

## HOUSEHOLD AND WORKPLACE MOBILITY: IMPLICATIONS FOR TRAVEL

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For traditional 4-step transport models, such as the *Sydney Strategic Transport Model* (STM), land use data is a key input to transport scenario testing and travel demand forecasting. However these models cannot be used to determine the effects of potential transport infrastructure changes on future land use. They have no explicit feedback from the transport outcomes back to the land use which would help answer the question “If we build this transport infrastructure here, how would the future land use change as a result?”.

Data on the way in which residents and businesses make choices about where to locate, what motivates these decisions and the role of proximity to transport, would inform our understanding of one aspect of the influence of transport changes on land use processes. This would enhance our ability to incorporate these effects more directly into travel models and improve the assessment of different transport infrastructure, service and policy alternatives.

This paper reports on preliminary analysis of the 2008 NSW State Supplementary Survey (SSS) conducted by the Australian Bureau of Statistics (ABS) on the topic of *Household and workplace mobility and the implications for travel*. The survey collected information on the household and workplace mobility of a sample of NSW residents, their reasons for the choice of location and a range of other characteristics.

### 1.0 INTRODUCTION

There has been growing emphasis on the importance of integrated land use and transport planning over recent decades and a considerable literature explores different aspects of the interaction between urban form and travel patterns. Much of this work explores ways of improving the integration of land use and transport models.

The Transport Data Centre, within the NSW Ministry of Transport, runs the Strategic Travel Model (STM). The STM is used to evaluate and plan future transport for the Sydney's Greater Metropolitan Area. The STM is a traditional 4-step travel model which forecasts demand for transport under alternative land use and transport assumptions. For an overview of the STM see TDC (2001).

A key input to this process is small area population and employment estimates for current and future years. Although alternative options for the growth and spatial distribution of people and jobs can be tested in the STM, adjustments to the land use data are made independently of the transport model. They are not factored into the model process to provide feedback to the land use component.

In order to more explicitly model the land use – transport interaction, we need to answer the question ‘will residents and businesses move to locations where new transport infrastructure is built or significant service or capacity changes are made?’

Evidence from household surveys and the census provide revealed preference data on where people with different characteristics live and work and their patterns of residential mobility. According to the ABS, over the past twenty years, about 16% of the Australian population has moved house each year and about 40% moved every 5 years (ABS 2009 Migration Australia 2007-2008).

However this data cannot tell us how people make decisions about where to locate, what factors they take into consideration and whether accessibility generally or transport more particularly, factor in this process.

These attitudinal questions have been explored in a number of one-off ABS surveys on housing choice and population mobility conducted in Western Australia (ABS 1999 and 2005), Queensland (ABS 2005), NSW (ABS 2004) and Victoria in (ABS 1999). These reveal that the desire to move to a better house or better location is the most important factor in the decision to move and the choice of new dwelling.

An opportunity to update this information for NSW arose when the Australian Bureau of Statistics consulted the NSW Government about topic proposals for the 2008 State Supplementary Survey (SSS). The Ministry of Transport's proposal on *Residential and Job location and the Implications for Travel* was the successful topic for 2008. This paper describes the survey and outlines some of the preliminary results.

A description of the survey method follows in Section 2.0, the results are presented in Section 3.0 and Section 4.0 presents the conclusion.

## 2.0 SURVEY METHOD

Each year the Australian Bureau of Statistics (ABS) offers to undertake a household survey, free of charge, on behalf of the state and territory governments. Topics are submitted by government agencies based on current policy concerns and they are evaluated according to their appropriateness to the survey vehicle.

The survey is run as a supplement to the ABS Monthly Population Survey (MPS), which is designed to track population and employment change and is the source of the official employment and unemployment statistics. The 'SSS' is a particularly powerful tool because it is based on an established survey and benefits from the considerable experience and reputation of the Bureau of Statistics. The survey has a relatively large sample and high response rates and is conducted under the authority of the *Census and Statistics Act 1905*.

The method does however place some constraints on the number and type of questions that can be asked. This is partly why there is such a long lead time for survey development, field testing and refinement, with consideration of topics starting in August of the year prior to the survey. A number of these methodological issues are outlined in Section 2.3

### 2.1 Survey populations

The in-scope survey population for this survey was all persons in NSW aged 18 years and over. In all 7,619 people were interviewed and the survey response rate was 93%. Output data is weighted to the official population estimates. The survey asked questions of the following sub-populations:

- All persons resident in occupied private dwellings and aged 18 years and over
- Persons who moved house
- Employed persons
- Employed persons with a fixed place of work
- Employed persons with a fixed place of work who changed job location

## 2.2 Survey content

The main focus of the survey was to ask:

- whether the person moved house or job location in last 3 years,
- the location (suburb) of the current and previous residence and job,
- household tenure before and after moving
- reasons for moving house and changing job location and
- for workers, the mode of travel to work before and after moving.

Standard demographic information was collected on; age, sex, tenure, household type, dwelling structure and vehicle ownership and the variables collected in the main MPS are also available for output together with the SSS variables. In addition, TDC created distance matrices which ABS could apply to the unit record data to derive distance estimates.

## 2.3 Methodological issues

**Sample size:** although the MPS has a robust sample for state level estimates, it poses limits on the reliability of detailed geographic and variable breakdowns. The sample size is reduced where sub populations are involved e.g. employed people who changed job location;

**Confidentiality:** related to sample size, data output is constrained if there is any risk of identifying individuals and no record data is available. ABS can however undertake analysis of unit record data on behalf of clients and provide aggregated output which is non-identifying;

**ARA method:** one person (Any Responsible Adult) is selected to answer questions on behalf of their household, so questions must be restricted to things they could be expected to know about a fellow householder's behaviour, previous experience or opinions;

**Interview time:** interviewers have on average no more than 17 minutes per household to complete the LFS and SSS, including post survey clerical checking time;

**Person or household basis:** as the 2008 NSW SSS collected data was on a person basis, questions about previous household characteristics could be different for different household members;

**Sample rotation:** the MPS has a rotating sample of households which are in the survey for 8 months. SSS questions are not asked of households in their final month;

**Question type:** some attitudinal questions, contentious topics and complicated issues that take a long time to consider and respond to may not be considered appropriate;

The in-scope population for the MPS is residents of private dwellings who are members of the civilian (non-military) population plus a sub-sample of non-private dwellings. These non-private dwellings are not included in the SSS.

## 3.0 SURVEY RESULTS

This section summarises the survey populations and rates of moving, then outlines the characteristics of those who moved house followed by those who changed job location and the reasons given for moving. The data summarised comes from tables available for download from the ABS website (ABS 2009) as well as customised tables purchased from ABS (ABS 2009).

