NEW SOUTH WALES DEPARTMENT OF TRANSPORT

TRANSPORT DATA CENTRE

1996 Journey to Work

USER GUIDE

RELEASE STATUS: Public

PREPARED BY: Transport Data Centre
NSW Department of Transport

Report No 98/2
February 1998

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Acknowledgements

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NSW Department of Transport
Transport Data Centre 1997

ISBN 0 7313 2802 7

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TECHNICAL APPENDIX

1. INTRODUCTION

The 1996 Journey to Work User Guide provides the information required to access and use the 1996 Journey to Work (JTW) data. The Guide begins by providing a background to the data and its collection, and discusses issues in using and interpreting the data. Details of each JTW table are then provided, along with the information necessary to retrieve the data from CD-ROM.

The Guide also contains a Technical Appendix which details the processing, validation and imputation of the 1996 JTW data. The Technical Appendix also contains information on particular localities where caution should be used in comparing 1991 and 1996 JTW data.

1.1 BACKGROUND

The 1996 JTW data is derived by the Australian Bureau of Statistics (ABS) from its 1996 Census of Population and Housing, using information supplied by the Transport Data Centre (TDC) to code the employment location of employed people to a TDC Travel Zone. Full details on this process are provided in Part A of the Technical Appendix.

The JTW data set provides information on the trip to work on Census day undertaken by all employed people aged 15 years and over who were enumerated in the JTW Study Area (Figure 1) on Census night. In addition to providing information on mode(s) of travel and key demographic data, the JTW also provides origin and destination data coded to TDC Travel Zone. It is thus the richest source of small area employment information available for the JTW Study Area.

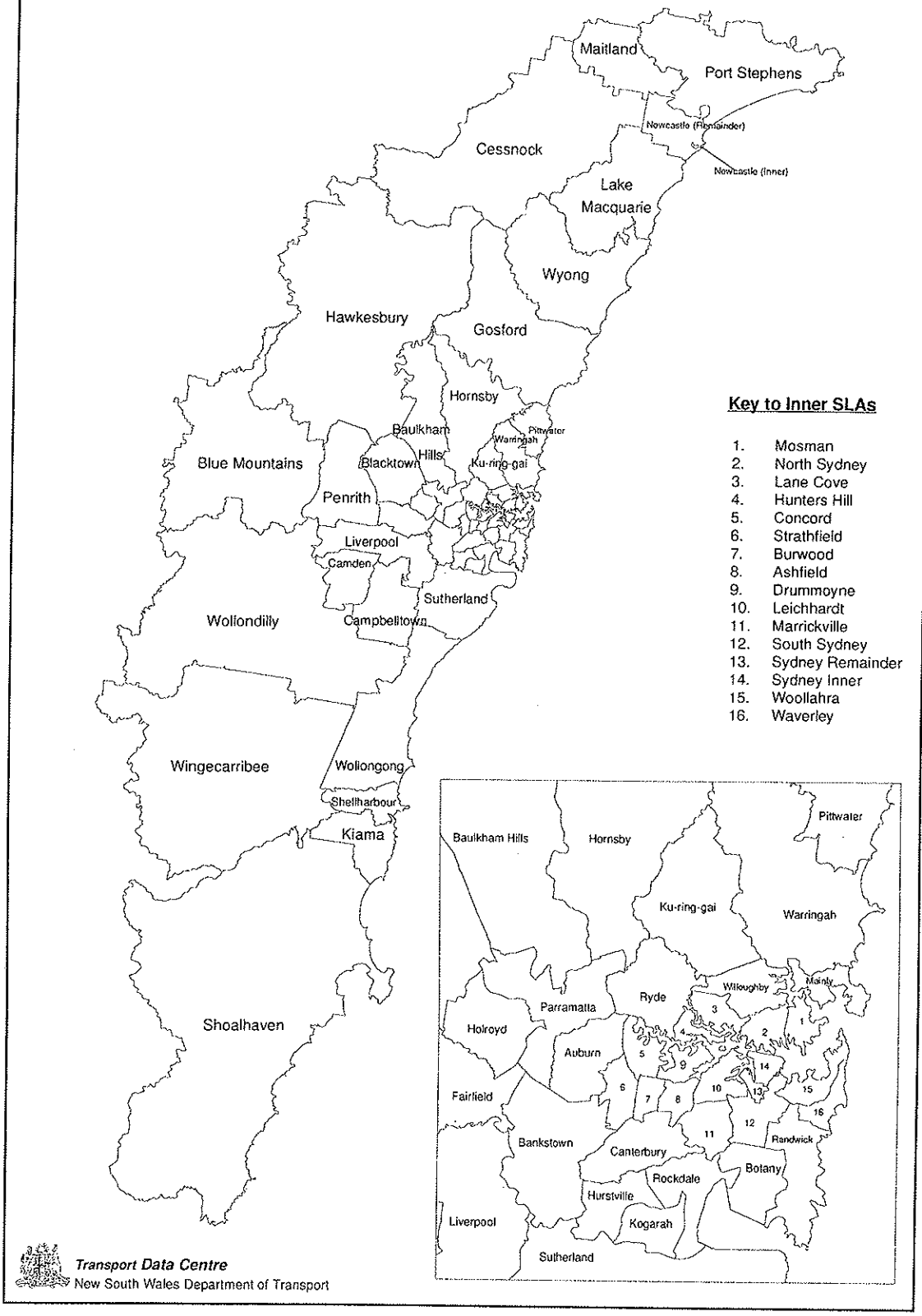
1.2 SOURCE

Data for the JTW collection is obtained from questions in the ABS Census of Population and Housing, conducted every five years. If a person reports in the Census that they have a full-time or part-time job they are then asked to complete a series of additional work-related questions:

- Type of employment
- Occupation
- Name and address of employer
- Industry of employer
- Hours worked
- How the person got to work

Figure 1

Map of the TDC Study Area with 1996 SLA Boundaries



The work-related questions for the 1996 Census are shown in full in Figure 2.

FIGURE 2 1996 ABS Population of Census and Housing: Employment questions

30 *Last week*, did the person have a full-time or part-time job of any kind?	[ ] Yes, worked for payment or profit [ ] Yes, but absent on holidays, on paid leave, on strike or temporarily stood down [ ] Yes, unpaid work in a family business [ ] Yes, other unpaid work **➡Go to 39** [ ] No, did not have a job **➡ Go to 39**
31 In the main job held *last week*, was the person:	[ ] A wage or salary earner? [ ] A helper not receiving wages? **Conducting own business in a limited liability company** [ ] With employees? [ ] Without employees **Conducting own business which is not a limited liability company** [ ] With employees? [ ] Without employees
32 In the main job held *last week*, what was the person's occupation?	Occupation
33 What are the main tasks that the person *himself/herself* usually performs in that occupation?	Tasks or duties
34 For the main job held *last week*, what was the employer's business name?	Business name
35 For the main job held *last week*, what was the employer's workplace address?	Street number and name Suburb, rural locality or town State/Territory Postcode
36 What kind of industry, business or service is carried out *by the employer* at that address?	Industry, business or service of employer
37 *Last week*, how many hours did the person work in all jobs?	[ ] None [ ] 1 - 15 hours [ ] 16 - 24 hours [ ] 25 - 34 hours [ ] 35 - 39 hours [ ] 40 hours [ ] 41 - 48 hours [ ] 49 hours or more
38 How did the person get to work on Tuesday, 6 August 1996?	[ ] Train [ ] Bus [ ] Ferry or tram [ ] Taxi [ ] Car - as driver [ ] Car - as passenger [ ] Motorbike or motor scooter [ ] Bicycle [ ] Walked only [ ] Worked at home [ ] Other [ ] Did not go to work

1.3 THE JOURNEY TO WORK STUDY AREA

The JTW Study Area is identical to the TDC Study Area, as shown in Figure 1. In 1996, the TDC Study Area was expanded to include the entire Shoalhaven Statistical Local Area (SLA); previously, only the Nowra part of Shoalhaven was part of the TDC Study Area. Digital boundaries provided on the JTW CD-ROM show the location of these new zones (Zones 5831 to 5840).

1.4 SCOPE OF THE JOURNEY TO WORK

For the 1996 Census, all employed people enumerated in the JTW Study Area were included in JTW processing. For the 1991 Census, only those employed people who were at their usual residence on Census night were included in JTW processing. Section 2.2 deals with the issue of comparing the slightly different scopes of the 1991 and 1996 JTW collections.

1.5 DEFINITIONS

It is important when analysing JTW data to understand exactly what is meant by the terms 'origin' and 'destination'. The JTW tables contain fields such as 'origin zone' and 'destination zone', and since the collection is about the journey to work, it is natural to assume that 'origin' refers to a person's location when they left for work, and 'destination' refers to the location where they went to work. This will be true in the majority of cases, *but not all*, and the use of the terms 'origin' and 'destination' is to some extent only one of convenience. To understand the precise meaning of these terms, it is necessary to understand the strict definitions used by ABS when processing JTW data from the Census.

1.5.1 Definition of 'Origin'

In the JTW, 'origin' means "place of enumeration" or "where the person was on Census night". In the majority of cases, this will be the same as the person's home address, but in some cases it will be somewhere other than home.

1.5.2 Definition of 'Destination'

In the JTW, 'destination' means "employer's workplace address". It does *not* necessarily mean the place where the person went to work on Census day, since on any one work day a person can be at a location other than their usual workplace.

1.5.3 Definition of 'Mode'

In the JTW, 'mode' means "the mode(s) used to get to work on Census day". It does *not* necessarily mean "the usual mode(s) used to get to work", since on any one work day a person can use a different mode of transport to their usual mode.

1.6 JOURNEY TO WORK 'ANOMALIES'

Once the precise definitions for 'origin', 'destination' and 'mode' are understood, it can be seen that JTW data which at first glance seems anomalous can, in fact, be quite valid. As an example, consider the following scenario:

A person lives in Gosford, but works in Sydney. However, on Census day the person attended a work conference in Gosford, rather than go to their usual workplace address in Sydney. The conference was close to home, so the person walked.

This scenario would result in the following JTW data:

Origin	*Destination*	*Mode*
Gosford	Sydney	Walked only

A cursory look at this data would suggest that it was incorrect, since a person cannot walk from Gosford to Sydney to go to work. However, when the strict definitions employed in the Census are taken into consideration, the data is perfectly correct; the apparent anomaly arises from the fact that 'destination' refers to the person's usual work address, whereas 'mode' describes the mode used on Census day.

This first example demonstrates how Census definitions can impact on the interpretation of destination compared with mode. The next example demonstrates how the definitions can impact on the interpretation of origin compared with mode:

A person lives in Parramatta, and works at Strathfield. On Census day, the person got the train to work, using no other mode of transport. However, on Census night the person stayed with friends at Manly.

This scenario would result in the following JTW data:

Origin	*Destination*	*Mode*
Manly	Strathfield	Train

Again, a cursory look at this data would suggest that it was incorrect, since a person cannot travel from Manly to Strathfield using train as the only form of transport, However, as in the first example, the data is perfectly correct; the apparent anomaly arises from the fact that 'origin' refers to where the person was on Census night, whereas 'mode' describes the mode used on Census day.

1.7 THE JOURNEY TO WORK ZONAL SYSTEM

To facilitate analysis of transport-related data at a small geographical level, TDC maintains its own classification of areas within the TDC Study Area. The units of classification are called Travel Zones (TZs). Travel zones are larger than Census Collector Districts (CDs), but smaller than Statistical Local Areas (SLAs).

ABS uses the term *DZN ('Destination Zone')* as a general term to refer to JTW zones, since different States can use different terms for their zonal units. In NSW, 'DZN' and 'TZ' are identical, but to maintain consistency with ABS and other JTW documentation, the Guide uses the term 'DZN' throughout.

1.8 JOURNEY TO WORK PROCESSING

Processing of all work-related questions in the Census is undertaken solely by ABS, with the exception of 'employer's workplace address', which requires input from State agencies to allow for coding to a smaller geographical unit than SLA. In NSW, TDC is responsible for this input, supplying detailed search indexes that facilitate ABS coding of addresses to DZNs. The importance of this process is that it provides a complete enumeration of employment at the small-area level for the TDC Study Area.

A detailed description of JTW processing is contained in Part A of the Technical Appendix.

1.9 JOURNEY TO WORK VALIDATION

Once ABS has completed processing of JTW data it supplies *a validation table* to TDC to facilitate checking of JTW data at the aggregate level before the data set is finalised. The validation table shows Employment x DZN x Industry Code (2-digit ANZSIC).

The validation table provides an opportunity to rectify any mistakes in DZN coding during normal processing. As a result of the validation process in 1996, TDC was able to identify a number of cases where the final JTW data could be improved by movement of selected employment from one zone to another.

A detailed description of JTW validation is contained in Part B of the Technical Appendix.

1.10 JOURNEY TO WORK IMPUTATION

During JTW processing it is not always possible to allocate a DZN to an address when the only address information reported is locality (e.g. suburb is reported, but

not street). If a locality can reasonably be allocated to one DZN without ambiguity, then addresses for this locality will be coded to that DZN. However, if a locality cannot be allocated to one DZN without ambiguity, then addresses which report that locality and no other information are allocated a *'locality dump code'* to indicate that locality is known but there is insufficient other information to allow coding to a DZN.

The original JTW tables provided by ABS to TDC contain locality dump codes. To ensure that users of JTW data do not have to individually undertake a process of distribution of locality dump employment to DZNs, TDC distributes *(imputes)* this data. As a result, the TDC JTW data set contains no locality dump codes.

A detailed description of JTW imputation is contained in Part C of the Technical Appendix.

1.11 CONFIDENTIALITY

In order to protect the confidentiality of individual Census respondents, the ABS does not provide TDC with JTW unit-record data. Instead, aggregate JTW data is provided in a number of tables. To further ensure confidentiality, ABS randomises any table cells which contain less than 3 people. Table cells originally containing 1 or 2 are randomly assigned the value of 0 or 3 in the ABS randomisation process. Any cells containing 1 or 2 in the final JTW tables are the result of TDC's imputation process (see Part C of the Technical Appendix).

As a result of the ABS randomisation process, there may be slight variations in totals compiled from different tables.

2. COMPARING 1996 AND 1991 JOURNEY TO WORK DATA

Before comparing 1996 and 1991 JTW data it is essential to first take into account a number of factors that influence interpretation of the data. Because of differences in scope and definitions between the two data sets, and improvements in the quality of processing between 1991 and 1996, *direct comparison of 1996 and 1991 data may occasionally show 'changes' in employment that are not real, but merely the result of the scope, definition and processing differences between 1991 and 1996.*

This section deals with the issue of comparability from a general perspective, which has been affected by changes in the coding of 'no fixed workplace address', changes in the scope of the data collected, improvements in processing between 1991 and 1996 and SLA and zone changes. Part D of the Technical Appendix highlights specific localities where caution should be taken in interpreting employment changes. **It is essential that Part D of the Technical Appendix is read before comparing 1996 and 1991 JTW data.**

2.1 NO FIXED WORKPLACE ADDRESS

In the 1991 JTW, all people with no fixed place of work were requested to provide the address of their employer's depot or office as their "employer's workplace address". In the 1996 JTW, these people were asked to respond "no fixed address" in answer to this question. As a result, the "no fixed address" category has increased significantly from 874 in 1991 to 58,601 in 1996. As a corollary, there will be a general 'decrease' in employment spread across all zones in 1996, due to people no longer being coded to a zone when they report "no fixed address".

2.2 SCOPE OF THE DATA COLLECTED

When comparing 1991 and 1996 JTW data, two changes in the scope of the collection should be kept in mind:

1. In 1991, *only employed residents* of the Study Area who were enumerated in the Study Area on Census night were included in the JTW. In 1996, the scope was expanded, so that *all employed persons* enumerated in the Study Area on Census night, even if they were not residents of the Study Area, were included in the JTW.

   TDC estimates the effect of this increase in scope to be an additional 27,000 employed visitors, or an additional 1.45% over the whole Study Area. The

distribution of these visitors is heavily skewed towards Sydney City, with 57% enumerated in Sydney Inner and Sydney Remainder SLAs.

It should be noted that it is not possible to *directly* identify people who live outside the Study Area, since 'origin' in JTW tables refers to place of enumeration, and thus, by definition, there is no origin code for 'outside study area'. The people in this category can be inferred from the number of people who have a 'destination' ("employer's workplace address") outside the study area, while taking into account the fact that an unknown, but probably relatively small, number of people with destination outside the study area live inside the study area.

2. In 1991, only the Nowra portion of Shoalhaven SLA was included in the JTW Study Area, but in 1996 the JTW Study Area was expanded to include the whole of Shoalhaven SLA. TDC estimates that this change in scope has led to an additional 8,500 employed persons being included in the 1996 JTW. See Technical Appendix Part B, Section 3 for a list of zones in the Shoalhaven SLA, and Part D, Section 1.14 for a discussion of the scope change.

2.3 PROCESSING

The quality of 1991 and 1996 JTW data at zonal level is dependent on the quality of the 1991 and 1996 search indexes used to code addresses to zones. Where there are deficiencies in one set of indexes compared to the other set, it is possible to have a situation where comparison of data at a zonal level reveals 'changes' in employment that are not real changes, but merely the result of one set of indexes being more accurate than the other set for that zone.

2.3.1 'Unknown' destinations

Improvements to the quality of search indexes and JTW processing procedures in 1996 led to a significant reduction in the number of unknown employer's workplace addresses between 1991 and 1996. In 1991, there were approximately 162,000 employees with employer's workplace address coded as "unknown" or "not stated". In 1996, this category was approximately 68,000. Note that the 1996 JTW data supplied by TDC excludes data for this category to ensure consistency with 1996 JTW data supplied by ABS.

2.3.2 'Changes' in employment between 1991 and 1996

During the JTW validation process, TDC investigated cases where comparisons of 1991 and 1996 JTW data indicated significant differences in employment between Censuses for particular zones. These investigations revealed a number of cases where, what appeared to be significant 'movement' of employment between 1991 and 1996, was actually likely to be the result of improvements in the indexes in

1996, and thus an artefact of processing, rather than a reflection of genuine change. The zones affected are discussed in detail in Part D of the Technical Appendix.

2.4 STATISTICAL LOCAL AREA AND TRAVEL ZONE CHANGES

2.4.1 Statistical Local Area changes between 1991 and 1996

Following the 1991 Census, the Warringah SLA (8000) was divided into two SLAs, Pittwater (6370) and Warringah (8000). Comparisons of 1991 and 1996 JTW data should take into account that SLA 8000 in 1991 is equivalent to SLAs 6370 and 8000 combined in 1996.

2.4.2 Travel Zone changes between 1991 and 1996

Since 1991, TDC has increased the number of TZs within the TDC Study Area. Apart from the inclusion of all Shoalhaven SLA, this has been achieved by splitting selected 1991 zones into smaller zones, to enhance the value of data at the small area level. All new 1996 zones can be uniquely mapped to their original 1991 zone. This mapping is shown in Table 1.

Table 1 TDC Travel Zone changes between 1991 and 1996

1991 TZ	1996 TZ	1996 TZ	1996 TZ	General location of zone(s)
The 1996 zones added together are equivalent to the 1991 zone				
0012	0831	0832	-	Sydney CBD area
0019	0838	0839	-	Sydney CBD area
0025	0833	0834	-	Sydney CBD area
0195	0195	0703	-	Ashfield area
0212	0212	0706	-	Concord area
0216	0216	0705	-	Strathfield area
0276	0276	0842	0843	Sutherland area
0291	0291	0844	-	Loftus area
0298	0298	0848	-	East Hills area
0334	0334	0846	-	Pendle Hill area
0388	0810	0811	-	Werrington area
0389	0812	0813	-	Kingswood area
0392	0392	0847	-	Lemongrove area
0414	0814	0815	-	Doonside area
0425	0425	0845	-	Toongabbie area
0447	0447	0828	-	Epping area
0474	0474	0829	-	Epping area
0475	0475	0830	-	North Epping area
0518	0518	0773	-	Gordon area
0519	0519	0772	-	Pymble area
0526	0526	0771	-	St Ives area
0536	0536	0850	-	Elanora Heights area
0537	0537	0841	-	Terrey Hills area
0606	0816	0817	-	Werrington area
0645	0645	0849	-	Ingleside area
0688	0818	0819	-	Scheyville area
0726	0820	0821	0840	Horsley Park area
0740	0822	0823	-	Eastern Creek area
0742	0824	0825	-	Riverstone area
0749	0826	0827	-	Rouse Hill area
0775	0775	0781	-	Crows Nest area
0782	0060	0782	-	Crows Nest area
0805	0835	0836	0837	Sydney CBD area
1690	1727	1728	-	Gosford area
1716	1731	1732	-	Kincumber area
1718	1729	1730	-	Avoca area
3787	3905	3906	-	Newcastle CBD area
3789	3903	3907	-	Newcastle CBD area
3791	3900	3901	3904	Hamilton area
3908	3896	3897	-	Mayfield area

3. USING THE JOURNEY TO WORK TABLES

The JTW data set contains 32 independent tables, each of which includes a unique combination of variables. The data contained in each table refers to number of employed people in a geographic area (travel zone or SLA) with a given combination of characteristics.

