



The University of Canterbury Transport Strategy

Alan Nicholson

Department of Civil Engineering
University of Canterbury

Simon Kingham

Department of Geography
University of Canterbury

ABSTRACT

The University of Canterbury has been monitoring the travel of staff and students to and from the University since 1962, in an effort to predict parking demand at its Ilam campus, to which the University moved (from its central city location) during the period 1961-75. The surveys have shown a steadily increasing demand for car parking, and while there was initially ample space for on-site car parking, the growth in staff and student numbers, along with the increase in car availability and use, has resulted in increasing difficulty in providing the predicted parking demand.

Complaints from residents of the area about on-street parking led in 1995 to the Christchurch City Council adding to the City Plan a requirement for the University to provide about 0.25 on-site car parks per equivalent full-time student. In creating the required 435 new on-site car parks, the University used much of its 'spare' open space, provoking considerable concern among staff and students about the decline in campus amenity. In 1999 the University established a Transport Working Group to develop a transport strategy to avert the need to provide even more parking. The strategy, which was adopted in December 2002, involves instituting charges for car parking and using the revenue to encourage walking, cycling, car-pooling and bus use.

This paper describes the transport strategy and its development, including the results of the 2000 travel survey, which involved asking staff and students what travel mode they chose, why they chose it, and why alternative modes were not used. The paper also describes the extensive and prolonged consultations with interested parties, and discusses the importance of a sound database upon which to found strategy development.

1. INTRODUCTION

There is increasing interest in getting large generators of traffic to develop transport strategies and plans for 'managing' the traffic they attract (especially car traffic). The hope is that this will reduce the rate of growth of car traffic, with more trips being made by other, more sustainable travel modes (e.g. bus, cycle and foot).

Territorial local authorities in several countries have established trip reduction ordinances, which are legal, planning mechanisms requiring land users to implement

enforceable programs to limit trip generation associated with their land use. Austroads (1995) provides a review of such scheme, concluding that they can be expected to “have a significant local impact, reducing site peak traffic generation by 5% to 50%”. The impact of such schemes on a network scale is generally quite small, unless they are adopted on a large scale (i.e. they apply to many land uses over a large area).

Universities can generate substantial amounts of traffic, and Balsas (2003) reviews the experiences of eight Universities in the USA, that have taken steps to encourage a modal shift from cars to other modes (especially cycling and walking). Balsas notes that the environmental effects of traffic to/from the Universities fall into two categories. Firstly, there are effects on the campus, staff and students (e.g. loss of natural environment and greenery, and despoliation of the visual environment by parking provisions); such effects are self-inflicted. Secondly, there are effects on neighbouring communities (e.g. traffic congestion and parking in streets around the campus); such effects are inflicted on others. Balsas argues that Universities are in a unique position in society, because they are able to take educate students regarding sustainability and help to shape society’s travel behaviour.

The University of Canterbury has been monitoring the travel of staff and students to and from the University since 1962 (Williman, 1973; Williman et al., 1976; Laird and Nicholson, 1994). During the period from 1961-75, the University moved in stages from its central city location to the suburb of Ilam. In late 1965, when the University Council approved sketch plans for the third stage of the development at Ilam, parking was already an issue. It was reported in *The Press* (1965) that “prohibition of car parking on the University property at Ilam was suggested as a possibility”. The Assistant Government Architect suggested that “one must consider the role of public transport ... and an embargo on staff and students not to bring cars within half a mile of the University might suggest itself”. A member of the University Council noted that catering for the likely demand for car parking would consume a large portion of the site. Such an embargo was not implemented (it would undoubtedly have been seen as draconian in 1965), although the University did implement parking charges about 10 years later, with the revenue apparently being ear-marked for assisting in the provision of improved public transport. However, the response of some staff and students (to park on the streets around the campus, leaving spare spaces in the on-site parking areas) resulted in removal of the parking charges after a few months.

There was sporadic discussion of transport matters during the next 20 years, but nothing was done (apart from increasing the free on-site parking from time to time) until 1994-1995. In response to dissatisfaction expressed by residents of the area around the University regarding parking in the neighbouring streets, the Christchurch City Council arranged a series of public meetings to discuss the problem. The residents felt that their residential amenity would be restored and/or protected if the University increased the on-site parking. The City Council subsequently amended the City Plan in 1995, to require the University to provide 1 on-site car park per 5 EFTS, plus 1 on-site car park per 18 staff members.

The University considered objecting to the City Plan requirement, on the grounds that providing extra parking would encourage increased car use, especially if parking continued to be free of charge. An increase in car use would lead to greater traffic flows in neighbouring streets, with a loss of residential amenity (i.e. effects on others), and more cars parked on-site, with a loss of campus amenity (i.e. effects on ourselves). The University Council decided against objecting, and a plan for providing the extra parking spaces to meet the City Plan requirement was developed.

That plan involved creating 545 extra spaces, including 230 in a multi-storey parking building costing about \$13,000/space. However, the University Council rejected the multi-storey car park proposal, choosing instead to create an additional 435 ground-level car parks, costing about \$2,500/space.

This decision was not universally well-received. In particular, there were objections from staff and students concerned with the loss of open 'green' space and the consequential loss of amenity on the campus. The discontent simmered away, and in November 1999 it was eventually agreed that a Transport Working Group (TWG) would be established, to consider the issues and options, and formulate a Transport Strategy for the University. The TWG included academic staff with both expertise and an interest in transport and strategy development, support staff involved in facilities management or providing student services, and representatives from the City and Regional Councils. A representative from the Student's Association was sought, but none participated until late in the process.

The TWG decided a survey of staff and students should be done, to obtain information for comparison with previous surveys in 1962, 1966, 1971, 1976 and 1993. The survey was conducted in July 2000, and the survey method and results are described in the next section. The transport strategy and its development are then described, and the paper concludes with a summary and discussion of the main findings.

2. JULY 2000 TRAVEL SURVEY

2.1 METHOD

Staff and students at the University of Canterbury were surveyed to find out their travel behaviour, attitudes and perceptions. On Tuesday 18th July 2000, a travel survey was distributed to over 3000 students during lectures. The questionnaires were completed there and collected immediately. A mixture of subjects and times were used to provide a representative cross-section of students. Of the 3000 handed out, 2769 were returned, a response rate of 92%. This represents 27% of all students at the University. During the same week survey forms were delivered to all 1611 University staff via internal mail and 927 were returned (i.e. a response rate of 58%). Data were input into a spreadsheet and analysed in the SPSS statistical package.