### 3.1 Summary of survey populations

The survey collected information for usual residents of NSW aged 18 years and over. This is the population for which information on house moving is available. Questions about change of job location were only asked for employed persons who had a fixed work address (other than home). Table 1 shows the distribution of the survey populations across the state, with about two thirds residing in metropolitan Sydney<sup>1</sup>.

According to the survey, about 1,560.6 million people, or 30% of the NSW population aged 18 years and over, moved house in the previous 3 years. This includes those who moved within the same suburb. Residents of the Sydney Region had slightly higher rates of moving (31%) than those in the balance of NSW (28%).

**Table 1: Survey populations (weighted) by place of usual residence ('000)**

	Sydney		Rest of NSW		Total NSW	
	No.	%	No.	%	No.	%
<b>Whether moved</b>						
Moved house	1,035.5	31%	525.1	28%	1,560.6	30%
Didn't move	2,298.4	69%	1,371.2	72%	3,669.6	70%
Total persons 18 years +	3,333.9	100%	1,896.3	100%	5,230.2	100%
<b>Employment status</b>						
Not employed <sup>2</sup>	1,183.8	35.5%	762.6	40.2%	1,946.3	37.2%
Employed	2,150.1	64.5%	1,133.8	59.8%	3,283.9	62.8%
Total persons 18 years +	3,333.9	100%	1,896.3	100%	5,230.2	100%
<b>Employment location</b>						
Fixed place of work	1,850.8	86.1%	954.9	84.2%	2,805.7	85.4%
No fixed work address	155.4	7.2%	64.1	5.7%	219.5	6.7%
Works at home	144.0	6.7%	114.8	10.1%	258.8	7.9%
Total employed	2,150.1	100%	1,133.8	100%	3,283.9	100%

As the concept of changing job location and the effect on travel to work only makes sense if a person usually travels to the same place of work, the population of workers for whom a change of job location was considered relevant excludes those with no fixed place of work and those who worked at home. The incidence of workers changing job location was similar to that for residents moving house, with mobility a little higher in Sydney than the rest of the state (Table 2).

**Table 2: Persons ('000) who changed job location by place of residence**

	Sydney		Rest of NSW		NSW Total	
Changed job location	565.7	31%	239.6	25%	805.3	29%
Did not change job location	1,285.1	69%	715.3	75%	2,000.4	71%
Travel to fixed place of work	1,850.8	100%	954.9	100%	2,805.70	100%
<b>Total employed</b>	<b>2150.1</b>		<b>1,133.80</b>		<b>3,283.90</b>	

<sup>1</sup> Sydney refers to Sydney Major Statistical Region (MSR) - the equivalent of Sydney Statistical Division

<sup>2</sup> Not employed: unemployed or not in the labour force as they are too young, retired or keeping house.

Of the 805,300 people in NSW who changed their job location, 407,200 also moved house. Table 3 shows this most mobile group in a number of ways; as a proportion of workers who did or didn't move house (row percentages), as a proportion of workers who did or didn't move job location (row percentages) and finally as a proportion of all employed persons with a fixed place of work.

It shows that 41.4% of employed persons who moved house also moved job, while only 22% of those who didn't move house, changed their moved job location. Half of those who moved job location also moved house and half didn't. This suggests that for workers, moving job location is associated with moving house more than moving house is associated with changing place of work.

**Table 3: Workers who changed job location and moved house, NSW ('000)**

	Moved House	Didn't move house	Total workers
Changed job location	407.2	398.1	805.3
Did not change job location	571.8	1,420.9	1,992.7
Not known	5.1	2.7	7.7
Employed (fixed workplace)	<b>984.0</b>	1,821.6	2,805.7
Changed job location	<b>41.4%</b>	21.9%	28.7%
Did not change job location	<b>58.1%</b>	78.0%	71.0%
Employed (fixed workplace)	<b>100.0%</b>	100.0%	100.0%
Changed job location	<b>50.6%</b>	<b>49.4%</b>	<b>100.0%</b>
Did not change job location	28.7%	71.3%	100.0%
Employed (fixed workplace)	35.1%	64.9%	100.0%
Changed job location	<b>14.5%</b>	14.2%	28.7%
Did not change job location	20.4%	50.6%	71.0%
Employed (fixed workplace)	35.1%	64.9%	<b>100.0%</b>

### 3.2 Characteristics of house movers

#### 3.2.1 Socio-demographic characteristics of house movers

While data was collected for all of NSW, the main focus of interest for TDC is the Greater Metropolitan Area as this is the area covered by the STM so the following analysis is for residents of Sydney unless otherwise stated. Table 4 presents the main socio-demographic characteristics of those who moved house in the last 3 years. The main demographic characteristics which distinguished movers and non-movers were age, household type, tenancy, dwelling structure and residing in inner metropolitan suburbs. Movers made up:

- 58% of those whose tenure type was 'renting'
- 51% of those aged 18–34 years
- 51% of those living in a flat, unit or apartment
- 46% of 'other households' (group, extended and multiple family households)
- 46% of the unemployed (based on a very small count)
- 47% of those living in Inner Sydney
- 43% of those living in Eastern Suburbs
- 37% of those living in Lower Northern Sydney

Many of these characteristics are correlated of course, as young adults are more likely to be renting and living in medium density housing and close to their place of study. Place of birth and gender did not strongly influence the tendency to move.

Respondents were asked about how often they had moved in the previous 3 years. Within Sydney 69% had lived in their current residence for at least 3 years, 7% for one to two years and 14% had been there for less than a year. 81% of respondents were living in households in which all household members had been living together over the previous 3 years.

**Table 4: Proportion of people who moved for selected characteristics**

Demographic Characteristics		Moved house	Did not move house	Total
<b>Age group</b>	18–34 years	51%	49%	100%
	35–54 years	29%	71%	100%
	55 years and over	12%	88%	100%
<b>Sex</b>	Male	31%	69%	100%
	Female	31%	69%	100%
<b>Country of birth</b>	Australia	30%	70%	100%
	Main English-speaking	36%	64%	100%
	Other countries	32%	68%	100%
<b>Employment</b>	Not in the Labour Force	22%	78%	100%
	Employed	35%	65%	100%
	Unemployed	46%	54%	100%
<b>Education</b>	In full-time education	42%	58%	100%
	Not at full-time education	48%	52%	100%
<b>Tenure</b>	Own outright	10%	90%	100%
	Owner with mortgage	27%	73%	100%
	Renter	58%	42%	100%
<b>Household</b>	Couple with children	25%	75%	100%
	Person living alone	27%	73%	100%
	Couple only	31%	69%	100%
	Lone parent	36%	64%	100%
	Other households	46%	54%	100%
<b>Dwelling</b>	Separate house	23%	77%	100%
	Semi, row, terrace, etc.	42%	58%	100%
	Flat/unit/apartment	51%	49%	100%
<b>Location</b>	Inner Sydney	47%	53%	100%
	Eastern Suburbs	43%	57%	100%
	Lower Northern Sydney	37%	63%	100%
	Central Western Sydney	33%	67%	100%
	Northern Beaches	33%	67%	100%
	Gosford-Wyong	30%	70%	100%
	North Western Sydney	29%	71%	100%
	Outer South Western Sydney	29%	71%	100%
	Central Northern Sydney	27%	73%	100%
	Inner Western Sydney	26%	74%	100%
	St George-Sutherland	26%	74%	100%
	Fairfield-Liverpool	25%	75%	100%
	Canterbury-Bankstown	24%	76%	100%
<b>Sydney MSR total</b>		<b>31%</b>	<b>69%</b>	<b>100%</b>

The majority of moves were local; with half of those who moved house either staying within the same suburb or within 5km of their previous suburb of residence. A further 14% moved over 50km and another 10% came from another interstate or overseas (Table 5).

