



**Halcrow** **Guides Used In Australia**

New South Wales  
RTA Guide to Traffic Generating Developments

Victoria  
Guidelines for Transport Impact Assessments for major land use and development proposals  
RTA Guide to Traffic Generating Developments  
ITE Trip generation

Queensland  
Guidelines for Assessment of Road Impacts  
RTA Guide to Traffic Generating Developments

South Australia  
RTA Guide to Traffic Generating Developments  
Land Use Traffic Generation Guidelines 1987

**Halcrow** **Guides Used In Australia**

Western Australia  
Transport Assessment Guidelines (2006 Draft)  
RTA Guide to Traffic Generating Developments  
Land Use Traffic Generation Guidelines (South Australia)1987

Australian Capital Territories  
RTA Guide to Traffic Generating Developments

Northern Territory  
RTA Guide to Traffic Generating Developments

Tasmania  
RTA Guide to Traffic Generating Developments

**Halcrow** **Background to Study**

## RTA Guide to Traffic Generating Developments 1993

1. Out of Date (most surveys prior to 1993)
2. New Land Uses have appeared

**Halcrow** **RTA Guidance**

The RTA guide also confirms

*“the guide as a whole is a summary of basic traffic generation information for various land uses to assist people who may not have traffic engineering training”.*

*“comparisons may be drawn however between the traffic generation potential of various land use types enabling a rough assessment of the traffic generation implications of land zoning. Departures from the average generation rates for individual development proposals may be adopted in which case such a departure should be justified with relevant supporting facts”.*

*“surveys of existing developments similar to the proposal can also be undertaken and comparisons may be drawn”.*



**Halcrow** **RTA Objectives**

**Appointed to**


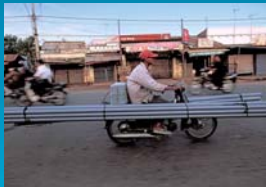
- (i) Study 2 new land uses
- (ii) Provide evidence of parking and trip rates
- (iii) Review existing traffic generation guidance
- (iv) Compare with other countries
- (v) Review if comparison can be made

**Halcrow** New Uses (1)

### Housing For Seniors

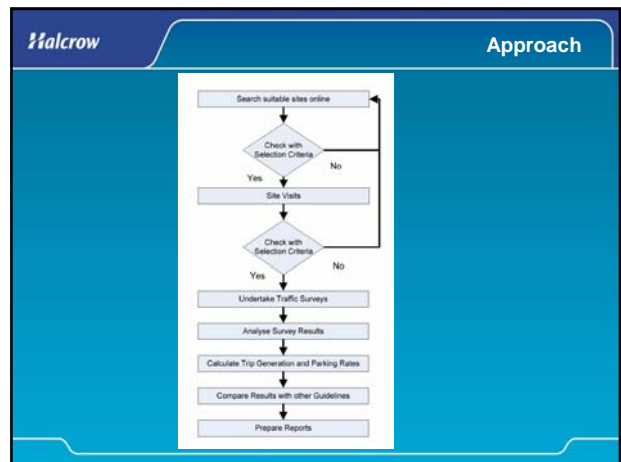
**Halcrow** New Uses (2)

**Bulky Goods** **Hardware**

**Halcrow** What Criteria For Search

Selection Criteria	Description
Out-of-centre (isolated)	The business is free-standing and has provided off-street parking for its own exclusive use.
Unconstrained parking	The provision of car parking satisfies peak daily demand and most seasonal demands
Ease for surveying	The number of entrances/exits are minimised and can easily be seen
Fairly recent construction	The building / business has opened within the last 15 years
Accessibility Score	This scoring system was developed by RTA to measure access to public transport. The chosen site should have scores less than 75 to indicate that sites are primarily dependent on cars rather than public transport.
No on-street parking	All residents, staff and visitors can park on site and can be recorded by traffic surveyors
Limited pedestrian access	Pedestrians may only enter the site at a few dedicated entrances.
Reasonable geographic spread	The sites are well distributed across the region.
A range of sizes	The sites should represent a range of sizes