3.1 THE 'FREQ' VARIABLE

Every JTW table contains a variable (or column) called 'freq'. This is short for *frequency*, and represents the number of employed people with the set of characteristics listed in the row of the table.

3.2 TRAVEL ZONES AND STATISTICAL LOCAL AREAS

JTW data is provided at either the Travel Zone (TZ) or Statistical Local Area (SLA) level. TDC has developed Travel Zones as a level of geography which sits between the ABS geographic classifications of Census Collector District (CD) and SLA. TDC provides a mapping of 1996 TZs to 1996 SLA and 1991 TZs on the 1996 JTW CD ROM. Hard copy maps at a range of geographical levels are also available.

3.3 FORMAT OF JOURNEY TO WORK TABLE DOCUMENTATION

Section 4 of the Documentation provides information on the variables in each of the 32 JTW tables, including the variable name, format of the data, and brief description of the variable.

Variable names are sometimes longer than 8 characters to provide a clearer indication of what the variable is, so some software, such as SPSS, will truncate these names.

Section 5 provides the list of categories (or 'code frame') for each variable.

Section 6 provides information on how to access and use the data on the 1996 JTW CD-ROM. Tables are supplied in both ASCII format and as a Microsoft Access 97 database.

The *Technical Appendix* provides detailed documentation on the processing, validation and imputation of JTW data.

4. 1996 JOURNEY TO WORK TABLES

4.1 SUMMARY OF 1996 JOURNEY TO WORK TABLES

Origin x Destination

Table01 Origin Zone x Destination Zone
Table02 Origin SLA x Destination SLA
Table03 Origin Zone x Destination Zone x Mode
Table04 Origin SLA x Destination Zone x Mode x Sex
Table05 Origin Zone x Destination SLA x Mode x Sex
Table06 Origin SLA x Destination SLA x Offspring Age x Hours Worked x Mode
Table07 Origin SLA x Destination SLA x Mode
Table08 Origin SLA x Destination SLA x Age x Mode
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Table10 Origin Zone x Destination SLA x Number of Vehicles x Mode
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Table12 Origin SLA x Destination Zone x Industry (1 digit)
Table13 Origin Zone x Destination SLA x Industry (1 digit)
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Destination

Table16 Destination Zone x Industry (4 digit)
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Table20 Destination Zone x Employment Status x Industry (1 digit) x Sex
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Table24 Destination Zone x Industry (1 digit) x Mode

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Table25 Origin Zone x Industry (1 digit) x Occupation (1 digit) x Sex
Table26 Origin Zone x Mode x Personal Income x Sex
Table27 Origin SLA x Employment Status x Education Level x Number of Vehicles x Mode
Table28 Origin Zone x Student Status x Educational Institution x Sex x Age
Table29 Origin Zone x Family Type x Sex x Mode
Table30 Origin Zone x Family Type x Household Type x Mode
Table31 Origin Zone x Offspring Age x Sex x Mode
Table32 Origin Zone x Household Type x Sex x Mode x Personal Income

4.2 VARIABLE FORMATS

Variables in JTW tables are held in one of the following formats:

- Char Character
- Integer Integers in the range –32,767 to +32,767
- Long Integer Integers in the range –2,147,483,647 to +2,147,483,647

4.3 DETAILS OF JOURNEY TO WORK TABLES

Table 01 Origin Zone x Destination Zone

Variable Name	Format	Description
TZ96_O	Integer	*Origin 1996 Travel Zone*
SLA96_O	Integer	*Origin 1996 SLA*
TZ96_D	Integer	*Destination 1996 Travel Zone*
SLA96_D	Integer	*Destination 1996 SLA*
FREQ	Long Integer	*Number of employed persons*

Table 02 Origin SLA x Destination SLA

Variable Name	Format	Description
SLA96_O	Integer	*Origin 1996 SLA*
SLA96_D	Integer	*Destination 1996 SLA*
FREQ	Long Integer	*Number of employed persons*

Table 03 Origin Zone x Destination Zone x Mode

Variable Name	Format	Description
TZ96_O	Integer	*Origin 1996 Travel Zone*
SLA96_O	Integer	*Origin 1996 SLA*
TZ96_D	Integer	*Destination 1996 Travel Zone*
SLA96_D	Integer	*Destination 1996 SLA*
MODE05	Integer	*Mode*
FREQ	Long Integer	*Number of employed persons*

Table 04 Origin SLA x Destination Zone x Mode x Sex

Variable Name	Format	Description
SLA96_O	Integer	*Origin 1996 SLA*
TZ96_D	Integer	*Destination 1996 Travel Zone*
SLA96_D	Integer	*Destination 1996 SLA*
MODE13	Integer	*Mode*
SEX	Integer	*Sex*
FREQ	Long Integer	*Number of employed persons*

Table 05 Origin Zone x Destination SLA x Mode x Sex

Variable Name	Format	Description
TZ96_O	Integer	*Origin 1996 Travel Zone*
SLA96_O	Integer	*Origin 1996 SLA*
SLA96_D	Integer	*Destination 1996 SLA*
MODE13	Integer	*Mode*
SEX	Integer	*Sex*
FREQ	Long Integer	*Number of employed persons*

Table 06 Origin SLA x Destination SLA x Offspring Age x Hours of Work x Mode

Variable Name	Format	Description
SLA96_O	Integer	*Origin 1996 SLA*
SLA96_D	Integer	*Destination 1996 SLA*
OFFAGE08	Integer	*Offspring age*
WORKHR06	Integer	*Working hours*
MODE05	Integer	*Mode*
FREQ	Long Integer	*Number of employed persons*

Table 07 Origin SLA x Destination SLA x Mode

Variable Name	Format	Description
SLA96_O	Integer	*Origin 1996 SLA*
SLA96_D	Integer	*Destination 1996 SLA*
MODE45	Integer	*Mode*
FREQ	Long Integer	*Number of employed persons*

Table 08 Origin SLA x Destination SLA x Age x Mode

Variable Name	Format	Description
SLA96_O	Integer	*Origin 1996 SLA*
SLA96_D	Integer	*Destination 1996 SLA*
AGE11	Integer	*Age*
MODE13	Integer	*Mode*
FREQ	Long Integer	*Number of employed persons*

Table 09 Origin SLA x Destination SLA x Dwelling Structure x Mode

Variable Name	Format	Description
SLA96_O	Integer	*Origin 1996 SLA*
SLA96_D	Integer	*Destination 1996 SLA*
DWELTYP8	Integer	*Dwelling structure*
MODE13	Integer	*Mode*
FREQ	Long Integer	*Number of employed persons*

Table 10 Origin Zone x Destination SLA x Number of Vehicles x Mode

Variable Name	Format	Description
TZ96_O	Integer	*Origin 1996 Travel Zone*
SLA96_O	Integer	*Origin 1996 SLA*
SLA96_D	Integer	*Destination 1996 SLA*
HHVEH07	Integer	*Number of vehicles in household*
MODE13	Integer	*Mode*
FREQ	Long Integer	*Number of employed persons*

Table 11 Origin SLA x Destination Zone x Number of Vehicles x Mode

Variable Name	Format	Description
SLA96_O	Integer	*Origin 1996 SLA*
TZ96_D	Integer	*Destination 1996 Travel Zone*
SLA96_D	Integer	*Destination 1996 SLA*
HHVEH07	Integer	*Number of vehicles in household*
MODE13	Integer	*Mode*
FREQ	Long Integer	*Number of employed persons*

Table 12 Origin SLA x Destination Zone x Industry (1 digit)

Variable Name	Format	Description
SLA96_O	Integer	*Origin 1996 SLA*
TZ96_D	Integer	*Destination 1996 Travel Zone*
SLA96_D	Integer	*Destination 1996 SLA*
INDUST19	Char (1)	*Industry (1 digit ANZSIC code)*
FREQ	Long Integer	*Number of employed persons*

Table 13 Origin Zone x Destination SLA x Industry (1 digit)

Variable Name	Format	Description
TZ96_O	Integer	*Origin 1996 Travel Zone*
SLA96_O	Integer	*Origin 1996 SLA*
SLA96_D	Integer	*Destination 1996 SLA*
INDUST19	Char (1)	*Industry (1 digit ANZSIC code)*
FREQ	Long Integer	*Number of employed persons*

Table 14 Origin SLA x Destination SLA x Industry (1 digit) x Occupation (1 digit) x Sex

Variable Name	Format	Description
SLA96_O	Integer	*Origin 1996 SLA*
SLA96_D	Integer	*Destination 1996 SLA*
INDUST19	Char (1)	*Industry (1 digit ANZSIC code)*
OCCPN11	Char(1)	*Occupation (1 digit ASCO code)*
SEX	Integer	*Sex*
FREQ	Long Integer	*Number of employed persons*

Table 15 Origin SLA x Destination SLA x Industry (1 digit) x Household Income

Variable Name	Format	Description
SLA96_O	Integer	*Origin 1996 SLA*
SLA96_D	Integer	*Destination 1996 SLA*
INDUST19	Char (1)	*Industry (1 digit ANZSIC code)*
HHINC12	Integer	*Annual household income*
FREQ	Long Integer	*Number of employed persons*

Table 16 Destination Zone x Industry (4 digit)

Variable Name	Format	Description
TZ96_D	Integer	*Destination 1996 Travel Zone*
SLA96_D	Integer	*Destination 1996 SLA*
INDUST615	Char (4)	*Industry (4 digit ANZSIC code)*
FREQ	Long Integer	*Number of employed persons*

Table 17 Destination Zone x Industry (2 digit)

Variable Name	Format	Description
TZ96_D	Integer	*Destination 1996 Travel Zone*
SLA96_D	Integer	*Destination 1996 SLA*
INDUST69	Char (2)	*Industry (2 digit ANZSIC code)*
FREQ	Long Integer	*Number of employed persons*

Table 18 Destination Zone x Occupation (4 digit)

Variable Name	Format	Description
TZ96_D	Integer	*Destination 1996 Travel Zone*
SLA96_D	Integer	*Destination 1996 SLA*
OCCPN437	Char (4)	*Occupation (4 digit ASCO code)*
FREQ	Long Integer	*Number of employed persons*

Table 19 Destination Zone x Occupation (2 digit)

Variable Name	Format	Description
TZ96_D	Integer	*Destination 1996 Travel Zone*
SLA96_D	Integer	*Destination 1996 SLA*
OCCPN46	Char (2)	*Occupation (2 digit ASCO code)*
FREQ	Long Integer	*Number of employed persons*

Table 20 Destination Zone x Employment Status x Industry (1 digit) x Sex

Variable Name	Format	Description
TZ96_D	Integer	*Destination 1996 Travel Zone*
SLA96_D	Integer	*Destination 1996 SLA*
EMPSTAT4	Integer	*Employment status*
INDUST19	Char (1)	*Industry (1 digit ANZSIC code)*
SEX	Integer	*Sex*
FREQ	Long Integer	*Number of employed persons*

Table 21 Destination Zone x Industry (1 digit) x Occupation (1 digit) x Sex

Variable Name	Format	Description
TZ96_D	Integer	*Destination 1996 Travel Zone*
SLA96_D	Integer	*Destination 1996 SLA*
INDUST19	Char (1)	*Industry (1 digit ANZSIC code)*
OCCPN11	Char(1)	*Occupation (1 digit ASCO code)*
SEX	Integer	*Sex*
FREQ	Long Integer	*Number of employed persons*

Table 22 Destination Zone x Hours Worked x Employment Status x Occupation (1 digit) x Sex

Variable Name	Format	Description
TZ96_D	Integer	*Destination 1996 Travel Zone*
SLA96_D	Integer	*Destination 1996 SLA*
WORKHR06	Integer	*Working hours*
EMPSTAT4	Integer	*Employment status*
OCCPN11	Char(1)	*Occupation (1 digit ASCO code)*
SEX	Integer	*Sex*
FREQ	Long Integer	*Number of employed persons*

Table 23 Destination Zone x Employment Status x Hours Worked x Mode

Variable Name	Format	Description
TZ96_D	Integer	*Destination 1996 Travel Zone*
SLA96_D	Integer	*Destination 1996 SLA*
EMPSTAT4	Integer	*Employment status*
WORKHR06	Integer	*Working hours*
MODE13	Integer	*Mode*
FREQ	Long Integer	*Number of employed persons*

Table 24 Destination Zone x Industry (1 digit) x Mode

Variable Name	Format	Description
TZ96_D	Integer	*Destination 1996 Travel Zone*
SLA96_D	Integer	*Destination 1996 SLA*
INDUST19	Char (1)	*Industry (1 digit ANZSIC code)*
MODE13	Integer	*Mode*
FREQ	Long Integer	*Number of employed persons*

Table 25 Origin Zone x Industry (1 digit) x Occupation (1 digit) x Sex

Variable Name	Format	Description
TZ96_O	Integer	*Origin 1996 Travel Zone*
SLA96_O	Integer	*Origin 1996 SLA*
INDUST19	Char (1)	*Industry (1 digit ANZSIC code)*
OCCPN11	Char(1)	*Occupation (1 digit ASCO code)*
SEX	Integer	*Sex*
FREQ	Long Integer	*Number of employed persons*

Table 26 Origin Zone x Mode x Personal Income x Sex

Variable Name	Format	Description
TZ96_O	Integer	*Origin 1996 Travel Zone*
SLA96_O	Integer	*Origin 1996 SLA*
MODE13	Integer	*Mode*
PERINC17	Integer	*Annual personal income*
SEX	Integer	*Sex*
FREQ	Long Integer	*Number of employed persons*

Table 27 Origin SLA x Employment Status x Education Level x Number of Vehicles x Mode

Variable Name	Format	Description
SLA96_O	Integer	*Origin 1996 SLA*
EMPSTAT4	Integer	*Employment status*
HIGHED10	Integer	*Education level*
HHVEH07	Integer	*Number of vehicles in household*
MODE13	Integer	*Mode*
FREQ	Long Integer	*Number of employed persons*

Table 28 Origin Zone x Student Status x Educational Institution x Sex x Age

Variable Name	Format	Description
TZ96_O	Integer	*Origin 1996 Travel Zone*
SLA96_O	Integer	*Origin 1996 SLA*
STUDHR04	Integer	*Student status*
EDINST08	Integer	*Educational institution*
SEX	Integer	*Sex*
AGE11	Integer	*Age*
FREQ	Long Integer	*Number of employed persons*

Table 29 Origin Zone x Family Type x Sex x Mode

Variable Name	Format	Description
TZ96_O	Integer	*Origin 1996 Travel Zone*
SLA96_O	Integer	*Origin 1996 SLA*
FAMTYP10	Integer	*Family type*
SEX	Integer	*Sex*
MODE13	Integer	*Mode*
FREQ	Long Integer	*Number of employed persons*

Table 30 Origin Zone x Family Type x Household Type x Mode

Variable Name	Format	Description
TZ96_O	Integer	*Origin 1996 Travel Zone*
SLA96_O	Integer	*Origin 1996 SLA*
FAMTYP10	Integer	*Family type*
HHTYPE06	Integer	*Household type*
MODE13	Integer	*Mode*
FREQ	Long Integer	*Number of employed persons*

Table 31 Origin Zone x Offspring Age x Sex x Mode

Variable Name	Format	Description
TZ96_O	Integer	*Origin 1996 Travel Zone*
SLA96_O	Integer	*Origin 1996 SLA*
OFFAGE08	Integer	*Offspring age*
SEX	Integer	*Sex*
MODE13	Integer	*Mode*
FREQ	Long Integer	*Number of employed persons*

Table 32 Origin Zone x Household Type x Sex x Mode x Personal Income

Variable Name	Format	Description
TZ96_O	Integer	*Origin 1996 Travel Zone*
SLA96_O	Integer	*Origin 1996 SLA*
HHTYPE06	Integer	*Household type*
SEX	Integer	*Sex*
MODE13	Integer	*Mode*
PERINC10	Integer	*Annual personal income*
FREQ	Long Integer	*Number of employed persons*

5. CODE FRAMES FOR JOURNEY TO WORK TABLES

5.1 CODE FRAMES FOR EACH JOURNEY TO WORK VARIABLE

The code frames are in alphabetical order of variable names.

AGE11 - Age — Tables: 08, 28

Value	Description
1	15 - 19 years
2	20 - 24 years
3	25 - 29 years
4	30 - 34 years
5	35 - 39 years
6	40 - 44 years
7	45 - 49 years
8	50 - 54 years
9	55 - 59 years
10	60 - 64 years
11	65 + years

DWELTYP8 - Dwelling structure — Table 09

Value	Description
1	Separate house
2	Semi-detached, row or terrace house, townhouse etc.
3	Flat, unit or apartment in a 1, 2 or 3 storey block
4	Flat, unit or apartment in a 4 or more storey block
5	Flat, unit or apartment attached to a house; House or flat attached to a shop etc.
6	Other dwelling: Caravan, cabin, houseboat; Improvised home, tent, sleepers out
7	Not stated
8	Not applicable

EDINST08 - Educational institution — Table 28

Value	Description
1	Secondary – Government
2	Secondary – Catholic
3	Secondary - Other Non-Government
4	Technical or Further Educational Institution (including TAFE College)
5	University or other Tertiary Institutions
6	Other
7	Not stated
8	Not applicable

EMPSTAT4 - Employment status — Tables: 20, 22, 23, 27

Value	Description
1	Employee
2	Employer
3	Own account worker
4	Contributing family worker

FAMTYP10 – Family type — Tables: 29, 30

Value	Description
1	One parent family with dependent children with or without other relatives
2	One parent family with non-dependent children with or without other relatives
3	One parent family with dependent & non-dependent children with or without other relatives
4	Couple only
5	Couple & other related individuals
6	Two parent family with dependent children with or without other relatives
7	Two parent family with non-dependent children with or without other relatives
8	Two parent family with dependent & non-dependent children with or without other relatives
9	Other family
10	Not applicable

HHINC12 - Annual household income — Table 15

Value	Description
1	Negative or nil income
2	$1 - $4159
3	$4160 - $8319
4	$8320 - $15,999
5	$15,600 - $25,999
6	$26,000 - $36,399
7	$36,400 - $51,999
8	$52,000 - $77,999
9	$78,000 - $103,999
10	$104,000 or more
11	Partial income stated or all incomes not stated
12	Not applicable

HHTYPE06 - Household type — Tables: 30, 32

Value	Description
1	Family households: One family household
2	Family households: Two family household
3	Family households: Three family household
4	Non-family households: Lone person household
5	Non-family households: Group household
6	Not classifiable, not applicable

HHVEH07 – Number of vehicles in household — Tables: 10, 11, 27

Value	Description
0	None
1	One
2	Two
3	Three
4	Four or more
8	Not stated
9	Not applicable

HIGHED10 – Education level — Table 27

Value	Description
1	Higher degree
2	Post graduate diploma
3	Bachelor degree
4	Undergraduate diploma
5	Associate diploma
6	Skilled vocational qualification
7	Basic vocational qualification
8	Level of attainment inadequately described
9	Level of attainment not stated
10	Not applicable

INDUST19 - Industry (1 digit ANZSIC), Tables: 12, 13, 14, 15, 20, 21, 24, 25

Value	Description
A	Agriculture, Forestry and Fishing
B	Mining
C	Manufacturing
D	Electricity, Gas and Water Supply
E	Construction
F	Wholesale Trade
G	Retail Trade
H	Accommodation, Cafes and Restaurants
I	Transport and Storage
J	Communication Services
K	Finance and Insurance
L	Property & Business Services
M	Government Administration and Defence
N	Education
O	Health and Community Services
P	Cultural and Recreational Services
Q	Personal and Other Services
R	Non-classifiable economic units
&	Not stated