The difference between NSW and Sydney for moves within suburbs is probably an artefact of urban densities and the smaller average size of suburbs in the metropolitan area.

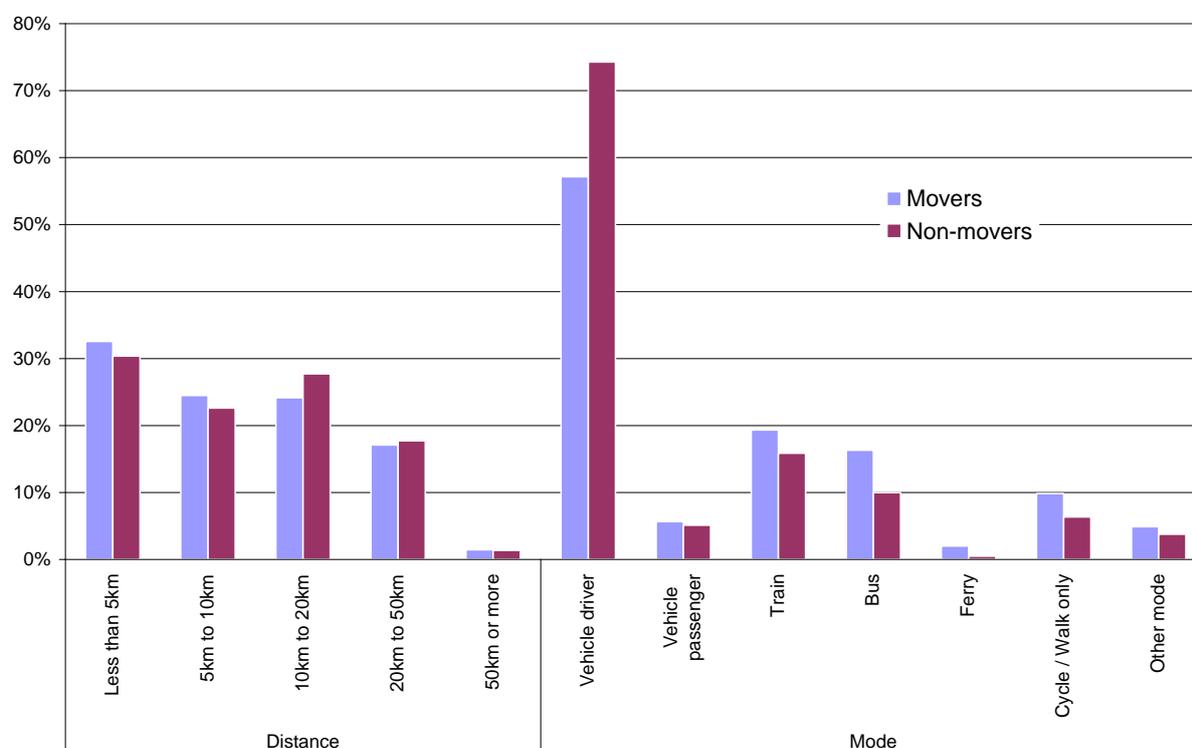
**Table 5: Proportion of movers by distance moved for NSW and Sydney**

Type of Move	NSW	Sydney
Moved within suburb	29%	19%
Different suburb: less than 5km	20%	29%
Different suburb: 5km to less than 20km	21%	27%
Different suburb: 20km to less than 50km	6%	7%
Different suburb: 50km or more	14%	5%
Moved from interstate or overseas	10%	12%
<b>Total moved</b>	<b>100%</b>	<b>100%</b>

### 3.2.2 Commuting distance and mode of house movers

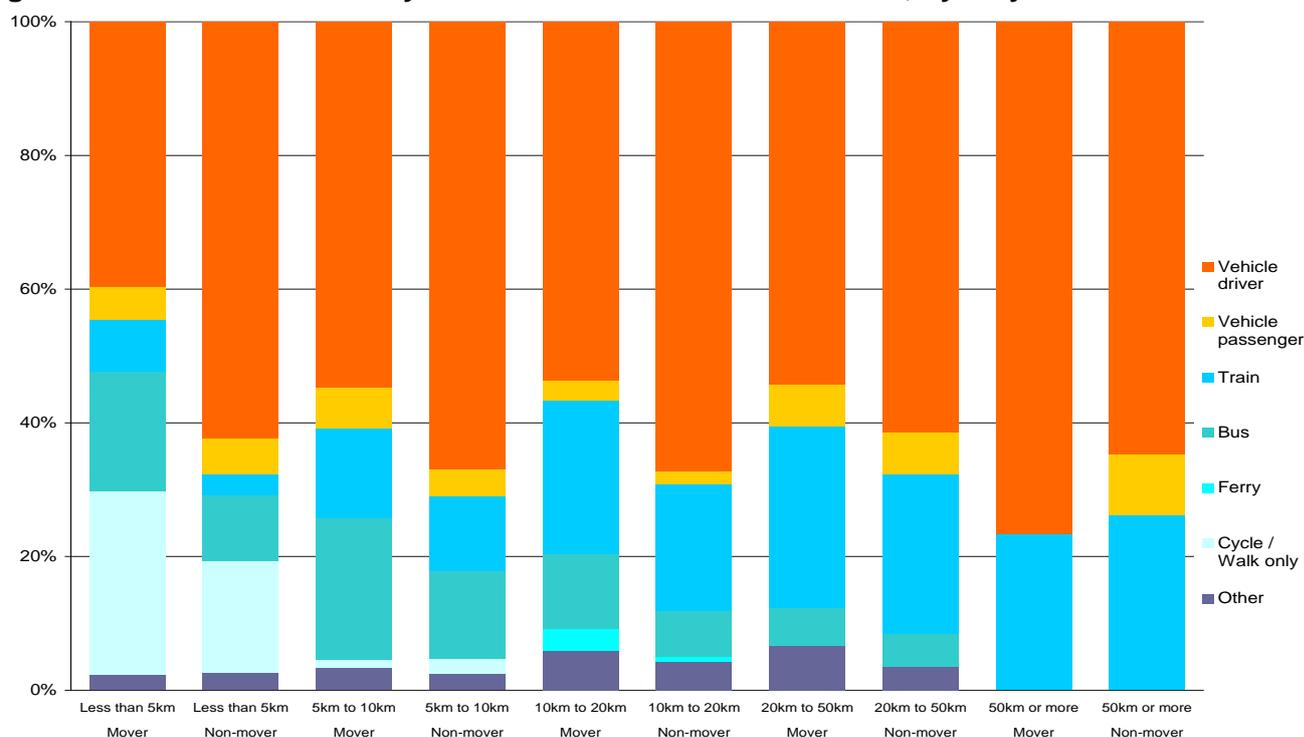
For workers, there appears to be a relationship between commuting patterns and residential mobility. Those who moved house had shorter commute distances and higher rates of public transport use, walking and cycling than those who didn't move, while non-movers had higher rates of driving (Figure 1).