- Halcrow** Data Recorded
- Parking – start and end to work out accumulation
  - Trips in & out – CARS & CV's
  - Vehicle occupancy
  - Number of pedestrian / cyclists
- Sample Interview Survey
- Travel mode of residents/visitors
  - Parked on-site or off-site
  - People's home postcode
  - Trip purpose such as pass by, multi purpose, single visit

- Halcrow** Data Required
- Weekday site peak hour generation
  - Weekday hourly generation in adjacent network AM peak
  - Weekday hourly generation in adjacent network PM peak
  - Weekday daily trip generation
  - Weekend site peak hour generation
  - Weekend peak hourly generation in adjacent network peak
  - Weekend daily trip generation



- Halcrow** Challenges - Housing For Seniors
1. Many Sites Under Construction
  2. Date of Opening defines Age Profile
  3. Hard to count the number of residents' vehicles. No accurate parking accumulation on the sites.



- Halcrow** Housing for Seniors - Key variables
- Site area / site density
  - Number of staff
  - Number of residents
  - Number of units

**Halcrow** Housing For Seniors

Table 2-1 Traffic Results Summary - Trips / Occupied Unit

Site ID	Sydney Metropolitan Area				Non-Metropolitan Area					
	S111	S112	S113	S114	S115	S116	S117	S118	S119	
No. of Occupied Units (Total)	205	78	264	174	214	240	71	70	38	81
<b>Weekdays</b>										
<b>Vehicle-based Trips</b>										
- Site Peak Hour	0.42	0.26	0.23	0.32	0.25	0.44	0.39	0.39	0.55	0.46
Trips/Unit										
- Network AM Peak	Network AM peak is outside of survey periods									
- Network PM Peak	0.36	0.06	0.05	0.24	0.17	0.23	0.31	0.23	0.03	0.33
Trips/Unit										
Daily Total Car Trips	2.85	1.22	1.33	1.64	1.37	2.85	1.96	2.09	1.66	2.52
Trips/Unit										
Daily Total CV Trips	0.04	0.13	0.11	0.15	0.18	0.25	0.18	0.09	0.32	0.08
Trips/Unit										
Daily Total Vehicle Trips	2.89	1.35	1.44	1.79	1.55	3.10	2.14	2.17	1.97	2.58
Trips/Unit										
% CV	1.3%	9.5%	7.8%	8.4%	11.4%	7.9%	8.3%	3.9%	16.0%	2.4%
<b>Weekend</b>										
<b>Vehicle-based Trips</b>										
- Site Peak Hour	0.10	0.19	0.21	0.26	0.23	0.35	0.29	0.29	0.29	0.41
Trips/Unit										
- Network Peak	0.04	0.14	0.17	0.17	0.14	0.33	0.06	0.26	0.16	0.33
Trips/Unit										
Daily Total Car Trips	0.46	1.22	1.27	1.39	1.25	1.30	1.10	0.93	1.53	1.62
Trips/Unit										
Daily Total CV Trips	0.05	0.03	0.08	0.04	0.07	0.01	0.00	0.00	0.05	0.04
Trips/Unit										
Daily Total Vehicle Trips	0.51	1.24	1.35	1.43	1.33	1.31	1.10	0.93	1.58	1.65
Trips/Unit										
% CV	9.8%	2.1%	6.2%	2.8%	5.0%	1.0%	0.0%	0.0%	3.2%	2.2%
CV - Commercial Vehicle										

**Halcrow** Housing For Seniors - Summary

**Trip Generation**

Units from 38 to 264  
 Weekday Site peak hour 0.23 - 0.55 vehicle trips per unit - average of 0.36  
 Weekday Daily trip rate 1.35 - 3.1 vehicle trips per unit - average of 2.04

**Parking**

Parking provision 0.45 - 2.32 spaces per unit - average of 1.07 spaces  
 Car ownership 0.35 - 1.04 cars per unit - average of 0.67  
 Parking provision exceeds demand on all of the sites  
 Higher car ownership on non-Metropolitan sites