2.2 RESULTS

2.2.1 Mode of travel

The modal split for travel to University for staff and students is presented in Figure 1. Driving a car is the main mode of travel for most staff (over 60%) and students (over 40%). Cycling (16-18%) and walking (15% for staff and over 30% for students) are significant secondary modes. Weather conditions can be seen to have a major effect on mode of travel (Figure 2), with the proportion of car drivers greater in poorer weather conditions, walking and cycling being the chief beneficiaries in better weather. The majority of staff and students live within 5kms of the University (Figure 3), with students living closer than staff.

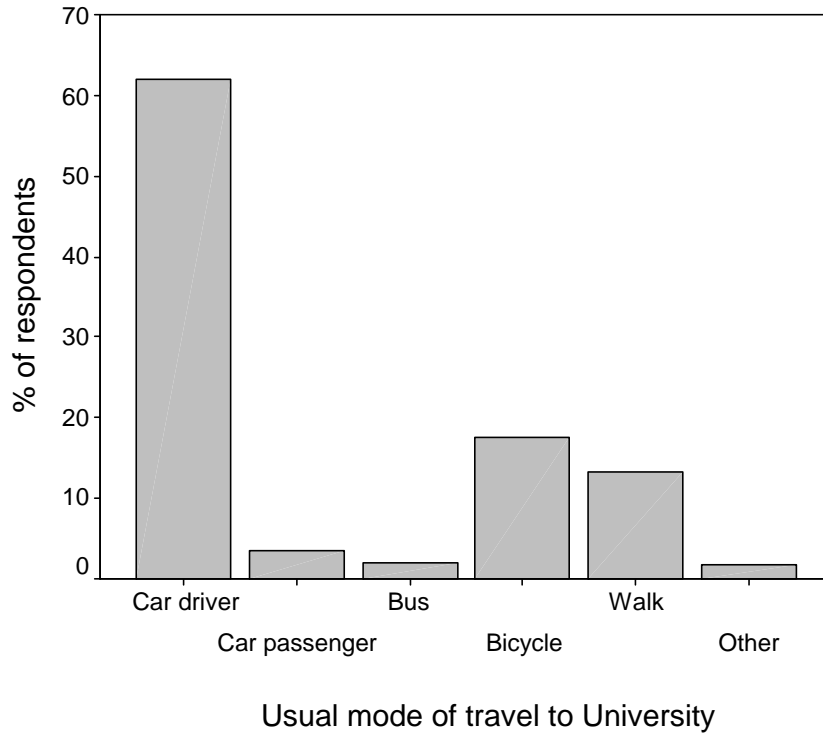


Figure 1a: Usual Travel Mode (Staff)

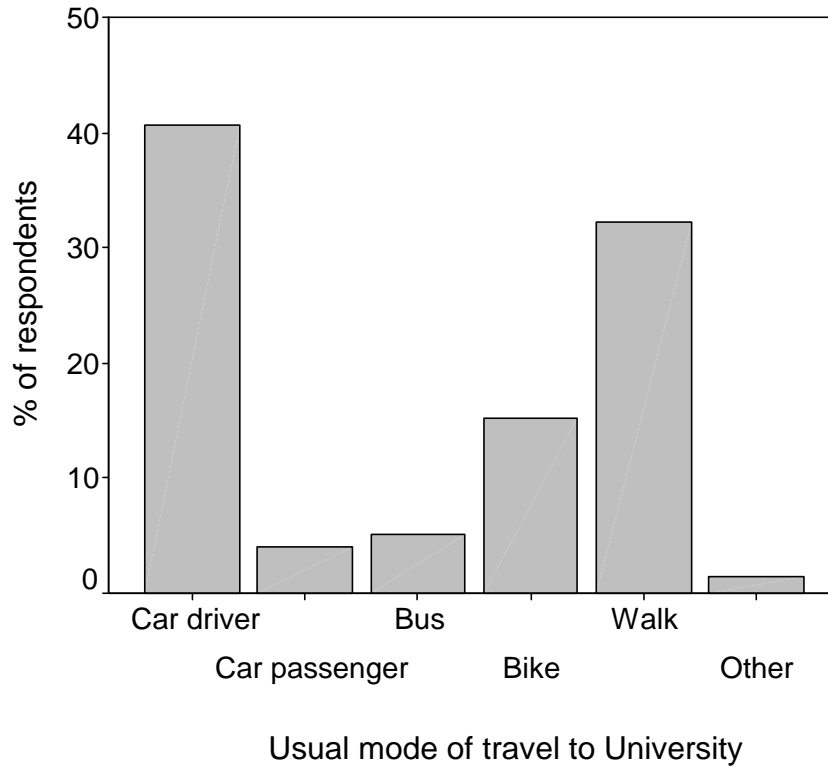


Figure 1b: Usual Travel Mode (Students)

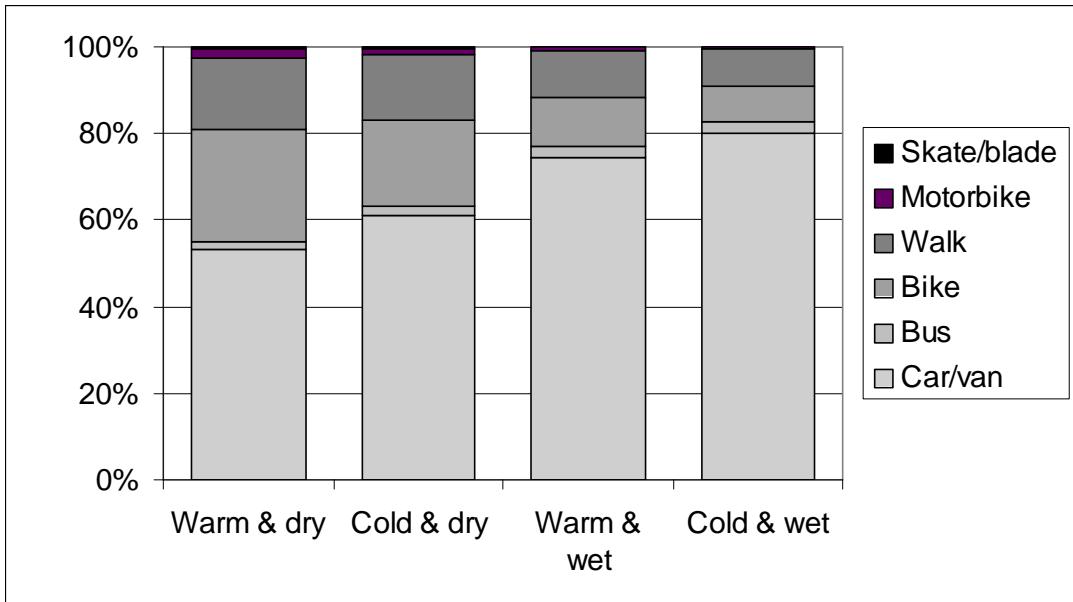


Figure 2a: Effect of Weather on Mode Choice (Staff)

