

LAND USE TRANSPORT INTERACTION OR
WHAT WENT WRONG WITH MATS?

B.C. THOMPSON

ABSTRACT: *The Comprehensive Transportation Studies of the 50s and 60s are now largely discredited. New urban studies are being mounted in the cities of Australia and the question arises - what to do about Land Use-Transport Interaction. Mr. Thompson discusses the weaknesses, in his view of the Metropolitan Adelaide Transportation Study (MATS) and draws certain conclusions which have been incorporated in a new generalised planning procedure which involves two levels of planning - the long-term strategy plan and the immediate corridor plan. He concludes with an outline of progress on the correct planning studies for the Adelaide Region and gives some thoughts for the future.*

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1. MATS - AFTER 10 YEARS

Before we get going may I please emphasise that this is not meant to be a witch-hunt against the MATS study. The MATS study I can assure you was a very well conducted study and was very professional in its approach. The consultants and public service professionals involved deserve credit for their effort.

What follows should be taken as a general comment on "comprehensive transportation studies" as a whole. If I refer to MATS it is because it is convenient for me, being the only such study with which I am sufficiently familiar.

1.1 MATS, for those who are unaware, stands for the Metropolitan Adelaide Transportation Study. It followed a line of comprehensive transportation studies for particular cities around the world, each with its own anagram, CATS for Chicago, PATS for Philadelphia or Perth etc., a process which commenced in the early 1950s in the USA and proceeded on a surprisingly standardised basis elsewhere.

1.2 The MATS study commenced early in 1965 and was occasioned by the need to examine in greater depth the transport proposals (principally a 150-odd kilometre freeway system) shown on the 1962 Metropolitan Adelaide Development Plan - which at that stage was only an advisory document.

1.3 The consulting firms of De Leuw Cather and Alan M. Voorhess & Associates (both of USA) in conjunction with Rankine & Hill of Sydney were engaged to undertake the study which was housed (and largely staffed) by the Highways Department.

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The first stage involved a massive data collection exercise with vehicle counts, roadside interviews, on-bus questionnaires and a massive 5% sample home interview survey.

The second stage involved data analysis and forecasting of future travel demand based on a gravity model calibrated for Adelaide conditions, resulting in total trip forecasts, by mode and trip purpose, to and from all zones in a 560 zone x 560 zone matrix.

The third stage involved all or nothing assignment to various trial networks leading up to a recommended network and using a considerable amount of manual re-assignment in the process. To my knowledge no computer assignment was carried out on the final recommended network.

1.4 The study was completed in 3½ years, the third stage taking at least half that time. It cost roughly \$3/4m.

Overall control was by a Steering Committee drawn from the highest levels of the Highways Department, Municipal Tramways Trust, South Australian Railways, Adelaide City Council and the State Planning Office. There was no public participation during the study but a series of public meetings were held after release of the printed report which, not surprisingly, were attended by throngs of people many of whom appeared to be hostile when they learnt for the first time that their properties would be affected by the proposals.

The consultants, having completed their task, went off home and the Highways Department was beleaguered for the next year or two by citizens claiming hardship or demanding that their properties should be acquired. The plans in the

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MATS report showed in accurate detail all the land which would be affected by the freeway proposals for the whole 20 year construction period to 1986. As a result the Commissioner of Highways became one of the biggest landowners in Adelaide.

1.5 The government of the day moved quickly to abandon the Hills Freeway and Foothills Expressway both of which passed through the affluent suburbs to the south-east of the city, and the residue of freeways were incorporated in a Supplementary Development Plan to the 1962 Metropolitan Adelaide Development Plan - which by now had statutory significance.

Two major variations to the freeway system originally proposed in 1962 were:

- a) to bring the north-south freeway very close to the western side of the city with high capacity access into the city centre;
- b) to gain access to Elizabeth via the Torrens Valley, Modbury and Golden Grove instead of following the northern suburban railway line from west of the city.

1.6 The study also recommended an underground railway through the city, but did not recommend electrification of suburban lines. Instead, diesel hydraulic rolling stock was to be converted to (or replaced by) diesel electric capable of using a DC third rail power source through the tunnel section. This novel solution may have recognised the likely shortage of funds to implement the proposal.

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In general, though, it must be said that the MATS study gave insufficient regard to availability of funds to implement its proposals.

1.7 As I speak in 1976, halfway through the planning period for MATS, the parking programme for the City of Adelaide is at least up to schedule, but little else recommended by MATS has been commenced, and there are no urban freeways.