**Figure 1: Commute distance and mode by whether moved house, Sydney MSR**



This pattern of mode use is retained irrespective of distance travelled. With the exception of those travelling 50 km or more to work, movers had higher rates of public transport use, walking and cycling within each distance class (Figure 2). This raises the question of whether for workers the decision to move or at least the choice of location was in order to be able to access public transport.

**Figure 2: Commute distance by mode for movers and non-movers, Sydney MSR**



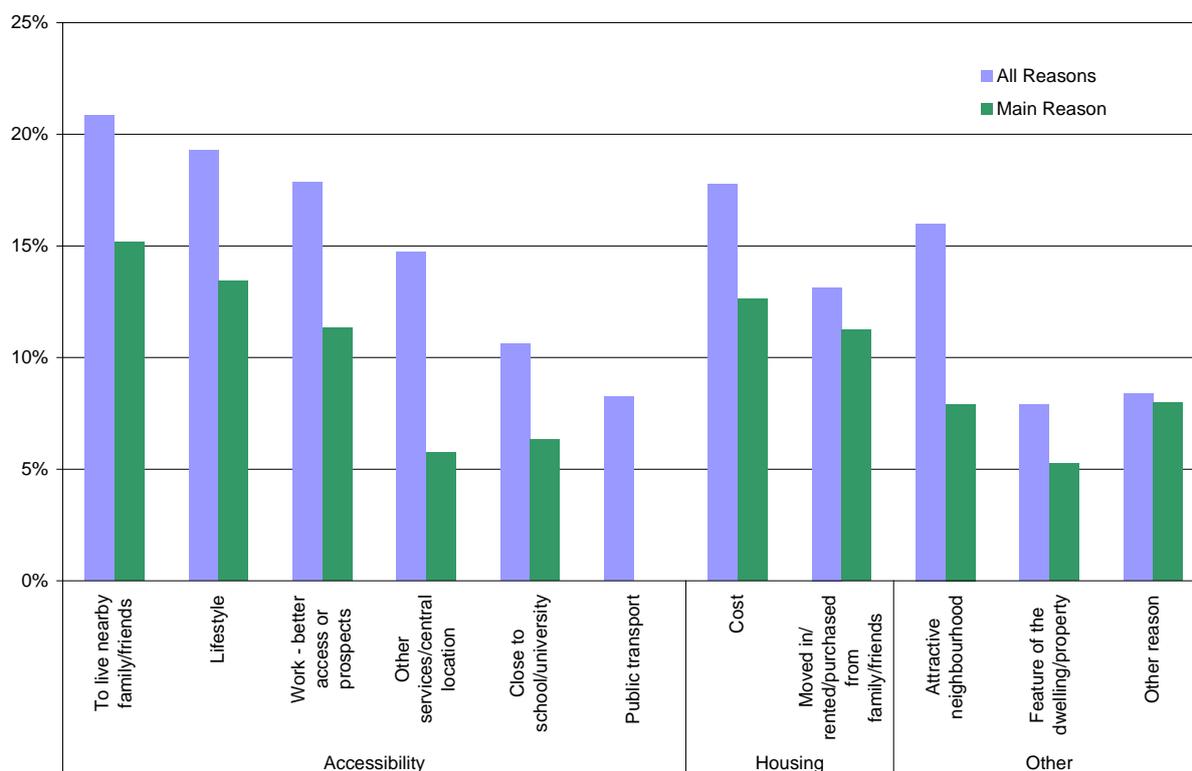
### 3.2.3 Reasons for moving house

A key focus of the survey was to try to understand how the characteristics of the area figured in the location choices made compared with other important factors such as the dwelling itself or cost.

The survey asked respondents for all reasons for moving to the current residential location as well as the main reason. These open responses were then coded to predetermined categories which were devised after survey testing to cover the most common responses. They are broadly grouped into accessibility, housing or other reasons. Some output categories have been combined by ABS where cell sizes are small.

The most common responses given, for both all reasons and the main reason, were 'live near family or friends', 'lifestyle' and 'cost' followed by 'access to work / job prospects' (Figure 3). Public transport was mentioned when people were asked about all reasons but the counts were negligible when considered as a main reason.

Reasons for moving varied depending on the person's household type, their tenure, whether they were employed and their travel to work characteristics. These results are presented in Sections 3.2.4 and 3.2.5 following.

**Figure 3: All reasons and main reasons for moving house, Sydney**

### 3.2.4 Reasons for moving house by household type

Figure 4 shows the proportion of people within each category of household type who selected each reason. While all household types tended to nominate a range of reasons, there were some very noticeable patterns.