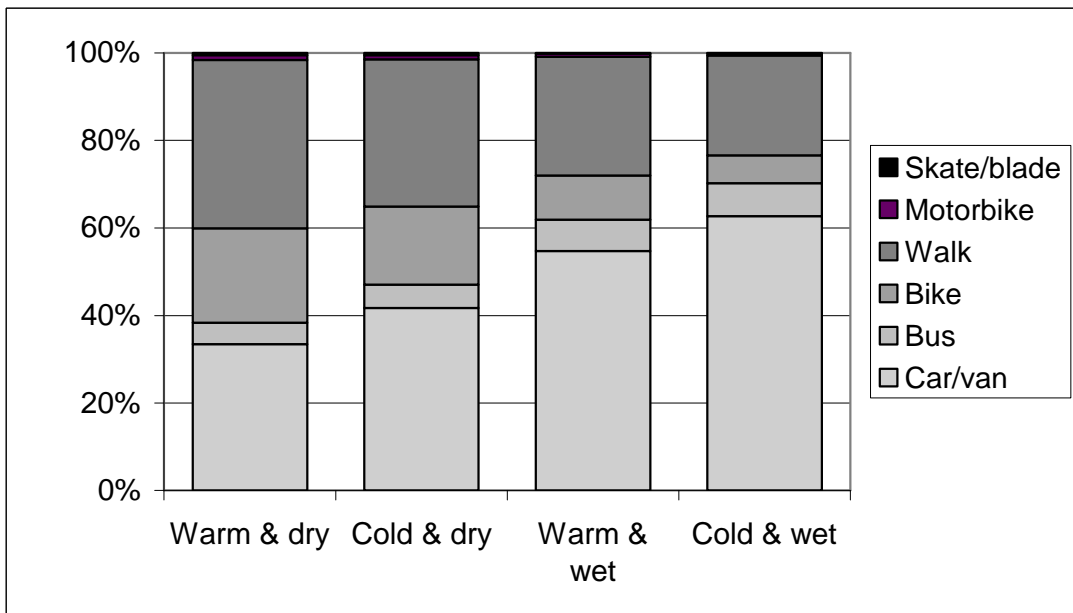


Figure 2b: Effect of Weather on Mode Choice (Students)

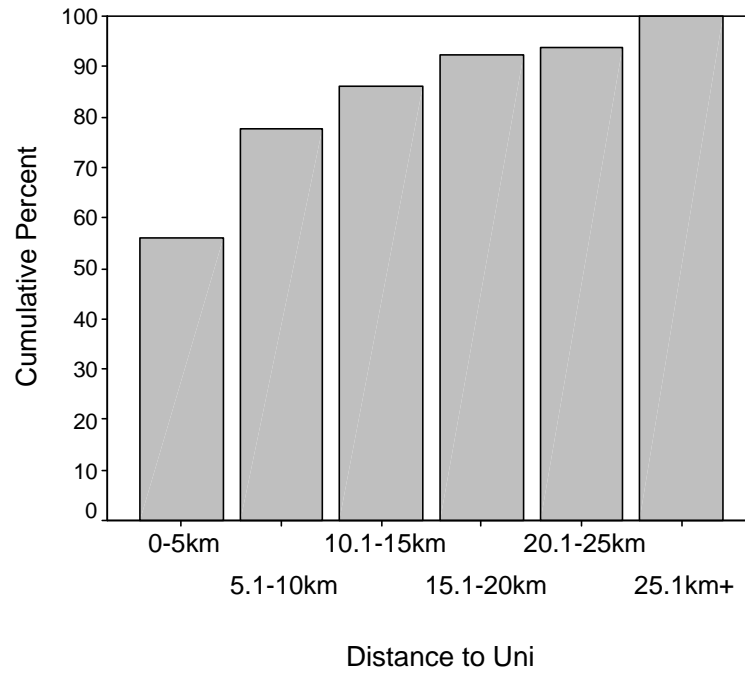


Figure 3a: Travel Distance to University (Staff)

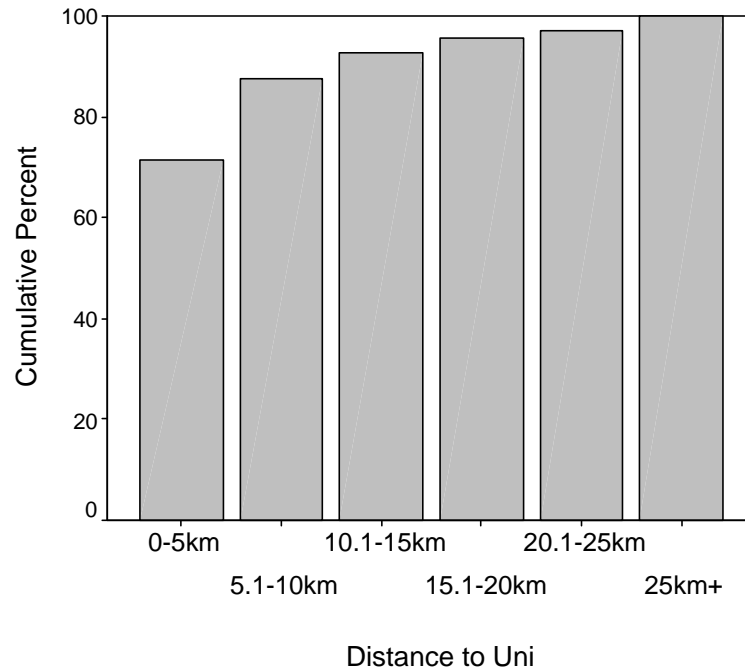


Figure 3b: Travel Distance to University (Students)

2.2.2 Reasons for modal choice

When focusing on car drivers only, it was possible to identify the main reasons stated for using the car (Figure 4). Use of vehicle for shopping and other use on the way to/from work and ease of use are the primary reason for staff (all over 40%). Ease is the primary reason for students (50% of respondents) with other reasons barely exceeding 20%. Free parking was indicated as a reason for between 10% and 20% of staff and student respondents.