Instead, we have seen better use being made of the existing road system, firstly by clearways and secondly by priority roads. Staggered working hours by means of flexitime may also have had some effect. Significant traffic generators, such as shopping centres and offices continue to disperse throughout the suburbs and dilute the problem to some extent.

There is a concerted effort to improve public transport services and the first major improvement for many years, viz. the Christie Downs railway extension, commenced services a few weeks ago. Patronage from the outset was encouraging and suggests that some peak hour commuters may have switched from car to train.

2. WHAT CAN WE LEARN FROM ALL THIS?

2.1 Most importantly, we find that the sheer chaos predicted for 1976 if urban freeways were not built has not materialised. The peak demand forecast in 1966 has not been reached and the existing road system has been shown to have a higher capacity.

(Levels of service for motorists are no doubt below those planned for in MATS, but on the other hand \$300m

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has not been spent on freeways and was, in theory, available for hospitals, schools or some other use.)

2.2 We find that politicians, being fully aware of public attitudes, have vetoed urban freeway construction. MATS must therefore have taken insufficient account of public attitudes and political acceptability.

2.3 The necessary funds to build freeways at the pace indicated in the MATS report, or even at much reduced pace, have clearly been unavailable, particularly when one accounts for inflation since 1968. MATS was therefore rather optimistic about available funds.

2.4 The basic tenets of the study were that one merely ascertained future demand and built facilities to satisfy that demand. MATS fell into the trap of assuming that demand could be satisfied. Experience in the USA and elsewhere indicates that demand cannot be satisfied and that road congestion is a permanent feature of urban life.

2.5 Like most such studies MATS was primarily a highways study, based on a single land use projection with inadequate consideration of other modes of transport, shortage of resources, changes in lifestyles and a host of other considerations. The interactive effects, particularly with land use, were thus largely ignored. Alternative scenarios were not investigated.

2.6 The result from MATS was one end-state plan fixed and finite for 1986, based very much on current trends in 1966. There was thus little recognition of the need for flexibility, apart from that afforded by variation of the pace or priorities for implementation.

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2.7 The presentation of a beautifully bound printed report was seen by the public as a fait accompli, which is precisely what it was at that time. MATS should have invited public participation at an earlier stage and thought more of the consequences, and need, to show detailed proposals for such a long period in advance.

2.8 The study assumed more or less standard responses and uniform behaviour of the public over a twenty year period. There is in fact a great deal of flexibility in people's ability to respond and more use could have been made of this in a 20-year plan.

2.9 The study was very much data-based and took the philosophy "let's find out what people are doing and provide for them to do more of it in future", and the data formulation and analysis to achieve this was enormously expensive in money and time. An alternative and much simpler approach is to plan by objectives, whereby the aims and objectives are looked at first and detailed investigations are narrowed down to a few key problems which become apparent when matching policies and proposals to the aims and objectives.

2.10 MATS tried to carry out all levels of planning down to fine detail in one exercise. As a result, detailed proposals tended to be rushed through as the target date for completion came nearer.

It would have been wiser in my opinion to have spent more time on overall interactive planning including social and environmental aspects as well as public and political considerations to produce a STRATEGIC PLAN or framework within which later detailed studies could have been fitted in accordance with a construction programme.

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2.11 The study was part of a fashion which swept the world, and decreed that your city hadn't really "arrived" if it didn't have its freeway plan. MATS tended to promote free-ways without really getting the most out of the existing arterial road system. (This has been achieved since with clearways and priority roads etc. at very little cost).

2.12 Finally, and without criticism of individuals, it must be said that a steering group made up entirely of public servants and transport operators lacks the broader perspective required to cover the social, environmental and political aspects of the planning task.

In conclusion, I repeat what I said before that I am not discrediting MATS as such. Wherever I have said MATS you may read "the typical transportation study".

3. WHAT SHOULD WE DO INSTEAD, OR
LAND USE - TRANSPORT INTERACTION IN THE 1970s

Perhaps I should open by saying that a recent Land Use-Transport Interaction Workshop in Canberra convinced me that we are in a very confused state about the whole thing.

There are still a few consultants claiming to have the "magic package" into which one feeds all sorts of data - including no doubt coded political attitudes and social climate - and out the other end of which comes your complete Land Use-Transport Plan.

Academics are having interminable debates with their rivals on the relative merits of their particular accessibility model. Others have suggested "thought models" - which I think

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are another name for commonsense - whilst others yet again have given up, saying that you cannot plan more than five years ahead anyway so what's the use.

Being a practising down-to-earth planner I have no magic theories, just some commonsense conclusions (or should I say thought models).

One clue to the problems at the Canberra Workshop may have been that about 95% of those in attendance were transport planners as distinct from land use planners.