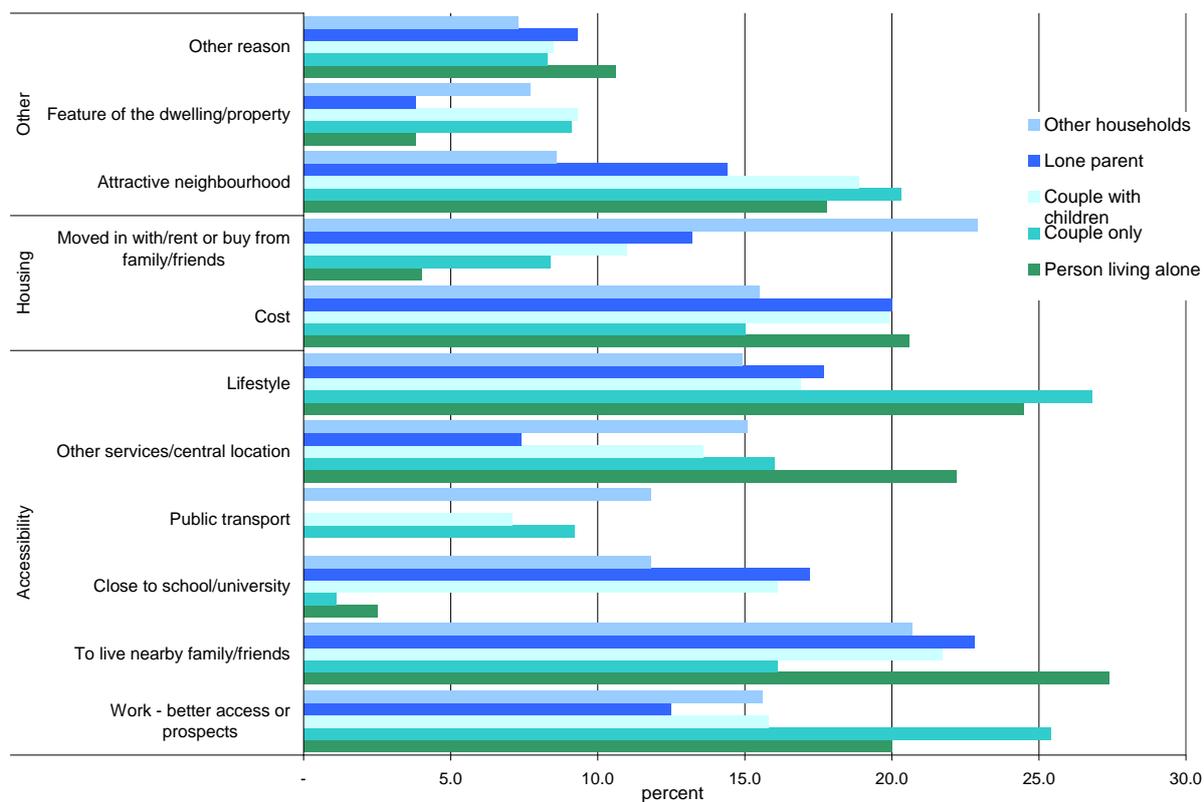
Persons living alone were the most likely to nominate 'to live near family/friends' (27%), 'lifestyle' (24%), 'other services/central location' (22%), 'cost' (21%) and 'better work access/prospects' (20%). Those in couple only households highlighted lifestyle (27%) and better work access/prospects (25%) and attractive neighbourhood (20%).

For lone parent households the most important reason was also 'to live near family/friends' (23%) then 'cost' (20%). This group was also the most likely to nominate 'close to school/university' (17%). Couples with children had similar reasons with 22% nominating 'to live near family/friends' and 20% 'cost'. This was followed by 'attractive neighbourhood' (19%).

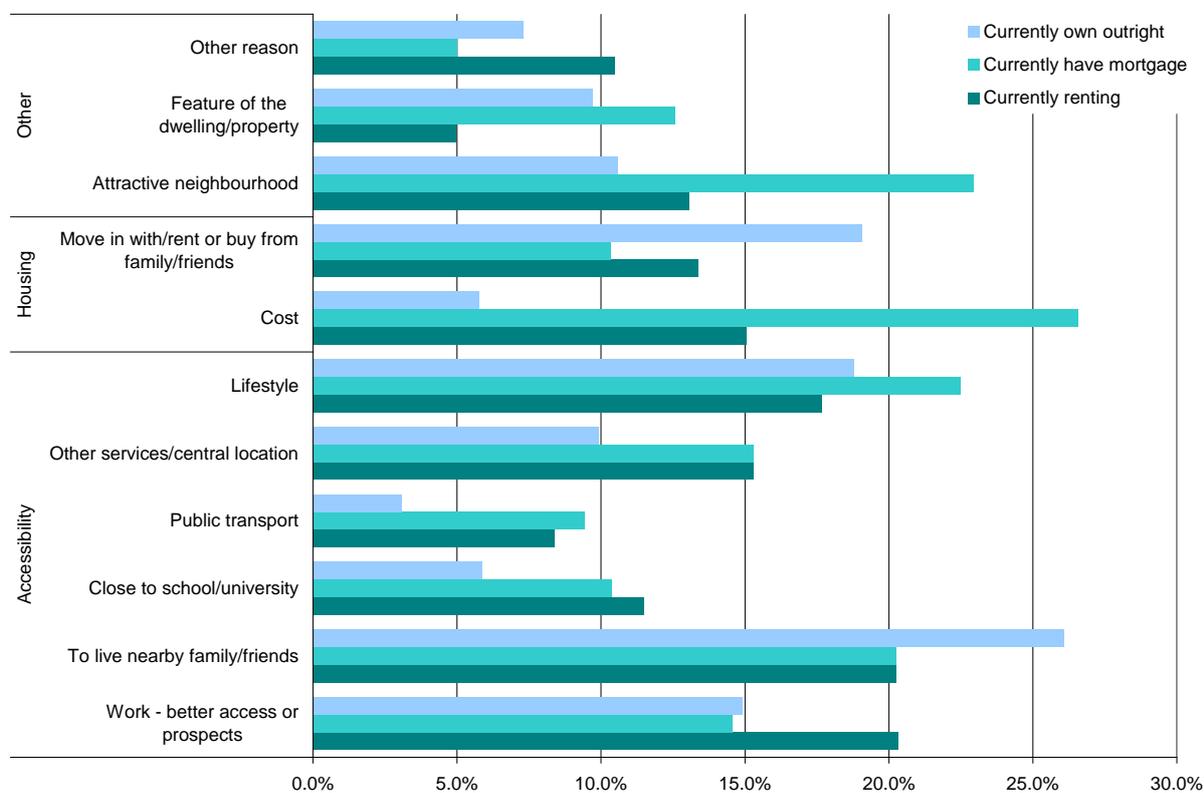
Those in the 'other household type' category were most likely to have moved in order 'to move in with family/ friends' (23%) or 'live near family/friends' (21%). This is not surprising as this category includes group households and extended families.

'Better work prospects /access' and 'access to other services/being in a central location' were more important for those living alone and couple only households. That is those without dependents living with them. Public transport was most likely to be mentioned by 'other households' (12%) and couples with (7%) and without (9%) children.

**Figure 4: All reasons for moving by household type**



**Figure 5: All reasons for moving by tenure**



### 3.2.5 Reason for moving house by tenure type

Figure 5 on the previous page shows the proportion of people with each tenure type who selected each reason. People with a mortgage had 'cost' on the top of their list (27%) ahead of the other tenure types. This was followed by 'attractive neighbourhood' and 'lifestyle' (both 23%) and 'to live near family/friends' (20%).