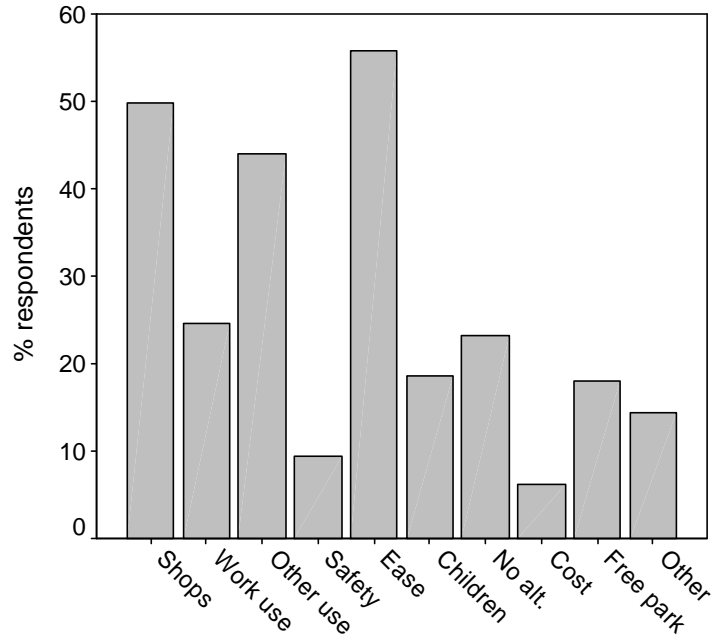


Figure 4a: Reasons for Car Use (Staff)

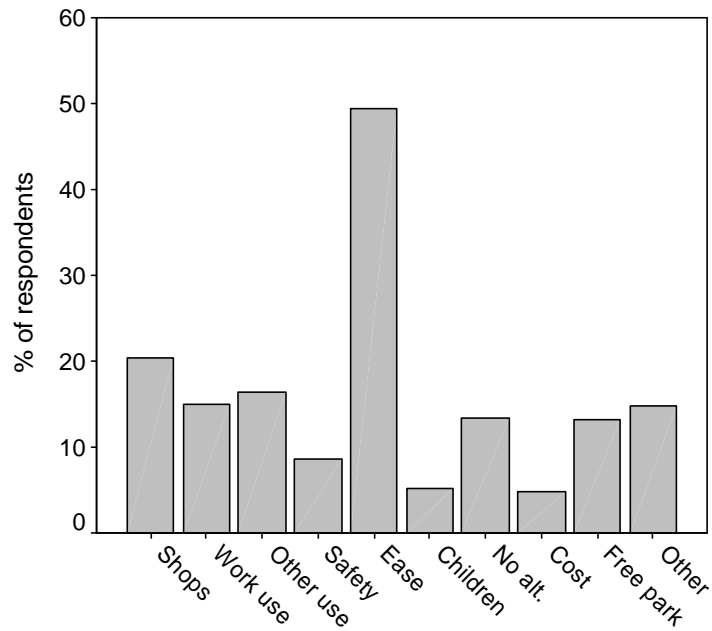


Figure 4b: Reasons for Car Use (Staff)

2.2.3 Encouragement to change modal choice

Factors likely to encourage people to use their cars less are presented in Figure 5. No one particular dominates, with a number receiving positive responses from between ten and twenty percent of respondents (for students financial incentives produced the greater response than other factors). This seems to suggest that no one policy will have a major impact but a combination of policies would work best.

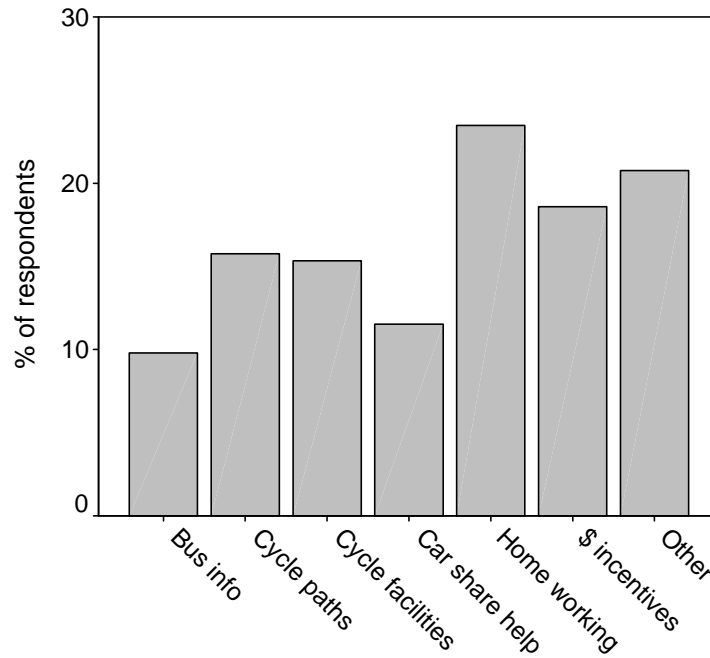


Figure 5a: Options for Decreasing Attractiveness of Car Use (Staff)

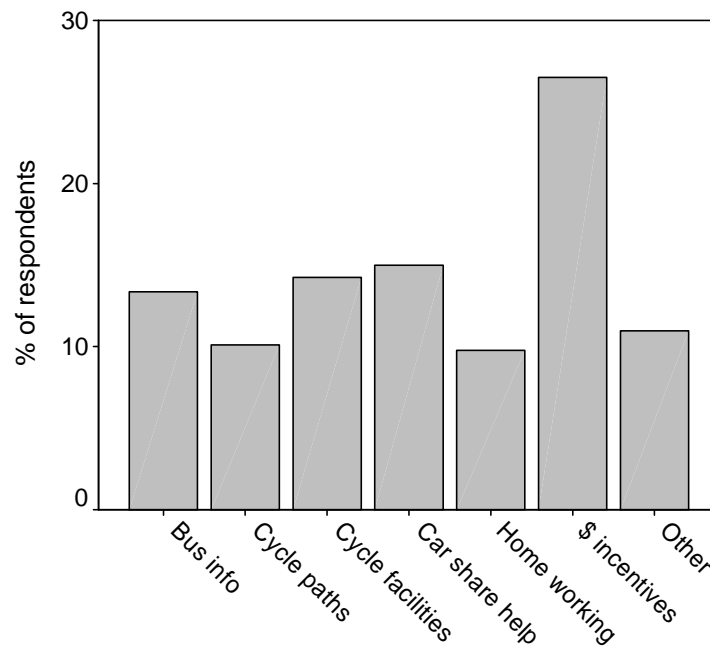


Figure 5b: Options for Decreasing Attractiveness of Car Use (Students)

Respondents were asked to indicate their expected response to three levels of parking charges (\$0.50, \$1.00 and \$5.00 per day). The results can be seen in Figure 6. Not surprisingly the greater the daily parking charge the bigger is the response, with students being more likely to change their behaviour than staff.

