimated were discounted at 7% over a thirty year period. The total discounted cost over 30 years for roads, rail and bus was then divided by the total number of estimated trips by car, train and bus, respectively in the same thirty years. The development contributions derived are detailed in Table 6. The one off contribution per residential allotment (in the case of Bringelly about \$115,000) would need to be paid prior to receipt of development approval.

The suggested procedure is sensitive to size and intensity of development, characteristics of the location of the development and costs of provision, administration, operating and maintenance. However, there are some factors for which the suggested procedure cannot account.

Developments that generate larger volumes of heavy vehicles will have a greater impact on the road network asset than those that generate light vehicle traffic. Heavy vehicle traffic takes a greater toll on road pavement than light vehicles and their poorer manoeuvrability results in delays to faster traffic. To account for heavy vehicle content, development contributions could be increased having regard to the estimated percentage of heavy vehicles that will be generated by a development. Further research would be required, however, to determine the precise values of this weighting in order to achieve fairness.

It is government policy to reduce the use of cars, both by increasing public transport usage and by reducing the length of car trips. There is scope to vary (reduce) contributions in areas within close proximity to transport modes as a means of discouraging private vehicle use and encouraging development in accessible areas.

Table 6: Example of contributions required for specific types of development (DTIP method) (A\$'000)

Equivalent Generators ¹		Bringelly				St George UIP				Cleveland Park			
		Road ²	Rail ³	Bus ⁴	Total	Road	Rail	Bus	Total	Road	Rail	Bus	Total
Contribution per Allotment or Equivalent Generator ⁵	na	63.6	36.1	15.8	115.5	2.18	6.56	0.21	8.9	1.04	3.7	.42	5.16
300 Houses	300	19,096.5	10,832.7	4,739.4	34,671.6	654.6	1,970.7	63.0	2,688.3	314.7	1,109.7	126	1,550.7
8,000m ² of Offices	80	5,092.4	2,888.7	1,263.8	9,245.8	174.6	525.5	16.8	716.9	83.9	295.9	33.6	413.5
20,000m ² of Offices	100	6,365.5	3,610.9	1,579.8	11,557.2	218.2	656.9	21.0	896.1	104.9	369.9	42	516.9
300,000m ² of Business Park	2000	127,310.0	72,218.0	31,596.0	231,144	4,364	13138.0	420.0	17,922	2098	7,398	840	10,338

¹ The number of equivalent generators included in the hypothetical developments

² The portion of the development contribution made up by road infrastructure and running costs

³ The portion of the development contribution made up by rail infrastructure and running costs

⁴ The portion of the development contribution made up by bus infrastructure and running costs

⁵ The average contribution calculated for the appropriate area

Assumptions

1. Area will be fully developed within 25 years.
2. Total costs over 30 years (discounted or not) will be recovered.
3. Estimated existing mode splits from 1996 journey to work statistics.
4. Estimated car occupancy from RTA's Economic Analysis Manual.
5. Estimated rail and bus operating costs from 2000 Annual Reports of SRA and STA respectively.
6. Road maintenance costs estimated at \$1,250 per lane km per year.
7. Value of existing asset estimated at replacement rate: \$14m per km double track for rail.

A viable policy tool

Sydney's dilemma is not unlike those of many other capital cities in the OECD group; continuing economic growth and prosperity, sustained demand for suburban household formation, rising car ownership rates and increased private motor vehicle trip making. Whilst previous census data suggests that an inner city revival and rising house prices are lessening what would otherwise be a stampede to the fringe, there appears enough evidence to warrant government intervention to both assist in cost recovery and more importantly to achieve a better spatial distribution of land uses and more sustainable travel behaviour throughout the city.

The DTIP method is considered a viable and sustainable funding mechanism consistent with the State's broader objectives as the levies could discourage fringe development in favour of development in more accessible and more sustainable locations. The method is equitable in that contributions made by the proponents of development are allocated to the provision of infrastructure and services that support the contributing developments. This compares with other methods (general taxes, Benefit Assessments and the like) which result in inner ring areas subsidising costs in other less accessible (fringe) areas of the city.

