

Transit Oriented Development: An Australian Overview

By

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Abstract

Four characteristics of successful Transit Oriented Development (TOD) are outlined:

- a strategic policy for centres,
- a strategic policy for rapid transit,
- a statutory base that requires implementation of necessary densities and design (preferably by a state government development agency), and
- a public-private financing mechanism to build rail linked to centres.

These are applied to each Australian capital city and in every case are found to be inadequate to some degree with a few good signs to build on. Policy suggestions for a way forward are suggested.

Introduction

Transit Oriented Development (TOD) requires a commitment to centres and a commitment to electric rail as its core ingredients – together.

Doing the two together requires:

1. A strategic policy framework that asserts where centres need to occur and at what kind of density and mix;
2. A strategic policy framework that links centres with a rapid transit base almost invariably electric rail;
3. A statutory planning base that requires development to occur at the necessary density and design in each centre, preferably by a state government development agency; and
4. A public-private funding mechanism that enables the electric rail to be built or refurbished through a linkage to the centres it will service.

This paper will examine why these four factors are a necessary part of any city's TOD strategy and will then evaluate how well they are operating in Australia's cities.

Why TOD needs a four-part strategy

1. Why do we need centres in a strategic plan?

- a. Centres provide services and amenity based on economies of scale and density.*

Most urban services and amenity cannot be provided unless there is a certain number of people that can make them viable. This has been understood for centuries as the basis of the existence of cities as distinct from rural areas (Jacobs, 1984 ; Mumford, 1961). However in the era of the automobile where transport to services and amenity could be assumed to be by car, the provision of centres of activity has been downplayed or decried (Troy, 1996). The UK Town and Country Planning Association's motto was "nothing gained by overcrowding" (King, 1980); this became the signal in many Anglo cities for the planning of car dependent suburbs and the denial of the need for centres.

Car dependence has reached its limits. Even before fuel problems began to create car dependent ghettos it was obvious that something was seriously wrong with the kind of centres car dependent suburbs seem to produce. Governments and the market cannot provide the services and amenities of centres in any kind of viable system if houses and jobs are scattered and spaced without focus. In particular they cannot provide a decent public transport system. Thus centres are being reinvented in car dependent cities such as in Australia, to help create this viability (Newman et al, 2003). TOD has been created as the design paradigm that overcomes car dependence.

The question that then follows is: what kind of density and mix of activity can give rise to urban services and amenity in centres? Data from a series of studies has been collected to provide a basis for this (Newman and Kenworthy, 2005). The data from global and Australian cities by local government area suggests:

- a minimum of 35 people and jobs/ha is required before a decent public transport system can be built;
- this kind of density is associated with a minimum range of urban services and amenity;
- if established within the limits of a 1 km radius, a local centre can be created with about 10,000 people and jobs;
- if within a 3 km radius, then a town centre can be created with about 50,000 population and jobs.

b. Centres enable car dependence to be reversed without destroying the character of suburbs.

The kind of TOD strategy outlined here suggests that if centres of an appropriate density and mix can be created then not only are viable centres created but the pressure on suburbs for unpopular infill is considerably reduced. Many suburbs will continue to be redeveloped, especially those where populations and services are declining, however the wholesale rebuilding of suburbs can be avoided if centres are the focus of development.

As shown in Figure 1, the kind of city envisaged by a TOD oriented future can build on the character of many suburbs yet still provide the services and amenity people are demanding, particularly a viable transit system, but central to this is the building of viable centres.

- c. Centres provide a population policy that can make cities work, coastal sprawl can begin to provide a more balanced future, and inland areas can be repopulated.*

Centres are facilitated if a city has a spatially constrained planning framework. Sydney has had that for its recent past and hence 70% of development has been in units and villas of high and medium density (around 20,000 homes) and 30% has been in traditional low density houses (around 8,000 homes) (Horin, 2005). This has enabled some centres to become considerably more viable such as the CBD and Parramatta. It has also driven some development away to other cities and to the coast (the “seachange” phenomenon) where there have been fewer spatial constraints. However the rapid sprawl and scatter in coastal areas is also reaching limits, because of the environmental impact from sprawl as well as the social and economic problems arising from the lack of viable centres (Birrell, Newman and Newton, 1995). With coastal areas now spatially constrained and needing a similar increase in centres to provide services and amenity, it is likely that population will spill over to inland settlements where fewer spatial constraints currently exist. This could be beneficial as inland areas have been in decline for some time.