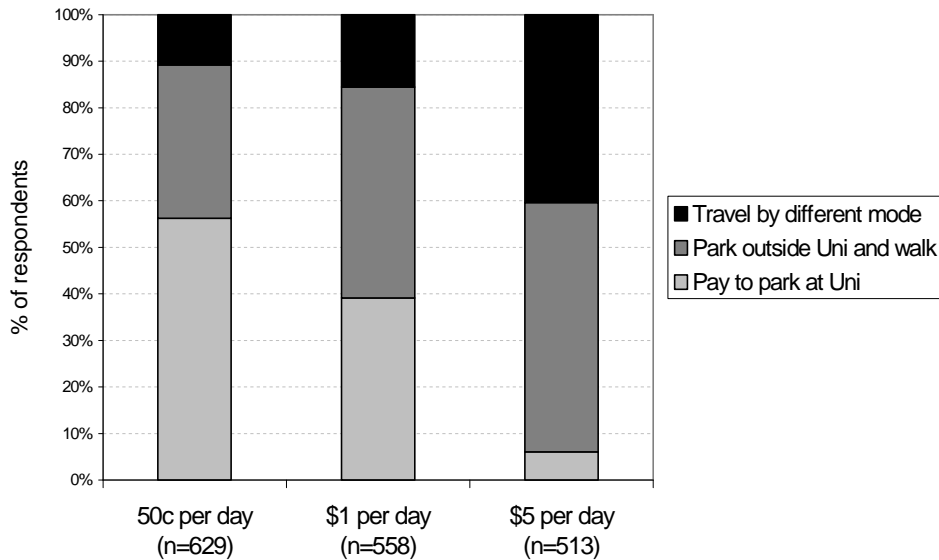


Figure 6a: Stated Response to Parking Charges (Staff)

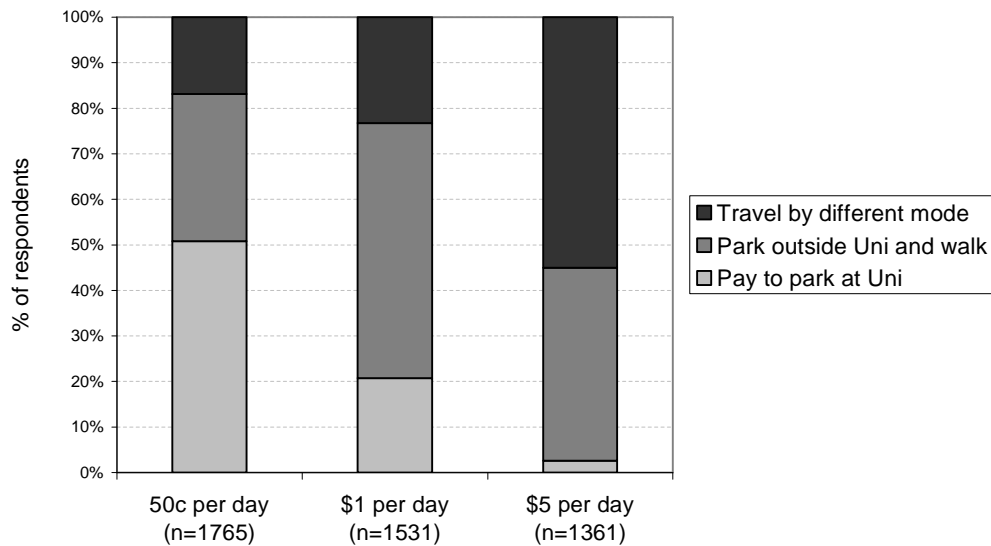


Figure 6b: Stated Response to Parking Charges (Students)

When questioned specifically about factors likely to encourage bus use (Figure 7), the most common factors related to the “efficiency” of the service (frequency, reliability, convenient stops and connections) and availability of discounted passes or tickets (the latter are especially important for students). The security, cleanliness and comfort of buses, and information about services were less important.

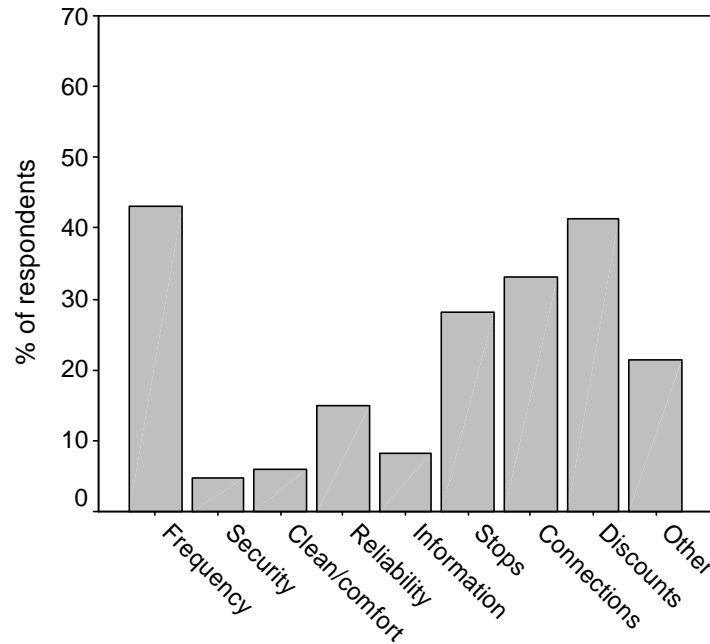


Figure 7a: Attributes Affecting Bus Attractiveness (Staff)

