

eTHEKWINI MUNICIPAL WIDE HOUSEHOLD TRAVEL INTERVIEW SURVEY: TRAVEL BEHAVIOUR FINDINGS

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ABSTRACT

In the first paper presented earlier, eThekweni Municipal Wide Household Travel Interview Survey: Survey Methodology, the organisational structure of the project; the survey methodology and the experiences of the survey contractor were presented. This second paper, eThekweni Municipal Wide Household Travel Interview Survey: Travel Behaviour Findings, focuses on the survey results and some interpretation of these results.

This paper has been prepared based on the contents of the “eThekweni Municipal Wide Household Survey 2007 / 2008 Key Findings Report” and “Technical Report” both prepared by Delca Research under the guidance of the Aurecon project management team.

INTRODUCTION

All household members provided information on the trips that they had made on the weekday preceding the interview date. This generated trip information on all trips undertaken on a “typical weekday” between Monday and Thursday. Friday trips were excluded as travelling patterns on a Friday were deemed to be non-typical of an average weekday. No interviews were undertaken during school holidays or during times where it was known in advance that travel behaviour would be abnormal, for example during public transport strikes or major sporting events.

A typical weekday for most household members would include regular travel activities such as travelling to and from work and school and some less regular activities such as social, recreational and shopping trips. The interviewee was requested to provide travel information all household members. Household members who were not present during the interview were noted and the person trip was flagged as proxy data.

For the purposes of comparing travel patterns during the peak periods of travel activity to travel throughout the day the following peak travel periods were defined:

- AM peak period: 04:30 – 08:30
- PM peak period: 15:30 – 18:30

GENERAL PERSON VEHICULAR TRIPS

In this section the characteristics of vehicular trips only are examined in terms of both household and individual commuter behaviour. Trip generation rates are also presented.

Household trip profile

The following tables reveal that in 81% of households, one or more vehicular trips were made from the home on the travel day. 74% of households made one or more trips in the AM peak period dropping down to 58% in the PM peak period. This is consistent with the general results of traffic counts within the eThekweni Municipality.

Table 2.1.1 Percent of Households Making a Vehicular Trip by Race Group

Time Period	Black %	Asian %	Coloured %	White %	Total %
AM peak period	71.7	80.1	80.3	70.9	73.6
PM peak period	53.8	69.8	71.2	60.8	58.4
All Day	77.9	85.9	87.6	85.6	80.7

Tables 2.1.1 and 2.1.2 show that there is a significant reduction in peak period and daily vehicular travel activity of between 30% and 40% between the most affluent and least affluent households. The poorest households are less likely to have jobs or to have the financial resources to make vehicular trips at a frequency similar to those households that are financially secure.

Table 2.1.2 Percent of Households Making a Vehicular Trip by Income Group

Time Period	<R1600 %	R1600-R5000 %	>R5000 %	Total %
AM peak period	44.3	74.4	91.0	73.6
PM peak period	22.3	60.2	69.4	58.4
All Day	55.8	82.4	95.1	80.7

Person trip profile

Tables 2.2.1 and 2.2.2 below present the differences in the level of vehicular travel for individual household members by race group and income category.

On average, 40% of household members made a vehicular trip on the travel day. With a population estimated at 3.2 million residents this equates to 1.3 million vehicular trips per travel day.

Generally, scholars travel during the AM peak period but in the afternoon most scholars begin travelling before the PM peak period and therefore scholar travel during the PM peak period is noticeably lower at 22% compared to the 36% during the AM peak period.

Table 2.2.1 Percent of Persons Making a Trip by Race Group

Time Period	Black %	Asian %	Coloured %	White %	All Race Groups %
AM peak period	32.1	42.1	42.6	54.2	36.1
PM peak period	17.8	29.0	26.8	35.5	21.7
All Day	35.7	46.8	47.3	64.1	40.4

Table 2.2.2 Percent of Persons Making a Trip by Income Group

Time Period	<R1600 %	R1600-R5000 %	>R5000 %	All Income Groups %
AM peak period	18.9	30.5	49.2	36.1
PM peak period	7.5	18.9	31.4	21.7
All Day	23.9	34.8	53.6	40.0

In the lowest household income group, the incidence of vehicular travel is substantially lower than amongst those who are financially secure.