Centres therefore provide the basis of a viable population policy for cities and the bush (Newman, 2005).

2. Why do we need rail rapid transit in a strategic plan?

Rail is the major way that rapid transit is provided. Bus transitways are being built but not generally with TOD due to problems from buses’ lack of speed, their bunching and their noise. Thus rail transit is being built for the following reasons:

- a. It assists cities in their wealth creation.*

Car dependence is expensive. The link between the wealth of a city and its car use is very weak, it is certainly not statistically significant (only 18% of the variation is explained, Newman and Kenworthy, 1999). European cities tend to be the wealthiest in the world yet have half the car use of US cities; wealthy Asian cities like Hong Kong, Tokyo and Singapore have ten times the per capita wealth of Bangkok, Jakarta, Kuala Lumpur, Manila, Surabaya, Seoul and Beijing, but per capita car use is less. Many wealthy cities have put their wealth into good transit infrastructure. The result is not a city that is poorer because it wastes money on public transport as suggested by most Australian and American economists (particularly Treasury officials). Indeed our global cities data suggest that the more a city has committed itself to public transport infrastructure the less the city spends overall on transport; and the more a city has built itself around car dependence the more of the city’s wealth is wasted on just getting around (Newman and Kenworthy, 1999) – see Figure 2. There is an equity argument here too as the poor in Australian cities are increasingly moving out to car dependent areas where they save money on housing but lose heavily on transport, some families spending up to 40% of their income on transport.

- b. It reduces the external costs of car dependence.*

It has been well documented that car dependence is costly in terms of environmental, social and economic externalities, e.g. McGlynn and Andrews (1991) suggest an extra 20c/pass.km which almost doubles its actual cost. The Federal Government's report on 'Sustainable Cities' suggests that perceived costs of car use are around 6c/pass-km but its real costs are closer to 60c/pass-km whereas perceived costs of public transport are around 11-20c/pass-km and real costs are 20-30c/pass-km (House of Representatives, 2005). Government costs due to accidents, pollution, noise etc have been estimated and compared to the government revenue benefits of the road system and there was an overall "road deficit" of \$8 billion in the late 1990s (Laird et al, 2002). The biggest looming problem of car dependence is oil vulnerability and here the "coalition of the willing" are US and Australian cities which have by far the biggest vulnerability to the looming global oil production peak. Electric rail systems (with TOD built around stations) will withstand this crisis far better than urban areas with extensive car dependence.

c. It saves time.

People do not want to travel more than an hour a day on average – this has become known as the Marchetti Principle (Marchetti, 1994). The switch to more sustainable modes of transport will not occur if it means people go beyond their travel time budget. Thus a city will only be truly moving towards a less car dependent future if it can:

- build a rapid transit system down every corridor faster than traffic, and
- build centres where walking, biking or a short bus or car trip become easier means of reaching major urban services.

TOD can thus be used to save time for local and long distance travel. But TOD centres only attract the necessary development potential around them if they are linked by fast transit. Almost invariably this is electric rail due to its speed (acceleration/deceleration, cruising speeds and egress/ingress speeds which are all significantly better than buses). Our data show bus cities have transit speeds of around 20-25 kph whilst rail cities have transit speeds of 35-40 kph which are competitive with overall traffic speeds (Kenworthy and Laube, 1999). Rail gives transit an edge in speed which is crucial to being competitive.

d. It saves space.

The reason that many cities switch from buses to rail is that their city centres get completely jammed with very slow buses. The Bangkok effect or "bus bunching" is due to a capacity factor that is even more obvious with cars. Table 1 shows the relative capacities of modes.

Mode	Carrying capacity (people per hour)
Freeway lane	2,500
Bus lane	5,000 to 7,000
Light rail	10,000 to 20,000
Heavy rail line	50,000

Table 1. Modal capacities.

Thus the space requirements of car dependence are 20 times those of rail. The costs of such space are considerable and help to explain why most central cities cannot function without rail access. If the 200,000/day of people who access central Sydney had to get there by car it would mean an extra 65 freeway lanes and 782 ha for carparks. Rail makes spatially constrained cities work.

e. It creates city spaces suitable for the knowledge/services economy.