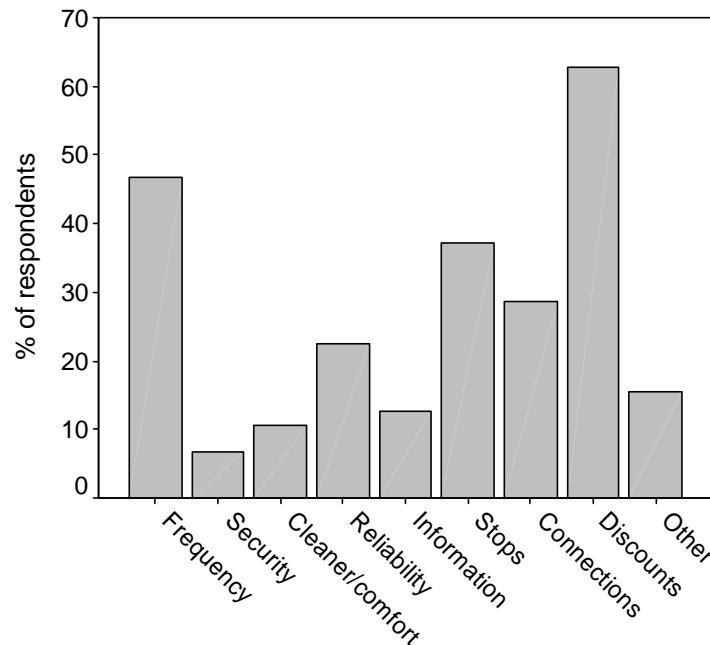


Figure 7b: Attributes Affecting Bus Attractiveness (Students)

Responses for cycling were less clear cut with differences between staff and students (Figure 8). Cycle infrastructure (cycle paths, facilities and better located bike stands) received a number of positives responses, as did reducing the impacts of other modes (less traffic and more courteous car drivers). While financial incentives had some positive responses, loans to bicycles did not (less than 10%). Twenty percent of staff and students said nothing would encourage them to cycle more.

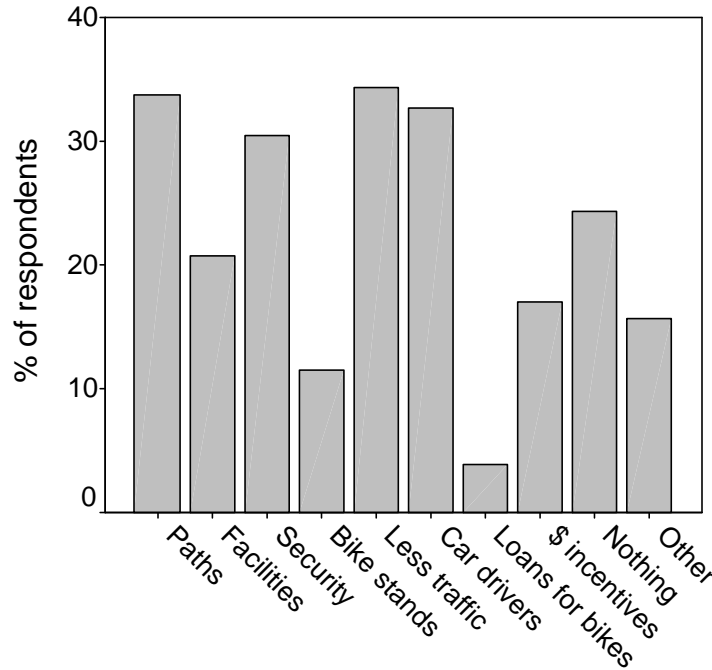


Figure 8a: Attributes Affecting Bicycle Attractiveness (Staff)

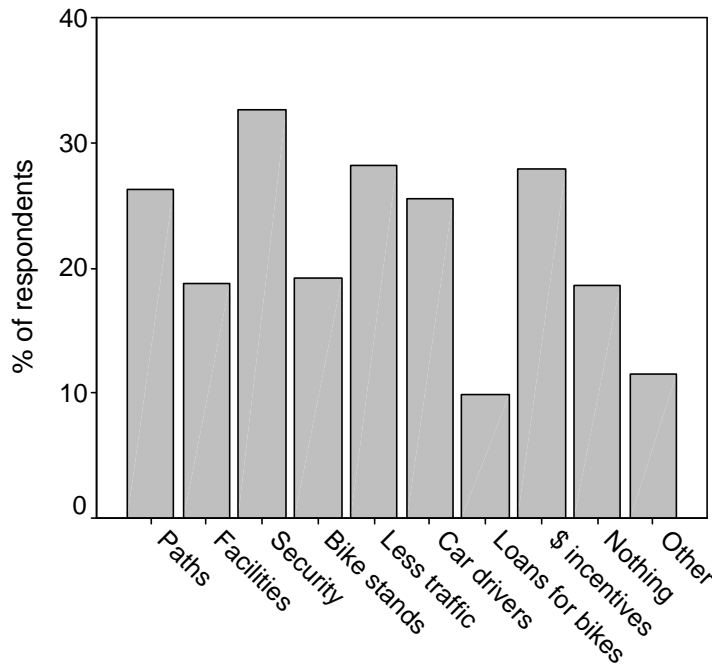


Figure 8b: Attributes Affecting Bicycle Attractiveness (Students)

2.2.4 Environmental attitudes

Respondents were asked a number of questions about their environmental attitudes in relation to traffic. This took the form of presenting a number of statements and asking respondents to what extent they agreed with them. Results are presented in Figure 9. The results seem to suggest that staff are more “environmentally friendly”, with more agreement to the questions, although there seems to be some polarisation

of responses with marginally more staff respondents disagreeing and less undecided. However when asked whether they would alter their behaviour in favour of more environmentally friendly modes, students appeared more likely to change behaviour.

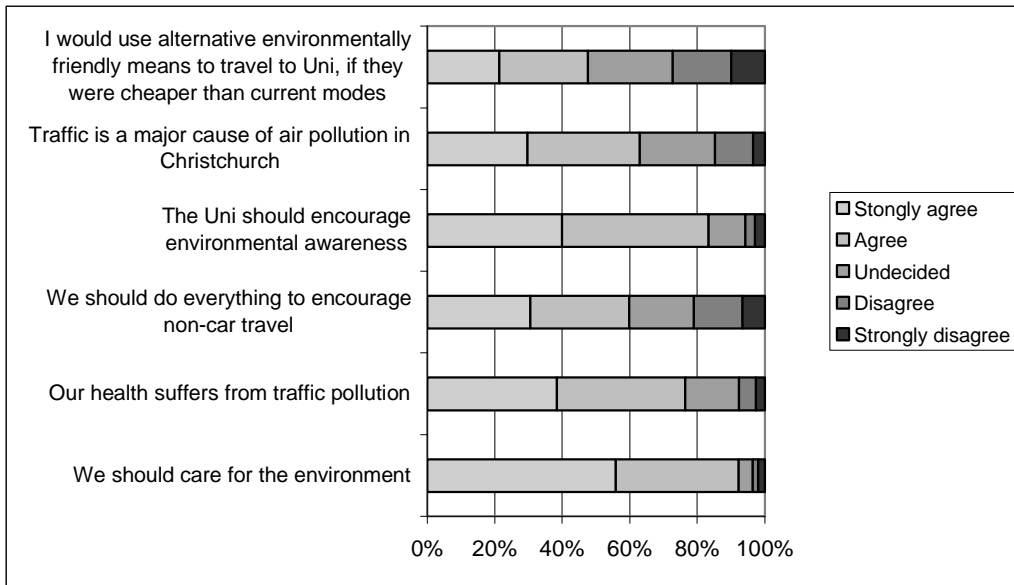


Figure 9a: Environmental Attitudes (Staff)