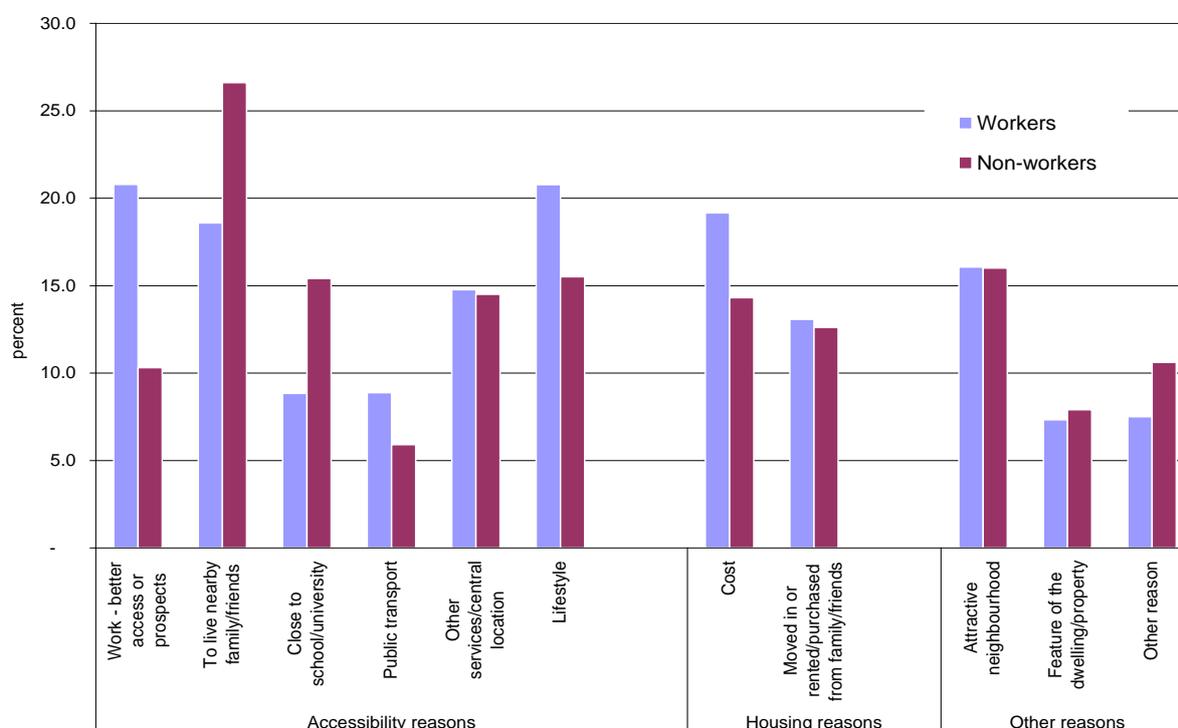
For those who own their property outright the most important feature of the area was that it was 'near family/friends' (26%) and lifestyle (19%). A further 19% of owners without a mortgage indicated that they 'moved in with family/friends'. Renters gave a much greater spread of reasons, with 'work prospects/access' and 'to live near family/friends' both at 20%, followed by 'lifestyle' (17%) and 'access to other services/a central location' (15%).

Both buyers and renters were about three times more likely to choose proximity to public transport than those who owned their property outright.

### 3.2.6 Reasons for moving house by employment and commuting characteristics

There was less variability of reason between those who worked and those who didn't, probably because both of these groups are quite diverse (Figure 6). For workers, the most important reasons were 'access to jobs/work prospects' (21%), 'lifestyle' (21%) and 'cost' (19%). These reasons probably reflect the lifecycle stage of families – who make up the majority of households.

**Figure 6: Reasons for moving house by employment status**



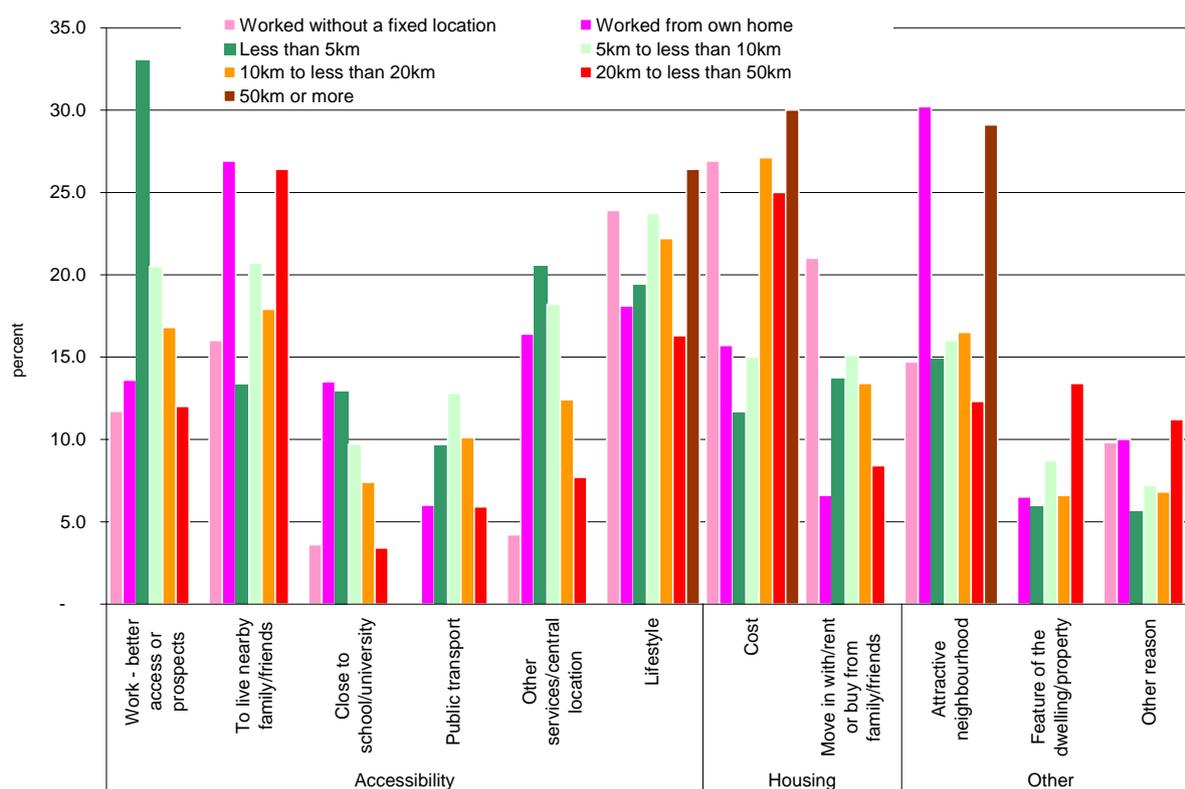
Workers were also slightly more likely to choose their residential location because it was near public transport – 9% versus 6% for non-workers. Non-workers are those not in the workforce because they are too young, too old, studying or keeping house, plus the unemployed. This group were much more likely to choose a location because it was near family and friends (27%) or their place of study (15%).

For workers the reasons varied with the distance to work. Figure 7 shows that cost of the residence was most important to those travelling long distances to work (over 10 kilometres), suggesting a trade off between accessibility and affordability.