The problem was tackled from the bottom up concentrating on transportation aspects and ignoring the totality of the system. The first thing should have been to establish aims and objectives, identify the problems and then look for solutions over the whole spectrum, not just transport solutions.

I would suggest the following ways of tackling transport and land use interactive planning of an urban area.

3.1 Firstly don't assume you know what people want, go out and ask them - but not in such a way that they merely confirm what you have suggested. In our current planning study for Adelaide we have been quite surprised at the widespread interest and depth of understanding of ordinary people and groups, when asked for their views without preconditioning. I doubt that we learnt much that was new about community problems, but we gained an important understanding of people's priorities.

3.2 Use these results plus the intuitive and technical input of the study team, and required policies and directives of government to postulate a series of aims and objectives for

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future development of the physical and social environment.

3.3 Examine at the broad level the major physical constraints to future development and the pre-commitments and "expectations" arising from existing development. At this level it should be possible to discern some obvious directions in which future development can proceed. Transport systems and urban structure can at this stage be optimised as a whole using established goals and objectives to assist.

3.4 Knowing the number of households forecast for the target year and the gross area of land required for development, a series of alternative urban structures each optimised with its transport component can be postulated and analysed for a range of attributes, principally accessibility, amenity, economy, social and environmental impact, political acceptability and achievability (all of which will be included in any self-respecting list of aims and objectives).

If you are lucky one particular strategy will be a fairly obvious winner. More often, the field will be narrowed down to two or three alternatives which probably vary only in a few problem localities.

3.5 Studies should be mounted including collection and analysis of all essential data to assist in deciding between alternatives in the problem localities. The result should now be a recommended overall strategy for the target year.

3.6 Programming studies follow to determine the logical sequence for development - which in most cases will be in the form of corridor extensions to the existing urban area.

The decision having been made with corridors should be developed during the (say) five year planning period prior to the next review of the overall plan, planning can proceed for those particular corridors to the required degree of detail.

3.7 Planning can proceed at two levels - an overall strategy plan updated at (say) 5-yearly intervals and corridor (or sector) plans for the areas programmed for that particular (say) 5-yearly interval.

Strategy planning tends to be carried out at a "broad brush" political and social level whereas detailed corridor planning is likely to involve data-based comparative economic studies of alternative land use and transport configurations, involving factors such as modal choice, comparative travel times, residential densities and alternative transport technologies.

3.8 Over a review period the resulting urban development will pre-commit the next strategy plan which in turn will be extended by one more review period. In theory, anyway, the strategy plan maintains long-term flexibility and gives a direction for future development while the corridor plans provide the financially justified development package for that specific time period in those specific locations.

3.9 Considerations of land use and transport interaction at the specific corridor level have in recent years given rise to some generally accepted optimum residential layouts, e.g. with higher density housing adjacent to a central public transport spine and lower density housing extending outwards towards parallel arterial roads on each side of the urban corridor, served by district centres located at major

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transport interchanges along the central spine.

3.10 Turning specifically to transportation, it is now recognised that congestion is a permanent feature of urban life. It is impractical even with enormous expenditure on improvements to the road system to eliminate congestion at all times. Having accepted this, road congestion can now be used as respectable planning tool to achieve desired objectives. An obvious example of this is early provision of public transport improvements with no alleviation of congestion on competing road facilities, resulting in a maximum transfer of allegiance from automobile to public transport by peak period travellers thus avoiding the need to upgrade the road facilities.

4. AN EXAMPLE - PLANNING STUDIES FOR THE ADELAIDE REGION

Studies have recently commenced with the intention of reviewing current development plans covering the Adelaide Region.

The following is a summary of steps already taken or contemplated in the planning process.

4.1 The study was programmed into three phases:

4.1.1 The Strategy Phase looking at overall future directions of development to AD 2006.

4.1.2 The Structure Phase. The region has been divided into four sectors each one to have its own structure plan showing the principal components of urban structure.

4.1.3 Infrastructure Phase. Detailed planning of defined future living areas showing sufficient detail to ensure provision of all required community facilities, bus routes, open spaces, etc. in the correct locality.

4.2 The first step in the strategy study was to call for public comment on issues of region-wide significance. Response was overwhelming and the standard of submissions was very high. (A major recurring comment was the need for improved public transport facilities, i.e. more frequent services provided within reasonable walking distance and as soon as development starts in a new area).

4.3 Specific aims and objectives were specified and the planning implications of the various constraints considered before arriving at a series of policies and proposals which were considered realistic and achievable.