Trip generation rate

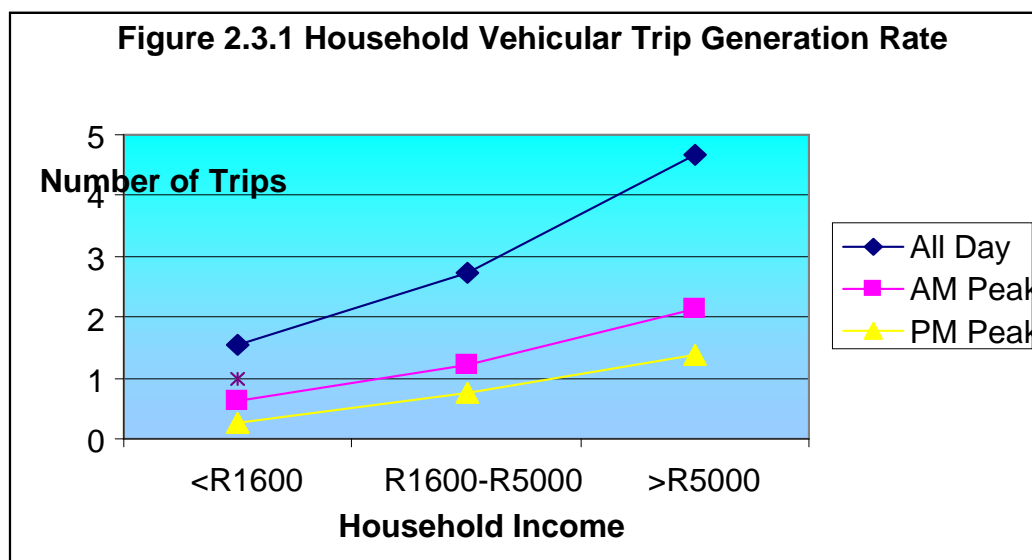
As an important aim of the survey was to collect information for travel forecasting purposes, in this section vehicle trip generation rates are presented by race group, household income and dwelling type in Tables 5, 6 and 7 below.

2.1.1. Household Vehicle Trip Generation Rate by Race Group

Time Period	Black	Asian	Coloured	White	All Races
Rate/household – all day	3.0	3.6	3.8	3.6	3.2
Rate/household – AM peak	1.3	1.6	1.7	1.5	1.4
Rate/household – PM peak	0.7	1.1	1.1	1.0	0.9
Rate/capita – all day	0.71	0.95	0.95	1.31	0.81
Rate/capita – AM peak	0.32	0.43	0.43	0.56	0.37
Rate/capita – PM peak	0.18	0.29	0.27	0.36	0.22

2.1.2. Daily Household Vehicle Trip Generation Rate by Income Group

Time Period	<R1600	R1600-R5000	>R5000	All Income Groups
Rate/household – all day	1.53	2.73	4.67	2.90
Rate/household – AM peak	0.61	1.21	2.15	1.29
Rate/household – PM peak	0.25	0.75	1.37	0.77
Rate/capita – all day	0.47	0.69	1.08	0.75
Rate/capita – AM peak	0.19	0.31	0.50	0.34
Rate/capita – PM peak	0.08	0.19	0.32	0.20



As depicted in Figure 2.3.1 there is a clear curvilinear relationship between vehicular trip generation and monthly household income.

2.1.3. Vehicle Trip Generation Rate by Dwelling Type

Dwelling Type	Rate/day	Rate/AM Peak	Rate/PM Peak
Formal	3.6	1.6	0.9
Hut of traditional materials	1.9	0.9	0.5
Flat in block of flats	2.6	1.2	0.8
Townhouse/cluster development	3.3	1.5	1.0
Second dwelling in backyard	2.2	1.0	0.6
Informal dwelling in backyard	2.5	1.1	0.6
Informal dwelling in shack settlement	2.4	1.0	0.6
All Dwelling Types	3.2	1.4	0.9

As expected, formal dwellings and townhouses have the highest trip generation rates and informal dwellings, second dwelling in backyard and huts of traditional materials have the lowest trip generation rates.