INDUST69 - Industry (2 digit ANZSIC code) Table 17

Value	Description
01	Agriculture
02	Services to Agriculture; Hunting and Trapping
03	Forestry and Logging
04	Commercial Fishing
11	Coal Mining
12	Oil and Gas Extraction
13	Metal Ore Mining
14	Other Mining
15	Services to Mining
21	Food, Beverage and Tobacco Manufacturing
22	Textile, Clothing, Footwear and Leather Manufacturing
23	Wood and Paper Product Manufacturing
24	Printing, Publishing and Recorded Media
25	Petroleum, Coal, Chemical and Associated Product Manufacturing
26	Non-Metallic Mineral Product Manufacturing
27	Metal Product Manufacturing
28	Machinery and Equipment Manufacturing
29	Other Manufacturing
36	Electricity and Gas Supply
37	Water Supply, Sewerage and Drainage Services
41	General Construction
42	Construction Trade Services
45	Basic Material Wholesaling
46	Machinery and Motor Vehicle Wholesaling
47	Personal and Household Good Wholesaling
51	Food Retailing
52	Personal and Household Good Retailing
53	Motor Vehicle Retailing and Services
57	Accommodation, Cafes and Restaurants
61	Road Transport
62	Rail Transport
63	Water Transport
64	Air and Space Transport
65	Other Transport
66	Services to Transport
67	Storage
71	Communication Services
73	Finance
74	Insurance
75	Services to Finance and Insurance
77	Property Services
78	Business Services
81	Government Administration
82	Defence

Value	Description
84	Education
86	Health Services
87	Community Services
91	Motion Picture, Radio and Television Services
92	Libraries, Museums and the Arts
93	Sport and Recreation
95	Personal Services
96	Other Services
97	Private Households Employing Staff
99	Non-classifiable economic units
A0	Agriculture, Forestry and Fishing, undefined
B0	Mining, undefined
C0	Manufacturing, undefined
D0	Electricity, Gas and Water Supply, undefined
E0	Construction, undefined
F0	Wholesale Trade, undefined
G0	Retail Trade, undefined
I0	Transport and Storage, undefined
K0	Finance and Insurance, undefined
L0	Property and Business Services, undefined
M0	Government Administration and Defence, undefined
O0	Health and Community Services, undefined
P0	Cultural and Recreational Services, undefined
Q0	Personal and Other Services, undefined
&&	Not stated

INDUST615 - Industry (4 digit ANZSIC code) Table 16

Value	Description
0100	Agriculture, undefined
0110	Horticulture and Fruit Growing, undefined
0111	Plant Nurseries
0112	Cut Flower and Flower Seed Growing
0113	Vegetable Growing
0114	Grape Growing
0115	Apple and Pear Growing
0116	Stone Fruit Growing
0117	Kiwi Fruit Growing
0119	Fruit Growing, nec
0120	Grain, Sheep and Beef Cattle Farming, undefined
0121	Grain Growing
0122	Grain-Sheep and Grain-Beef Cattle Farming
0123	Sheep-Beef Cattle Farming
0124	Sheep Farming
0125	Beef Cattle Farming

Value	Description
0130	Dairy Cattle Farming
0140	Poultry Farming, undefined
0141	Poultry Farming (Meat)
0142	Poultry Farming (Eggs)
0150	Other Livestock Farming, undefined
0151	Pig Farming
0152	Horse Farming
0153	Deer Farming
0159	Livestock Farming, nec
0160	Other Crop Growing, undefined
0161	Sugar Cane Growing
0162	Cotton Growing
0169	Crop and Plant Growing, nec
0200	Services to Agriculture; Hunting and Trapping undefined
0210	Services to Agriculture, undefined
0211	Cotton Ginning
0212	Shearing Services
0213	Aerial Agricultural Services
0219	Services to Agriculture, nec
0220	Hunting and Trapping
0300	Forestry and Logging, undefined
0301	Forestry
0302	Logging
0303	Services to Forestry
0400	Commercial Fishing, undefined
0410	Marine Fishing, undefined
0411	Rock Lobster Fishing
0412	Prawn Fishing
0413	Finfish Trawling
0414	Squid Jigging
0415	Line Fishing
0419	Marine Fishing, nec
0420	Aquaculture
1100	Coal Mining, undefined
1101	Black Coal Mining
1102	Brown Coal Mining
1200	Oil and Gas Extraction
1310	Metal Ore Mining, undefined
1311	Iron Ore Mining
1312	Bauxite Mining
1313	Copper Ore Mining
1314	Gold Ore Mining
1315	Mineral Sand Mining
1316	Nickel Ore Mining
1317	Silver-Lead-Zinc Ore Mining
1319	Metal Ore Mining, nec

Value	Description
1400	Other Mining, undefined
1410	Construction Material Mining, undefined
1411	Gravel and Sand Quarrying
1419	Construction Material Mining, nec
1420	Mining, nec
1500	Services to Mining, undefined
1510	Exploration, undefined
1511	Petroleum Exploration (Own Account)
1512	Petroleum Exploration Services
1513	Mineral Exploration (Own Account)
1514	Mineral Exploration Services
1520	Other Mining Services
2100	Food, Beverage and Tobacco Manufacturing, undefined
2110	Meat and Meat Product Manufacturing, undefined
2111	Meat Processing
2112	Poultry Processing
2113	Bacon, Ham and Smallgood Manufacturing
2120	Dairy Product Manufacturing, undefined
2121	Milk and Cream Processing
2122	Ice Cream Manufacturing
2129	Dairy Product Manufacturing, nec
2130	Fruit and Vegetable Processing
2140	Oil and Fat Manufacturing
2150	Flour Mill and Cereal Food Manufacturing, undefined
2151	Flour Mill Product Manufacturing
2152	Cereal Food and Baking Mix Manufacturing
2160	Bakery Product Manufacturing, undefined
2161	Bread Manufacturing
2162	Cake and Pastry Manufacturing
2163	Biscuit Manufacturing
2170	Other Food Manufacturing, undefined
2171	Sugar Manufacturing
2172	Confectionery Manufacturing
2173	Seafood Processing
2174	Prepared Animal and Bird Feed Manufacturing
2179	Food Manufacturing, nec
2180	Beverage and Malt Manufacturing, undefined
2181	Soft Drink, Cordial and Syrup Manufacturing
2182	Beer and Malt Manufacturing
2183	Wine Manufacturing
2184	Spirit Manufacturing
2190	Tobacco Product Manufacturing
2200	Textile, Clothing, Footwear and Leather Manufacturing, undefined.
2210	Textile Fibre, Yarn and Woven Fabric Manufacturing, undefined
2211	Wool Scouring
2212	Synthetic Fibre Textile Manufacturing

Value	Description
2213	Cotton Textile Manufacturing
2214	Wool Textile Manufacturing
2215	Textile Finishing
2220	Textile Product Manufacturing, undefined
2221	Made-Up Textile Product Manufacturing
2222	Textile Floor Covering Manufacturing
2223	Rope, Cordage and Twine Manufacturing
2229	Textile Product Manufacturing, nec
2230	Knitting Mills, undefined
2231	Hosiery Manufacturing
2232	Cardigan and Pullover Manufacturing
2239	Knitting Mill Product Manufacturing, nec
2240	Clothing Manufacturing, undefined
2241	Men's and Boys' Wear Manufacturing
2242	Women's and Girls' Wear Manufacturing
2243	Sleepwear, Underwear and Infant Clothing Manufacturing
2249	Clothing Manufacturing, nec
2250	Footwear Manufacturing
2260	Leather and Leather Product Manufacturing, undefined
2261	Leather Tanning and Fur Dressing
2262	Leather and Leather Substitute Product Manufacturing
2300	Wood and Paper Product Manufacturing, undefined
2310	Log Sawmilling and Timber Dressing, undefined
2311	Log Sawmilling
2312	Wood Chipping
2313	Timber Resawing and Dressing
2320	Other Wood Product Manufacturing, undefined
2321	Plywood and Veneer Manufacturing
2322	Fabricated Wood Manufacturing
2323	Wooden Structural Component Manufacturing
2329	Wood Product Manufacturing, nec
2330	Paper and Paper Product Manufacturing, undefined
2331	Pulp, Paper and Paperboard Manufacturing
2332	Solid Paperboard Container Manufacturing
2333	Corrugated Paperboard Container Manufacturing
2334	Paper Bag and Sack Manufacturing
2339	Paper Product Manufacturing, nec
2400	Printing, Publishing and Recorded Media, undefined
2410	Printing and Services to Printing, undefined
2411	Paper Stationery Manufacturing
2412	Printing
2413	Services to Printing
2420	Publishing, undefined
2421	Newspaper Printing or Publishing
2422	Other Periodical Publishing
2423	Book and Other Publishing

Value	Description
2430	Recorded Media Manufacturing and Publishing
2500	Petroleum, Coal, Chemical and Associated Product Manufacturing, undefined
2510	Petroleum Refining
2520	Petroleum and Coal Product Manufacturing, nec
2530	Basic Chemical Manufacturing, undefined
2531	Fertiliser Manufacturing
2532	Industrial Gas Manufacturing
2533	Synthetic Resin Manufacturing
2534	Organic Industrial Chemical Manufacturing, nec
2535	Inorganic Industrial Chemical Manufacturing, nec
2540	Other Chemical Product Manufacturing, undefined
2541	Explosive Manufacturing
2542	Paint Manufacturing
2543	Medicinal and Pharmaceutical Product Manufacturing
2544	Pesticide Manufacturing
2545	Soap and Other Detergent Manufacturing
2546	Cosmetic and Toiletry Preparation Manufacturing
2547	Ink Manufacturing
2549	Chemical Product Manufacturing, nec
2550	Rubber Product Manufacturing, undefined
2551	Rubber Tyre Manufacturing
2559	Rubber Product Manufacturing, nec
2560	Plastic Product Manufacturing, undefined
2561	Plastic Blow Moulded Product Manufacturing
2562	Plastic Extruded Product Manufacturing
2563	Plastic Bag and Film Manufacturing
2564	Plastic Product Rigid Fibre Reinforced Manufacturing
2565	Plastic Foam Product Manufacturing
2566	Plastic Injection Moulded Product Manufacturing
2600	Non-Metallic Mineral Product Manufacturing, undefined
2610	Glass and Glass Product Manufacturing
2620	Ceramic Product Manufacturing, undefined
2621	Clay Brick Manufacturing
2622	Ceramic Product Manufacturing
2623	Ceramic Tile and Pipe Manufacturing
2629	Ceramic Product Manufacturing, nec
2630	Cement, Lime, Plaster and Concrete Product Manufacturing, undefined
2631	Cement and Lime Manufacturing
2632	Plaster Product Manufacturing
2633	Concrete Slurry Manufacturing
2634	Concrete Pipe and Box Culvert Manufacturing
2635	Concrete Product Manufacturing, nec
2640	Non-Metallic Mineral Product Manufacturing, nec
2700	Metal Product Manufacturing, undefined
2710	Iron and Steel Manufacturing, undefined
2711	Basic Iron and Steel Manufacturing

Value	Description
2712	Iron and Steel Casting and Forging
2713	Steel Pipe and Tube Manufacturing
2720	Basic Non-Ferrous Metal Manufacturing, undefined
2721	Alumina Production
2722	Aluminium Smelting
2723	Copper, Silver, Lead and Zinc Smelting, Refining
2729	Basic Non-Ferrous Metal Manufacturing, nec
2730	Non-Ferrous Basic Metal Product Manufacturing, undefined
2731	Aluminium Rolling, Drawing, Extruding
2732	Non-Ferrous Metal Rolling, Drawing, Extruding nec.
2733	Non-Ferrous Metal Casting
2740	Structural Metal Product Manufacturing, undefined
2741	Structural Steel Fabricating
2742	Architectural Aluminium Product Manufacturing
2749	Structural Metal Product Manufacturing, nec
2750	Sheet Metal Product Manufacturing, undefined
2751	Metal Container Manufacturing
2759	Sheet Metal Product Manufacturing, nec
2760	Fabricated Metal Product Manufacturing, undefined
2761	Hand Tool and General Hardware Manufacturing
2762	Spring and Wire Product Manufacturing
2763	Nut, Bolt, Screw and Rivet Manufacturing
2764	Metal Coating and Finishing
2765	Non-Ferrous Pipe Fitting Manufacturing
2769	Fabricated Metal Product Manufacturing, nec
2800	Machinery and Equipment Manufacturing, undefined
2810	Motor Vehicle and Part Manufacturing, undefined
2811	Motor Vehicle Manufacturing
2812	Motor Vehicle Body Manufacturing
2813	Automotive Electrical and Instrument Manufacturing
2819	Automotive Component Manufacturing, nec
2820	Other Transport Equipment Manufacturing, undefined
2821	Shipbuilding
2822	Boatbuilding
2823	Railway Equipment Manufacturing
2824	Aircraft Manufacturing
2829	Transport Equipment Manufacturing, nec
2830	Photographic and Scientific Equipment Manufacturing, undefined
2831	Photographic and Optical Good Manufacturing
2832	Medical and Surgical Equipment Manufacturing
2839	Professional and Scientific Equipment Manufacturing, nec
2840	Electronic Equipment Manufacturing, undefined
2841	Computer and Business Machine Manufacturing
2842	Telecommunication, Broadcasting and Transceiving Equipment Manufacturing
2849	Electronic Equipment Manufacturing, nec
2850	Electrical Equipment and Appliance Manufacturing, undefined

Value	Description
2851	Household Appliance Manufacturing
2852	Electric Cable and Wire Manufacturing
2853	Battery Manufacturing
2854	Electric Light and Sign Manufacturing
2859	Electrical and Equipment Manufacturing, nec
2860	Industrial Machinery and Equipment Manufacturing, undefined
2861	Agricultural Machinery Manufacturing
2862	Mining and Construction Machinery Manufacturing
2863	Food Processing Machinery Manufacturing
2864	Machine Tool and Part Manufacturing
2865	Lifting and Material Handling Equipment Manufacturing
2866	Pump and Compressor Manufacturing
2867	Commercial Space Heating and Cooling Equipment Manufacturing
2869	Industrial Machinery and Equipment Manufacturing nec
2900	Other Manufacturing, undefined
2910	Prefabricated Building Manufacturing, undefined
2911	Prefabricated Metal Building Manufacturing
2919	Prefabricated Building Manufacturing, nec
2920	Furniture Manufacturing, undefined
2921	Wooden Furniture and Upholstered Seat Manufacturing
2922	Sheet Metal Furniture Manufacturing
2923	Mattress Manufacturing (Except Rubber)
2929	Furniture Manufacturing, nec
2940	Other Manufacturing, undefined
2941	Jewellery and Silverware Manufacturing
2942	Toy and Sporting Good Manufacturing
2949	Manufacturing, nec
3600	Electricity and Gas Supply, undefined
3610	Electricity Supply
3620	Gas Supply
3700	Water Supply, Sewerage and Drainage Services, undefined
3701	Water Supply
3702	Sewerage and Drainage Services
4100	General Construction, undefined
4110	Building Construction, undefined
4111	House Construction
4112	Residential Building Construction, nec
4113	Non-Residential Building Construction
4120	Non-Building Construction, undefined
4121	Road and Bridge Construction
4122	Non-Building Construction, nec
4200	Construction Trade Services, undefined
4210	Site Preparation Services
4220	Building Structure Services, undefined
4221	Concreting Services
4222	Bricklaying Services

Value	Description
4223	Roofing Services
4224	Structural Steel Erection Services
4230	Installation Trade Services, undefined
4231	Plumbing Services
4232	Electrical Services
4233	Air Conditioning and Heating Services
4234	Fire and Security System Services
4240	Building Completion Services, undefined
4241	Plastering and Ceiling Services
4242	Carpentry Services
4243	Tiling and Carpeting Services
4244	Painting and Decorating Services
4245	Glazing Services
4250	Other Construction Services, undefined
4251	Landscaping Services
4259	Construction Services, nec
4500	Basic Material Wholesaling, undefined
4510	Farm Produce Wholesaling, undefined
4511	Wool Wholesaling
4512	Cereal Grain Wholesaling
4519	Farm Produce and Supplies Wholesaling, nec
4520	Mineral, Metal and Chemical Wholesaling, undefined
4521	Petroleum Product Wholesaling
4522	Metal and Mineral Wholesaling
4523	Chemical Wholesaling
4530	Builders Supplies Wholesaling, undefined
4531	Timber Wholesaling
4539	Building Supplies Wholesaling, nec
4600	Machinery and Motor Vehicle Wholesaling, undefined
4610	Machinery and Equipment Wholesaling, undefined
4611	Farm and Construction Machinery Wholesaling
4612	Professional Equipment Wholesaling
4613	Computer Wholesaling
4614	Business Machine Wholesaling, nec
4615	Electrical and Electronic Equipment Wholesaling nec
4619	Machinery and Equipment Wholesaling, nec
4620	Motor Vehicle Wholesaling, undefined
4621	Car Wholesaling
4622	Commercial Vehicle Wholesaling
4623	Motor Vehicle New Part Dealing
4624	Motor Vehicle Dismantling and Used Part Dealing
4700	Personal and Household Good Wholesaling, undefined
4710	Food, Drink and Tobacco Wholesaling, undefined
4711	Meat Wholesaling
4712	Poultry and Smallgood Wholesaling
4713	Dairy Produce Wholesaling

Value	Description
4714	Fish Wholesaling
4715	Fruit and Vegetable Wholesaling
4716	Confectionery and Soft Drink Wholesaling
4717	Liquor Wholesaling
4718	Tobacco Product Wholesaling
4719	Grocery Wholesaling, nec
4720	Textile, Clothing and Footwear Wholesaling, undefined
4721	Textile Product Wholesaling
4722	Clothing Wholesaling
4723	Footwear Wholesaling
4730	Household Good Wholesaling, undefined
4731	Household Appliance Wholesaling
4732	Furniture Wholesaling
4733	Floor Covering Wholesaling
4739	Household Good Wholesaling, nec
4790	Other Wholesaling, undefined
4791	Photographic Equipment Wholesaling
4792	Jewellery and Watch Wholesaling
4793	Toy and Sporting Good Wholesaling
4794	Book and Magazine Wholesaling
4795	Paper Product Wholesaling
4796	Pharmaceutical and Toiletry Wholesaling
4799	Wholesaling, nec
5100	Food Retailing, undefined
5110	Supermarket and Grocery Stores
5120	Specialised Food Retailing, undefined
5121	Fresh Meat, Fish and Poultry Retailing
5122	Fruit and Vegetable Retailing
5123	Liquor Retailing
5124	Bread and Cake Retailing
5125	Takeaway Food Retailing
5126	Milk Vending
5129	Specialised Food Retailing, nec
5200	Personal and Household Good Retailing, undefined
5210	Department Stores
5220	Clothing and Soft Good Retailing, undefined
5221	Clothing Retailing
5222	Footwear Retailing
5223	Fabric and Other Soft Good Retailing
5230	Furniture, Houseware and Appliance Retailing, undefined
5231	Furniture Retailing
5232	Floor Covering Retailing
5233	Domestic Hardware and Houseware Retailing
5234	Domestic Appliance Retailing
5235	Recorded Music Retailing
5240	Recreational Good Retailing, undefined

Value	Description
5241	Sport and Camping Equipment Retailing
5242	Toy and Game Retailing
5243	Newspaper, Book and Stationery Retailing
5244	Photographic Equipment Retailing
5245	Marine Equipment Retailing
5250	Other Personal and Household Good Retailing
5251	Pharmaceutical, Cosmetic and Toiletry Retailing
5252	Antique and Used Good Retailing
5253	Garden Equipment Retailing
5254	Flower Retailing
5255	Watch and Jewellery Retailing
5259	Retailing, nec
5260	Household Equipment Repair Services, undefined
5261	Household Equipment Repair Services (Electrical)
5269	Household Equipment Repair Services, nec
5300	Motor Vehicle Retailing and Services, undefined
5310	Motor Vehicle Retailing, undefined
5311	Car Retailing
5312	Motor Cycle Dealing
5313	Trailer and Caravan Dealing
5320	Motor Vehicle Services, undefined
5321	Automotive Fuel Retailing
5322	Automotive Electrical Services
5323	Smash Repairing
5324	Tyre Retailing
5329	Automotive Repair and Services, nec
5700	Accommodation, Cafes and Restaurants, undefined
5710	Accommodation
5720	Pubs, Taverns and Bars
5730	Cafes and Restaurants
5740	Clubs (Hospitality)
6100	Road Transport, undefined
6110	Road Freight Transport
6120	Road Passenger Transport, undefined
6121	Long Distance Bus Transport
6122	Short Distance Bus Transport (Including Tramway)
6123	Taxi and Other Road Passenger Transport
6200	Rail Transport
6300	Water Transport, undefined
6301	International Sea Transport
6302	Coastal Water Transport
6303	Inland Water Transport
6400	Air and Space Transport, undefined
6401	Scheduled International Air Transport
6402	Scheduled Domestic Air Transport
6403	Non-Scheduled Air and Space Transport