The method is consistent with the concept of nexus in that infrastructure and service needs are defined on an area basis and will benefit those developments within those transport infrastructure regions or TIR's. The DTIP method is targeted to the infrastructure and service needs of a given area or TIR and will not result in metropolitan wide subsidisation as occurs in some cities within the United States where the BA system has been applied.

Contributions rates are derived on the basis of equivalent generators that reduce a range of differing uses to a common base for the purpose of comparison and contribution calculation. The method provides for the recouping of the development related costs of development, reducing the State's financial exposure and better positioning it to increase expenditure on sustainable transport infrastructure and services where they are most needed. The method is flexible in that the contribution rates could be varied to take account of the lower trip generating characteristics of sustainable development. This could be done by adjusting the trip assumptions of the equivalent generators and in turn adjusting the contribution rate.

The DTIP method assumes increased modal share to public transport over time but could enable investment in less sustainable modes during intervening periods. This would be consistent with the need to instil sustainable travel behaviour in the early stages of development.

This weakness could be remedied by:

1. A weighting method to restrict the flow of developer contribution funds to less sustainable modes so as to ensure infrastructure capacity in accord with achieving longer term mode shares on more sustainable modes. (In effect, the weighting method should establish guidelines for developers to receive “discounts” if planning of their developments is within sustainable guidelines and in accord with other Government policies, such as State Environmental Planning Policy 66 (SEPP 66). If developers choose not to follow these guidelines an additional penalty contribution could apply), and
2. Establishing principles of mode share objectives, target dates and review at each stage(s) of the development(s).

The justification for the introduction of a regional contributions regime is founded on the need to retard the continued outward expansion of cities such as Sydney. The introduction of such a mechanism ought not be based solely on the securing of alternative sources of infrastructure funding. The regime is best viewed as one of many tools available to Government to bring about a better distribution of land use throughout the city and as a means of discouraging development in areas not serviced by transport infrastructure and public facilities. In this regard the contributions plans would function as both carrot and stick, encouraging and discouraging development in accessible and inaccessible areas, respectively.

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References

Ashworth, S. (1996) *Have American Planners Lost Their Values?* *Hard Lines*, May, Volume 8, No.3.

Bureau of Transport Economics (1999) *Public Road Related Expenditure & Revenue in Australia* – Information Sheet 13. Canberra.

Department of Infrastructure Victoria (2000) *Review of Development Contributions in Victoria*. October. Melbourne.

Department of Urban Affairs and Planning (2000) *Review of the Developer Contributions System*, Report to Minister for Urban Affairs and Planning. April. Sydney.

Department of Urban Affairs and Planning (2000) *Land and Housing Monitor – January to June 2000*. Sydney.

Department of Urban Affairs and Planning (2001) *Joint Working Group on Transport Developer Contributions. Confidential Draft Discussion Paper*. Sydney.

DJA – Denis Johnston and Associates (1992) *Options for Funding Public Transport*. October. Report Prepared for the ACT Government. Canberra.

European Conference of Ministers of Transport (2001) *Implementing Sustainable Urban Transport Policies*, UK.

Hampshire County Council (2000) *Basingstoke Environmental Strategy for Transport*. February. UK.

Leicestershire County Council (1999) *Structure Plan*, UK.

NSW Government Printer (1994) *Sydney Water Act, 1994*. Sydney.

Queensland Government Printers (1997) *Queensland Integrated Planning Act 1997*. Brisbane.

Rushmoor Borough Council (1996) *Local Plan Review*. June, UK.

Sandercock, L. (1977) *Cities for Sale - Property, Politics and Urban Planning in Australia* Melbourne University Press 1977.

Southampton City Council (2001) *Local Transport Plan*, UK.

Toon J et al (1994) *Review of Contributions Plans*, Planning Research Centre, University of Sydney.

Brogan & Watters

Transport Network Associates (2001) *The St George Councils Regional Transport Strategy* Draft Report (Vols 1 & 2) March. Sydney

Transport NSW (2002) *Household Travel Survey Summary Report 2002*, Sydney Statistical Division.