The key to the new economy based on transactions between knowledge/services professionals, is the ability to meet and interact. Electronic communication is used to follow up the creative interactions that occur face to face (Hall, 1997). Cities therefore need centres which are dense, mixed and walkable, to create such interactions. This is the philosophy of the New Urbanists (Calthorpe, 1993) and although their human-oriented urban designs are critical, so is the role of rail in creating spaces where bitumen is not the dominant land use.

f. It creates certainty for investment.

Rail is fixed and it lasts a long time – certainly beyond the period which most investors need to get their investment back. Bus routes change, even bus lanes and busways are flexible. Transport planners are entranced by flexibility but nothing can compete with the flexibility of cars if road space is sufficient - certainly no bus system can. But once road space is constrained the existence of fixed and certain rail systems becomes critical: they offer both a real transport solution and a real land investment opportunity. Cervero (2003) has shown in over 30 studies in the US, that access to rail station land provided “proven land value premiums”. An Australian developer has created a fund for doing TOD in Perth as its rail projects offer potential for at least 15% higher return in the areas around stations due to the attraction of the new rail system.

3. Why do we need a statutory planning process to require development in centres?

a. TOD's cannot be left to local politics.

Strategic planning is necessary but not sufficient. It needs to be translated into a statutory planning mechanism that *requires* density and mix in centres. This requires clear zoning and an urban design and planning system that can facilitate TOD's. This is generally a partnership between local and state governments as invariably if it is left just to local governments the regional perspectives are lost.

Local government is usually closely tied into local politics and there are usually groups opposed to redevelopment and density increases that undermine such TOD projects. Australian cities are littered with examples of lost TOD's. The rationale for the local reaction is often that density is socially dangerous and unhealthy though the evidence for this is not found in the literature (Newman and Kenworthy, 1989) or on the ground after such development. If TOD implementation is going to be left to local councils to do by

themselves there will be much less achieved as projects are generally watered down by local reactions. Regional planning perspectives are necessary in the local political mix but they don't often get a hearing in local media and decision-making. Australian planning is continuing to emasculate TOD's by local politics.

b. *TOD's require regional planning resources.*

Most TOD's require repackaging of land parcels, redesign of roads and reorientation towards the rail system. Proactive planning processes that create these land packages and do the detailed urban design are usually beyond local government resources. In the US this is usually done by private developers and in Australia by land development agencies. Both need local government involvement but the history of TOD development in Australia is such that without State Government intervention little happens. The best TOD's in recent times came from Better Cities projects linked to state development corporations.

The role of State Government in facilitating TOD's (such as Fortitude Valley in Brisbane, Pyrmont in Sydney and Subiaco or East Perth in Perth) is not just in technical planning but also in public engagement and communication processes. Regional perspectives are needed to show why centres are required and viable regional transit systems cannot happen without such centres. Development corporations for TOD can bring the creative human resources for charettes, visioning workshops, citizen juries etc to enable these issues to be considered.

4. Why do we need a financing mechanism for rail in TOD?

a. *Rail development has floundered while road development has creatively found financing mechanisms.*

Transport funding in Australia has had two radically different approaches in recent history:

- **1970s to 1990s: Centrist Road Planning.** Federal funds were the major input into transport from the 1970s but this was tightly controlled and channelled into roads. In this period \$25 billion went to roads and \$1 billion to rail (Laird et al 2002). Rail managed to survive through state government but it was rarely expanded. Only Perth did anything of significance in this period with new rail and this was because of an intensely political process (Newman, 2001). Brisbane's rail was electrified by a Federal grant from the Whitlam ALP Government and this was the only significant venture by Federal transport into rail. This era saw major roads built in all Australian cities feeding rapid urban sprawl and car dependence. The cost effectiveness of this was never challenged. Rail was never able to generate the political clout during this period to have tied funding like roads, where no market process was ever considered necessary.
- **2000's.....: Market Road Planning.** The GST put an end to tied road funding in cities. Federal transport funds are now only regional and can even include rail in the

AusLink program. States can fund roads or rail but the politics of funding transport when health, education and police are always higher on the agenda means that road funding has mostly had to go elsewhere. A market process was discovered using toll roads and after early models where government guarantees were needed, the system is now delivering major projects where the state government can not only get a road but a substantial cash grant from the private consortium just for the right to build. Thus in Sydney over \$10 billion worth of toll roads has been built from the mid 90s. Most other Australian cities are moving to tollways, only Perth has withstood this move.