WALK TRIPS

In this section the characteristics of walk trips are examined in terms of both household and individual commuter behaviour. The incidence of household walk trips is presented in Tables 3.1 and 3.2 below by race group and monthly household income.

On average, 32% of households made at least one walk trip on the travel day. There are major differences in the incidence of household walk trips between race groups. Only 8% of White households made one or more walk trips during the travel day compared to 41% of Black households. There are also significant differences evident between the income sectors where twice as many of the poorest households made walk trips compared to the most affluent group.

Table 3.1 Percent of Persons Making a Walk Trip by Race Group

Time Period	Black %	Asian %	Coloured %	White %	Total %
AM Peak	17.2	6.8	8.6	2.7	13.7
PM Peak	2.0	0.8	1.0	0.9	1.7
All Day	17.9	7.5	9.5	3.8	14.5

Table 3.2 Percent of Persons Making a Walk Trip by Income Group

Time Period	<R1600 %	R1600-R5000 %	>R5000 %	Total %
AM Peak	21.2	15.4	7.8	13.7
PM Peak	2.0	1.9	1.3	1.7
All Day	22.2	16.1	8.5	14.5

In total on the travel day 14% of persons made a walk trip which equates to approximately half a million walk trips on a typical travel day. Only 4% of Whites made a trip on foot compared to 8% of Asians and 18% of Black commuters. Walk trips in the evening peak period have only an incidence of 2% compared to the morning peak where the incidence is 14%. This drop in walk trips during the PM peak period is attributed to walkers who shop in the afternoon on their way home that prefer the convenience of public transport. Further, as sunset approaches commuters are generally concerned with safety and security issues associated with walking. Commuters with limited budgets for transport would generally walk for morning home to work trip than the afternoon work to home trip.

TRAIN TRIPS

Tables 4.1 and 4.2 illustrate that the use of rail is very limited in the eThekweni area with just over 5% of households making one or more trips by train on a travel day. Just under 10% of Black households have an incidence of rail usage. The use of rail is however more common amongst the middle income households which could be attributed to the relatively efficient rail service between Chatsworth and the city centre for example.

Train trip generation rates are highest amongst households resident in informal shack settlements and blocks of flats. This is due to the high usage of train in KwaMashu A where there is a high density of hostel and shack dwellers.

Table 4.1 Percent of Households Making a Train Trip by Race Group

Time Period	Black %	Asian %	Coloured %	White %	Total %
AM Peak	8.2	0.7	0.3	0.3	5.5
PM Peak	6.2	0.5	0.3	0.2	4.2
All Day	9.3	0.9	0.3	0.3	6.3

Table 4.2 Percent of Households Making a Train Trip by Income Group

Time Period	<R1600 %	R1600-R5000 %	>R5000 %	Total %
AM Peak	4.1	8.3	4.0	5.5
PM Peak	2.2	7.2	2.9	4.2
All Day	4.7	9.5	4.5	6.3

MODAL SPLIT

For reporting purposes travel mode has been categorised into three primary modes:

- Trips using public transport;
- Trips using private transport;
- Walk / cycle trips.

Table 5.1 and Table 5.2 show the primary mode of travel by race group for both peak period trips and all trips on a travel day. Although public transport is the primary mode overall, there are major differences in travel mode across the race groups. Use of public transport dominates amongst Black commuters followed by walk / cycle trips whereas for the other race groups private transport is the dominant mode with far less reliance on walk trips. Whites rely almost solely on private transport with only about 10% of trips being undertaken on foot or using public transport.

Table 5.1 Modal Split by Race Group – All Trips

Mode	Black %	Asian %	Coloured %	White %	Total %
Private Transport	14.6	64.0	57.9	89.8	33.2
Public Transport	52.0	22.5	25.9	4.8	40.7
Walk/Cycle	33.4	13.5	16.3	5.4	26.1
Total	100.0	100.0	100.0	100.0	100.0

Table 5.2 Modal Split by Race Group – AM and PM Peak Period Trips

Mode	Black %	Asian %	Coloured %	White %	Total %
Private Transport	15.1	67.3	60.9	91.7	35.6
Public Transport	57.0	22.9	26.7	4.3	43.4
Walk/Cycle	27.8	9.7	12.4	4.0	21.0
Total	100.0	100.0	100.0	100.0	100.0

Table 5.3 Modal Split by Race Group – All Work Trips

Mode	Black %	Asian %	Coloured %	White %	Total %
Private Transport	19.1	73.8	67.5	93.2	43.3
Public Transport	73.0	23.4	29.2	4.1	50.9
Walk/Cycle	7.9	2.8	3.3	2.7	5.8
Total	100.0	100.0	100.0	100.0	100.0

Table 5.3 above shows the breakdown of mode used for work trips.