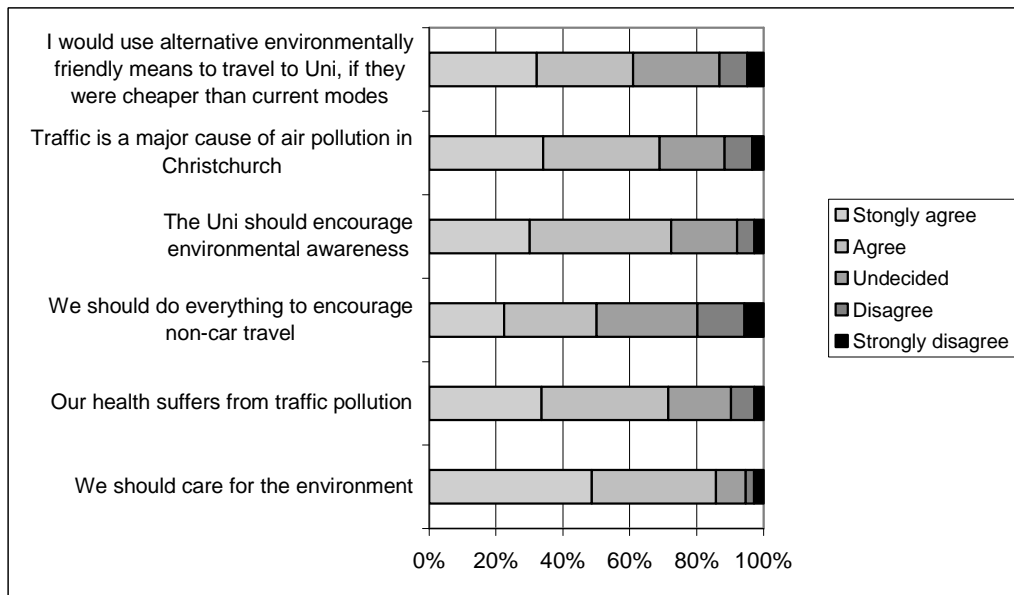


Figure 9b: Environmental Attitudes (Students)

2.3 POTENTIAL FOR MODAL CHANGE

The results of the survey do not indicate that one single factor is likely to affect a significant change in modal choice, but that a number of factors together could impact travel behaviour. Some of these factors are external to the University such as improving cycle paths, and public transport provision and some are arguably

unchangeable at least in the short term such as reducing traffic and making car drivers more courteous. However a third category can be affected by internal changes in University policy such as charging a fee for parking, improving cycling facilities, improved location of bike stands and subsidising bus use. This offers some opportunities for the University to affect transport modal choice in favour of more sustainable modes.

3. TRANSPORT STRATEGY DEVELOPMENT

The results from the July 2000 survey were compared with those from the earlier surveys, to identify the temporal trends in mode split (Table 1). It can be seen that during the period 1966-1976, there was a substantial decline in bus use by both staff and students (especially the former). This can be explained largely by the University shifting from the city-centre to a suburban location (at Ilam), as during the same period, the proportion of work trips to the city-centre declined much more slowly, from 19.8% to 16.8% (Douglass, 2000). There was also a substantial increase in cycle use by staff and walking by students.

Table 1: Temporal Change in Mode Split

Year	Staff					Students				
	Car	Bus	Cycle	Walk	Other	Car	Bus	Cycle	Walk	Other
1966	64.0	9.6	14.4	6.4	5.6	35.2	10.4	27.2	9.6	17.6
1971	60.8	10.0	16.0	7.2	6.0	31.2	10.4	28.0	12.8	17.6
1976	59.0	3.0	22.0	8.0	8.0	32.0	5.0	23.0	23.0	17.0
1993	69.1	0.5	18.2	10.3	1.9	38.1	2.2	37.6	18.4	3.7
2000	68.4	2.5	15.0	12.5	1.6	49.0	5.7	14.5	29.6	1.2

Note: 'Other' includes motorcycle.

The period 1976-1993 saw an increase in car use and a decrease in motorcycle use, by both staff and students, with student use of cycles increasing considerably. The period from 1993-2000 saw little change in staff modal split, but for students there were substantial increases in car use and walking, with a large decrease in cycle use. The increase in traffic flows and parking demand around the University in the early 90's prompted the reactivation of travel surveys in 1993, in an effort to identify the factors affecting mode choice and how mode choice might be modified. This entailed development of a multinomial logit model (Laird and Nicholson, 1994).

A factor likely to have had a substantial effect on mode choice is car availability, and there have been substantial changes in car availability during the last four decades. In 1962, 82% of male staff and 40% of female staff had a car available, but by 1993, the proportion was 90% for both groups. While the proportion was 26% and 9% for male and female students respectively in 1962, it was 65% for both groups in 1993. That is, car availability for females increased much more for females, with the difference between males and females being eliminated by 1993. During the period 1993-2000, car availability for male and female staff remained constant at 90%, but the proportion of female and male students with a car available increased to 90% (i.e. the difference between staff and student car availability was eliminated).

An analysis of student travel behaviour and student numbers revealed that between 1976 and 2000, the number of students increased by 65%, but the number of student cars parked on the campus or surrounding streets increased by 160%. That is, change in travel behaviour was a much bigger contributor to the increase in parking

demand than was the increase in student numbers. It was feared that the increasing propensity for bringing cars may have prompted an increase in the City Plan parking requirement, and this was not attractive to the University.

The University had adopted an annual parking charge of \$10 in 1975, with the revenue being assigned to funding a special bus service between the city and Ilam (apparently in an effort to reverse the shift away from using buses between 1971 and 1976). This change involved minimal consultation and encountered substantial resistance, and the charges were withdrawn after a few months. The Transport Working Group (TWG) therefore considered it extremely important to keep the University community fully informed during the development of the transport strategy, and to provide plenty of opportunity for staff and students to express their views. Indeed, staff who opposed parking charges frequently referred to the events of 1975, suggesting that a re-introduction of parking charges would meet the same fate.

