Table 84

MOVEMENT OF WORKERS TRAVELLING TO WORK BY CAR (1951)

(Thousands of Workers)[1]

Subdivision of Residence / Sub-division of Work Place	1	2	3	4	5	6	7	8	9	0	X	X_s	Total
1 (a)	**0.4**	0.4	0.4	2.7	1.1	3.3	2.7	3.1	3.4	2.0	0.2	—	19.7
1 (b)	**2.2**	1.1	1.3	1.9	2.6	1.9	2.2	1.3	2.2	2.0	0.1	0.5	19.3
2	0.5	**1.1**	0.1	0.2	1.9	1.6	1.0	0.4	1.0	0.8	—	—	8.6
3	0.6	—	**3.3**	0.9	0.5	0.1	—	0.3	0.3	0.3	—	—	6.3
4	0.3	0.2	0.3	**3.1**	0.7	—	0.3	0.2	0.2	—	—	—	5.3
5	0.6	0.3	—	1.2	**3.1**	0.4	0.1	0.4	0.4	0.1	—	—	6.7
6	—	0.4	—	0.1	0.4	**2.5**	1.0	0.1	0.3	0.2	0.1	0.2	5.2
7	—	—	—	—	0.1	0.4	**2.8**	0.6	0.2	—	0.1	—	4.2
8	0.2	0.4	—	0.3	—	0.1	0.6	**2.5**	2.0	0.9	—	—	7.0
9	0.1	0.2	—	—	—	—	0.4	0.5	**1.6**	0.4	—	—	3.2
0	—	—	—	0.1	—	—	0.1	0.7	1.1	**4.1**	0.2	0.3	6.6
X_c	—	—	—	—	—	—	—	—	0.2	—	**0.6**	0.2	1.0
X_s	—	—	—	—	—	—	—	—	—	—	—	**1.3**	1.3
Total	4.9	4.1	5.4	10.5	10.4	10.3	11.2	10.1	12.9	10.8	1.3	2.5	94.4

(1) For example, 1,900 workers living in subdivision 6 travel to work in subdivision 1(b) by car.

Table 85

MOVEMENT OF WORKER TRAFFIC BETWEEN SUBDIVISIONS (1951)

(In thousand of vehicles per day)

Statistical Subdivision	1	2	3	4	5	6	7	8	9	0	X_c	X_s
1 (a)	0.6	0.6	0.6	4.3	1.8	5.3	4.3	4.9	5.4	3.2	0.3	—
1 (b)	3.5	2.6	3.0	3.5	5.1	3.0	3.5	2.4	3.7	3.2	0.2	0.8
2	—	1.8	0.2	0.6	3.5	3.2	1.6	1.3	1.9	1.3	—	—
3	—	—	5.3	1.9	0.8	0.2	—	0.5	0.5	0.5	—	—
4	—	—	—	4.9	3.0	0.2	0.5	0.8	0.3	0.2	—	—
5	—	—	—	—	4.9	1.3	0.3	0.6	0.6	0.3	—	—
6	—	—	—	—	—	4.2	2.4	0.3	0.5	0.2	0.2	0.3
7	—	—	—	—	—	—	4.5	1.9	1.0	0.2	0.2	0.3
8	—	—	—	—	—	—	—	4.0	4.0	2.6	—	—
9	—	—	—	—	—	—	—	—	2.6	2.4	0.3	—
0	—	—	—	—	—	—	—	—	—	6.6	0.3	0.5
X_c	—	—	—	—	—	—	—	—	—	—	1.0	0.3
X_s	—	—	—	—	—	—	—	—	—	—	—	2.1

numbers at the bridge and at the principal outlets of the area shown in map 60. The map shows the distribution of the bridge traffic. The analysis showed that approximately 45% of the traffic had its origin or destination within the area.

