

1. PURPOSE

The purpose of this note is to :

1. Communicate changes to the client on the proposed expansion categories and the potential implication on the outcomes sought in the model specification report.
2. Brief Opus Consultants on the changes to the expansion specification and categories defined in the WRTM-03 Household Interview Survey contract documents..

2. INTRODUCTION

In the WRTM Model Specification Report, we foreshadowed a category model consisting of five person categories, four car ownership categories, and up to eleven household 'lifestyle' categories. At that time, we considered that this might reduce to some 120 household categories.

This number was taken through into the RFT for the Household Interview Survey (HIS) since part of the specification for expanding (or weighting) the sample is a check that the household categories are correctly represented in the sample when compared against the 2006 Census data.

Recently, we have had an opportunity to analyse the 2006 Christchurch HIS data, and have reduced the 120 categories into 18 lifestyle (or life cycle) categories by 4 car ownership categories. When we then apply the constraint that the number of cars available is to be limited to the number of persons old enough to have a licence then the number reduces to about 40 categories. It may reduce further once we have the Census data and the survey data available, as some minor categories may be able to be aggregated.

Section 4 of this note outlines the process that we went through to define the categories, and section 5 discusses likely implications of the application of expansion factors.

3. THE TRADITIONAL NEW ZEALAND MODEL

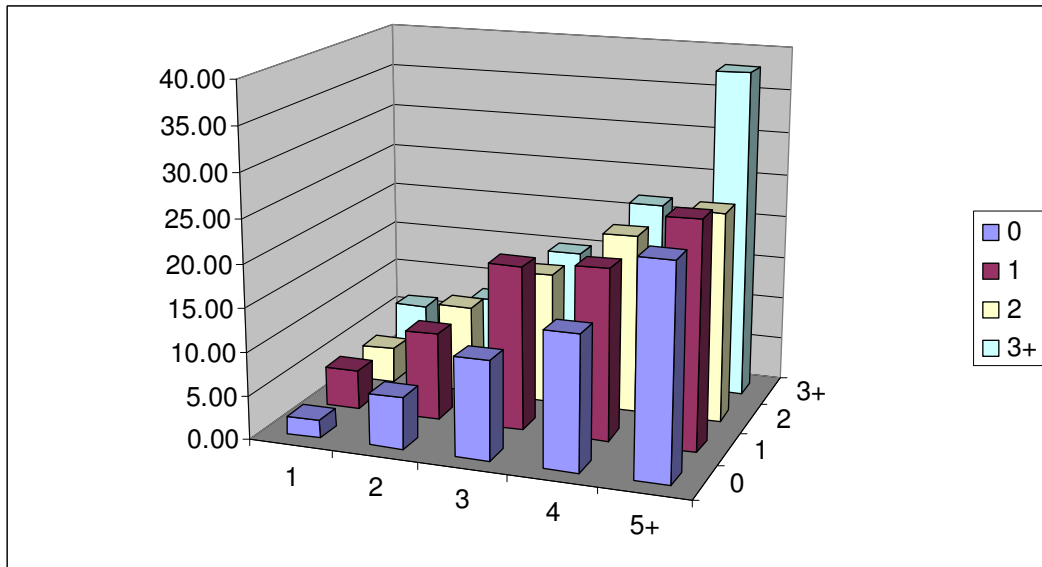
A large number of models in New Zealand have used a 5 by 4 (20) category model, comprising 1, 2, 3, 4, 5+ persons by 0, 1, 2, 3+ cars. This model form has served well, particularly in car driver models (three step), and more recently in four step models.

In Christchurch the trip rates that were calibrated from the HIS data are shown in Table 1 below for all modes, and Table 2 for car drivers.