4.4 Physical and geographical constraints dictate that Adelaide should be a linear city running north/south along the coastal plain between the sea and the Hills Face Zone of the Mt. Lofty Ranges. Considerations of urban structure and transportation systems also favour a linear city where one can have easy access to abutting countryside and yet also enjoy all the advantages of a regional centre plus ready access to the city centre and the rest of the metropolitan area via a linear transport spine.

4.5 The major disadvantage of a linear city is the long distances involved in reaching the city centre from the extremities. This requires that a fast and frequent transport service be provided along the spine. By fortunate coincidence this can be achieved in Adelaide with a rail system which serves most of the new regional centres along its north/south

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run, such concentration on a single line adding to patronage and promoting a more frequent service.

4.6 A parallel freeway reservation exists or is proposed parallel to the railway and generally to the west of it. This will be held in reserve and developed if and when a demand arises.

4.7 A subsidiary corridor runs north-east to Modbury and Golden Grove. The study team have merely identified the corridor as requiring some form of line haul system between the city centre and the Modbury Town Centre transport interchange, from which a feeder bus system will serve the catchment.

Detailed feasibility studies are underway in the Department of Transport to identify the appropriate line haul technology.

4.8 As planning becomes more specific the detailed planning of transport components of the system will be pursued.

The strategy plan will point the direction of long-term development but detailed planning for specific corridors will determine what exactly gets built.

5. LAND USE - TRANSPORT AIMS AND OBJECTIVES

To give some indication of the wide range of factors which are relevant to transport and land use interaction studies I have included draft objectives for our Adelaide Region planning studies under the heading "Urban Structure and Accessibility".

These plus other relevant objectives (such as the need for any scheme to be within the financial capability of government) are all relevant to the planning task.

5.1 Urban Structure and Accessibility

The shape of a city and its transport system have a considerable influence on the ability of its inhabitants to enjoy city life. The distance they must go to enjoy open countryside or the ease with which they can move throughout the urban area, with or without their own vehicle, are obvious examples.

The way facilities are grouped together within the urban structure can effect profitability and efficiency by providing a wider choice and easier access to such facilities by the public.

The geography and natural features of a region place limitations on the shape of a city which then limits the options available for transport modes within that city.

The geographic, economic and social aspects of this interaction between urban structure and accessibility are spelled out in the following objectives:

5.1.1 Provide maximum mobility for all sections of the community.

5.1.2 Promote an urban structure which provides the best living environment.

5.1.3 Promote an urban form which optimises the use of public and private transport for passengers and freight movement where each mode is most appropriate and efficient.

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- 5.1.4 Ensure that urban structure and transport systems promote economic viability of the private sector.
- 5.1.5 Take account of existing urban structure and present expectations regarding future urban expansion.
- 5.1.6 Make best use of, and improve the standard of, existing transport facilities.
- 5.1.7 The importance of the City of Adelaide as a metropolitan and State focus should be recognised in terms of both urban form and transport systems.
- 5.1.8 Efficient access is needed between the metropolitan area, the rest of the State, and the rest of Australia.
- 5.1.9 Environmental and social impact of transport facilities on urban and rural area should be minimised.
- 5.1.10 The spatial priority, or access advantage, for various forms of movement should generally favour pedestrians.
- 5.1.11 Urban structure should be flexible with respect to transport systems to cope with events such as a possible fuel shortage which may significantly affect choice of transport mode.
- 5.1.12 Urban structure and communication systems should promote the best use of resources and should remain flexible to cope with changes, provided development at a necessary and logical pace is not hindered.

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6. CONCLUDING REMARKS

I have tried to give a broad outline of a more flexible politically responsive planning process which we think will work in Adelaide.

Many of the questions on transportation planning remain unanswered, and I make no apology. I don't think anyone has the whole answer, the problems are so complex and interactive that it becomes impossible to comprehend the whole.

We must do our best and can rely upon the comforting fact that human beings will adapt to cope with a fairly wide margin of error.

After all, most of our present environment was the result of individual judgements and we manage to survive reasonably well.

One factor which has come through strongly is the need to be able to cope with a wide variety of futures, some of which may include shortages of fuel and lower living standards. Future urban development should have ability therefore to be served by public transport. To ensure this requires close co-ordination of major land use locations with transport systems. Cities with such co-ordination can also be readily served by private transport (as will be the case in Adelaide via the parallel freeway reservation), whereas the opposite doesn't apply - cities with highly-developed private transport systems and scattered land uses often cannot be economically served by public transport. The losers are the 30% of the population without private transport, a percentage that may well rise sharply by the turn of the century.

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My final comment is that transport, while it may well be the highest cost component of our urban fabric, is only one of many important inputs to urban planning. We ignore these broad issues and the overall view at our peril.