The consultation process began before the July 2000 survey, with articles in the University Chronicle and Student Association magazine, announcing the establishment of the TWG, our intention to develop a transport strategy, and seeking cooperation with the survey. All staff whose lectures were selected for surveying students agreed to losing 10 minutes of lecture time, and students seemed happy to participate.

The analysis of the survey data was not completed until February 2001. In the interim, other Universities and large Polytechnics were surveyed to identify what parking fees they charged, and how the revenue was used. It was found that the majority charged for parking, with the fees ranging from about \$40 to \$800 per year, with one charging on a daily basis (\$4/day). None reported using the revenue for encouraging the alternative travel modes. From February to August 2001, the TWG developed a 'discussion paper' on the transport issues and options, and this was made available to all staff and students, who were invited to make submissions and to participate in focus groups, to discuss the issues and options in detail.

After receiving a detailed report on the focus group discussions, the TWG prepared its final report (Transport Working Group, 2002) on the issues and three options:

- (1) continuing to provide free parking and increasing parking as demand increased (i.e. the status quo);
- (2) charging for parking, as a means of restraining the demand for parking;
- (3) charging for parking and using the revenue to encourage travel by bus, cycle, car-pooling and walking, to restrain the demand for parking.

This report evaluated each option in detail and recommended the third option, with parking charges being on a daily basis, so that staff and students would be encouraged to consider the necessity of driving their cars to the campus each day.

This report was also made available to all staff and students, who were again invited to make submissions (60 staff and 250 students did so). An analysis of the submissions revealed that 25% of staff and 52% of students favoured the first option. The second option was favoured by 16% of staff and 7% of students, while 52% of staff and 41% of students favoured the third option (i.e. there was a clear preference for the revenue from parking charges to be used for assisting the more sustainable travel modes, rather than being used for 'general expenditure'. All staff and students were invited to a University Forum to discuss the report, and about 70 attended.

Opponents of parking charges raised a number of arguments. For instance, it was claimed that the increase in the number of cars being brought to the University was

almost entirely due to the increase in student numbers, but the survey results showed that the increase in student numbers accounted for only 40% of the increase in car numbers (i.e. the effect of travel behaviour change was the dominant effect). It was also claimed that encouraging the alternative modes would be sufficient (i.e. that there was no need to discourage car use via parking charges), but the results of the earlier study (Laird and Nicholson, 1994) showed that car users are much more sensitive to increases in the costs of car use than to improvements in the attributes of the alternative modes. Some opponents suggested that the vast majority of staff and students lived so far away from the campus that it was not practical for them to use an alternative travel mode, but the survey results showed that 55% of students (and 40% of staff) live within 5 km of the campus. Having such information, much of which was not available in 1975 when the first attempt to implement car parking charges occurred, helped considerably when responding to opponents of parking charges.

Much of the opposition to parking charges appeared to stem from a fear that the revenue would be used for 'general expenditure'. A substantial proportion of opponents indicated that they would reluctantly accept parking charges, provided the revenue is used to encourage alternative modes of travel (viz. the higher level of support for policy option 3 than for option 2).

The University then undertook formal consultations with the Christchurch City Council (in particular, the Sustainable Transport and Utilities Committee and two Community Boards for the area around the University), and obtained their support for the third option. The University decided, in the light of staff and student comments, to charge \$40/year (or \$2/day for casual use), rather than a daily charge for all (the TWG recommendation). Finally, in December 2002 the University Council received and approved a report recommending implementation of the third option.

Parking charges were implemented in February 2003 for students and April 2003 for staff. The delay for staff was because of legal action by the Association of University Staff (AUS), which has claimed that free parking is an implied condition of employment. This matter was not resolved at mediation, and was the subject of an Employment Relations Authority hearing in July 2003. The Authority's decision is awaited.

While no surveys have been done yet, the anecdotal evidence indicates that the vast majority of staff and students have accepted the change, with some travel behavioural changes, and no obvious increase in parking on streets around the campus. Parking charge revenue is being used for various works to encourage the other modes (e.g. providing secure, covered storage for cycles, and improving campus footpath lighting). Measures to encourage bus travel include linking to the real-time bus information system now operational in Christchurch, and development of a small bus exchange for the five services passing the campus.

4. CONCLUSION

The development of the University of Canterbury Transport strategy has highlighted the importance of:

- having a sound knowledge of travel behaviour and understanding of the reasons for that behaviour (i.e. being technically competent), so the criticisms of opponents can be rebutted;
- consulting widely, frequently and unhurriedly with all interested parties (i.e. being politically competent);

- avoiding premature and ill-prepared interventions, as they can make subsequent interventions more difficult;
- ensuring interventions have positive elements (e.g. using parking fee revenue to encourage alternative modes) and not just negative elements (e.g. having parking fees to discourage car use).

ACKNOWLEDGEMENTS

Thanks to our fellow members of the Transport Working Group, and to two students at the University of Canterbury, Hamish Wilde and Caroline Rhoades, for their assistance in analysing the survey data and evaluating strategy options.

REFERENCES

- Austrroads (1995). *Travel Demand Management Guidelines*. Report AP-117, Austrroads, Sydney, Australia.
- Balsas, C.J.L. (2003). Sustainable transportation planning on college campuses. *Transport Policy*, 10 (1), 35-49.
- Douglass, M. (2000). *Christchurch City Centre: 40 Years of Change, Traffic and Planning 1959-1999*. Christchurch City Council, Christchurch, NZ.
- Laird, J.J. and Nicholson, A.J. (1994). *The University of Canterbury Travel Survey 1993: A Stated Preference Approach to Modelling Modal Split*. Civil Engineering Research Report 94-6, University of Canterbury, Christchurch, NZ.
- University of Canterbury Transport Working Group (2002). *Draft Transport Strategy: Setting a New Direction for Transport at the University of Canterbury*. Report to Facilities Advisory Committee, University of Canterbury, Christchurch, NZ.
- Williman, A. (1973). The University of Canterbury Travel and Parking Studies of 1962, 1966 and 1971. *Australian Road Research*, 5(2), 3-22.
- Williman, A., Seddon, P.A., Elms, D.G. and Thurston, S (1976). *The University of Canterbury travel and parking study 1976*. Civil Engineering Research Report 76-14, University of Canterbury, Christchurch, NZ.