**Halcrow** Comparisons with Other Worldwide Databases

(i) **New Zealand TDB**  
Retirement Homes – No retirement villages

(ii) **USA – ITE**  
Senior Housing attached  
Congregate Care Facility  
Assisted Living  
Continuing Care Retirement Community

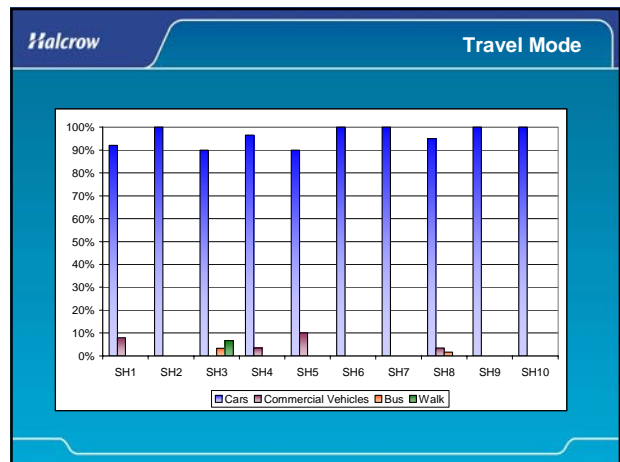
(iii) **UK – TRICS**  
Sheltered Housing  
Retirement Flats

**Halcrow** What Do the Guides Say – Trip Generation

	WEEKDAY		WEEKEND	
	Peak Hour Trip Generation	Daily Trip Generation	Peak Hour Trip Generation	Daily Trip Generation
	(Vehicle Trips per unit)		(Vehicle Trips per unit)	
RTA Guide	0.1 to 0.2	1 to 2	-	-
NZTPDB	-	3.04	-	-
ITE	0.16	3.48	-	-
TRICS	0.32	1.557	0.23*	1.37*
Study Results	0.36	2.04	0.25	1.21

**Halcrow** What Do the Other Guides Say - Parking

	Parking Provision / Demand
RTA Guide	0.67 spaces per unit + 1 space every 5 visitors PROVISION
NZTDB	0.37 spaces per unit DEMAND 0.58 parking spaces per unit PROVISION.
ITE	0.33 spaces per unit DEMAND 0.58 spaces per unit PROVISION
TRICS	0.54 spaces per unit PROVISION
2009 Survey	1.07 spaces per unit PROVISION



- Halcrow** Bulky Goods / Hardware
- Bulky Goods
- Furniture: FANTASTIC FURNITURE
  - Electrical Shops: HARVEY NORMAN
  - Bed Shops: FORTY WINKS
- Hardware
- Large DIY Shops: BUNNINGS
  - Smaller: MITRE 10

**Location of Sites**

Figure 2-1 Site Location - Sydney Metropolitan Area

Figure 2-2 Site Location - Non-Metropolitan Area

**Challenges**

1. Many Customers to Hardware stores come by Utes – Customer or Service Vehicle ?
2. New bulky goods are in homemaker centres Many similar uses under one roof
3. In Country towns, bulky goods in centre so shared car parking with other stores