The percentage of motorised trips to work by public transport averages at 51% for the eThekweni population as a whole this compared to the results of the NHTS which gave an average of 52% for the whole of the RSA. There is a glaring racial disparity in the use of public transport for work related trips where only 4% of trips made by Whites use public transport compared to 73% of trips of Black commuters.

It is clearly evident that household income directly influences commuters' choice of travel mode. Looking at all trips made on the travel day, 13% of commuters from the most affluent households travel on foot. This rises to 32% amongst commuters earning between R1600 and R5000 per month and rises to almost 50% amongst the poorest households with a household income not exceeding R1600 per month.

Table 5.4 Modal Split by Income Group – All Trips

Mode	<R1600 %	R1600-R5000 %	>R5000 %	Total %
Private Transport	7.8	16.8	49.2	27.1
Public Transport	43.7	51.6	37.5	44.3
Walk/cycle	48.4	31.6	13.4	28.6
Total	100.0	100.0	100.0	100.0

Modal choice is also influenced by affordability. In Table 5.5, it is evident that more than 85% of commuters in more rural areas walk or use public transport.

Table 5.5 Modal Split by Dwelling Type – Work Trips

Dwelling Type	Transport Mode			
	Private Transport %	Public Transport %	Walk/cycle %	Total %
Formal dwelling on a separate stand	46.7	49.3	4.0	100.0
Hut made of traditional materials	13.5	77.0	9.5	100.0
Flat or apartment in a block of flats	38.9	50.8	10.3	100.0
Town/cluster/semi-detached house	68.2	28.6	3.2	100.0
2nd dwelling in yard/plot	35.8	40.1	24.1	100.0
Informal dwelling/shack in backyard	4.2	89.2	6.6	100.0
Informal dwelling/shack not in backyard	8	76.1	15.9	100.0
All Dwelling Types	42.6	51.5	5.9	100.0

TRIP PURPOSE

The questionnaire elicited the main reason each trip was made by the household member for the travel day. Tables 17, 18 and 19 indicate the main reasons for undertaking weekday trips. Overall and in the morning peak period the major destinations were work or to attend educational institutions accounting for almost 90% of the trips.

Table 6.1 Trip Purpose by Race- All Trips

Trip Purpose	Black %	Asian %	Coloured %	White %	Total %
Home	1.2	0.9	2.0	0.5	1.1
Work	39.2	58.3	51.4	53.5	44.7
Firm's business	0.2	0.2	0.3	1.0	0.3
School or college	51.7	30.7	37.7	27.1	44.7
Serve a passenger	0.1	1.5	1.3	3.8	0.8
Shopping	3.1	4.2	4.4	9.3	3.9
Social/recreational	1.0	1.5	0.9	2.3	1.3
Looking for work	1.4	0.3	0.4	0.1	1.1
Medical purposes	1.0	1.4	0.5	1.0	1.1
Other	1.0	0.9	1.1	1.4	1.0
Total	100.0	100.0	100.0	100.0	100.0

Table 6.2 Trip Purpose by Race - AM Peak Period Trips

Trip Purpose	Black %	Asian %	Coloured %	White %	Total %
Home	1.1	0.8	2.0	0.5	1.0
Work	39.6	61.2	53.8	60.6	46.1
Firm's business	0.2	0.2	0.1	0.8	0.2
School or college	55.0	33.3	41.0	31.4	48.2
Serve a passenger	0.1	1.3	1.1	3.5	0.7
Shopping	0.9	1.0	0.6	1.0	0.9
Social/recreational	0.4	0.5	0.5	1.2	0.5
Looking for work	1.3	0.3	0.1	0.0	1.0
Medical purposes	0.8	0.9	0.2	0.3	0.8
Other	0.5	0.4	0.5	0.7	0.5
Total	100.0	100.0	100.0	100.0	100.0

The incidence of trips to work was highest amongst Whites and lowest amongst Blacks.