No similar financing method has yet been developed for rail. Proposals for building fast, heavy rail using tollway financing have been suggested, e.g. Western Sydney Fast Rail, and proposals for building light rail using land development opportunities have also been considered in most cities. Examples of both are found in other parts of the world, however no mechanism has yet been facilitated or approved by state governments in Australia (Hass Klau, 2004).

b. Public-private partnerships for rail projects automatically integrate centres.

Building a rail line entirely as a transport proposition by a state government can mean that it is optimised around rail operations without any consideration for the linking of centres or building of TOD's; this has mostly been the history of rail development in Australia. However if the private sector were to build it in partnership with government, with land development financing, rail would automatically be integrated with land use as that would be the major way of paying for it. Thus public-private funding arrangements for rail are an inherently more effective way of creating TOD's than state funding alone

Application of four part TOD strategy to Australian cities.

In the table below the four part strategy is examined in relation to each of the Australian capital cities to see how well they have been applied.

City	Strategic policy for centres	Strategic policy for rail transit	Statutory process to implement TOD	Public-private funding mechanism
Sydney	Yes	Weak in past decade. New rail project huge potential.	Yes in new areas; possibly elsewhere.	Possibly but not yet.
Melbourne	Yes, but struggling.	Weak. Present rail mostly.	Yes but not strong.	No.
Brisbane	Yes, but not well defined.	Weak. Present rail mostly. Busway dominance.	No.	No.

Perth	Yes, but not well defined.	Yes.	No.	No.
Adelaide	Yes, but not well defined.	Weak on rail.	No.	No.
<u>Others:</u> <u>Canberra,</u> <u>Hobart,</u> <u>Newcastle...</u>	Yes, but not well defined.	No.	No.	No.

Sydney

TOD's can be found across Sydney in Chadstone, Bondi Junction, Parramatta, Edgecliff ...and they have all been growing. New examples include the Kogarah Centre which is quite possibly the best eco TOD in the world. The redevelopment or consolidation of Sydney has been quite dramatic in the CBD, North Sydney and Parramatta. The new Metropolitan Strategy is based on extending this centres-oriented development model to a range of further centres. It is partly designed to take the pressure off suburbs where redevelopment has been too rapid and partly to make centres more viable as places that can compete for new knowledge economy jobs and provision of services. It also seeks to facilitate six "Transit Cities" that can be linked by rapid transit and provide the basis of a less car dependent city (see Newman and Kenworthy, 2005).

Rail vision is difficult in Sydney. Operational problems have not helped with the politics of rail and thus the priority in the past decade shifted to roads and busways (the \$10 billion of private tollways in the past 10 years would not have been so easy had rail not been so unmanageable). However the latest proposal for the 'Global Arc' rail which links the growth centres in the NW and SW through a new under the harbour tunnel is a fantastic opportunity for TOD (see Figure 3). It takes over from Perth's rail projects as being the most visionary rail proposal that has been put together in the past 50 years in Australia. It now needs to be supported in its detailed planning by a commitment to TOD's at all stations that can assist in its funding as well as its viability. It enables the Metropolitan Strategy to have a market base for its plan to bring most new people to Sydney into redeveloped urban centres which are attractive and far less car dependent.

A statutory process to guide TOD's is in place for the New Land Release areas through a Development Corporation with all the required powers to ensure density and design are sufficient to create a viable centre. The same process for designated development areas such as TOD is under consideration for the rest of the city.

Sydney has no rail public-private financing system in place, but it has much potential:

- it has demonstrated one possible mechanism through the development levy on new blocks in the Southwest Land Release area;
- it has a proposal for a Western Fast Rail that is entirely privately funded based on the tollway model; and
- it has a light rail consortium prepared to look at ways of financing extensions to the small LRT system through a land development mechanism.

The new 'Global Arc' rail has the potential to provide the basis for this new funding mechanism, perhaps involving the Federal Government; it was suggested in the Federal Government's 'Sustainable Cities' report (House of Representatives, 2005) that rail funding in cities should be on the Federal agenda. Regions of local governments having a vision for how TOD's could work around this new fast rail system are likely to be in a strong position to take advantage of funding as it shifts away from car dependence to such locations.