Value	Description
6500	Other Transport, undefined
6501	Pipeline Transport
6509	Transport, nec
6600	Services to Transport
6610	Services to Road Transport, undefined
6611	Parking Services
6619	Services to Road Transport, nec
6620	Services to Water Transport, undefined
6621	Stevedoring
6622	Water Transport Terminals
6623	Port Operators
6629	Services to Water Transport, nec
6630	Services to Air Transport
6640	Other Services to Transport, undefined
6641	Travel Agency Services
6642	Road Freight Forwarding
6643	Freight Forwarding (Except Road)
6644	Customs Agency Services
6649	Services to Transport, nec
6700	Storage, undefined
6701	Grain Storage
6709	Storage, nec
7100	Communication Services, undefined
7110	Postal and Courier Services, undefined
7111	Postal Services
7112	Courier Services
7120	Telecommunication Services
7300	Finance, undefined
7310	Central Bank
7320	Deposit Taking Financiers, undefined
7321	Banks
7322	Building Societies
7323	Credit Unions
7324	Money Market Dealers
7329	Deposit Taking Financiers, nec
7330	Other Financiers
7340	Financial Asset Investors
7400	Insurance, undefined
7410	Life Insurance and Superannuation Funds, undefined
7411	Life Insurance
7412	Superannuation Funds
7420	Other Insurance, undefined
7421	Health Insurance
7422	General Insurance
7500	Services to Finance and Insurance, undefined
7510	Services to Finance and Investment, undefined

Value	Description
7511	Financial Asset Broking Services
7519	Services to Finance and Investment, nec
7520	Services to Insurance
7700	Property Services, undefined
7710	Property Operators and Developers, undefined
7711	Residential Property Operators
7712	Commercial Property Operators and Developers
7720	Real Estate Agents
7730	Non-Financial Asset Investors
7740	Machinery and Equipment Hiring and Leasing, undefined
7741	Motor Vehicle Hiring
7742	Other Transport Equipment Leasing
7743	Plant Hiring or Leasing
7800	Business Services, undefined
7810	Scientific Research
7820	Technical Services, undefined
7821	Architectural Services
7822	Surveying Services
7823	Consulting Engineering Services
7829	Technical Services, nec
7830	Computer Services, undefined
7831	Data Processing Services
7832	Information Storage and Retrieval Services
7833	Computer Maintenance Services
7834	Computer Consultancy Services
7840	Legal and Accounting Services, undefined
7841	Legal Services
7842	Accounting Services
7850	Marketing and Business Management Services, undefined
7851	Advertising Services
7852	Commercial Art and Display Services
7853	Market Research Services
7854	Business Administrative Services
7855	Business Management Services
7860	Other Business Services, undefined
7861	Employment Placement Services
7862	Contract Staff Services
7863	Secretarial Services
7864	Security and Investigative Services (Except Police)
7865	Pest Control Services
7866	Cleaning Services
7867	Contract Packing Services, nec
7869	Business Services, nec
8100	Government Administration, undefined
8110	Government Administration (Except Defence)
8111	Central Government Administration

Value	Description
8112	State Government Administration
8113	Local Government Administration
8120	Justice
8130	Foreign Government Representation
8200	Defence
8400	Education, undefined
8410	Preschool Education
8420	School Education, undefined
8421	Primary Education
8422	Secondary Education
8423	Combined Primary and Secondary Education
8424	Special School Education
8430	Post School Education, undefined
8431	Higher Education
8432	Technical and Further Education
8440	Other Education
8600	Health Services, undefined
8610	Hospitals and Nursing Homes, undefined
8611	Hospitals (Except Psychiatric Hospitals)
8612	Psychiatric Hospitals
8613	Nursing Homes
8620	Medical and Dental Services, undefined
8621	General Practice Medical Services
8622	Specialist Medical Services
8623	Dental Services
8630	Other Health Services, undefined
8631	Pathology Services
8632	Optometry and Optical Dispensing
8633	Ambulance Services
8634	Community Health Centres
8635	Physiotherapy Services
8636	Chiropractic Services
8639	Health Services, nec
8640	Veterinary Services
8700	Community Services, undefined
8710	Child Care Services
8720	Community Care Services, undefined
8721	Accommodation for the Aged
8722	Residential Care Services, nec
8729	Non-Residential Care Services, nec
9100	Motion Picture, Radio and Television Services, undefined
9110	Film and Video Services, undefined
9111	Film and Video Production
9112	Film and Video Distribution
9113	Motion Picture Exhibition
9120	Radio and Television Services, undefined

Value	Description
9121	Radio Services
9122	Television Services
9200	Libraries, Museums and the Arts, undefined
9210	Libraries
9220	Museums
9230	Parks and Gardens, undefined
9231	Zoological and Botanic Gardens
9239	Recreational Parks and Gardens
9240	Arts, undefined
9241	Music and Theatre Productions
9242	Creative Arts
9250	Services to the Arts, undefined
9251	Sound Recording Studios
9252	Performing Arts Venues
9259	Services to the Arts, nec
9300	Sport and Recreation, undefined
9310	Sport, undefined
9311	Horse and Dog Racing
9312	Sports Grounds and Facilities, nec
9319	Sports and Services to Sports, nec
9320	Gambling Services, undefined
9321	Lotteries
9322	Casinos
9329	Gambling Services, nec
9330	Other Recreation Services
9500	Personal Services, undefined
9510	Personal and Household Goods Hiring, undefined
9511	Video Hire Outlets
9519	Personal and Household Goods Hiring, nec
9520	Other Personal Services, undefined
9521	Laundries and Dry-Cleaners
9522	Photographic Film Processing
9523	Photographic Studios
9524	Funeral Directors, Crematoria and Cemeteries
9525	Gardening Services
9526	Hairdressing and Beauty Salons
9529	Personal Services, nec
9600	Other Services, undefined
9610	Religious Organisations
9620	Interest Groups, undefined
9621	Business and Professional Associations
9622	Labour Associations
9629	Interest Groups, nec
9630	Public Order and Safety Services, undefined
9631	Police Services
9632	Corrective Services

Value	Description
9633	Fire Brigade Services
9634	Waste Disposal Services
9700	Private Households Employing Staff
9900	Non-classifiable economic units
A000	Agriculture, Forestry and Fishing, undefined
B000	Mining, undefined
C000	Manufacturing, undefined
D000	Electricity, Gas and Water Supply, undefined
E000	Construction, undefined
F000	Wholesale Trade, undefined
G000	Retail Trade, undefined
I000	Transport and Storage, undefined
K000	Finance and Insurance, undefined
L000	Property and Business Services, undefined
M000	Government Administration and Defence, undefined
O000	Health and Community Services, undefined
P000	Cultural and Recreational Services, undefined
Q000	Personal and Other Services, undefined
&&&&	Not stated

MODE05 – Mode — Tables: 03, 06

Value	Description
1	Train (Train + any combination with train)
2	Bus (Bus + any combination with bus except if train)
3	Car (Car as driver / passenger + any combination with car except train, bus, ferry/tram or taxi)
4	Other (Any other mode or combination of modes, includes unknown)
5	Non travel (Worked at home, did not go to work)

MODE13 - Mode — Tables: 04, 05, 08, 09, 10, 11, 23, 24, 26, 27, 29, 30, 31, 32

Value	Description
1	Train
2	Bus
3	Ferry/tram
4	Taxi
5	Car as driver
6	Car as passenger
7	Motorbike/motor scooter
8	Bicycle
9	Other
10	Walked only

Value	Description
1	Train
11	Worked at home
12	Did not go to work
13	Not stated

MODE45 - Mode — Table 07

Value	Description
1	Train
2	Bus
3	Ferry/tram
4	Taxi
5	Car as driver
6	Car as passenger
7	Motor bike/motor scooter
8	Bicycle
9	Other single mode
10	Train, bus
11	Train, ferry/tram
12	Train, taxi
13	Train, car as driver
14	Train, car as passenger
15	Train, bicycle
16	Train, motor bike/motor scooter or other
17	Bus, ferry/tram
18	Bus, taxi
19	Bus, car as driver
20	Bus, car as passenger
21	Bus, motor bike/motor scooter or bicycle or other
22	Ferry/tram, car as driver
23	Ferry/tram, taxi or car as passenger or motor bike/motor scooter or bicycle or other
24	Taxi, car as driver
25	Taxi, car as passenger
26	Taxi, motor bike/motor scooter or bicycle or other
27	Car as driver, car as passenger
28	Car as driver, motor bike/motor scooter or bicycle or other
29	Car as passenger, motor bike/motor scooter or bicycle or other
30	Train, bus, ferry/tram
31	Train, bus, taxi
32	Train, bus, car as driver
33	Train, bus, car as passenger
34	Train, bus, motor bike/motor scooter or bicycle or other
35	Train, ferry/tram, taxi or car as driver or car as passenger or motor bike/motor scooter or bicycle or other
36	Train, Taxi, car as driver or car as passenger or motor bike/motor scooter or other

Value	Description
37	Train, car as driver, car as passenger
38	Train + 2 other (see note below)
39	Bus + 2 other (see note below)
40	Taxi + 2 other (see note below)
41	All other 2 or 3 modes (see note below)
42	Walked only
43	Worked at home
44	Did not go to work
45	Not stated

OCCPN11 – Occupation (1 digit ASCO code) Tables: 14, 21, 22, 25

Value	Description
1	Managers and Administrators
2	Professionals
3	Associate Professionals
4	Tradespersons and Related Workers
5	Advanced Clerical and Service Workers
6	Intermediate Clerical, Sales and Service Workers
7	Intermediate Production and Transport Workers
8	Elementary Clerical, Sales and Service Workers
9	Labourers and Related Workers
0	Inadequately described
&	Not stated

OCCPN46 - Occupation (2 digit ASCO code) Table 19

Value	Description
10	Managers and Administrators nfd
11	Generalist Managers
12	Specialist Managers
13	Farmers and Farm Managers
20	Professionals, nfd
21	Science, Building and Engineering Professionals
22	Business and Information Professionals
23	Health Professionals
24	Education Professionals
25	Social, Arts and Miscellaneous Professionals
30	Associate Professionals, nfd
31	Science, Engineering and Related Associate Professionals
32	Business and Administration Associate Professionals
33	Managing Supervisors (Sales and Service)
34	Health and Welfare Associate Professionals
39	Other Associate Professionals
40	Tradespersons and Related Workers, nfd

Value	Description
41	Mechanical and Fabrication Engineering Tradespersons
42	Automotive Tradespersons
43	Electrical and Electronics Tradespersons
44	Construction Tradespersons
45	Food Tradespersons
46	Skilled Agricultural and Horticultural Workers
49	Other Tradespersons and Related Workers
50	Advanced Clerical and Service Workers, nfd
51	Secretaries and Personal Assistants
59	Other Advanced Clerical and Service Workers
60	Intermediate Clerical, Sales and Service Workers, nfd
61	Intermediate Clerical Workers
62	Intermediate Sales and Related Workers
63	Intermediate Service Workers
70	Intermediate Production and Transport Workers, nfd
71	Intermediate Plant Operators
72	Intermediate Machine Operators
73	Road and Rail Transport Drivers
79	Other Intermediate Production and Transport Workers
80	Elementary Clerical, Sales and Service Workers, nfd
81	Elementary Clerks
82	Elementary Sales Workers
83	Elementary Service Workers
90	Labourers and Related Workers, nfd
91	Cleaners
92	Factory Labourers
99	Other Labourers and Related Workers
09	Inadequately described
&&	Not stated

OCCPN437 – Occupation (4 digit ASCO code) Table 18

Value	Description
1000	Managers and Administrators, nfd
1100	Generalist Managers, nfd
1110	General Managers and Administrators, nfd
1111	Legislators and Government Appointed Officials
1112	General Managers
1190	Miscellaneous Generalist Managers, nfd
1191	Building and Construction Managers
1192	Importers, Exporters and Wholesalers
1193	Manufacturers
1200	Specialist Managers, nfd
1210	Resource Managers, nfd
1211	Finance Managers
1212	Company Secretaries
1213	Human Resource Managers
1220	Engineering, Distribution and Process Managers, nfd
1221	Engineering Managers
1222	Production Managers
1223	Supply and Distribution Managers
1224	Information Technology Managers
1231	Sales and Marketing Managers
1290	Miscellaneous Specialist Managers, nfd
1291	Policy and Planning Managers
1292	Health Services Managers
1293	Education Managers
1294	Commissioned Officers (Management)
1295	Child Care Co-ordinators
1296	Media Producers and Artistic Directors
1299	Other Specialist Managers
1310	Farmers and Farm Managers, nfd
1311	Mixed Crop and Livestock Farmers
1312	Livestock Farmers
1313	Crop Farmers
1314	Aquaculture Farmers
2000	Professionals, nfd
2100	Science, Building and Engineering Professionals, nfd
2110	Natural and Physical Science Professionals, nfd
2111	Chemists
2112	Geologists and Geophysicists
2113	Life Scientists
2114	Environmental and Agricultural Science Professionals
2115	Medical Scientists
2119	Other Natural and Physical Science Professionals
2120	Building and Engineering Professionals, nfd

Value	Description
2121	Architects and Landscape Architects
2122	Quantity Surveyors
2123	Cartographers and Surveyors
2124	Civil Engineers
2125	Electrical and Electronics Engineers
2126	Mechanical, Production and Plant Engineers
2127	Mining and Materials Engineers
2128	Engineering Technologists
2129	Other Building and Engineering Professionals
2200	Business and Information Professionals, nfd
2210	Accountants, Auditors and Corporate Treasurers, nfd
2211	Accountants
2212	Auditors
2213	Corporate Treasurers
2220	Sales, Marketing and Advertising Professionals, nfd
2221	Marketing and Advertising Professionals
2222	Technical Sales Representatives
2231	Computing Professionals
2290	Miscellaneous Business and Information Professionals, nfd
2291	Human Resource Professionals
2292	Librarians
2293	Mathematicians, Statisticians and Actuaries
2294	Business and Organisation Analysts
2295	Property Professionals
2299	Other Business and Information Professionals
2300	Health Professionals, nfd
2310	Medical Practitioners, nfd
2311	Generalist Medical Practitioners
2312	Specialist Medical Practitioners
2320	Nursing Professionals, nfd
2321	Nurse Managers
2322	Nurse Educators and Researchers
2323	Registered Nurses
2324	Registered Midwives
2325	Registered Mental Health Nurses
2326	Registered Developmental Disabililty Nurses
2380	Miscellaneous Health Professionals, nfd
2381	Dental Practitioners
2382	Pharmacists
2383	Occupational Therapists
2384	Optometrists
2385	Physiotherapists
2386	Speech Pathologists
2387	Chiropractors and Osteopaths
2388	Podiatrists
2391	Medical Imaging Professionals

Value	Description
2392	Veterinarians
2393	Dietitians
2394	Natural Therapy Professionals
2399	Other Health Professionals
2400	Education Professionals, nfd
2410	School Teachers, nfd
2411	Pre-Primary School Teachers
2412	Primary School Teachers
2413	Secondary School Teachers
2414	Special Education Teachers
2420	University and Vocational Education Teachers, nfd
2421	University Lecturers and Tutors
2422	Vocational Education Teachers
2490	Miscellaneous Education Professionals, nfd
2491	Extra-Systemic Teachers
2492	English as a Second Language Teachers
2493	Education Officers
2500	Social, Arts and Miscellaneous Professionals, nfd
2510	Social Welfare Professionals, nfd
2511	Social Workers
2512	Welfare and Community Workers
2513	Counsellors
2514	Psychologists
2515	Ministers of Religion
2520	Miscellaneous Social Professionals, nfd
2521	Legal Professionals
2522	Economists
2523	Urban and Regional Planners
2529	Other Social Professionals
2530	Artists and Related Professionals, nfd
2531	Visual Arts and Crafts Professionals
2532	Photographers
2533	Designers and Illustrators
2534	Journalists and Related Professionals
2535	Authors and Related Professionals
2536	Film, Television, Radio and Stage Directors
2537	Musicians and Related Professionals
2538	Actors, Dancers and Related Professionals
2539	Media Presenters
2540	Miscellaneous Professionals, nfd
2541	Air Transport Professionals
2542	Sea Transport Professionals
2543	Occupational and Environmental Health Professionals
2549	Other Professionals
3000	Associate Professionals, nfd
3100	Science, Engineering & Related Associate Professionals, nfd

Value	Description
3110	Medical and Science Technical Officers, nfd
3111	Medical Technical Officers
3112	Science Technical Officers
3120	Building and Engineering Associate Professionals, nfd
3121	Building, Architectural & Surveying Associate Professionals
3122	Civil Engineering Associate Professionals
3123	Electrical Engineering Associate Professionals
3124	Electronics Engineering Associate Professionals
3125	Mechanical Engineering Associate Professionals
3129	Other Building and Engineering Associate Professionals
3200	Business and Administration Associate Professionals, nfd
3210	Finance Associate Professionals, nfd
3211	Branch Accountants and Managers (Financial Institution)
3212	Financial Dealers and Brokers
3213	Financial Investment Advisers
3290	Miscellaneous Business & Administration Associate Professionals, nfd
3291	Office Managers
3292	Project and Program Administrators
3293	Real Estate Associate Professionals
3294	Computing Support Technicians
3300	Managing Supervisors (Sales and Service), nfd
3311	Shop Managers
3320	Hospitality and Accommodation Managers, nfd
3321	Restaurant and Catering Managers
3322	Chefs
3323	Hotel and Motel Managers
3324	Club Managers (Licensed Premises)
3325	Caravan Park and Camping Ground Managers
3329	Other Hospitality and Accommodation Managers
3390	Miscellaneous Managing Supervisors (Sales & Service), nfd
3391	Sport and Recreation Managers
3392	Customer Service Managers
3393	Transport Company Managers
3399	Other Managing Supervisors (Sales and Service)
3400	Health and Welfare Associate Professionals, nfd
3411	Enrolled Nurses
3421	Welfare Associate Professionals
3490	Miscellaneous Health & Welfare Associate Professionals, nfd
3491	Ambulance Officers and Paramedics
3492	Dental Associate Professionals
3493	Aboriginal and Torres Strait Islander Health Workers
3494	Massage Therapists
3900	Associate Professionals, nfd
3911	Police Officers
3990	Miscellaneous Associate Professionals, nfd
3991	Primary Products Inspectors

Value	Description
3992	Safety Inspectors
3993	Sportspersons, Coaches and Related Support Workers
3994	Senior Non-Commissioned Defence Force Officers
3995	Senior Fire Fighters
3996	Retail Buyers
3997	Library Technicians
3999	Other Miscellaneous Associate Professionals
4000	Tradespersons and Related Workers, nfd
4100	Mechanical and Fabrication Engineering Tradespersons, nfd
4110	Mechanical Engineering Tradespersons, nfd
4111	General Mechanical Engineering Tradespersons
4112	Metal Fitters and Machinists
4113	Toolmakers
4114	Aircraft Maintenance Engineers
4115	Precision Metal Tradespersons
4120	Fabrication Engineering Tradespersons, nfd
4121	General Fabrication Engineering Tradespersons
4122	Structural Steel and Welding Tradespersons
4123	Forging Tradespersons
4124	Sheetmetal Tradespersons
4125	Metal Casting Tradespersons
4126	Metal Finishing Tradespersons
4210	Automotive Tradespersons, nfd
4211	Motor Mechanics
4212	Automotive Electricians
4213	Panel Beaters
4214	Vehicle Painters
4215	Vehicle Body Makers
4216	Vehicle Trimmers
4310	Electrical and Electronics Tradespersons, nfd
4311	Electricians
4312	Refrigeration and Airconditioning Mechanics
4313	Electrical Distribution Tradespersons
4314	Electronic Instrument Tradespersons
4315	Electronic and Office Equipment Tradespersons
4316	Communications Tradespersons
4400	Construction Tradespersons, nfd
4410	Structural Construction Tradespersons, nfd
4411	Carpentry and Joinery Tradespersons
4412	Fibrous Plasterers
4413	Roof Slaters and Tilers
4414	Bricklayers
4415	Solid Plasterers
4416	Wall and Floor Tilers and Stonemasons
4420	Final Finishes Construction Tradespersons, nfd
4421	Painters and Decorators