From the special check on the portion of the area cross-hatched on map 60, which is entirely industrial, and from data supplied by the various manufacturers in the area the following particulars were obtained:

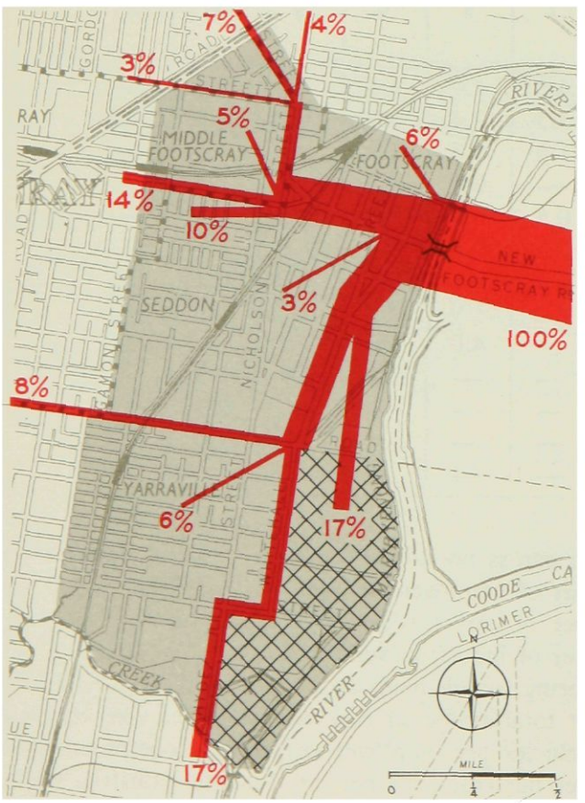
Traffic across boundaries of area	3,360	vehicles per day
Number of employees in area	2,472	,, ,, ,,
Number of cars carrying workers	192	,, ,, ,,
Number of industrial vehicles entering and leaving area	1,156	,, ,, ,,

The total traffic in this sample count was equivalent to 1.4 vehicles per employee per day as compared with 1.75 vehicles per employee per day for city industrial traffic (see Table 106).

Table 86

PROPORTION OF WORKER TRAFFIC

Location	*Estimated Total Traffic 1000 Vehicles per day*	*Estimated Worker Traffic*	
		1,000 Vehicles per day	*% of Total*
All central area traffic	150.0	31.3	21
All traffic on boundary of central city area	298.0	134.0	45
Central area approaches in South Melbourne	71.7	23.8	33
Williamstown	15.6	7.6	49
Footscray approaches to central district	27.0	8.5	31
Ascot Vale	19.7	8.8	45
Northern approaches to central district at Brunswick	55.2	24.0	43
Eastern approaches to central district at Hawthorn and Kew	40.0	18.9	47



60 TRAFFIC DISTRIBUTION — FOOTSCRAY

The actual count was 25% more than is accounted for by worker and industrial vehicles. The difference would probably be made up by visitors, staff movements and the movement of people associated with the industry but working elsewhere.

Characteristics of Commercial Traffic

Studies were made of traffic entering and leaving the suburban shopping areas of Glenferrie and Hampton, the traffic counts being made by noting the registered number of the vehicle and the time of passing through the cordoned shopping area. Relevant particulars are given in Table 87.

Table 87

TRAFFIC GENERATED BY SUBURBAN SHOPPING

Details	*Shopping Centre*	
	Glenferrie	*Hampton*
Day of week	Friday	Friday
Number of shops	180	130
Vehicle trips across boundaries	5,790	4,830
Percentage of through traffic	50%	60%
Traffic generated per shop (trips)	32	37
Traffic generated per employee (trips)	13	12

When traffic is related to the number of employees, it is seen that the traffic generated in such centres is very much higher than that generated by general employment.

ANALYSIS OF TRAFFIC GENERATION

If the observations of existing traffic conditions are to be applied to the estimation of future traffic, it is necessary that they be related to factors which have a bearing on traffic generation.

While an analysis of worker and shopper traffic indicates that they were important components of the traffic, it was not found possible to predict total traffic from these components only. It was therefore necessary to widen the scope of the investigations and to introduce other factors which appeared to have a bearing on traffic volumes.

Repeated trials with different elements of available data all produced unsatisfactory results while it was assumed that central area traffic and inter-suburban traffic followed the same laws. However, after it was assumed that city traffic and inter-suburban traffic were affected differently by distance, much better correlations were obtained. In this work, an analysis of the origin and destination survey of city traffic carried out in conjunction with the 1947 traffic census, proved very helpful in estimating the portion of the traffic at various points in the metropolitan area which had originated in or was destined for the city.