Melbourne

Melbourne has a strategic policy for centres based on its Melbourne 2030 Strategy. This requires 13 "transit cities" all on its extensive heavy rail network. Melbourne however has a much less TOD-oriented past than Sydney and many of its centres, especially large retail, are located off its rail network. Attempts to create more TOD's in the past around its rail system have met with virulent opposition (Birrell et al, 2005). Thus the success at implementing Melbourne 2030 so far has not been evident.

A rail vision for Melbourne is not yet obvious. They have an extensive network and it is being extended to fast rail out to its regional centres like Ballarat and Bendigo. However new rail lines are painfully slow and difficult to create. The spur to Aurora is the first heavy rail extension proposed but this has been postponed and the proposal for a Rowethorpe extension (through Monash) has not been successful despite linking a series of major knowledge economy centres with huge TOD potential. Light rail extensions have been completed successfully in Melbourne.

The need for a statutory process that requires TOD's to be developed is obvious in Melbourne. The regional benefits are huge but the local opposition is well organised and dramatically political. Creative public processes to resolve these tensions are necessary as well as the political nerve to implement them. This needs an institutional structure like a development corporation to assist local authorities.

There is no clear public-private financing mechanism for rail in Melbourne despite some small attempts with light rail to the Docklands and the city loop, both of which demonstrated clear TOD benefits.

Brisbane

Brisbane has a new strategic centres policy in its SEQ Regional Plan 2004. This plan sets aside 80% of the SEQ area as a "no go" for development in order to contain urban sprawl and instead concentrate development in a series of centres to support high frequency public transport. Higher density centres are not a feature of the SEQ region apart from the Brisbane CBD and the Gold Coast, hence there is some cynicism about whether such a strategy is feasible (www.cpbs.apana.org.au).

The SEQ Regional Plan 2004 recommends new rail lines to the Gold Coast and Sunshine Coast be investigated. Rail patronage has continued to grow in the region despite the fact

that most of the investment in recent years has been in expensive busways and most of the regional infrastructure plans are for tunnels and freeways.

No statutory planning mechanism for TOD currently exists in Brisbane. The one-off redevelopment project at Fortitude Valley, the most impressive example in Australia of a state-local partnership with very clear benefits to the public and private sectors, had a strong government institutional framework that came out of the Better Cities program. A similar entity is required to make its TOD centres work.

No funding mechanism for rail involving public-private interests has happened though the opportunity existed in the failed Brisbane Light Rail project and in the much proposed Gold Coast Light Rail.

Perth

Perth has a new strategic plan “Network City” which is designed to contain urban growth and focus on centres and corridors. It is less specific about a growth boundary than the other strategies in Australia and less directive about how much of the future population or jobs should be directed into particular centres. However it is clear that urban growth should be transit oriented and a new TOD Strategy is being developed.

Perth has the most ambitious urban rail vision of all Australian cities though it also had the least extensive urban rail system to build on. With the completion in 2007 of the 80 km rail to Mandurah (at a cost of \$1.5 b) the system will have around 280 km of fast electric rail line with 72 stations. This is a huge turnaround for a city that had no electric rail line in 1990. Other potential lines have been suggested and several Light Rail projects have been linked to new developments as possibilities.

There has been statutory guidance on TOD for 15 years in Perth but that has been of absolutely no consequence in the planning of most station areas during the period in which the State Government has made this substantial rail infrastructure investment. The only TOD's have occurred at Subiaco and East Perth due to State Government intervention with the Subiaco and East Perth Redevelopment Authorities and Federal Government involvement through Better Cities. No mechanism requiring local authorities to provide TOD's exists. The mooted Development Authority (combining the Redevelopment Authorities and LandCorp) could have responsibility for all TOD's with clear powers to assist in their design and development. This would appear to be necessary for widespread adoption of TOD's though a few examples of planned TOD's down the new southern line are being developed by local authorities. Their implementation will need assistance. A TOD Committee has been formed from across government agencies to try and remedy some of the lack of co-ordination and focus on TOD's in Perth. This will help but unless there is a clear statutory requirement guided by a state development agency it is unlikely to succeed where previous attempts based purely on advice have failed.

No financing mechanism joining public and private interests exists for rail TOD's in Perth though proposals have occasionally appeared from the private sector.

Adelaide

Adelaide has the most recent strategic plan (Planning Strategy for Metropolitan Adelaide, April 2005). It too tries to contain growth and to reduce car dependence through focussing on integrated land use around public transport. Centres are clearly delineated.