Christchurch HIS trip rates - All modes all day – Persons by cars

Table 1

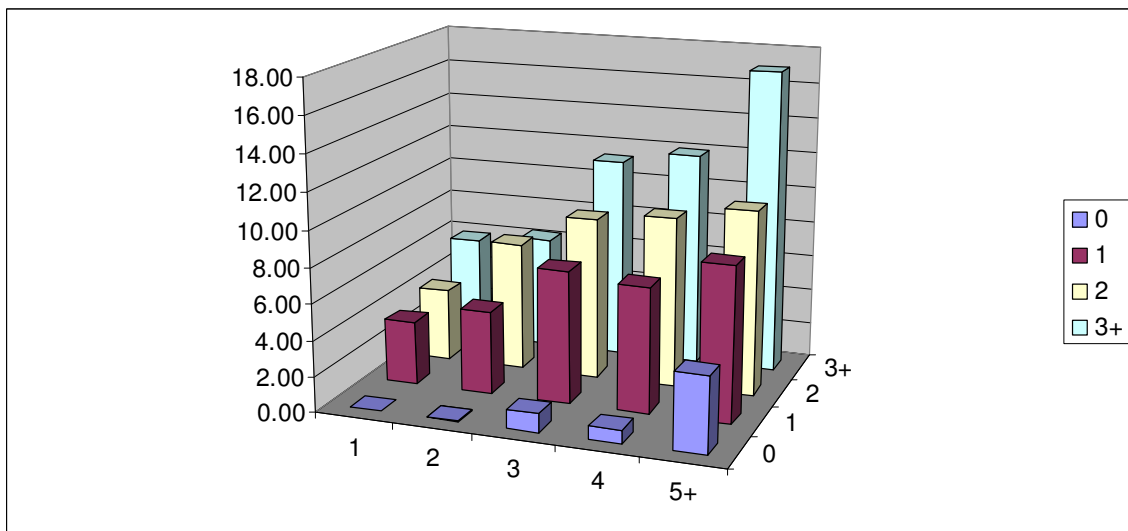
<i>Cars Person</i>	<i>0</i>	<i>1</i>	<i>2</i>	<i>3+</i>
1	2.11	4.59	4.10	6.46
2	5.98	10.05	10.23	8.23
3	11.29	18.84	15.19	15.10
4	15.28	19.55	20.67	21.79
5+	24.15	25.94	24.16	38.03



Christchurch HIS trip rates - Car Driver all day – persons by car

Table 2

Cars Persons	0	1	2	3+
1	0.02	3.57	4.07	5.85
2	0.03	4.65	7.21	6.32
3	1.04	7.40	9.09	11.32
4	0.74	6.98	9.56	12.04
5+	4.21	8.62	10.36	17.03



The trends that we would expect to see – increasing trip rate with increasing household size and increasing vehicle availability are apparent.

4. DEVELOPMENT OF LIFE CYCLE CATEGORIES

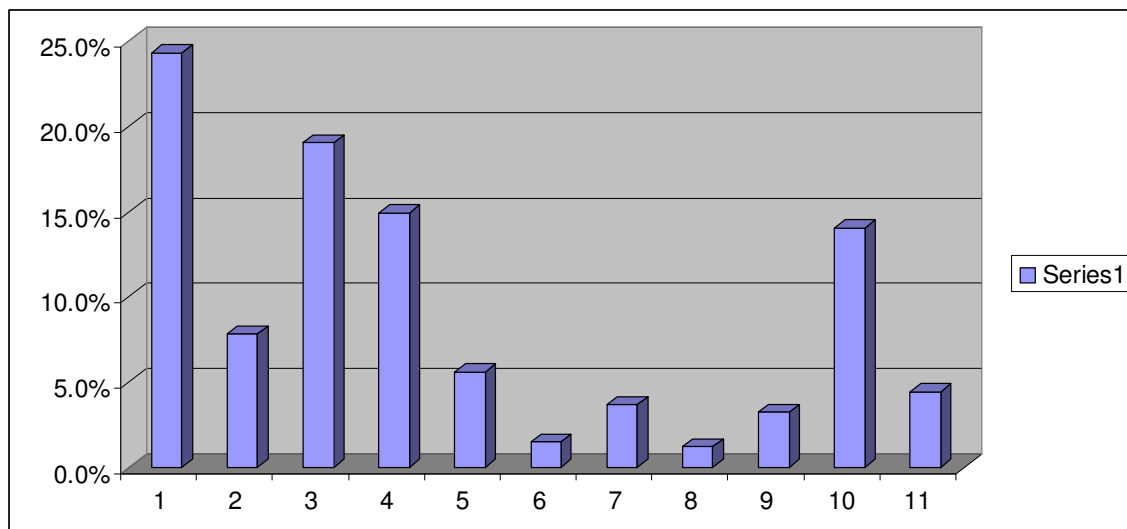
Current thinking is that trip making at the household level is related to the activity of the household rather than just household size and vehicle availability. In other words, is a household made up of students, does it have children, or is it a retired household.