In this study it was assumed that the traffic between two regions A and B could be expressed in the form:

$$T = \frac{K_1\ a_1\ b_1}{D^{n_1}} + \frac{K_2\ a_2\ b_2}{D^{n_2}} \ldots \text{etc.} \qquad (1)$$

where T represents the traffic passing between regions A and B, originating in one region and destined for the other.

a_1, a_2 . . . etc. are characteristics of region A, for example the number of cars garaged or the number of jobs.

b_1, b_2 . . . etc. are characteristics of region B, not necessarily the same as for A.

D is the mean distance in miles between regions A and B.

K_1, K_2 . . . & n_1, n_2 . . . are constants to be determined.

Trials were made with several known characteristics of the different subdivisions shown in map 59 to determine which would give the best indication of the traffic generated and what values of n and K would give the best correlation between actual traffic and that estimated from the particular characteristics.

It was found that:

(a) The characteristics of the subdivisions giving the best correlation with traffic are a combination of the number of jobs with either the resident workers or the number of cars and utility trucks garaged. It does not make much difference to the correlation whether the number of cars garaged or the number of resident workers is used. However, in the final result "resident workers" were used to determine the city traffic and number of "vehicles garaged" for the inter-suburban traffic.

(b) It was found that for traffic to and from the central area the best value of n was zero, which means that the volume of all such traffic, like the worker portion of it, was independent of the distance between its origin and destination.

(c) For inter-suburban traffic as a whole the best value of n was 1.5 as compared with 2.0 for the worker portion of it.

The degree of correlation obtained between computed and actual traffic is shown in diagram 61.

These relationships confirm what was found out with worker movements, that the functions of the city are specialist in nature, and draw on the whole urban area for their satisfaction, whereas the functions of the various suburban areas are in competition with one another and relatively more movements occur between those close together than those far apart.

For 1951 conditions it was found that traffic between any suburban area and the central city area could be expressed by the formula

$$T_c = 0.12\ W + 0.20\ J \qquad (2)$$

where T_c = total number of vehicles passing between the suburban area and the central area in 12 hours.

W = the number of workers living in the particular suburban area.

J = the total number of jobs in the suburban area.

The types of traffic movements represented by the first term of this expression included city worker traffic, deliveries from retail stores, city shopper traffic and other journeys between the city and the home. Movements represented by the second term include deliveries from factories to city warehouses and wholesale stores, servicing of suburban shops from city wholesalers, suburban commercial travellers, communications between head offices and branches, servicing of city hotels, residentials and cafes.

For 1951 inter-suburban traffic it was found that traffic between two suburban areas A and B could be expressed by the formula:

$$T_s = \frac{J_a\ J_b}{132{,}000\ D^{1.5}} + \frac{J_a\ V_b + J_b\ V_a}{44{,}000\ D^{1.5}} \qquad (3)$$

where T_s = total number of vehicles passing between suburban areas A and B in 12 hours.

J_a and J_b = the number of jobs in areas A and B respectively.

V_a and V_b = the number of cars and utility trucks garaged in areas A and B respectively.

D = the mean distance in miles between areas A and B.

The inter-suburban movements computed from these formulae are shown in map 62.

ESTIMATION OF FUTURE TRAFFIC

Future Vehicle Registrations and Total Traffic

The future number of motor vehicles in relation to the population is dependent upon a number of relatively unpredictable factors, and this aspect of future traffic is the most difficult to assess.

A study of diagram 56 shows a definite tendency for Victorian registrations to be about the same as those for the United States twenty years earlier. However, this fact does not in itself give a reliable guide to future registrations. The basic considerations are psychological and economic in nature.

With regard to commercial traffic the fundamental reasons for the preference of motor transport to other forms are the same here as in the United States and it can be reasonably assumed that we will continue to follow American experience. This assumption is strengthened by the fact that the long-term trend in motor transport is for the cost of fuel to become a constantly decreasing proportion of the total. Furthermore, as the Australian market for motor vehicles increases so will the cost of the vehicles decrease. Thus it may be expected that the relative cost of motor transport in this country will tend to approach that of America.

With regard to private motoring, there are some people who consider that because of different conditions and outlook we will not attain the high American car-ownership