**Key variable**

- Site area
- Number of staff
- Parking Space
- Gross Floor Area GFA

Hardware

**Hardware**

Table 3-2 Trips Rate Summary – Hardware/DIY

	Sydney Metropolitan Area HW1 to HW5			Non-Metropolitan Area HW6 to HW9			All Survey Sites HW1 to HW9			Avg Non-metro / Metro %
	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	
<b>Trips/ 100m<sup>2</sup> GFA</b>										
<b>Weekdays</b>										
<b>Person-based Trips</b>										
- Site Peak Hour	4.00	5.77	5.06	3.95	6.40	5.49	3.95	6.40	5.25	106.6%
- Vehicle Network AM Peak	0.65	2.72	2.01	1.28	4.75	2.97	0.65	4.75	2.43	147.9%
- Vehicle Network PM Peak	2.48	4.89	3.50	2.79	4.65	3.78	2.48	4.89	3.63	108.0%
Daily Total Person Trips	32.88	53.26	42.42	29.22	43.40	38.34	29.22	53.26	40.61	90.4%
<b>Vehicle-based Trips</b>										
- Site Peak Hour	3.15	4.67	4.03	2.74	5.60	4.41	2.74	5.60	4.20	109.6%
- Network AM Peak	0.60	2.22	1.68	1.09	3.88	2.50	0.60	3.88	2.05	148.7%
- Network PM Peak	2.05	3.56	2.70	1.99	3.80	3.03	1.99	3.80	2.85	112.5%
Daily Total LV Trips	25.21	38.25	30.59	20.66	35.90	30.30	20.66	38.25	30.46	99.0%
Daily Total HV Trips	0.99	6.17	2.40	0.69	2.25	1.49	0.69	6.17	2.00	62.0%
Daily Total Vehicle Trips	26.80	39.75	32.99	21.35	38.15	31.79	21.35	39.75	32.46	96.4%
Peak Parking Accumulation	0.78	1.67	1.16	1.05	1.90	1.48	0.78	1.90	1.30	127.8%

**Hardware - Summary**

Trip Generation

The survey GFA range from 1,600 to 14,111 square metres.

The weekday site peak hour trip rate varied from 2.74 to 5.6 vehicle trips per 100 sq m GFA with an average of 4.2 trips.

The weekday daily trip rate varied from 21.35 to 39.75 vehicle trips per 100 sq m GFA with an average of 32.46 trips.

Parking

Weekday peak parking demand was 0.78 to 1.9 spaces per 100 sq m GFA.

When comparing weekday v weekend data, all sites are busier at the weekend.

(i) New Zealand TDB

Hardware Store

(ii) USA – ITE

Building Materials & Lumber Store  
Hardware / Paint Store  
Home Improvement Superstore

(iii) UK – TRICS

DIY Superstore with Garden Centre  
DIY Superstore without Garden Centre  
Builders Merchant

Table 4-12 Summary Trip Generation Comparison - Hardware

Vehicle Trips per 100m <sup>2</sup> GFA	WEEKDAY			WEEKEND	
	Network AM Peak	Network PM Peak	Site Peak	Site Peak	Daily
RTA Guide	-	-	0.1-6.4	-	0.7-16.9
NZTDB	No Data Available				
ITE	1.2-2.0	2.6-5.2	3.6-6	4.9-12	56-99
TRICS	0.4-5.2	0-3.7	2.4-10.1	35-85	50-122
STUDY RESULTS	0.6-3.9	2-3.8	2.8-5.6	21-40	4.3-6.7

ITE data has been converted from spaces per sq ft to sq m. (1,000 square foot = 92.90304 square metres)

Table 4-6 Summary Comparison of Parking Rate - Hardware

(Spaces per 100m <sup>2</sup> GFA)	Parking Supply	Parking Demand
RTA Guide	N/A	0.3 - 5.1
NZTDB	N/A	2.5
ITE	2.6 - 7.2	1.2 - 5.1
TRICS	0.47 - 38	0.12 - 31
2009 Survey	1.5 - 5	1.04 - 2.81

ITE data has been converted from spaces per sq ft to sq m. (1,000 square foot = 92.90304 square metres)