Value	Description
4422	Signwriters
4423	Floor Finishers
4431	Plumbers
4510	Food Tradespersons, nfd
4511	Meat Tradespersons
4512	Bakers and Pastrycooks
4513	Cooks
4519	Other Food Tradespersons
4600	Skilled Agricultural and Horticultural Workers, nfd
4610	Skilled Agricultural Workers, nfd
4611	Farm Overseers
4612	Shearers
4613	Wool, Hide and Skin Classers
4614	Animal Trainers
4620	Horticultural Tradespersons, nfd
4621	Nurserypersons
4622	Greenkeepers
4623	Gardeners
4900	Other Tradespersons and Related Workers, nfd
4910	Printing Tradespersons, nfd
4911	Graphic Pre-Press Tradespersons
4912	Printing Machinists and Small Offset Printers
4913	Binders and Finishers
4914	Screen Printers
4920	Wood Tradespersons, nfd
4921	Wood Machinists and Turners
4922	Cabinetmakers
4929	Other Wood Tradespersons
4931	Hairdressers
4940	Textile, Clothing and Related Tradespersons, nfd
4941	Clothing Tradespersons
4942	Upholsterers and Bedding Tradespersons
4943	Footwear Tradespersons
4944	Leather Goods, Canvas Goods and Sail Makers
4980	Miscellaneous Tradespersons and Related Workers, nfd
4981	Marine Construction Tradespersons
4982	Glass Tradespersons
4983	Jewellers and Related Tradespersons
4984	Florists
4985	Fire Fighters
4986	Drillers
4987	Chemical, Petroleum and Gas Plant Operators
4988	Power Generation Plant Operators
4991	Defence Force Members Not Elsewhere Included
4992	Performing Arts Support Workers
4999	Other Miscellaneous Tradespersons and Related Workers

Value	Description
5000	Advanced Clerical and Service Workers, nfd
5111	Secretaries and Personal Assistants
5900	Other Advanced Clerical and Service Workers, nfd
5910	Advanced Numerical Clerks, nfd
5911	Bookkeepers
5912	Credit and Loans Officers
5990	Miscellaneous Advanced Clerical & Service Workers, nfd
5991	Advanced Legal and Related Clerks
5992	Court and Hansard Reporters
5993	Insurance Agents
5994	Insurance Risk Surveyors, Investigators and Loss Adjusters
5995	Desktop Publishing Operators
5996	Travel Attendants
5999	Other Miscellaneous Advanced Clerical & Service Workers
6000	Intermediate Clerical, Sales and Service Workers, nfd
6100	Intermediate Clerical Workers, nfd
6111	General Clerks
6121	Keyboard Operators
6131	Receptionists
6140	Intermediate Numerical Clerks, nfd
6141	Accounting Clerks
6142	Payroll Clerks
6143	Bank Workers
6144	Insurance Clerks
6145	Money Market and Statistical Clerks
6150	Material Recording and Despatching Clerks, nfd
6151	Production Recording Clerks
6152	Transport and Despatching Clerks
6153	Stock and Purchasing Clerks
6190	Miscellaneous Intermediate Clerical Workers, nfd
6191	Inquiry and Admissions Clerks
6192	Library Assistants
6193	Personnel Clerks
6194	Intermediate Inspectors and Examiners
6199	Other Intermediate Clerical Workers
6210	Intermediate Sales and Related Workers, nfd
6211	Sales Representatives
6212	Motor Vehicle and Related Products Salespersons
6213	Retail and Checkout Supervisors
6300	Intermediate Service Workers, nfd
6310	Carers and Aides, nfd
6311	Education Aides
6312	Children's Care Workers
6313	Special Care Workers
6314	Personal Care and Nursing Assistants
6320	Hospitality Workers, nfd

Value	Description
6321	Hotel Service Supervisors
6322	Bar Attendants
6323	Waiters
6324	Hospitality Trainees
6390	Miscellaneous Intermediate Service Workers, nfd
6391	Dental Assistants
6392	Veterinary Nurses
6393	Prison Officers
6394	Gaming Workers
6395	Personal Care Consultants
6396	Fitness Instructors and Related Workers
6397	Travel and Tourism Agents
6399	Other Intermediate Service Workers
7000	Intermediate Production and Transport Workers, nfd
7100	Intermediate Plant Operators, nfd
7110	Mobile Plant Operators, nfd
7111	Mobile Construction Plant Operators
7112	Fork Lift Drivers
7119	Other Mobile Plant Operators
7120	Intermediate Stationary Plant Operators, nfd
7121	Engine and Boiler Operators
7122	Crane, Hoist and Lift Operators
7123	Engineering Production Systems Workers
7124	Pulp and Paper Mill Operators
7129	Other Intermediate Stationary Plant Operators
7200	Intermediate Machine Operators, nfd
7210	Intermediate Textile, Clothing and Related Machine Operators, nfd
7211	Sewing Machinists
7212	Textile and Footwear Production Machine Operators
7290	Miscellaneous Intermediate Machine Operators, nfd
7291	Plastics Production Machine Operators
7292	Rubber Production Machine Operators
7293	Chemical Production Machine Operators
7294	Wood Processing Machine Operators
7295	Paper Products Machine Operators
7296	Glass Production Machine Operators
7297	Clay, Stone and Concrete Processing Machine Operators
7298	Photographic Developers and Printers
7299	Other Intermediate Machine Operators
7310	Road and Rail Transport Drivers, nfd
7311	Truck Drivers
7312	Bus and Tram Drivers
7313	Automobile Drivers
7314	Delivery Drivers
7315	Train Drivers and Assistants
7900	Other Intermediate Production and Transport Workers, nfd

Value	Description
7910	Intermediate Mining and Construction Workers, nfd
7911	Miners
7912	Blasting Workers
7913	Structural Steel Construction Workers
7914	Insulation and Home Improvements Installers
7990	Miscellaneous Intermediate Production and Transport Workers, nfd
7991	Motor Vehicle Parts and Accessories Fitters
7992	Product Quality Controllers
7993	Storepersons
7994	Seafarers and Fishing Hands
7995	Forestry and Logging Workers
7996	Printing Hands
8000	Elementary Clerical, Sales and Service Workers, nfd
8110	Elementary Clerks, nfd
8111	Registry and Filing Clerks
8112	Mail Sorting Clerks
8113	Switchboard Operators
8114	Messengers
8115	Betting Clerks
8116	Office Trainees
8119	Other Elementary Clerks
8200	Elementary Sales Workers, nfd
8211	Sales Assistants
8290	Miscellaneous Elementary Sales Workers, nfd
8291	Checkout Operators and Cashiers
8292	Ticket Salespersons
8293	Street Vendors and Related Workers
8294	Telemarketers
8295	Sales Demonstrators and Models
8296	Service Station Attendants
8297	Sales and Service Trainees
8299	Other Elementary Sales Workers
8310	Elementary Service Workers, nfd
8311	Guards and Security Officers
8312	Ushers, Porters and Related Workers
8313	Domestic Housekeepers
8314	Caretakers
8315	Laundry Workers
8319	Other Elementary Service Workers
9000	Labourers and Related Workers, nfd
9111	Cleaners
9200	Factory Labourers, nfd
9210	Process Workers, nfd
9211	Engineering Production Process Workers
9212	Product Assemblers
9213	Meat and Fish Process Workers

Value	Description
9214	Other Food Factory Hands
9215	Wood Products Factory Hands
9219	Other Process Workers
9220	Product Packagers, nfd
9221	Hand Packers
9222	Packagers and Container Fillers
9900	Other Labourers and Related Workers, nfd
9910	Mining, Construction and Related Labourers, nfd
9911	Mining Support Workers and Driller's Assistants
9912	Earthmoving Labourers
9913	Paving and Surfacing Labourers
9914	Survey Hands
9915	Railway Labourers
9916	Construction and Plumber's Assistants
9917	Concreters
9918	Electrical and Telecommunications Trades Assistants
9919	Other Mining, Construction and Related Labourers
9920	Agricultural and Horticultural Labourers, nfd
9921	Farm Hands
9922	Nursery and Garden Labourers
9929	Other Agricultural and Horticultural Labourers
9930	Elementary Food Preparation and Related Workers, nfd
9931	Kitchenhands
9932	Fast Food Cooks
9933	Food Trades Assistants
9990	Miscellaneous Labourers and Related Workers, nfd
9991	Garbage Collectors
9992	Freight and Furniture Handlers
9993	Handypersons
9999	Other Miscellaneous Labourers and Related Workers
0998	Inadequately described
&&&&	Not stated

OFFAGE08 – Offspring age — Tables: 06, 31

Value	Description
1	0-12 year olds only
2	13-14 year olds only
3	15-24 year olds only
4	0-12 year olds and 13-14 year olds only
5	0-12 year olds and 15-24 year olds only
6	13-14 year olds and 15-24 year olds only

Value	Description
7	0-12 year olds, 13-14 year olds and 15-24 year olds only
8	Not applicable, unknown

PERINC10 – Annual personal income — Table 32

Value	Description
1	Negative or nil income
2	$1 - $4159
3	$4160 - $8319
4	$8320 - $15599
5	$15600 - $25999
6	$26000 - $36399
7	$36400 - $51999
8	$52000 - $77999
9	$78000 or more
10	Not stated

PERINC17 - Annual personal income — Table26

Value	Description
1	Negative income
2	Nil income
3	$1 - $2079
4	$2080 - $4159
5	$4160 - $6239
6	$6240 - $8319
7	$8320 - $10399
8	$10400 - $15599
9	$15600 - $20799
10	$20800 - $25999
11	$26000 - $31199
12	$31200 - $36399
13	$36400 - $41599
14	$41600 - $51999
15	$52000 - $77999
16	$78000 or more
17	Not stated

SEX — Tables: 04, 05, 14, 20, 21, 22, 25, 26, 28, 29, 31, 32

Value	Description
1	Male
2	Female

STUDHR04 – Student status **Table 28**

Value	Description
1	Not attending
2	Full time student
3	Part time student
4	Not stated

TZ96_D – 1996 Destination Travel Zone Tables: 1, 3, 4, 11, 12, 16-24

Since TDC Travel Zones consist of spatial boundaries, there is no code frame for this variable (the zone boundaries are provided electronically on CD-ROM). However, the following special codes should be noted:

Value	Description
9979	NSW undefined
9985	Sydney undefined
9990	No fixed address
9998	Outside TDC Study Area
9999	Unknown

WORKHR06 – Working hours **Tables: 06, 22, 23**

Value	Description
1	0 - 15 hours
2	16 - 24 hours
3	25 - 34 hours
4	35 - 39 hours
5	40 + hours
6	Not stated

5.2 MODE GROUPING EQUIVALENCES

Mode data in the 1996 JTW tables is provided in three grouping formats:

1. 45 mode categories,

2. 13 mode categories, and

3. 5 mode categories.

All groupings are compiled from a full list of 131 categories supplied by ABS. The following equivalence tables list the relationships between the three mode groupings and the full list of 131 categories.

1996 JTW Modes: Equivalence of Mode 131 with Mode 45, Mode 13 and Mode 05

Sorted in order of Mode 131 code

Mode 131	Mode 45	Mode 13	Mode 5
1 Train	1 Train	1 Train	1 Train
2 Bus	2 Bus	2 Bus	2 Bus
3 Ferry/tram	3 Ferry/tram	3 Ferry/tram	4 Other
4 Taxi	4 Taxi	4 Taxi	4 Other
5 Car, as driver	5 Car as driver	5 Car as driver	3 Car
6 Car, as passenger	6 Car as passenger	6 Car as passenger	3 Car
7 M.bike/scooter	7 Motor bike/ motor scooter	7 M.bike/scooter	4 Other
8 Bicycle	8 Bicycle	8 Bicycle	4 Other
9 Other	9 Other single mode	9 Other	4 Other
10 Train, bus	10 Train, bus	1 Train	1 Train
11 Train, ferry/tram	11 Train, ferry/tram	1 Train	1 Train
12 Train, taxi	12 Train, taxi	1 Train	1 Train
13 Train, car as driver	13 Train, car as driver	1 Train	1 Train
14 Train, car as passenger	14 Train, car as passenger	1 Train	1 Train
15 Train, m.bike/scooter	16 Train, m.bike/scooter or other	1 Train	1 Train
16 Train, bicycle	15 Train, bicycle	1 Train	1 Train
17 Train, other	16 Train, m.bike/scooter or other	1 Train	1 Train
18 Bus, ferry/tram	17 Bus, ferry/tram	2 Bus	2 Bus
19 Bus, taxi	18 Bus, taxi	2 Bus	2 Bus
20 Bus, car as driver	19 Bus, car as driver	2 Bus	2 Bus
21 Bus, car as passenger	20 Bus, car as passenger	2 Bus	2 Bus
22 Bus, m.bike/scooter	21 Bus, m.bike/scooter or bicycle or other	2 Bus	2 Bus
23 Bus, bicycle	21 Bus, m.bike/scooter or bicycle or other	2 Bus	2 Bus
24 Bus, other	21 Bus, m.bike/scooter or bicycle or other	2 Bus	2 Bus
25 Ferry/tram, taxi	23 Ferry/tram, taxi or car as pass. or m.bike/scooter or bicycle or other	3 Ferry/tram	4 Other
26 Ferry/tram, car driver	22 Ferry/tram, car driver	3 Ferry/tram	4 Other
27 Ferry/tram, car passenger	23 Ferry/tram, taxi or car as pass. or m.bike/scooter or bicycle or other	3 Ferry/tram	4 Other

28 Ferry/tram, m.bike/scooter	23 Ferry/tram, taxi or car as pass. or m.bike/scooter or bicycle or other	3 Ferry/tram	4 Other
29 Ferry/tram, bicycle	23 Ferry/tram, taxi or car as pass. or m.bike/scooter or bicycle or other	3 Ferry/tram	4 Other
30 Ferry/tram, other	23 Ferry/tram, taxi or car as pass. or m.bike/scooter or bicycle or other	3 Ferry/tram	4 Other
31 Taxi, car as driver	24 Taxi, car as driver	4 Taxi	4 Other
32 Taxi, car as passenger	25 Taxi, car as passenger	4 Taxi	4 Other
33 Taxi, m.bike/scooter	26 Taxi, m.bike/scooter or bicycle or other	4 Taxi	4 Other
34 Taxi, bicycle	26 Taxi, m.bike/scooter or bicycle or other	4 Taxi	4 Other
35 Taxi, other	26 Taxi, m.bike/scooter or bicycle or other	4 Taxi	4 Other
36 Car as driver, car as passenger	27 Car as driver, car as passenger	5 Car as driver	3 Car
37 Car as driver, m.bike/scooter	28 Car as driver, m.bike/scooter or bicycle or other	5 Car as driver	3 Car
38 Car as driver, bicycle	28 Car as driver, m.bike/scooter or bicycle or other	5 Car as driver	3 Car
39 Car as driver, other	28 Car as driver, m.bike/scooter or bicycle or other	5 Car as driver	3 Car
40 Car as passenger, m.bike/scooter	29 Car as passenger, m.bike/scooter or bicycle or other	6 Car as passenger	3 Car
41 Car as passenger, bicycle	29 Car as passenger, m.bike/scooter or bicycle or other	6 Car as passenger	3 Car
42 Car as passenger, other	29 Car as passenger, m.bike/scooter or bicycle or other	6 Car as passenger	3 Car
43 M.bike/scooter, bicycle	41 All other 2 or 3 modes	7 M.bike/scooter	4 Other
44 M.bike/scooter, other	41 All other 2 or 3 modes	7 M.bike/scooter	4 Other
45 Bicycle, other	41 All other 2 or 3 modes	8 Bicycle	4 Other
46 Train, bus, ferry/tram	30 Train, bus, ferry/tram	1 Train	1 Train
47 Train, bus, taxi	31 Train, bus, taxi	1 Train	1 Train
48 Train, bus, car as driver	32 Train, bus, car as driver	1 Train	1 Train
49 Train, bus, car as passenger	33 Train, bus, car as passenger	1 Train	1 Train
50 Train, bus, m.bike/scooter	34 Train, bus, m.bike/scooter or bicycle or other	1 Train	1 Train
51 Train, bus, bicycle	34 Train, bus, m.bike/scooter or bicycle or other	1 Train	1 Train
52 Train, bus, other	34 Train, bus, m.bike/scooter or bicycle or other	1 Train	1 Train
53 Train, ferry/tram, taxi	35 Train, ferry/tram, taxi or car driv/pass or m.bike/scooter or bicycle or other	1 Train	1 Train
54 Train, ferry/tram, car as driver	35 Train, ferry/tram, taxi or car driv/pass or m.bike/scooter or bicycle or other	1 Train	1 Train
55 Train, ferry/tram, car as passenger	35 Train, ferry/tram, taxi or car driv/pass or m.bike/scooter or bicycle or other	1 Train	1 Train
56 Train, ferry/tram, m.bike/scooter	35 Train, ferry/tram, taxi or car driv/pass or m.bike/scooter or bicycle or other	1 Train	1 Train
57 Train, ferry/tram, bicycle	35 Train, ferry/tram, taxi or car driv/pass or m.bike/scooter or bicycle or other	1 Train	1 Train
58 Train, ferry/tram, other	35 Train, ferry/tram, taxi or car driv/pass or m.bike/scooter or bicycle or other	1 Train	1 Train

59 Train, taxi, car as driver	36 Train, Taxi, car as driver or car as passenger or m.bike/scooter or other	1 Train	1 Train
60 Train, taxi, car as passenger	36 Train, Taxi, car as driver or car as passenger or m.bike/scooter or other	1 Train	1 Train
61 Train, taxi, m.bike/scooter	36 Train, Taxi, car as driver or car as passenger or m.bike/scooter or other	1 Train	1 Train
62 Train, taxi, bicycle	38 Train + 2 other	1 Train	1 Train
63 Train, taxi, other	36 Train, Taxi, car as driver or car as passenger or m.bike/scooter or other	1 Train	1 Train
64 Train, car driver, car passenger	37 Train, car as driver, car as passenger	1 Train	1 Train
65 Train, car as driver, m.bike/scooter	38 Train + 2 other	1 Train	1 Train
66 Train, car as driver, bicycle	38 Train + 2 other	1 Train	1 Train
67 Train, car as driver, other	38 Train + 2 other	1 Train	1 Train
68 Train, car as passenger, m.bike/scooter	38 Train + 2 other	1 Train	1 Train
69 Train, car as passenger, bicycle	38 Train + 2 other	1 Train	1 Train
70 Train, car as passenger, other	38 Train + 2 other	1 Train	1 Train
71 Train, m.bike/scooter, bicycle	38 Train + 2 other	1 Train	1 Train
72 Train, m.bike/scooter, other	38 Train + 2 other	1 Train	1 Train
73 Train, bicycle, other	38 Train + 2 other	1 Train	1 Train
74 Bus, ferry/tram, taxi	39 Bus + 2 other	2 Bus	2 Bus
75 Bus, ferry/tram, car as driver	39 Bus + 2 other	2 Bus	2 Bus
76 Bus, ferry/tram car as passenger	39 Bus + 2 other	2 Bus	2 Bus
77 Bus, ferry/tram, m.bike/scooter	39 Bus + 2 other	2 Bus	2 Bus
78 Bus, ferry/tram, bicycle	39 Bus + 2 other	2 Bus	2 Bus
79 Bus, ferry/tram, other	39 Bus + 2 other	2 Bus	2 Bus
80 Bus, taxi, car as driver	39 Bus + 2 other	2 Bus	2 Bus
81 Bus, taxi, car as passenger	39 Bus + 2 other	2 Bus	2 Bus
82 Bus, taxi, m.bike/scooter	39 Bus + 2 other	2 Bus	2 Bus
83 Bus, taxi, bicycle	39 Bus + 2 other	2 Bus	2 Bus
84 Bus, taxi, other	39 Bus + 2 other	2 Bus	2 Bus
85 Bus, car as driver, car as passenger	39 Bus + 2 other	2 Bus	2 Bus
86 Bus, car as driver, m.bike/scooter	39 Bus + 2 other	2 Bus	2 Bus
87 Bus, car as driver, bicycle	39 Bus + 2 other	2 Bus	2 Bus
88 Bus, car as driver, other	39 Bus + 2 other	2 Bus	2 Bus
89 Bus, car as passenger, m.bike/scooter	39 Bus + 2 other	2 Bus	2 Bus