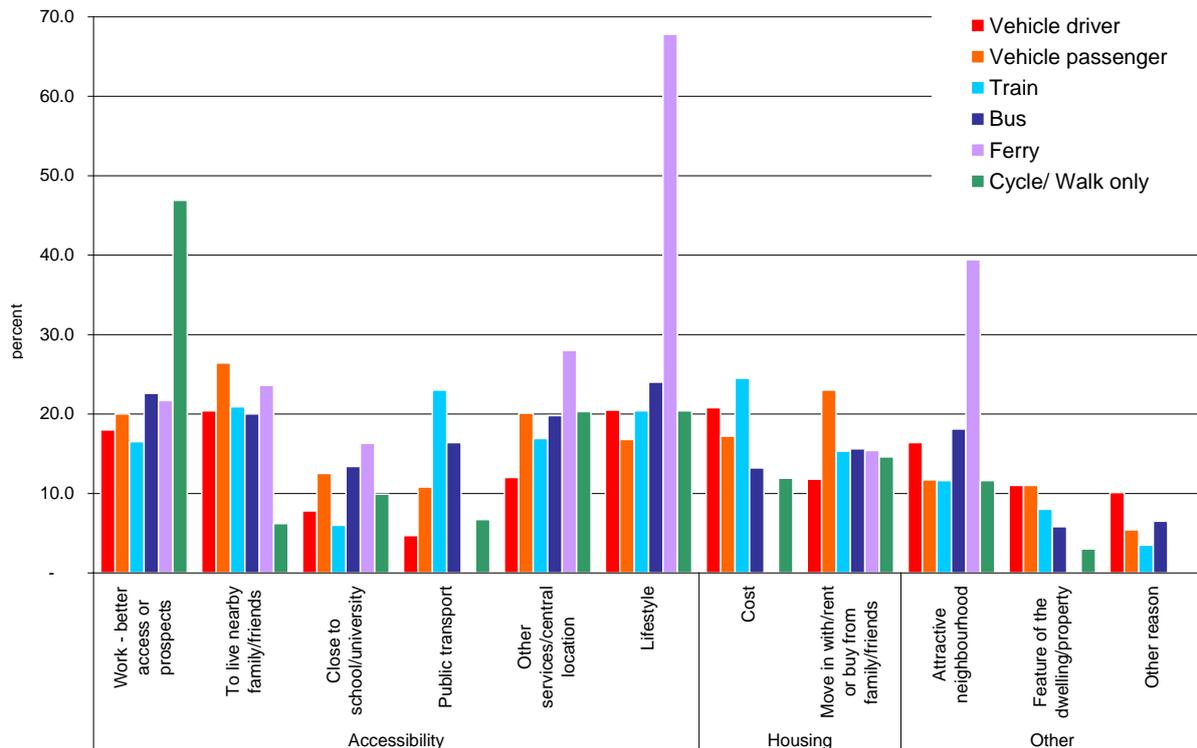
'Cost' was also the most important factor for those with no fixed work address (27%). This category of workers – typically technicians, tradesmen and labourers – do not have a typical commute trip but often drive long distances in the course of their work. 'Attractive neighbourhood' and 'lifestyle' were much more important to those with the longest (typical) commute trip, that is 50 kilometres or more.

Better work prospects/ access (33%), access to other services/central location (20%) and lifestyle (19%) were the more important reasons to those who travelled less than 5 km to work. For people working from home, the 'attractive neighbourhood' (30%) and proximity to 'family or friends' (27%) were the most common reasons. For those who had no fixed work address, which is associated with particular occupations, 27% gave 'cost' and 24% 'lifestyle'. They were also the most likely to give the reason 'to move in with or rent/buy from family or friends' (21%).

**Figure 7: Reasons for moving house by distance to work**



Reasons varied more by the distance travelled to work than mode used, with a few notable exceptions. Figure 8 shows that 68% of those who travelled to work by ferry chose their place of residence for 'lifestyle' reasons and 39% because of the 'attractive neighbourhood'. This is not surprising as in Sydney most ferry commuters live close to Sydney Harbour and the Parramatta River. However the ferry sample is very small. Of those who walked or cycled to work, 47% nominated 'better access to work/job prospects'.

**Figure 8: Reasons for moving house by typical commute**

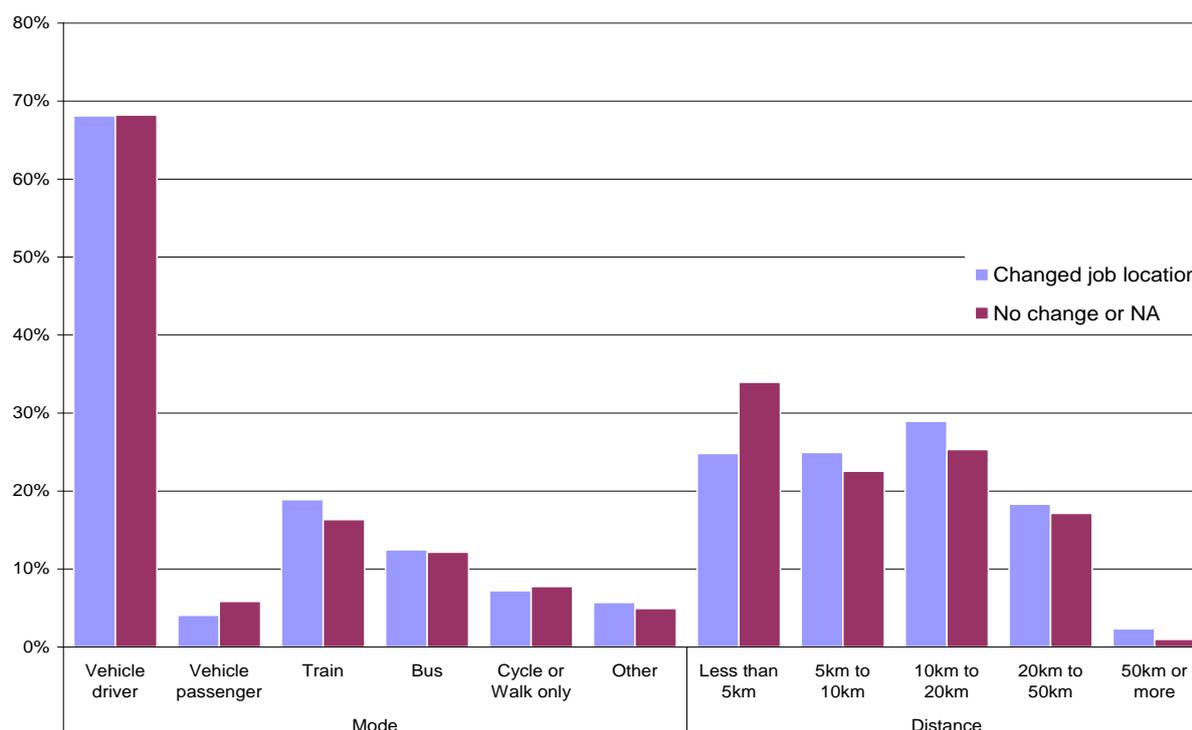
### 3.3 Job location change

The second important part of this survey was investigating the less often explored question of work location change and how it relates to access to and travel to work. As the focus was on changing job location and the typical commute, the questions on job location change were only asked of those who had a fixed place of work. The survey showed that there were 2,150,100 workers aged 18 and over living in Sydney. Of these 1,850,800 (86%) had a fixed work address and 565,700 (31%) had changed their job location at least once in the previous 3 years – this is equivalent to 26% of all workers living in Sydney. See Table 6.