Table 3-4 Traffic Results Summary – Bulky Goods

Site ID	Sydney Metropolitan Area			Non-Metropolitan Area		
	804	802	803	804	806	808
Gross floor area (m2)	4,300	14,849	600	6,629	1,200	1,700
<b>Weekdays</b>						
<b>Person-based Trips</b>						
f Site Peak Hour	104	531	42	150	94	61
Trips / 100m <sup>2</sup> GFA	2.42	3.58	7.00	2.84	7.83	3.59
<b>Vehicle Network AM Peak</b>						
Network AM peak is outside of opening hours						
<b>Vehicle Network PM Peak</b>						
f Vehicle Network PM Peak	57	301	Outside of	104	55	43
Trips / 100m <sup>2</sup> GFA	1.33	2.03	opening hrs	1.72	4.58	2.65
Daily Total Person Trips	683	3,169	218	1,315	509	326
Trips / 100m <sup>2</sup> GFA	15.88	21.04	36.33	21.81	49.92	19.41
<b>Vehicle-based Trips</b>						
f Site Peak Hour	61	232	35	118	57	35
Trips / 100m <sup>2</sup> GFA	1.42	1.56	4.33	1.95	4.75	2.06
<b>Network AM Peak</b>						
Network AM peak is outside of opening hours						
<b>Network PM Peak</b>						
f Network PM Peak	35	180	Outside of	70	27	13
Trips / 100m <sup>2</sup> GFA	0.81	1.21	opening hrs	1.16	2.25	1.12
Daily Total LV Trips	437	1743	133	898	319	170
Trips / 100m <sup>2</sup> GFA	10.16	11.74	22.17	14.89	26.56	10.00
Daily Total HV Trips	9	0	18	12	26	4
Trips / 100m <sup>2</sup> GFA	0.21	0.00	3.00	0.20	2.33	0.24
Daily Total Vehicle Trips	446	1743	151	910	347	174
Trips / 100m <sup>2</sup> GFA	10.37	11.74	25.17	15.09	28.92	11.66
% HV	2.0%	0.0%	11.5%	1.3%	6.1%	2.3%
Peak Parking Accumulation	28	133	19	41	24	7
Peak Parking / 100m <sup>2</sup> GFA	0.65	0.90	3.17	0.88	2.00	0.41

The range of surveys was 600 to 14,849 square metres.

Weekday site peak hour trip rate 1.42 to 4.75 vehicle trips per 100 sq m GFA with an average of 2.68 trips.

Weekday daily trip rate 10.37r - 28.92 vehicle trips per 100 sq m GFA with an average of 16.92 trips.

The non-metropolitan sites generally had higher trip rates than the metropolitan sites.

The weekday peak parking demand was between 0.41 and 3.17 spaces per 100 sq m GFA.

(i) New Zealand TDB

Bulky Goods Stores

(ii) USA – ITE

Electronics Superstore  
Discount Home Furnishing Superstore  
Furniture Store  
Carpet Store

(iii) UK – TRICS

Other individual non food superstore

Table 4-13 Summary Trip Generation Comparison – Bulky Goods

Vehicle Trips per 100m <sup>2</sup> GFA	WEEKDAY				WEEKEND	
	Network AM Peak	Network PM Peak	Site Peak	Daily	Site Peak	Daily
RTA Guide	-	-	0.1-6.4	-	0.7-16.9	-
NZTDB	No Data Available					
ITE	0.2-0.5	0.5-4.8	0.6-4.8	5.4-48.5	1-3.4	5-36
TRICS	0.1-0.4	0.6-3.2	0.8-10.3	23	1.5-13.7	27
STUDY RESULTS	-	0.8-2.3	1.4-4.8	10-29	2.2-6.2	11-34

ITE data has been converted from spaces per sq ft to sq m. (1,000 square foot = 92.90304 square metres)

Table 5-18 Summary Comparison of Parking Rate– Bulky Goods

(Spaces per 100m <sup>2</sup> GFA)	Parking Supply	Parking Demand
RTA Guide	N/A	0.3 - 5.1
NZTDB	2.1 - 5.53	0.91 - 5.94
ITE	2.3 - 2.5	0.7 - 3.3
TRICS	0.47 - .98	0.12 - .31
2009 Survey	1.5 - 5	1.04 - 2.81

ITE data has been converted from spaces per sq ft to sq m. (1,000 square foot = 92.90304 square metres)

UK transport policy - development now needs to take place in 'centres'

All but the smallest sites for a 'green travel plan' to be submitted and implemented in any development application. These plans generally set targets for reducing single occupancy car use.

Even 'edge of town' sites in the UK have some level of accessibility for non car modes

NZ & USA for out of town development - more comparable

1. Did we provide adequate data ?

More than enough ...possibly too much

2. Did we analyse the data and what did it reveal ?

Even though we tried to limit the variables, trip rates varied a lot for what appeared to be similar sites

My view is that it is more to do with catchment (particularly for hardware & bulky goods) than site characteristics

3. Comparison with other databases

NZ & USA – yes probably

UK – only for specific uses as car use is not so prevalent in UK