90 Bus, car as passenger, bicycle	39 Bus + 2 other	2 Bus	2 Bus
91 Bus, car as passenger, other	39 Bus + 2 other	2 Bus	2 Bus
92 Bus, m.bike/scooter, bicycle	39 Bus + 2 other	2 Bus	2 Bus
93 Bus, m.bike/scooter, other	39 Bus + 2 other	2 Bus	2 Bus
94 Ferry/tram, taxi, car as driver	41 All other 2 or 3 modes	3 Ferry/tram	4 Other
95 Ferry/tram, taxi, car as passenger	41 All other 2 or 3 modes	3 Ferry/tram	4 Other
96 Ferry/tram, taxi, m.bike/scooter	41 All other 2 or 3 modes	3 Ferry/tram	4 Other
97 Ferry/tram, taxi, bicycle	41 All other 2 or 3 modes	3 Ferry/tram	4 Other
98 Ferry/tram, taxi, other	41 All other 2 or 3 modes	3 Ferry/tram	4 Other
99 Ferry/tram, car as driver, car as passenger	41 All other 2 or 3 modes	3 Ferry/tram	4 Other
100 Ferry/tram, car as driver, m.bike/scooter	41 All other 2 or 3 modes	3 Ferry/tram	4 Other
101 Ferry/tram, car as driver, bicycle	41 All other 2 or 3 modes	3 Ferry/tram	4 Other
102 Ferry/tram, car as driver, other	41 All other 2 or 3 modes	3 Ferry/tram	4 Other
103 Ferry/tram, car as passenger, m.bike/scooter	41 All other 2 or 3 modes	3 Ferry/tram	4 Other
104 Ferry/tram, car as passenger, bicycle	41 All other 2 or 3 modes	3 Ferry/tram	4 Other
105 Ferry/tram, car as passenger, other	41 All other 2 or 3 modes	3 Ferry/tram	4 Other
106 Ferry/tram, m.bike/scooter, bicycle	41 All other 2 or 3 modes	3 Ferry/tram	4 Other
107 Ferry/tram, m.bike/scooter, other	41 All other 2 or 3 modes	3 Ferry/tram	4 Other
108 Ferry/tram, bicycle, other	41 All other 2 or 3 modes	3 Ferry/tram	4 Other
109 Taxi, car as driver, car as passenger	40 Taxi + 2 other	4 Taxi	4 Other
110 Taxi, car as driver, m.bike/scooter	40 Taxi + 2 other	4 Taxi	4 Other
111 Taxi, car as driver, bicycle	40 Taxi + 2 other	4 Taxi	4 Other
112 Taxi, car as driver, other	40 Taxi + 2 other	4 Taxi	4 Other
113 Taxi, car as passenger, m.bike/scooter	40 Taxi + 2 other	4 Taxi	4 Other
114 Taxi, car as passenger, bicycle	40 Taxi + 2 other	4 Taxi	4 Other
115 Taxi, car as passenger, other	40 Taxi + 2 other	4 Taxi	4 Other
116 Taxi, m.bike/scooter, bicycle	40 Taxi + 2 other	4 Taxi	4 Other
117 Taxi, m.bike/scooter, other	40 Taxi + 2 other	4 Taxi	4 Other
118 Taxi, bicycle, other	40 Taxi + 2 other	4 Taxi	4 Other
119 Car as driver, car as passenger, m.bike/scooter	41 All other 2 or 3 modes	5 Car as driver	3 Car
120 Car as driver, car as passenger, bicycle	41 All other 2 or 3 modes	5 Car as driver	3 Car

121 Car as driver, car as passenger, other	41 All other 2 or 3 modes	5 Car as driver	3 Car
122 Car as driver, m.bike/scooter, bicycle	41 All other 2 or 3 modes	5 Car as driver	3 Car
123 Car driver, m.bike/scooter, other	41 All other 2 or 3 modes	5 Car as driver	3 Car
124 Car as driver, bicycle, other	41 All other 2 or 3 modes	5 Car as driver	3 Car
125 Car as passenger, m.bike/scooter, bicycle	41 All other 2 or 3 modes	6 Car as passenger	3 Car
126 Car as passenger, m.bike/scooter, other	41 All other 2 or 3 modes	6 Car as passenger	3 Car
127 Car as passenger, bicycle, other	41 All other 2 or 3 modes	6 Car as passenger	3 Car
128 M.bike/scooter, bicycle, other	41 All other 2 or 3 modes	7 M.bike/scooter	4 Other
129 Walked only	42 Walked only	10 Walked only	4 Other
130 Worked at home	43 Worked at home	11 Worked at home	5 Non travel
131 Did not go to work	44 Did not go to work	12 Did not go to work	5 Non travel
&&& Not stated	45 Not stated	13 Not stated	4 Other

1996 JTW Modes: Equivalence of Mode 131 To Mode 45

Sorted in order of Mode 45 code

Mode 131	Mode 45
1 Train	1 Train
2 Bus	2 Bus
3 Ferry/tram	3 Ferry/tram
4 Taxi	4 Taxi
5 Car, as driver	5 Car as driver
6 Car, as passenger	6 Car as passenger
7 Motor bike/motor scooter	7 Motor bike/ motor scooter
8 Bicycle	8 Bicycle
9 Other	9 Other single mode
10 Train, bus	10 Train, bus
11 Train, ferry/tram	11 Train, ferry/tram
12 Train, taxi	12 Train, taxi
13 Train, car as driver	13 Train, car as driver
14 Train, car as passenger	14 Train, car as passenger
16 Train, bicycle	15 Train, bicycle
15 Train, m.bike/m.scooter	16 Train, motor bike/motor scooter or other
17 Train, other	16 Train, motor bike/motor scooter or other
18 Bus, ferry/tram	17 Bus, ferry/tram
19 Bus, taxi	18 Bus, taxi
20 Bus, car as driver	19 Bus, car as driver
21 Bus, car as passenger	20 Bus, car as passenger
22 Bus, m.bike/m.scooter	21 Bus, motor bike/motor scooter or bicycle or other
23 Bus, bicycle	21 Bus, motor bike/motor scooter or bicycle or other
24 Bus, other	21 Bus, motor bike/motor scooter or bicycle or other
26 Ferry/tram, car driver	22 Ferry/tram, car driver
25 Ferry/tram, taxi	23 Ferry/tram, taxi or car as passenger or motor bike/motor scooter or bicycle or other
27 Ferry/tram, car passenger	23 Ferry/tram, taxi or car as passenger or motor bike/motor scooter or bicycle or other

Mode 131	Mode 45
28 Ferry/tram, m.bike/m.scooter	23 Ferry/tram, taxi or car as passenger or motor bike/motor scooter or bicycle or other
29 Ferry/tram, bicycle	23 Ferry/tram, taxi or car as passenger or motor bike/motor scooter or bicycle or other
30 Ferry/tram, other	23 Ferry/tram, taxi or car as passenger or motor bike/motor scooter or bicycle or other
31 Taxi, car as driver	24 Taxi, car as driver
32 Taxi, car as passenger	25 Taxi, car as passenger
33 Taxi, m.bike/m.scooter	26 Taxi, motor bike/motor scooter or bicycle or other
34 Taxi, bicycle	26 Taxi, motor bike/motor scooter or bicycle or other
35 Taxi, other	26 Taxi, motor bike/motor scooter or bicycle or other
36 Car as driver, car as passenger	27 Car as driver, car as passenger
37 Car as driver, m.bike/m.scooter	28 Car as driver, motor bike/motor scooter or bicycle or other
38 Car as driver, bicycle	28 Car as driver, motor bike/motor scooter or bicycle or other
39 Car as driver, other	28 Car as driver, motor bike/motor scooter or bicycle or other
40 Car as passenger, m.bike/m.scooter	29 Car as passenger, motor bike/motor scooter or bicycle or other
41 Car as passenger, bicycle	29 Car as passenger, motor bike/motor scooter or bicycle or other
42 Car as passenger, other	29 Car as passenger, motor bike/motor scooter or bicycle or other
46 Train, bus, ferry/tram	30 Train, bus, ferry/tram
47 Train, bus, taxi	31 Train, bus, taxi
48 Train, bus, car as driver	32 Train, bus, car as driver
49 Train, bus, car as passenger	33 Train, bus, car as passenger
50 Train, bus, m.bike/m.scooter	34 Train, bus, motor bike/motor scooter or bicycle or other
51 Train, bus, bicycle	34 Train, bus, motor bike/motor scooter or bicycle or other
52 Train, bus, other	34 Train, bus, motor bike/motor scooter or bicycle or other
53 Train, ferry/tram, taxi	35 Train, ferry/tram, taxi or car as driver or car as passenger or motor bike/motor scooter or bicycle or other
54 Train, ferry/tram, car as driver	35 Train, ferry/tram, taxi or car as driver or car as passenger or motor bike/motor scooter or bicycle or other
55 Train, ferry/tram, car as passenger	35 Train, ferry/tram, taxi or car as driver or car as passenger or motor bike/motor scooter or bicycle or other
56 Train, ferry/tram, m.bike/m.scooter	35 Train, ferry/tram, taxi or car as driver or car as passenger or motor bike/motor scooter or bicycle or other
57 Train, ferry/tram, bicycle	35 Train, ferry/tram, taxi or car as driver or car as passenger or motor bike/motor scooter or bicycle or other
58 Train, ferry/tram, other	35 Train, ferry/tram, taxi or car as driver or car as passenger or motor bike/motor scooter or bicycle or other
59 Train, taxi, car as driver	36 Train, Taxi, car as driver or car as passenger or motor bike/motor scooter or other
60 Train, taxi, car as passenger	36 Train, Taxi, car as driver or car as passenger or motor bike/motor scooter or other

Mode 131	Mode 45
61 Train, taxi, m.bike/m.scooter	36 Train, Taxi, car as driver or car as passenger or motor bike/motor scooter or other
63 Train, taxi, other	36 Train, Taxi, car as driver or car as passenger or motor bike/motor scooter or other
64 Train, car driver, car passenger	37 Train, car as driver, car as passenger
62 Train, taxi, bicycle	38 Train + 2 other
65 Train, car as driver, m.bike/m.scooter	38 Train + 2 other
66 Train, car as driver, bicycle	38 Train + 2 other
67 Train, car as driver, other	38 Train + 2 other
68 Train, car as passenger, m.bike/m.scooter	38 Train + 2 other
69 Train, car as passenger, bicycle	38 Train + 2 other
70 Train, car as passenger, other	38 Train + 2 other
71 Train, m.bike/m.scooter, bicycle	38 Train + 2 other
72 Train, m.bike/m.scooter, other	38 Train + 2 other
73 Train, bicycle, other	38 Train + 2 other
74 Bus, ferry/tram, taxi	39 Bus + 2 other
75 Bus, ferry/tram, car as driver	39 Bus + 2 other
76 Bus, ferry/tram car as passenger	39 Bus + 2 other
77 Bus, ferry/tram, m.bike/m.scooter	39 Bus + 2 other
78 Bus, ferry/tram, bicycle	39 Bus + 2 other
79 Bus, ferry/tram, other	39 Bus + 2 other
80 Bus, taxi, car as driver	39 Bus + 2 other
81 Bus, taxi, car as passenger	39 Bus + 2 other
82 Bus, taxi, m.bike/m.scooter	39 Bus + 2 other
83 Bus, taxi, bicycle	39 Bus + 2 other
84 Bus, taxi, other	39 Bus + 2 other
85 Bus, car as driver, car as passenger	39 Bus + 2 other
86 Bus, car as driver, m.bike/m.scooter	39 Bus + 2 other
87 Bus, car as driver, bicycle	39 Bus + 2 other
88 Bus, car as driver, other	39 Bus + 2 other
89 Bus, car as passenger, m.bike/m.scooter	39 Bus + 2 other
90 Bus, car as passenger, bicycle	39 Bus + 2 other

Mode 131	Mode 45
91 Bus, car as passenger, other	39 Bus + 2 other
92 Bus, m.bike/m.scooter, bicycle	39 Bus + 2 other
93 Bus, m.bike/m.scooter, other	39 Bus + 2 other
109 Taxi, car as driver, car as passenger	40 Taxi + 2 other
110 Taxi, car as driver, m.bike/m.scooter	40 Taxi + 2 other
111 Taxi, car as driver, bicycle	40 Taxi + 2 other
112 Taxi, car as driver, other	40 Taxi + 2 other
113 Taxi, car as passenger, m.bike/m.scooter	40 Taxi + 2 other
114 Taxi, car as passenger, bicycle	40 Taxi + 2 other
115 Taxi, car as passenger, other	40 Taxi + 2 other
116 Taxi, m.bike/m.scooter, bicycle	40 Taxi + 2 other
117 Taxi, m.bike/m.scooter, other	40 Taxi + 2 other
118 Taxi, bicycle, other	40 Taxi + 2 other
43 M.bike/m.scooter, bicycle	41 All other 2 or 3 modes
44 M.bike/m.scooter, other	41 All other 2 or 3 modes
45 Bicycle, other	41 All other 2 or 3 modes
94 Ferry/tram, taxi, car as driver	41 All other 2 or 3 modes
95 Ferry/tram, taxi, car as passenger	41 All other 2 or 3 modes
96 Ferry/tram, taxi, m.bike/m.scooter	41 All other 2 or 3 modes
97 Ferry/tram, taxi, bicycle	41 All other 2 or 3 modes
98 Ferry/tram, taxi, other	41 All other 2 or 3 modes
99 Ferry/tram, car as driver, car as passenger	41 All other 2 or 3 modes
100 Ferry/tram, car as driver, m.bike/m.scooter	41 All other 2 or 3 modes
101 Ferry/tram, car as driver, bicycle	41 All other 2 or 3 modes
102 Ferry/tram, car as driver, other	41 All other 2 or 3 modes
103 Ferry/tram, car as passenger, m.bike/m.scooter	41 All other 2 or 3 modes
104 Ferry/tram, car as passenger, bicycle	41 All other 2 or 3 modes
105 Ferry/tram, car as passenger, other	41 All other 2 or 3 modes
106 Ferry/tram, m.bike/m.scooter, bicycle	41 All other 2 or 3 modes
107 Ferry/tram, m.bike/m.scooter, other	41 All other 2 or 3 modes

Mode 131	Mode 45
108 Ferry/tram, bicycle, other	41 All other 2 or 3 modes
119 Car as driver, car as passenger, m.bike/m.scooter	41 All other 2 or 3 modes
120 Car as driver, car as passenger, bicycle	41 All other 2 or 3 modes
121 Car as driver, car as passenger, other	41 All other 2 or 3 modes
122 Car as driver, m.bike/m.scooter, bicycle	41 All other 2 or 3 modes
123 Car driver, m.bike/m.scooter, other	41 All other 2 or 3 modes
124 Car as driver, bicycle, other	41 All other 2 or 3 modes
125 Car as passenger, m.bike/m.scooter, bicycle	41 All other 2 or 3 modes
126 Car as passenger, m.bike/m.scooter, other	41 All other 2 or 3 modes
127 Car as passenger, bicycle, other	41 All other 2 or 3 modes
128 M.bike/m.scooter, bicycle, other	41 All other 2 or 3 modes
129 Walked only	42 Walked only
130 Worked at home	43 Worked at home
131 Did not go to work	44 Did not go to work
&&& Not stated	45 Not stated

1996 JTW Modes: Equivalence of Mode 45 with Mode 13 with Mode 05

Sorted in order of Mode 45 code

Mode 45	Mode 13	Mode 05
1 Train	1 Train	1 Train
2 Bus	2 Bus	2 Bus
3 Ferry/tram	3 Ferry/tram	4 Other
4 Taxi	4 Taxi	4 Other
5 Car as driver	5 Car as driver	3 Car
6 Car as passenger	6 Car as passenger	3 Car
7 Motor bike/motor scooter	7 Motor bike/motor scooter	4 Other

Mode 45	Mode 13	Mode 05
8 Bicycle	8 Bicycle	4 Other
9 Other single mode	9 Other	4 Other
10 Train, bus	1 Train	1 Train
11 Train, ferry/tram	1 Train	1 Train
12 Train, taxi	1 Train	1 Train
13 Train, car as driver	1 Train	1 Train
14 Train, car as passenger	1 Train	1 Train
15 Train, bicycle	1 Train	1 Train
16 Train, motor bike/motor scooter or other	1 Train	1 Train
17 Bus, ferry/tram	2 Bus	2 Bus
18 Bus, taxi	2 Bus	2 Bus
19 Bus, car as driver	2 Bus	2 Bus
20 Bus, car as passenger	2 Bus	2 Bus
21 Bus, motor bike/motor scooter or bicycle or other	2 Bus	2 Bus
22 Ferry/tram, car as driver	3 Ferry/tram	4 Other
23 Ferry/tram, taxi or car as passenger or motor bike/motor scooter or bicycle or other	3 Ferry/tram	4 Other
24 Taxi, car as driver	4 Taxi	4 Other
25 Taxi, car as passenger	4 Taxi	4 Other
26 Taxi, motor bike/motor scooter or bicycle or other	4 Taxi	4 Other
27 Car as driver, car as passenger	5 Car as driver	3 Car
28 Car as driver, motor bike/motor scooter or bicycle or other	5 Car as driver	3 Car
29 Car as passenger, motor bike/motor scooter or bicycle or other	6 Car as passenger	3 Car
30 Train, bus, ferry/tram	1 Train	1 Train
31 Train, bus, taxi	1 Train	1 Train
32 Train, bus, car as driver	1 Train	1 Train
33 Train, bus, car as passenger	1 Train	1 Train
34 Train, bus, motor bike/motor scooter or bicycle or other	1 Train	1 Train

Mode 45	Mode 13	Mode 05
35 Train, ferry/tram, taxi or car as driver or car as passenger or motor bike/motor scooter or bicycle or other	1 Train	1 Train
36 Train, Taxi, car as driver or car as passenger or motor bike/motor scooter or other	1 Train	1 Train
37 Train, car as driver, car as passenger	1 Train	1 Train
38 Train + 2 other	1 Train	1 Train
39 Bus + 2 other	2 Bus	2 Bus
40 Taxi + 2 other	4 Taxi	4 Other
41 All other 2 or 3 modes	n/a	n/a
42 Walked only	10 Walked only	4 Other
43 Worked at home	11 Worked at home	5 Non travel
44 Did not go to work	12 Did not go to work	5 Non travel
45 Not stated	13 Not stated	4 Other

6. USING THE 1996 JOURNEY TO WORK CD-ROM

The 1996 JTW CD-ROM works like any CD-ROM containing software or data. When inserted into a CD-ROM drive, the CD-ROM should appear as a new drive on your computer. For instance, in a non-networked environment where only a C:drive is available, the CD-ROM would normally appear as a D:drive. In a networked environment, what drive the CD-ROM appears as will depend on what current drives are already installed, and will vary between users.

Once the CD-ROM appears as a drive on the computer, it behaves identically to the C:drive or any other drive. The 1996 JTW files appear as normal files within directories (folders), and may be accessed as such.

There are three directories on the CD-ROM:

1. Tables
2. Doco
3. Other

6.1 FILES ON THE 1996 JOURNEY TO WORK CD-ROM

6.1.1 Tables

The 1996 JTW tables are provided in two formats:

1. As separate text files for each table, and
2. As a single Microsoft Access 97 database, containing all tables.

6.1.1.1 Text files

All 1996 JTW tables are provided in text (ASCII) format. Each table is provided as a separate ASCII file, with fields within the table being separated by commas. Such files are called comma-delimited files. Comma-delimited files can be loaded into any database, spreadsheet or word processing software, subject to any limitations the software may have on the number of rows of data that can be imported.

The table files supplied in text format are:

table01.txt	*table12.txt*	*table23.txt*
table02.txt	*table13.txt*	*table24.txt*
table03.txt	*table14.txt*	*table25.txt*
table04.txt	*table15.txt*	*table26.txt*
table05.txt	*table16.txt*	*table27.txt*
table06.txt	*table17.txt*	*table28.txt*
table07.txt	*table18.txt*	*table29.txt*
table08.txt	*table19.txt*	*table30.txt*
table09.txt	*table20.txt*	*table31.txt*
table10.txt	*table21.txt*	*table32.txt*
table11.txt	*table22.txt*	

6.1.1.2 Microsoft Access database

All 1996 JTW tables are also provided within a single Microsoft Access 97 database called *JTW1996.MDB*.