Adelaide's public transport is ready for re-visioning. Its rail is slow and old so no TOD's are being attracted to it. The new Light Rail replacing the Glenelg tram and being extended to City Station, could be the basis for a new rail vision.

No development control mechanism for TOD's exists and little experience of Development Commissions in TOD's is apparent.

No public-private funding mechanism exists, though the extension of the Light Rail lends itself to such a model.

Other cities

Other cities in Australia have sometimes produced strategic plans, e.g. Canberra, Newcastle and Hobart where centres are considered to be significant and public transport is focussed. None are building rail. Amazingly, Newcastle is about to lose their last 2 km of rail to the city centre. None of the smaller cities have TOD plans of consequence, though the Hunter and Illawarra are probably going to focus their development along their rail lines.

Conclusion

TOD's have occurred occasionally in Australian urban development though they have not been strategically or statutorily planned. The market is now exercising a bigger role in urban development and the financial logic of TOD is coming to the fore. This is parallel with a strategic planning focus derived from the many aspects of sustainability that is pushing Australian cities more towards centres and more towards public transport. However the four part strategy which is necessary to guarantee the provision of Transit Oriented Development has not yet been put in place in any Australian city. Thus this paper would suggest that each Australian city reviews its planning and transport strategies to ensure it has:

1. A strategic planning framework that asserts where centres need to occur, in what density and mix;
2. a strategic planning framework that links its centres with a rapid transit base, almost invariably with electric rail;

3. a statutory planning base that requires development to occur at the necessary density and design in each centre, preferably with state government intervention; and
4. a public-private funding mechanism that enables the electric rail to be built or refurbished through a linkage to the centres it will service.