Table 6.3 shows that in the PM peak period trips back home accounted for over 95% of all trips made.

Table 6.3 Trip Purpose by Race - PM Peak Period Trips

Trip Purpose	Black %	Asian %	Coloured %	White %	Total %
Home	96.2	97.0	93.3	96.9	96.4
Work	2.9	1.3	3.5	1.1	2.2
Firm's Business	0.0	0.1	0.0	0.1	0.0
School or college	0.2	0.1	0.0	0.1	0.2
Serve a passenger	0.1	0.4	0.3	0.6	0.2
Shopping	0.3	0.3	1.7	0.6	0.4
Social/recreational	0.2	0.4	0.9	0.6	0.3
Other	0.2	0.3	0.3	0.1	0.2
Medical purposes	0.0	0.1	0.0	0.0	0.0
Total	100.0	100.0	100.0	100.0	100.0

Table 6.4 shows that the main reasons for travel in the morning peak were to go to work or to attend educational institutions. The importance of the educational trips amongst the poorest sector is apparent where over 70% of AM peak period trips are to educational centres. This also confirms that unemployment is highest amongst the poorest sector.

Table 6.4 Trip Purpose by Income Group - AM Peak Period Trips

Trip Purpose	<R1600 %	R1600-R5000 %	>R5000 %	Total %
Home	0.5	1.6	2.1	1.6
Work	18.7	43.1	58.2	43.4
Firm's Business	0.1	0.1	0.4	0.2
School or college	71.1	50.7	36.8	49.9
Serve a passenger	0.1	0.3	0.6	0.4
Shopping	2.1	1.0	0.5	1.1
Social/recreational	1.2	0.6	0.3	0.6
Looking for work	3.3	1.0	0.3	1.2
Medical purposes	1.9	1.0	0.4	1.0
Other	1.1	0.5	0.4	0.6
Total	100.0	100.0	100.0	100.0

Table 6.5 shows that virtually all trips in the PM peak period are trips returning home.

Table 6.5 Trip Purpose by Income Group - PM Peak Period Trips

Trip Purpose	<R1600 %	R1600-R5000 %	>R5000 %	Total %
Home	95.8	95.9	96.5	96.2
Work	1.0	2.6	2.3	2.3
Firm's Business	0.0	0.0	0.1	0.0
School or college	0.4	0.2	0.2	0.2
Serve a passenger	0.0	0.2	0.2	0.2
Shopping	1.3	0.3	0.3	0.4
Social/recreational	1.2	0.3	0.3	0.4
Medical purposes	0.0	0.1	0.0	0.1
Other	0.3	0.2	0.1	0.2
Total	100.0	100.0	100.0	100.0

TRAVEL TIME

This section of the report examines the door-to-door travel time between trip origin and destination. Table 7.1 shows that the average travel time in minutes for all vehicular trips undertaken throughout the day as well as during the morning and afternoon peak hours by race group.

Table 7.1 Average Travel Time by Race Group

Race Group	All Trips	AM Peak Trips	PM Peak Trips
Black	56.1	52.0	61.7
Asian	39.6	38.3	44.8
Coloured	36.9	35.1	40.6
White	30.2	30.2	34.9
All Races	48.3	45.3	53.2