6.1.2 Documentation

An electronic copy of this Guide is contained in the file *JTW96USE.DOC*. This file is in Microsoft Word 97 format.

6.1.3 Other

6.1.3.1 1996 and 1991 zone equivalences

Equivalence files are files that facilitate comparison of different data sets. In section 2.4.2 of the Guide it was noted that there have been some changes to TDC TZs between 1991 and 1996. The file *EQV9691.TXT* lists all 1996 TZs and shows their equivalence(s) with 1991 TZs. This file is in comma-delimited ASCII format.

6.1.3.2 Electronic zone boundaries

The boundaries for 1996 TZs are provided in electronic form on the CD-ROM. These boundaries can be loaded into GIS (Geographic Information System) packages, and have been provided in three formats.

1. *ARCINFO* format: the file *TZ96.E00* is suitable for importing into ARCINFO/ARCVIEW.

2. *MAPINFO* format: the files *TZ96.MID* and *TZ96.MIF* are suitable for importing into MAPINFO (both files are used in the import process).

3. *OTHER GIS* formats: the file TZ96.DXF is in Digital Exchange Format, a generalised format that can be imported into a wide range of packages. DXF formats exist in different versions; the one supplied is AutoCAD Version 12 compliant.

TECHNICAL APPENDIX

DOCUMENTATION OF PROCESSING, VALIDATION AND IMPUTATION OF 1996 JOURNEY TO WORK DATA

This report documents the process used by the Transport Data Centre (TDC) and the Australian Bureau of Statistics (ABS) to produce and validate the Journey to Work (JTW) data from the 1996 Census supplied by ABS.

Part A discusses the details of the *processing*.

Part B discusses some issues raised in the *validation* of the 1996 JTW data which users should understand before using the data.

Part C discusses the method used to distribute locality dump employment to travel zones (referred to as *imputation*).

Part D discusses issues involved in comparing changes in employment between 1991 and 1996 for particular localities.

PART A
PROCESSING OF 1996 JOURNEY TO WORK DATA

1. INTRODUCTION

Data for the Journey to Work (JTW) collection is obtained from questions in the Australian Bureau of Statistics (ABS) Census of Population and Housing, conducted every five years. If a person reports in the Census having a full-time or part-time job they are then asked to complete a series of additional work-related questions:

- Type of employment
- Occupation
- Name and address of employer
- Industry of employer
- Hours worked
- How the person got to work

The work-related questions for the 1996 Census are shown in full in Figure 1.

Responses to the 'Type of employment', 'Hours worked' and 'How the person got to work' questions are processed by ABS during *first stage processing* i.e. the response boxes marked are simply recorded using OMR (Optical Mark Recognition) technology. Responses to the 'Occupation', 'Name and address of employer' and 'Industry of employer' questions are processed during *second stage processing* i.e. the responses are open-ended and therefore require special processing for a code to be allocated.

Second stage processing of 'Occupation' and 'Industry of employer' to an ASCO (Australian Standard Classification of Occupations) and ANZSIC (Australian and New Zealand Standard Industrial Classification) code, respectively, is undertaken by ABS without input from any external agencies. In contrast, processing of 'Name and address of employer' requires input from appropriate State agencies to allow for the coding of employer's address to a geographical unit smaller than SLA (Statistical Local Area); ABS is prepared to fund coding to SLA level but requires the States to fund the additional work involved in coding to a smaller geographical level.

In NSW, the Transport Data Centre (TDC) is responsible for the additional work required to have employer's address in the Census coded to a smaller geographical level than SLA. This additional work involves the production of detailed search indexes that allow ABS to code to TDC's smallest geographical unit, the DZN ('Destination Zone').

Figure 1 1996 ABS Population of Census and Housing: Employment questions

30 ***Last week*, did the person have a full-time or part-time job of any kind?**	[ ] Yes, worked for payment or profit [ ] Yes, but absent on holidays, on paid leave, on strike or temporarily stood down [ ] Yes, unpaid work in a family business [ ] Yes, other unpaid work ➡**Go to 39** [ ] No, did not have a job ➡ **Go to 39**
31 **In the main job held *last week*, was the person:**	[ ] A wage or salary earner? [ ] A helper not receiving wages? **Conducting own business in a limited liability company** [ ] With employees? [ ] Without employees **Conducting own business which is not a limited liability company** [ ] With employees? [ ] Without employees
32 **In the main job held *last week*, what was the person's occupation?**	Occupation
33 **What are the main tasks that the person *himself/herself* usually performs in that occupation?**	Tasks or duties
34 **For the main job held *last week*, what was the employer's business name?**	Business name
35 **For the main job held *last week*, what was the employer's workplace address?**	Street number and name Suburb, rural locality or town State/Territory Postcode
36 **What kind of industry, business or service is carried out *by the employer* at that address?**	Industry, business or service of employer
37 ***Last week*, how many hours did the person work in all jobs?**	[ ] None [ ] 1 - 15 hours [ ] 16 - 24 hours [ ] 25 - 34 hours [ ] 35 - 39 hours [ ] 40 hours [ ] 41 - 48 hours [ ] 49 hours or more
38 **How did the person get to work on Tuesday, 6 August 1996?**	[ ] Train [ ] Bus [ ] Ferry or tram [ ] Taxi [ ] Car - as driver [ ] Car - as passenger [ ] Motorbike or motor scooter [ ] Bicycle [ ] Walked only [ ] Worked at home [ ] Other [ ] Did not go to work

2. TDC PREPARATION FOR JTW PROCESSING

The term 'Journey To Work Processing' does not refer to Question 38 in the Census "How did the person get to work' as this question requires no second stage processing by ABS. *What is known as 'Journey to Work processing' is the allocation of a TDC Travel Zone to employer's workplace address reported in Question 35 in the Census.* The importance of this process is that it provides the only complete enumeration of employment at the small-area level.

2.1 The JTW Study Area

The JTW Study Area is identical to the TDC Study Area. In 1996, the TDC Study Area was expanded to include the entire Shoalhaven SLA; previously, only the Nowra part of Shoalhaven was part of the TDC Study Area. Digital boundaries provided on the JTW CD-ROM show the location of these new zones (Zones 5831 to 5840).

2.2 Scope of the JTW

For the 1991 Census, only those employed people who were at their usual residence on census night were included in JTW processing. For the 1996 Census, all employed people enumerated in the JTW Study Area were included in JTW processing. Although the exact effect of this scope change cannot be determined, overall it should lead to a higher enumeration of employment in 1996.

2.3 The JTW zonal system

To facilitate analysis of transport-related data at a small geographical level, TDC maintains its own classification of areas within the TDC Study Area. The units of classification are called Travel Zones (TZs). Travel zones are larger than Census Collector Districts (CDs), but smaller than Statistical Local Areas (SLAs).

ABS uses the term *DZN ('Destination Zone')* as a general term to refer to JTW zones, since different States can use different terms for their zonal units. In NSW, 'DZN' and 'TZ' are identical , but to maintain consistency with ABS and other JTW documentation, this paper uses the term 'DZN' throughout.

2.4 The JTW search indexes

To ensure that any employer's address within the TDC Study Area can be accurately coded to a DZN, it is TDC's responsibility to provide ABS with listings of localities, street names, street number ranges and other information. These listings should cover *every* locality, street name and street number ranges in the Study Area.

The listings supplied to ABS are known as *search indexes*. There are two search indexes used:

1. Level 1 ('Locality') Index, and

2. Level 2 ('Streets') Index

When an address is processed, the locality will first be checked against the Level 1 index to see whether it can be coded to a DZN from the locality alone. If DZN cannot be allocated from locality alone then the address will be passed through the more complex and time-consuming Level 2 index.

The structure of the search indexes is determined by ABS, and it is TDC's responsibility to compile the indexes in the appropriate format and supply them to the ABS Data Processing Centre (DPC) for second stage processing of the Census. For 1996, the structure of the indexes was as follows:

Level 1 Index ('Locality Index')

Field	*Length*	*Comments*
Locality	24	Suburb, rural locality or town
State	3	State = 'nsw'
Study Area	1	TDC study area = 1
DZN Code	4	A DZN or a flag indicating the Level 2 index must be used

Level 2 Index ('Streets Index')

Field	*Length*	*Comments*
Locality	24	Suburb, rural locality or town
Street	20	Street name
Street Type	5	Street type ('street', 'road', 'avenue' etc)
Start	4	Start of street number range
End	4	End of street number range
Odd/even/all	1	Indicator that street number range is odd, even or all
DZN	4	DZN for this locality, street, street type, number range

2.5 Operator processing and index design

Level 1 Index ('Locality Index')

When an ABS operator enters employer address, he/she first enters the *locality only*. This locality is then checked against the *Level 1 Index*. The Level 1 index should contain entries for every locality in NSW (not just the TDC Study Area), and should be consistent with the ABS National Localities Index (NLI). Assuming the entered locality is found, which it should be if the index has been constructed properly, three scenarios are then possible:

Scenario Sample from 1996 Level 1 Index:

	Locality	DZN
1	hurlstone park	nsw10239
2	hursley	nsw19998
3	hurstville	nsw1****

1. The index shows a valid DZN number in the DZN column. Such a locality is known as a *'Level 1 entry'*, which means that any address for that locality will be coded directly to the DZN shown in the Level 1 Index without the operator having to type in any further address information.

   The main reason for having Level 1 entries is to reduce development and processing time and costs, by minimising the number of localities that require compilation and processing of detailed street indexes. When deciding whether or not a locality becomes a Level 1 entry, this processing saving needs to be balanced against the risk that some addresses may be incorrectly zoned because a more detailed street matching process was not undertaken.

   The main criteria for deciding that a locality can be made a Level 1 entry are (i) that it is not a significant employment area, and (ii) that the majority of people who report employment in that locality would be referring to addresses within one zone. In 1996, it was decided that the vast majority of addresses for Hurlstone Park, which is not a high employment area, would fall within DZN 0239.

2. The index shows '9998' in the DZN column. This means that the locality is outside the TDC Study Area and no further processing is required.

3. The index shows '****' in the DZN column. This means that the locality reported could refer to an address in more than one zone, and therefore it is necessary to obtain further information before allocating a zone. Such a locality is known as a *'Level 2 entry'* or *'Split locality'*, which means that the operator will have to type in additional address information to code to the correct DZN. In 1996, addresses for Hurstville required this additional processing.

Level 2 Index ('Streets Index')

As explained above, any locality flagged with '****' in the Level 1 Index requires further processing before a DZN can be allocated. After entering such a locality the operator will then be required to enter the *Street Name* (refers generically to street, road, avenue etc). Two broad scenarios are possible at this stage:

Scenario Sample from 1996 Level 2 Index:

	Locality	Street	DZN
1	hurstville	no street name given	a6483
2	hurstville	noble s	00019999a0261

1. *No street name given.* No street information was reported, and therefore it is not possible to accurately code the address to a DZN using locality and street name. If employer's name is reported the record will be given to the ABS Query Resolution Group (QRG), who will attempt to allocate a DZN based on the employer's address in a telephone book or other address source. If employer's name is not reported, or the QRG is unable to allocate a DZN, then the address will be allocated a '*locality dump code*'.

   Every Level 2 locality has a 'no street name given' entry with an associated locality dump code. If the only known information for an address is its locality then the appropriate locality dump code will be allocated. Thus, in 1996 the locality dump code 6483 means "We know the address was in Hurstville, but that's all we know".

2. *Street name given.* If a street name was reported, the operator will enter the name, and will then be faced with two alternatives:

   i. *All of that street is within one zone.* Where this is the case, there should only be one entry for this street, with the format '00019999a', meaning 'All of the street is in this zone'. Because there is only one entry for this street the operator will be presented with only one option from which to choose, and hence will be able to allocate DZN without having to enter further information. In 1996, all of Noble Street, Hurstville was coded to DZN 0261.

   ii. *The street spans two or more zones.* Where this is the case, there should be a number of entries for this street. The exact number of entries will depend on (a) the number of zones the street spans, and (b) whether the odd and even-numbered sides of the street are in different zones. The entries taken together must cover every possible number for that street. In addition, there must be a 'no nmbr' (meaning 'no number') entry, to cover cases where no street number is reported.

Sample from 1996 Level 2 Index:

Locality	Street	DZN
hurstville	hurstville rd	00020024e0263
hurstville	hurstville rd	00269998e0264
hurstville	hurstville rd	00010105o0265
hurstville	hurstville rd	01079999o0264
hurstville	hurstville rd	no nmbr 0265

a) *'No number' entries.* For 'no number' entries a decision must be made (during construction of the indexes) as to what zone an address should be coded if the only information available is locality and street name. The address must be 'best-fitted' i.e. allocated to the zone that is most likely to correspond to the zone the address was actually in. Best-fitting is not an exact science and usually requires decisions on a case-by-case basis.

When best-fitting for 'no number' entries, it is important to avoid, if at all possible, simply selecting the zone that contains the largest number range for the street involved . There are two reasons for this. Firstly, the longest section of a street may have little or no employment; it may, for instance, be mainly a residential section at the end of which is, say, a small row of shops. In a case like this it is the zone containing the shops (i.e. employment locations) that should be allocated to the 'no number' entry, irrespective of the fact that it may relate to only a small part of the street physically. Secondly, multiple entries for this street may exist to allow for 'fuzzy' searching (see later section), which means that not all entries are equally likely; some will have been included only to accommodate the possibility of vague reporting of locality. In the sample from the 1996 index above, Hurstville Road is actually in the Oatley/Hurstville Grove/Hurstville South area and has been included under Hurstville mainly to allow for imprecise reporting of suburb; thus the DZN allocated for 'no number' is 0265, the best-fit for Hurstville Road, not 0266, the best-fit for Hurstville.

c) *Multiple entries.* If there are multiple entries for a street the index entries must cover every odd number in the range 0001 to 9999 and every even number in the range 0002 to 9998, irrespective of what the actual number ranges are for this street. Great care should be taken when compiling these entries to ensure that, wherever possible, the number ranges correspond *exactly* with zone boundaries. Having a street number range incorrect by just one number in a dense employment area like the CBD can mean a major employment location ends up in the wrong zone (albeit an adjoining one).

Facility entries

In addition to entries that follow the standard locality, street name, street type, number range, DZN format the indexes can also contain special entries for specific locations known as 'facility entries'. These are entries that only contain locality, facility name and DZN e.g.

camperdown	royal prince alfred	0034
croydon	westfield shoppingto	0205

If facility entries are included in the indexes care should be taken, because:

1. The source of the address for the facility (from which the DZN is derived) may not be accurate. Address information from phone books, for instance, can often be misleading and/or out of date.

2. During the lag between the inclusion of the facility in the indexes and ABS processing the facility may have changed location. In general, this should rarely be a problem as significant locations, such as major shopping centres, are unlikely to change within such a time frame, and any changes that do occur may well be within the same DZN anyway. Nevertheless, the possibility exists.

Facility entries can be added to both the Level 1 and Level 2 indexes, but will only be used during Level 1 processing if no address is reported. This limitation, and other restrictions, means that the importance of facility entries should not be over-emphasised. Section 3.3 *'Operator coding'* later in this paper deals further with this issue.

2.6 Reporting problems

The quality of JTW zone coding is only as good as the quality of the addresses reported. The Census is a *self-completion* collection, and virtually no editing of the questionnaires is undertaken by ABS. Consequently, the addresses reported can be inadequate in a number of ways:

1. *No address supplied*: Self-explanatory; no zone coding is possible, and the record will be allocated the code for 'Not stated'.

2. *Address is wrong*: Some addresses will simply be wrong, either because the employee is not clear what the address is (e.g. new employee) or inadvertently reports the address incorrectly. In such cases, the address may be codeable but will be wrong. The extent of such hidden error is unknown.

3. *Address is incomplete*: Many addresses will be incomplete. For example, only the suburb may be reported, or suburb and street name may be reported, but no street number. Special procedures have been set up to code incomplete addresses. In some cases, the incomplete address may supply sufficient information to allow for accurate coding. Other cases may be codeable using a 'best-fit' approach, but, by definition, this approach can only allocate a likely zone, not guarantee the correct one. In many cases, the incomplete address will not be codeable to a zone, and will have to be allocated a *locality dump code*.

4. *Address is complete but imprecise*: A major problem with reporting of addresses in self-completion collections is that people often report a *general* rather than a *specific* area i.e. they report on a regional or general locality basis rather than supply a specific suburb. Unfortunately, this is particularly common in areas that have high employment, such as business districts. People who work, say, at Millers Point, Surrey Hills, Ultimo or anywhere else in the general area around the Sydney CBD may simply report suburb as "Sydney". Many people will report on an even broader regional basis than this, simply reporting "Newcastle", for instance, to encompass numerous suburbs within the central Newcastle area. In addition to this regional reporting, there is also the problem of people reporting an *adjoining* locality

rather than the locality to which the address more properly belongs. All this imprecision provides great problems for coding and leads to the usage of 'fuzzy searching', described in the next section.

2.7 Fuzzy searching

'Fuzzy searching' describes the process of searching for a DZN where the reported locality may be imprecise i.e. an adjoining or nearby locality is reported rather than the locality to which the address more properly belongs. This fuzzy searching is implemented by duplicating selected street entries in the Level 2 index so that the streets can be found for a range of reported localities.

As an example of duplicating street entries, say we were looking at Camden Street, Newtown in the Level 2 index. When developing the index one option would be to just have entries for this street under the locality 'Newtown'. Alternatively, we could duplicate these entries so that they also existed under the localities 'St Peters' and 'Enmore' to allow for the fact that people may report the suburb differently. The value in this duplication is that without it any Camden Street addresses reported in St Peters or Enmore could not be coded, since the index system will find 'St Peters' and 'Enmore' but no 'Camden Street' for either locality.

Although the concept of duplicating street entries is straight-forward, in practice it is difficult to implement. The easiest approach would be to duplicate every 'core' street entry in the indexes for every conceivable surrounding suburb, but this leads to indexes so large that they are impractical. This is not because bigger indexes would significantly slow down the searching process, as even very large indexes can be searched quickly, but because both the development and running of the indexes involves numerous validation and updating processes which *are* significantly slowed if the indexes become too large. *To keep street entry duplication to a manageable level it is necessary to prioritise what streets are duplicated, and the overriding consideration is whether the streets are likely to have significant employment.* If Camden Street, Newtown is almost wholly residential it is not important to duplicate the entry for it; if it contains significant employment, it would be unwise not to do so.

Where duplication of street entries is required the quickest method is to copy all streets for one locality so that they also appear under another locality. Unfortunately, this approach can be dangerous - if a street name is common to both localities the copying process will lead to errors. For example, some people may report a Paddington address as 'Sydney', but it is not possible to deal with this by simply copying street entries for 'Paddington' to the locality 'Sydney', as there is a small street in Paddington called George Street, and copying this street under the locality name 'Sydney' will conflict with the far more important George Street in the Sydney CBD. If duplication of Paddington streets is required each street must be examined individually to ensure it does not conflict with another street of the same name in the same general area.

Long streets present a particular problem when dealing with imprecise reporting of locality. For example, Parramatta Road passes through a large number of suburbs,

and there is more than one number range for Parramatta Road. In this case, it is not possible to duplicate Parramatta Road entries for adjoining suburbs where the number ranges change between those suburbs. Where a single number range does span a number of suburbs duplication is possible, but great care must be taken to ensure that no overlap of number ranges results from the process. It is essential that such duplication be double-checked: the best-fit DZN for each suburb might be quite different e.g. Parramatta Road 'no number', Annandale and Parramatta Road 'no number', Camperdown are best fitted to DZN 0171 and DZN 0164, respectively.

3. ABS PROCESSING OF JOURNEY TO WORK DATA

The preparation of search indexes by TDC is all geared towards ABS's coding of employer's address to DZN when second stage processing takes place at the DPC. In principle, this processing is simple: operators key in responses to Question 35 ("For the main job held last week, what was the employer's workplace address?"), and an ABS program then allocates a DZN based on the TDC search indexes. In practice, because of the immense scope of the indexes, *and the fact that there will always be cases where people report address in an unexpected way*, there are inevitably problems discovered during processing that need to be resolved and then incorporated in the indexes. During ABS processing, therefore, the indexes are in a constant state of revision and updating; the only 'final' indexes are those remaining after all processing has been completed.