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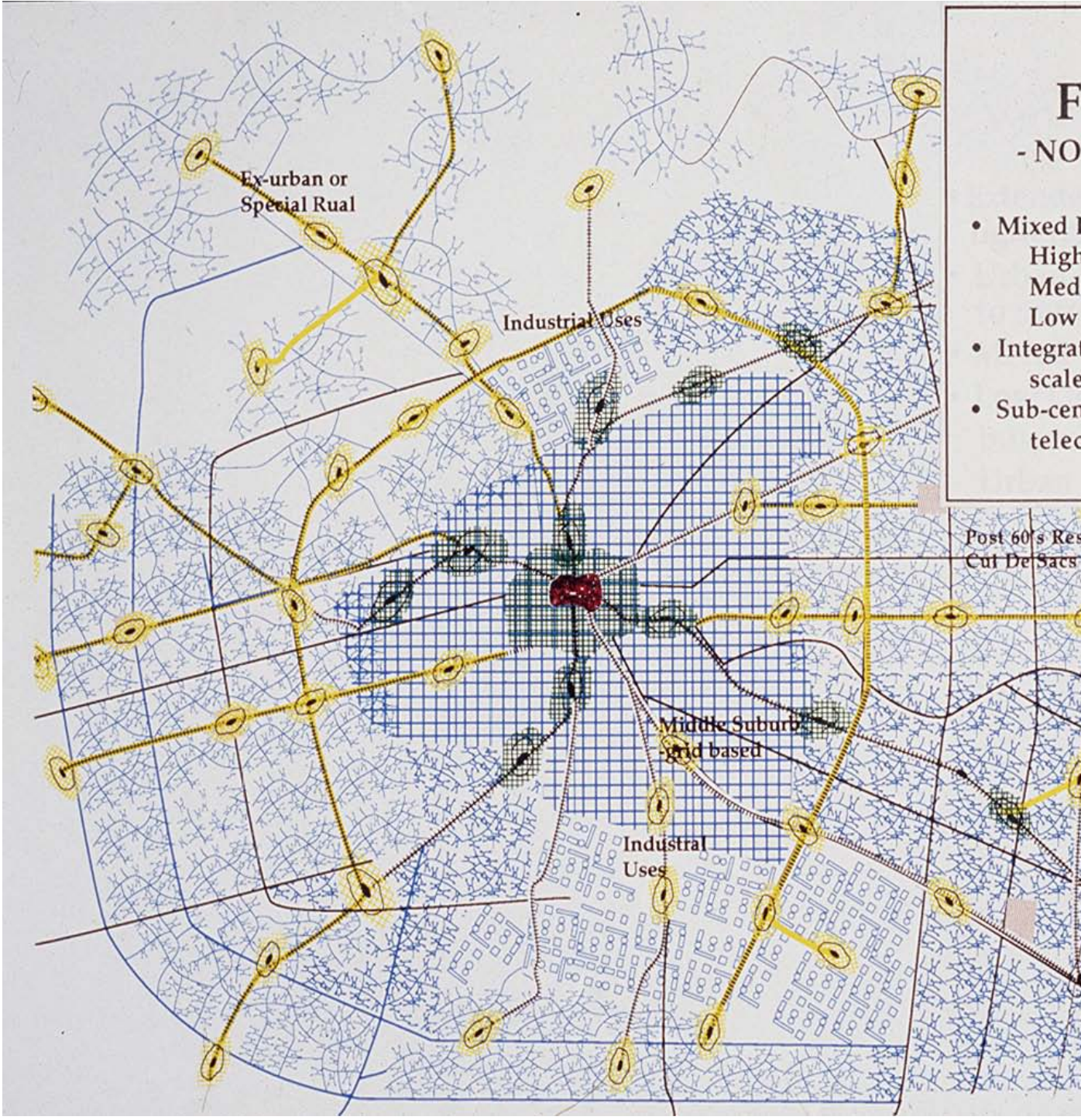
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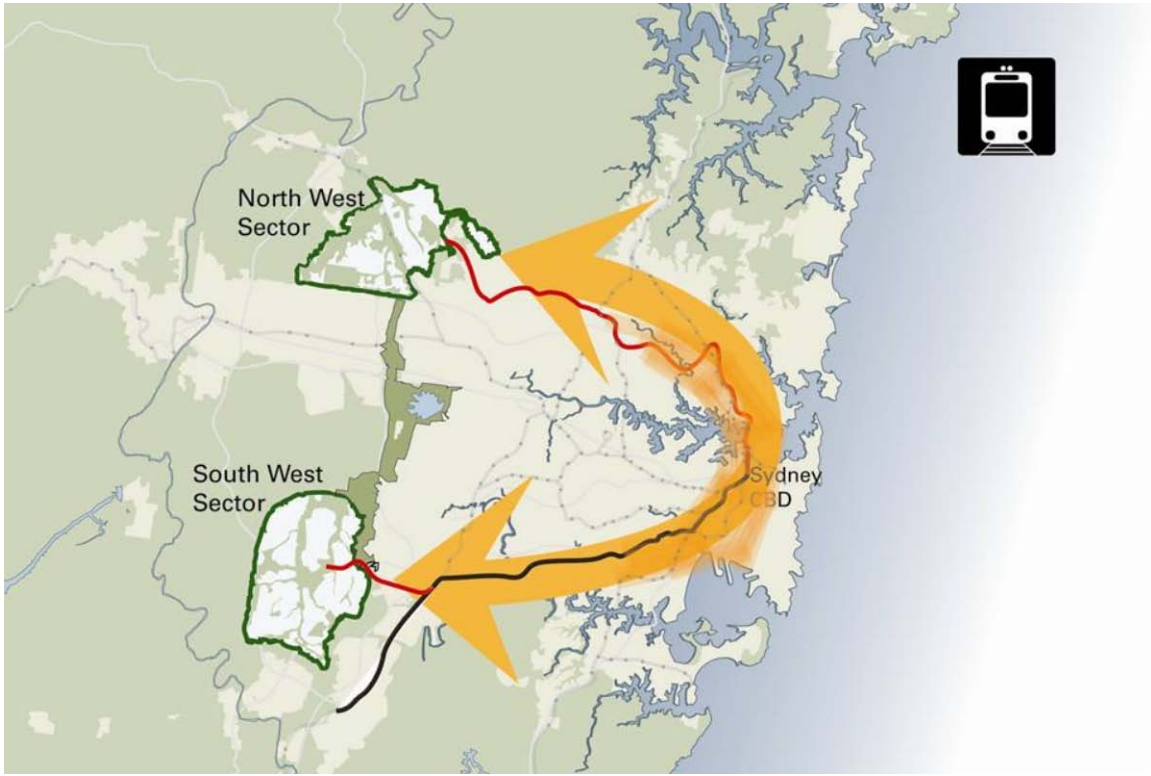
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