This concept, as noted above, was brought into the model specification for the WRTM project where eleven life cycle categories were initially identified, namely:

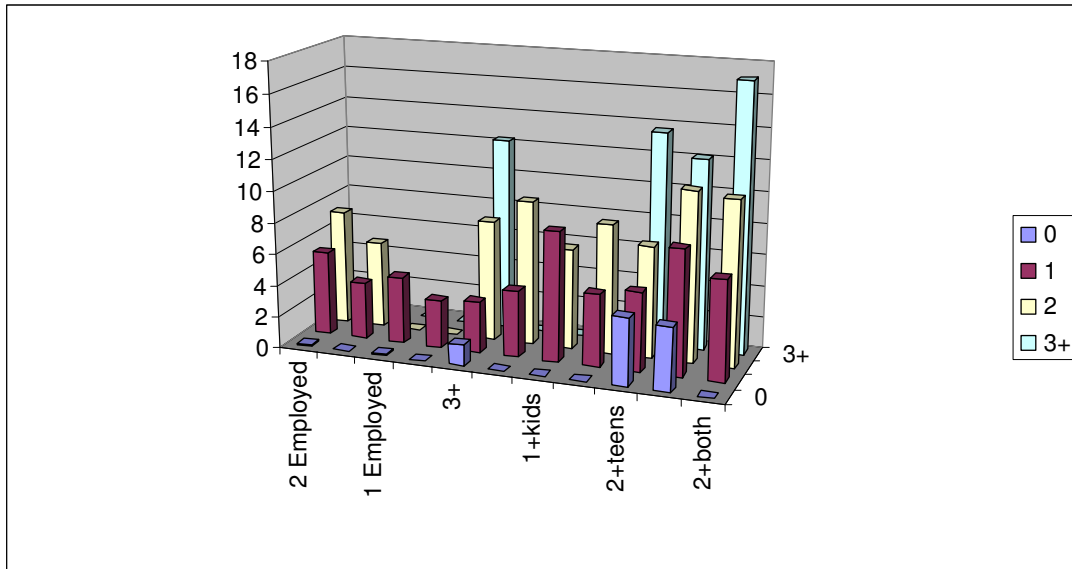
Category	Description
Households without children	
1	2 persons at least one employed
2	2 persons, both not working
3	1 person employed
4	1 person not working
5	3 or more people
Household with children	
6	1 adult + teenage children
7	1 adult + children aged 12 or under
8	1 adult + teenage and young children
9	2 adults + teenage children
10	2 adults + children aged 12 or under
11	2 adults + teenage and young children

The original idea was to cross classify these against household size, and vehicle availability, although it is clear that the first 5 categories implicitly define household size.

The distribution of these households across the Waikato Study Area is shown below:



Categories 6, 7 and 8 (1 adult households with children) have a very low incidence and could be collapsed into one category. The Christchurch trip rates for each of these categories cross classified against vehicle availability is shown below, subject to the constraint that there can be no more vehicles available than there are people old enough to drive them. There is a general increase in trip making over most household categories as vehicle availability increases, and a very much higher trip rate for households with children.