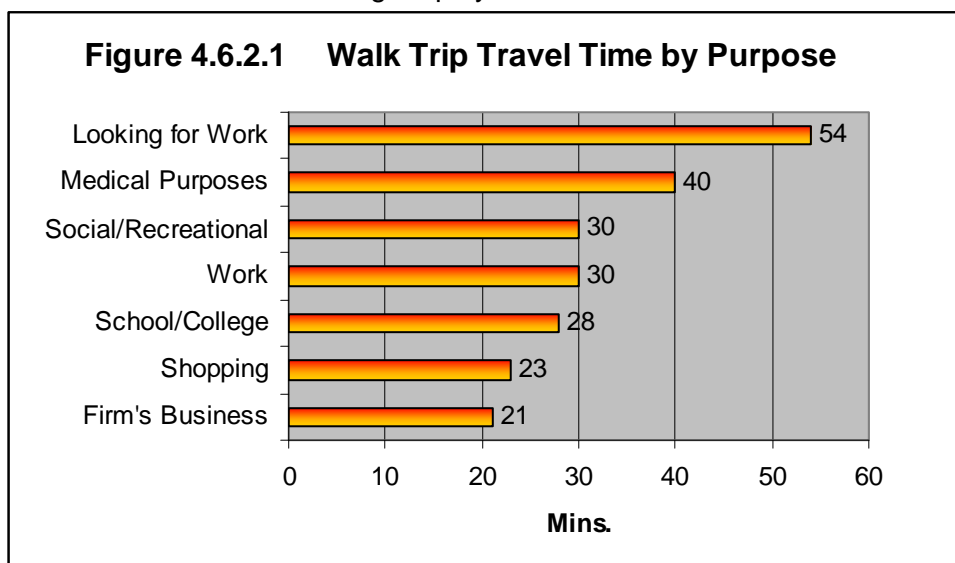
Black commuters on average travel for close to an hour. Travel times for Whites on the other hand who rely little on public transport average about half an hour. As Table 7.2 illustrates travel times to work show a similar pattern.

Table 7.2 Average Travel Time for Work Trips by Race Group

Race Group	All Trips	AM Peak Trips	PM Peak Trips
Black	59.5	54.2	63.2
Asian	43.5	42.1	46.3
Coloured	39.7	37.8	42.0
White	34.7	33.6	36.9
All Races	51.7	47.5	54.8

The 2003 NHTS results gave an average travel time to work of 48 minutes for Black commuters and 30 minutes for White commuters. The results of this survey gave an average travel time to work of 60 minutes for Black commuters and 35 minutes for White commuters in eThekweni.

Figure 4.6.2.1 (extracted from Delca Research’s Key Findings report) highlights the difference in travel times for walk trips by trip purpose. Walk trips to both educational and employment centres average about 30 minutes. Not unexpectedly walk trips by those seeking employment exceeded other trips in terms of travel time. These persons are likely to walk from one employment prospect to the next in the course of their seeking employment.



PUBLIC TRANSPORT COSTS

Tables 8.1 and 8.2 below show the average monthly household expenditure on public transport by race, income, car availability and dwelling type.

Table 8.1 Average Public Transport Costs

Race	Cost/month Rand	Income	Cost/month Rand	Car Availability	Cost/month Rand
Black	475.4	Less R1600/month	239.7	Yes	264.6
Asian	297.1	R1600 – R5000/month	414.5	No	457.7
Coloured	312.5	More than R5000/month	479.0		
White	51.9				
All Races	386.8	All Income Groups	386.8	Both	386.8

Table 8.2 Average Public Transport Cost by Dwelling Type

Dwelling Type	Cost/month Rand
Formal	429.6
Hut of traditional materials	350.0
Flat in block of flats	261.4
Townhouse/cluster development	262.8
Second dwelling in backyard	399.4
Informal dwelling in backyard	472.1
Informal dwelling in shack settlement	366.2
All Dwelling Types	386.8

The following points are noteworthy:

- The average cost for all public transport users is R387 per month;
- The poorer the household the greater the proportion of their income spent on public transport; and
- On average, Black households spend almost ten times as much on public transport as White households.

CONCLUDING REMARKS

The results of the eThekweni Household Travel Survey 2007/8 once disaggregated into race and income group were by and large predictable and no major discrepancies were identified. Where an unusual result was identified, for example, high use by the middle income group of rail for work trips, more detailed investigation revealed a logical explanation.

The survey has achieved its objectives of producing reliable and statistically sound data and information that can be used with confidence for the purpose of transportation planning and other transportation based investigations and evaluations. The database also contains a wealth of demographic and other information which can be analysed from a multiple of perspectives depending on the objectives of the end user. It should however be noted that the sample size and distribution thereof has been designed specifically for transportation planning purposes, and it should therefore be cautiously used for other purposes.

The sample itself has limitations even within transportation planning as it was developed to yield statistically representative data for sixty two survey areas and not the 338 traffic zones. It is not suitable, for example, for micro-transportation planning where accurate information at a much localised level is required.