**Table 6: Workers by place of residence and whether they changed job address**

Whether moved job location	Place of usual Residence					
	Sydney		Rest of NSW		NSW	
	No. ('000)	%	No. ('000)	%	No. ('000)	%
Moved job location	565.7	31%	239.6	31%	805.3	29%
Didn't move job location	1,285.1	69%	715.3	69%	2,000.4	71%
Total workers with a fixed work place	1,850.8	100%	954.9	100%	2,805.7	100%
Total employed	2,150.1		1,133.8		3,283.9	

There was not a great deal of difference between workers who changed job location and those who didn't in terms of their commute trip. Those who changed job location were slightly more likely to use public transport and tended to have a longer trip to work than other workers (Figure 9). 'Other workers' includes those who do not have a fixed place of work and therefore the question of change of location is not applicable.

**Figure 9: Mode and distance to worker for job movers versus other workers**

### 3.3.1 Reasons for changing job location

As the focus was on changing job location and the typical commute, the questions on job location change were only asked of those who had a fixed place of work. For most people who changed their job location in the previous 3 years, the most important reasons given were related to the job itself rather than the location although 14% identified that it was close to home. Only 1% said because it was close to public transport (Table 7).

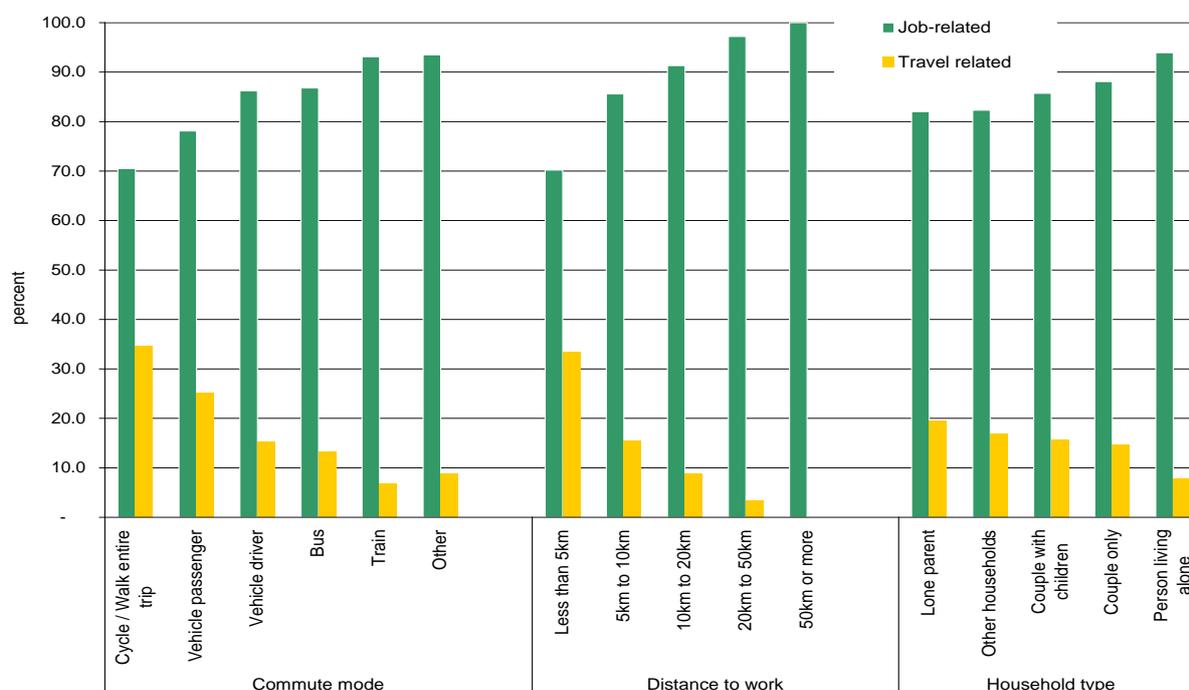
**Table 7: All reasons for changing job location, Sydney**

Reasons	No. ('000)	%
Job related reasons		
Choice based on the job only	460.8	57%
Transferred by employer	79.4	10%
Type of work available	68.1	8%
Availability of jobs	64.0	8%
Travel related reasons		
Close to home	114.3	14%
Close to public transport	4.9	1%
Other reasons		
Not known	2.8	0%
<b>Total</b>	<b>808.4</b>	<b>100%</b>

The reasons for the choice of work location varied with both the distance travelled to work and the usual way of commuting. Due to the sample size for some categories, ABS grouped the reasons into 'job related' and 'travel related' for the following output.

Travel related reasons were more likely to be cited by those walking or cycling to work (35%) followed by vehicle passengers (25%) and by those with the shortest trip to work (33%) (Figure 10). There appears to be no strong influence of household type although those in single parent households (19%) had the highest for travel related reasons and lone person households had the lowest (8%).

**Figure 10: reasons for job location change by selected characteristics**



## 4.0 CONCLUSION

Many things will interact to constrain an individual's choice of housing and job, and the socio-demographic and attitudinal data reported here reflects the significance of life cycle stage on location decisions and travel patterns.

Access to public transport was not generally very important in the choice of residential location. It was most important to workers commuting by train (23%). Accessibility to work / work prospects on the other hand, was very important to those who walked or cycled to work (47%) followed by those who lived less than 5 km from work (33%). Cost did not rate very highly for these two groups.

By contrast, those with the longest commute trip were most likely to have chosen their home location because of cost and to be close to family and friends or because of the lifestyle. Proximity to work and public transport were not important. This suggests that different groups make the trade-off between affordability and commuting time/distance in different ways.

For workers changing job location, aspects of the job itself rather than the location were most important. While proximity to public transport was not significant, 14% chose the job because it was close to home.

This paper has only covered preliminary data released from the survey and much of the material presented here was only available in the form of simple two-way cross-tabulations. Additional customised tables from ABS will allow TDC to explore the associations found in more detail.

For example, whether the distance between home and work declined after a move and how this relates to the reasons for moving. Further analysis is also yet to be undertaken on the characteristics of that highly mobile group who changed both their job location and moved house within the past 3 years.

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