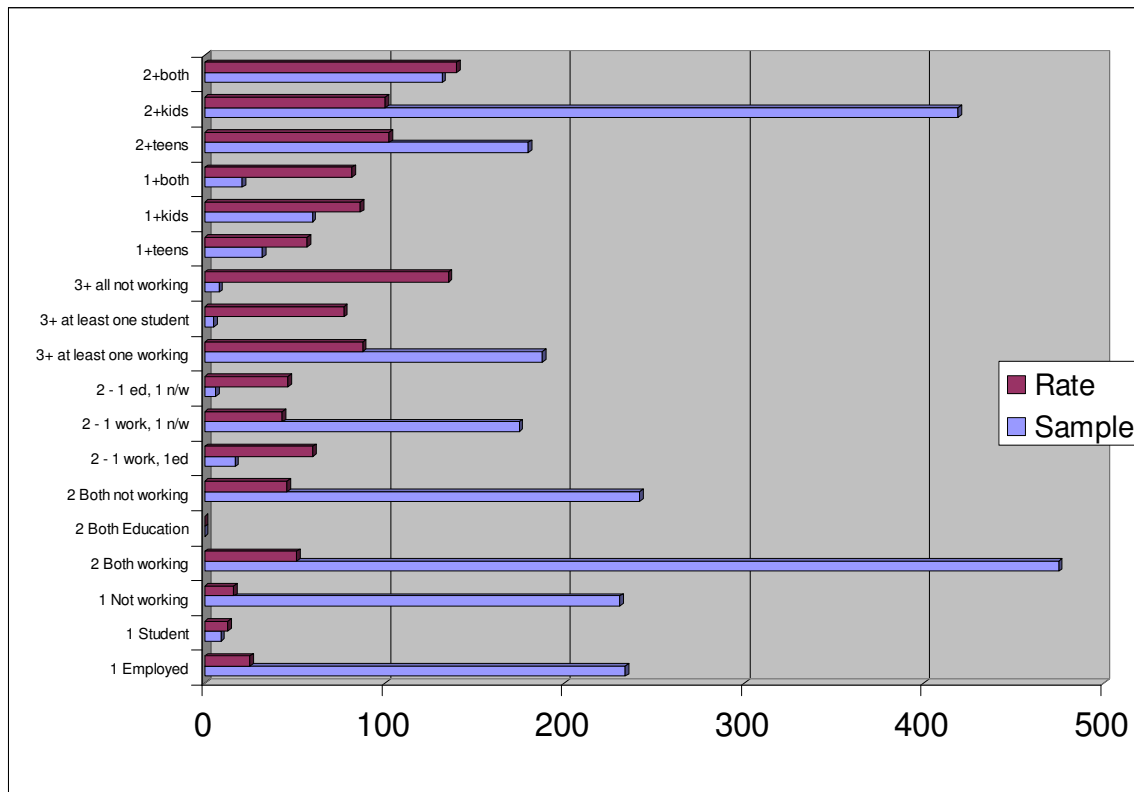


Having got to this point, the importance of education came into the discussions and the 11 categories were redefined into 18, as shown below.

Category	Description
Households without children	
1	1 person employed
2	1 person student
3	1 person not working
4	2 people both working
5	2 people both in education
6	2 people both not working
7	2 people - 1 work, 1 student
8	2 people - 1 work, 1 not working
9	2 people - 1 student 1 not working
10	3 or more people - at least one working
11	3 or more people - at least one student (and no one working)
12	3 or more people - all not working
Household with children	
13	1 adult + teenage children
14	1 adult + children aged 12 or under
15	1 adult + teenage and young children
16	2 adults + teenage children
17	2 adults + children aged 12 or under
18	2 adults + teenage and young children

The incidence of these categories in the Christchurch data and the trip rates are shown graphically below. Once again it is clear that the households with children have a much higher trip rate, although they have a lower proportion of the population while household without children have a high proportion of the population but a very much lower trips rate.

It is also clear that, in Christchurch at least, some of the categories can be collapsed, even more so when these are cross classified against vehicle availability. At present we do not have the Census data for Christchurch or Waikato at this level of cross classification, and this will need to be obtained before we can refine the categories.



5. IMPLICATIONS FOR EXPANSION FACTORS

We recommend a two-step system for expanding the home interview data.

Step 1: expanding the surveyed households to the populations in the sampled meshblocks, followed by expansion of the surveyed meshblocks to the defined surveyed areas.

This partially expanded data then needs to be checked for the Hamilton Sub-Model area and the wider region to show that the basic demographics of the region have been matched. There may need to be an additional person based factor applied if there is a significant bias in the surveyed data so that both household numbers and person numbers correlate with Census data.

Step 2: , at the household level, there needs to be a match between the proportions of households surveyed in each of the household categories against the regional totals supplied by Statistics New Zealand from the 2006 Census. Again this would be done at the Hamilton Sub-Model level and the wider region.