3.1 TDC involvement

ABS recommends that, where possible, a representative of the State agency responsible for compilation of search indexes attends the DPC initially to help resolve queries and monitor processing from a State perspective. In 1996, a TDC officer attended the DPC virtually full-time for the first three weeks of processing, and part-time as required for about three weeks thereafter. This proved to be of enormous benefit to the JTW coding process as TDC was able to utilise its local knowledge and GIS expertise to help resolve queries accurately and quickly and recommend appropriate index changes.

3.2 Operator Coding

To ensure a consistent approach is applied to all address coding, operators are given very firm instructions by ABS *not* to interpret address data. The main rules they have to follow are:

1. They may only accept *exact* matches for locality, street and street number. That is, they are not allowed to interpret data even if it is perfectly obvious what location is being referred to e.g. if a reported employment location was "RPA, Camperdown", operators would *not* be allowed to interpret this as "Royal Prince

Alfred Hospital, Camperdown"; instead they would have to look for the exact entry "RPA" in the list of "Camperdown" entries.

2. If locality, street and street number are reported operators will select a DZN based on this information even if there is a specific index entry for the employment location (known as a facility entry) e.g. if an address is reported as 'Royal North Shore Hospital, 100 Pacific Highway St. Leonards', the operator will allocate a DZN using '100 Pacific Highway St. Leonard's, ignoring any separate index entry for 'Royal North Shore Hospital'.

3. If locality and facility name only are reported, then a DZN based on a facility entry for that locality will be allocated. If there is no facility entry, the record will be sent for query resolution.
4. If a facility name only is reported operators will allocate a DZN as long as there is a Level 1 entry for the facility.
5. If an address is reported as "corner of" two streets, the operator will choose the street which contains an 'all' entry. If both streets contain an 'all' entry, the operator will select the first street reported.
6. If locality only is reported, the operator will select the "no street name given" entry for that locality.
7. Localities and locality/street combinations that are not in the indexes will be sent to query resolution.

PART B
VALIDATION OF JOURNEY TO WORK DATA

1. INTRODUCTION

Once ABS has completed processing of JTW data it supplies *a validation table* to TDC. This table shows Employment x DZN x Industry Code (ANZSIC). The industry code is at 2-digit level, which is quite broad (e.g. "Accommodation, Cafes and Restaurants", "Road Transport", "Finance"); 4-digit level data can be supplied by ABS on request.

The validation table provides a final opportunity to rectify any major mistakes in DZN coding. This is an extremely important part of JTW processing, but also a very limited one in terms of what changes can be made. Once the validation table is received it means that *all processing of individual records has ceased*; the extra cost and delay that would be involved restricts any recoding at the individual record level. What validation checking does allow is the possibility of *batch* recoding of data, so that all data in a particular industry can be moved from one DZN to another.

Because batch movement of data can have significant effects on the final JTW tables, it should only be recommended to ABS when there is strong evidence that *virtually all the employment in a particular industry should be in a different zone to the one to which it is currently coded.* In some cases this may be relatively straight-forward, because it is clear that employment in the industry could only be undertaken at a single location. In other cases, however, it may not be possible to move data because the establishment identified as likely to have been miscoded is only one of many in that industry. If, for example, it was known that in a particular suburb shops in a certain street were miscoded, but all other shops in that suburb were coded correctly, it would not be possible to move *part* of the employment for Retail, for the simple reason that we would not know how much employment in Retail was attributable to the miscoded shops. The data would have to be left as it is, despite the fact that it is known to be incorrect.

2. IDENTIFICATION OF POSSIBLE PROBLEM AREAS

There are a number of approaches that can be adopted during validation to identify possible problem areas. The main approaches are:

2.1 Comparison with other data sources

If reliable employment data is available from alternative sources, then obviously it should be used in the validation process. In practice, this is rarely a viable option since the only reliable official source of such data is the JTW itself. However, in some cases use of such sources can contribute to the process. For example, specific employment studies may have been undertaken in certain areas, or large organisations that dominate employment in one industry within a zone may be willing to supply data. In 1996, the former situation was useful for validation of JTW data for the Shoalhaven area, while the latter was used to validate JTW data for zones at and surrounding Sydney Airport (described in Part D of this appendix).

2.2 Time series analysis

The main method used to identify possible problem areas with JTW data is time series analysis i.e. comparison of current year data with previous years. Within the short time frame set for validation (two weeks in 1996) it is not possible to examine every zone in depth, so it is necessary to prioritise by targeting zones that show significant employment change, either absolutely or proportionately. Once a target zone is identified, the following steps (at least) should be undertaken:

1. The index entries relevant to the zone should be examined for the comparison years. This step *must* be undertaken, as differences in the accuracy of the indexes used in different years can lead to 'changes' in employment that are spurious i.e. they do not reflect genuine changes in employment, but merely the fact that one set of indexes was more accurate than the other. It is essential that any such changes are identified and documented. During 1996 validation it was found that, for a significant number of zones, 'changes' in employment between 1991 and 1996 were simply due to errors in the 1991 indexes having been corrected for 1996, with the consequence that spurious employment 'movement' occurred.

2. Once any changes based on index differences are resolved, any target zones remaining should be examined at the *industry level*. This will help to establish whether employment change in a zone tends to be (a) across-the-board or (b) restricted to one industry or a small number of related industries. Which of the two is the case will to some extent determine the focus of further investigation. In either case, however, the changes thus flagged need to be evaluated in terms of what is known about the area bounded by the zone.

There are no hard and fast rules for deciding that change shown in the JTW reflects genuine change; each zone needs to examined on a case-by-case basis, and whatever tools and knowledge are available used to make a decision. Again, though, it is essential to first establish whether any of the data reflects an error in the indexes. As mentioned above, what focus is taken will be affected by the nature of the change involved:

a. *Across-the-board change*: If change tends to be spread across industry codes, it is essential that the 'no number' entries for the locality are examined. 'No

number' entries are best-fit allocations, and it is easy for a poor-fitting DZN to be allocated. If this is found to be the case, a decision then needs to be made as to what industries, if any, can be moved from the current DZN to a more appropriate DZN. In general, this can only be recommended where virtually no employment would be expected for that industry in the current zone.

b. *Restricted to one industry or a small number of related industries:* If change is restricted to one industry or a small number of related industries, the zone should be examined closely to determine what establishment(s) are likely to have affected the data. For example, if employment has decreased in 'Health Services', has a hospital, health centre or something of that nature closed since the previous Census? If the change cannot be accounted for in this way, the indexes should be examined with reference to the known address(es) for establishment(s) in this industry sector to determine if there was any error in the relevant entries.

2.3 Example of data movement during validation

An example from 1996 validation illustrates a situation where it was possible to correct a major coding error through the validation process. The validation table showed 2,234 people working in the Metal Product Manufacturing industry in DZN 5756. However, map and on-site inspection showed this zone had no steel manufacturing establishments, whereas the adjoining zone DZN 5757 did. It was established that this was the result of an index error that coded a street wholly contained within DZN 5757 to DZN 5756. Because the incorrect data could be clearly related to a particular industry and zone, it was possible to recommend that all the employment for this industry be moved from the incorrect zone to the correct one.

3. 1996 TDC STUDY AREA EXTENSION - SHOALHAVEN

In 1996, TDC extended its Study Area to include the entire Shoalhaven SLA. To assist with validation of this new JTW area, Shoalhaven City Council agreed to supply estimates of employment in the region. The estimates were compiled from employment surveys conducted by Shoalhaven City Council for Nowra/Bomaderry and Milton/Ulladulla (1995), with estimates for other areas based on existing employment data collected during the late 1980s. These estimates, shown in Table 1, were compared with the JTW validation tables.

These estimates were supplied after validation was finished, so it was not possible to include consideration of them in the validation process. However, the data was scrutinised later, and, in general, found to be consistent with 1996 JTW data, allowing for the fact that Council's data is survey and/or model-based, and therefore subject to unknown error. The approximately 30% higher employment total shown in the JTW data was regarded as reasonable given that (i) much of Council's data was for the 1980s, and (ii) the Council definition of employment is likely to be

stricter than that used in the Census by ABS, where "A job means any type of work including casual or temporary work or part-time work, if it was for one hour or more".

Table 1 Comparison of employment estimates, Shoalhaven City Council and 1996 JTW

Zone	Name	Council data	JTW data
5792	Bomaderry	922	1,024
5793	Illaroo	282	556
5794	Bomaderry West	916	1,468
5795	Berry	994	727
5796	North Nowra	513	528
5797	South West Nowra	156	1,566
5798	Nowra	4,310	4,217
5799	South Nowra	1,011	1,649
5800	Coolangatta	21	61
5801	Shoalhaven Heads	78	268
5802	Terara	134	82
5830	Broughton Vale	16	9
5831	Budawang Ranges	155	199
5832	Kangaroo Valley	307	617
5833	Flinders	491	454
5834	HMAS Albatross	707	1,007
5835	Culburra	691	821
5836	Huskisson	668	894
5837	Sanctuary Point	590	720
5838	Sussex Inlet	304	580
5839	Milton-Ulladulla	2,467	3,100
5840	Bawley Point	57	150
Total		15,790	20,695

On a zone by zone basis, only the data for DZN 5797 and DZN 5798 were thought to be of concern. This was because (i) JTW data was much higher than Council's data for DZN 5797, and (ii) JTW data for DZN 5798 (the main employment zone in Nowra) did not reflect the overall 30% higher level of employment compared with Council's data. Since these zones are adjoining zones, there was clearly a possibility that an index error may have affected the JTW data. Examination of the 1991 and 1996 indexes indicated that this was the case.

North Street, Nowra spans both DZN 5796 and DZN 5798, with the majority of the street being in DZN 5798. Unfortunately, this street was coded incorrectly to DZN 5797 in both the 1991 and 1996 indexes. North Street is a significant employment location in Nowra, so it is likely that a significant proportion of the 1,566 people currently coded to DZN 5797 really belong in DZN 5798. Based on Shoalhaven City Council estimates of employment in North Street, TDC recommends that total

employment figures for DZNs 5796, 5797 and 5798 should be adjusted by the following amounts:

DZN	JTW96	Adjustment	Recommended JTW96
5796	528	+32	560
5797	1,566	-215	1,351
5798	4,217	+183	4,400

PART C
DISTRIBUTION OF LOCALITY DUMP DATA

1. INTRODUCTION

JTW processing involves the allocation of a DZN ('Destination Zone') to employer's address reported in the ABS Census of Population and Housing. However, it is not always possible to allocate a DZN to an address when the only address information reported is locality (e.g. suburb is reported, but not street). If a locality can reasonably be allocated to one DZN without ambiguity, then addresses which report that locality and no other information are assigned to that DZN during the ABS processing of addresses. If a locality cannot be allocated to one DZN without ambiguity, then addresses which report that locality and no other information are allocated a '*locality dump code*' to indicate that locality is known but there is insufficient other information to allow coding to a DZN.

The DZN field in JTW tables compiled by ABS contains locality dump codes as well as true zones; all DZNs in the 6000 - 7999 number range are locality dump codes. To facilitate usage of, and help to standardise, JTW data, TDC distributes (imputes) locality dump employment to DZNs. As a result of this imputation process, TDC is able to provide clients with JTW tables that contain no locality dump codes. To avoid confusion, this appendix will refer to DZNs prior to imputation (when locality dump codes exist) as ABS_DZNs. After imputation, when locality dump data has been distributed (and locality dump codes no longer exist) DZNs will be referred to as TDC_DZNs. DZN will be used when the reference is generic.

The general structure of the JTW tables before and after imputation is as follows:

Original ABS Table (ABS_DZN)		**After TDC Imputation (TDC_DZN)**	
0001	}	0001	}
.	}	.	}
.	} TDC travel zones	.	} TDC travel zones
.	}	.	}
5999	}	5999	}
			}
6000	}		}
.	}		}
.	} Locality dump codes		} No locality dump codes
.	}		}
7999	}		}
9979	NSW undefined	9979	NSW undefined
9985	Sydney undefined	9985	Sydney undefined
9990	No fixed address	9990	No fixed address
9998	Outside TDC Study Area	9998	Outside TDC Study Area

2. LOCALITY DUMP DISTRIBUTION

2.1 Restrictions on distribution

There are two restrictions on the distribution process that limit the options for development of a distribution methodology:

1. *All SLA totals must be retained:* JTW tables provide data at both SLA and TDC_DZN level. Each locality dump code is mapped to a single SLA, and consequently SLA data does not require any imputation. It is essential, therefore, that any distribution of locality dump data to TDC_DZNs leaves SLA totals undisturbed.

2. *All TDC_DZN totals must be consistent across tables*: The distribution process must ensure that the TDC_DZN totals are consistent across all JTW tables.

These restrictions on the imputation process cannot be perfectly achieved because it is ABS policy to ensure confidentiality by randomising table cells containing less than three people. The ABS rule is to randomly assign the value of cells containing 1 or 2 people to either 0 or 3. As a result, zone totals, SLA totals, and even table totals differ slightly across ABS JTW tables as each table is independently randomised.

2.2 Candidate zones

When an address only contains locality name, and hence is allocated a locality dump code, it cannot be known for certain what area (or zones) this name refers to. It is necessary to define a range of zones which, without extending the range unrealistically, covers the areas that could have been meant by the locality reported. The first stage in distribution, therefore, is to compile a list of '*candidate zones*' for each locality dump code.

A locality dump code is allocated to an address by having an appropriate 'no street name given' record in the Level 2 index e.g.

Locality	Street	ABS_DZN
hurstville	no street name given	6483

A list of candidate zones for a locality dump code is compiled using this information, as follows:

1. From the Level 2 index the locality names for the locality dump code are determined from the localities for the 'no street name given' records to which the locality dump code is attached. There may be more than one locality name pointing to a locality dump code (e.g. 'no street name given' records for "Liverpool" and "Liverpool North" both point to locality dump code 6596), but in the current example the only locality name for locality dump code 6483 is "Hurstville".

2. The *potential* candidate zones for the locality dump code comprise the DZNs for which there are Level 2 entries under the locality dump name e.g.

Locality	Street	No. Range	DZN
hurstville	albert st	00019999a	*0263*
hurstville	alfred st	00019999a	*0266*
hurstville	allen st	00019999a	*0261*
hurstville	alma st	00019999a	*0261*
hurstville	annie st	00019999a	*0267*

Assuming for the sake of this example that this was the entire list of entries for "Hurstville" (the full list is too long to include here) then the potential candidate zones for dump 6483 would be 0261, 0263, 0266 and 0267. The actual potential candidate zones for dump 6483 are shown in the following table:

Locality dump code	Candidate DZN	SLA for DZN
6483	248	6650
6483	249	6650
6483	259	4450
6483	260	4450
6483	261	4450
6483	263	4450
6483	264	4450
6483	265	4450
6483	266	**4150**
6483	267	**4150**
6483	269	**4150**

The *final* candidate zones for the locality dump code are determined by selecting from the potential candidate zones *only those DZNs with the same SLA as that to which the locality dump code is mapped.* This is to comply with the restriction referred to in Section 2.1 that *"All SLA totals must be retained"*. Since locality dump code 6483 ("Hurstville") is mapped to SLA 4150 (Hurstville), the final list of candidate zones for this locality dump code is 0266, 0267 and 0269.

2.3 Distributing the data

Having compiled a list of candidate zones for each locality dump code, the next task is to distribute locality dump employment to these zones.

2.3.1 Maintaining variable integrity

When distributing employment from a locality dump code *it is desirable that variable integrity is maintained* i.e. the frequencies of other variables associated with the dump code are maintained (although they will always differ slightly due to randomisation). For example, in JTW Table 24 (DZN x Industry x Mode x Employment) there may be the following record:

ABS_DZN	Industry	Mode	Employment
6483	7	1	10

Since we know from this record that the locality dump code employment was for Industry = 7 and Mode = 1, we would obviously want to distribute the employment to candidate zones as Industry = 7 and Mode = 1 i.e. distribution of locality dump employment should be undertaken individually for each locality dump record to ensure that data for other variables is maintained.

2.3.2 Primary distribution methodology

If there were only one candidate zone for a locality dump code, then distribution of employment would be simple. For example, if locality dump code 6483 only had the one candidate zone, DZN 0266, say, then distribution would only entail creation of one new record, as follows:

DZN	Industry	Mode	Employment
0266	7	1	10

In reality, there is more than one candidate zone for locality dump code 6483, so we need to have a process for estimating how much of the locality dump employment to apportion to each candidate zone. The only relevant information available for this process is the JTW data itself, and since we know the frequency of employment for each candidate zone, for each exact variable combination, the primary assumption made is that *the locality dump employment distribution for the variables in question is the same as the distribution of employment between candidate zones for the same variables.*

To make clear what is meant here, assume that Table 24 contains the following records:

ABS_DZN	Industry	Mode	Employment
0266	7	1	50
0267	7	1	250
0269	7	1	150
			450

For the candidate zones the employment distribution (where Industry = 7 and Mode = 1) is therefore:

ABS_DZN	Industry	Mode	Employment
0266	7	1	50/450 = 20%
0267	7	1	250/450 = 50%
0269	7	1	150/450 = 30%

Based on the primary assumption we would thus distribute the locality dump employment to candidate zones as follows:

ABS_DZN	Industry	Mode	Employment
0266	7	1	Locality dump employment (10) * 20% = 2
0267	7	1	Locality dump employment (10) * 50% = 5
0269	7	1	Locality dump employment (10) * 30% = 3

This employment is added to the imputed Table 24, thus:

TDC_DZN	Industry	Mode	Original + Imputed	Imputed Employment
0266	7	1	50 + 2 = 52	52
0267	7	1	250 + 5 = 255	255
0269	7	1	150 + 3 = 153	153
				460

2.3.3 Variable prioritisation

It is desirable to maintain variable integrity when distributing locality dump employment, and the only meaningful way to do so is using the primary distribution methodology which assumes that locality dump employment distribution for a combination of variables is the same as the candidate zone employment distribution for the same combination of variables. *Unfortunately, it is not possible to apply the primary distribution methodology to more than one table* as doing so conflicts with the restriction referred to in Section 2.1 that *"all TDC_DZN totals must be consistent across tables"*.

To see why this is so, consider the current example where employment for locality dump code 6483 has now been distributed in Table 24 to TDC_DZN 0266, 0267 and 0269. The JTW tables aggregate data in different ways. Where Table 24 aggregates data for DZN x Industry x Mode x Employment, Table 21, for example, aggregates data for DZN x Industry x Occupation x Sex x Employment. Assume for the current example that Table 21 contains the following data for locality dump code 6483:

ABS_DZN	Industry	Occupation	Sex	Employment
6483	7	3	2	10

Applying the same procedure used for Table 24, we would search for records in Table 21 that have DZN = Candidate zone, Industry = 7, Occupation = 3 and Sex = 2. We might find the following data [Note: to keep the example simple, it is assumed that there is only one Occupation x Sex category reported for each DZN x Industry combination; in reality there may be a number of different categories reported for each combination]:

ABS_DZN	Industry	Occupation	Sex	Employment
0266	7	3	2	100
0267	7	3	2	250
0269	7	6	1	150

Continuing the same procedure, we apply the simplifying assumption that the locality dump employment distribution for the variables in question is the same as the candidate zone employment distribution for the same variables, to obtain this distribution:

ABS_DZN	Industry	Occupation	Sex	Employment
0266	7	3	2	100
0267	7	3	2	250
				350

to get:

ABS_DZN	Industry	Occupation	Sex	Employment
0266	7	3	2	100/350 = 29%
0267	7	3	2	250/350 = 71%

and:

ABS_DZN	Industry	Occupation	Sex	Employment
0266	7	3	2	Dump employment (10) * 29% = 3
0267	7	3	2	Dump employment (10) * 71% = 7

Therefore, as a result of applying the primary distribution methodology to both tables, the same locality dump employment (10) has been distributed in different amounts across the candidate zones:

TDC_DZN	Table 24	Table 21
0266	2	3
0267	5	7
0269	3	-

Since it is not possible to apply the primary distribution methodology to more than one table, as the resulting data conflicts with the requirement that all TDC_DZN totals are consistent across tables, it is necessary to prioritise the JTW variables i.e. decide which variables should have their original distributions maintained through using the primary distribution methodology, and which variables can be distributed in a less exact manner.

For the 1996 JTW it was decided that the variables whose exact distribution should be maintained were Industry and Mode, as contained in Table 24.

2.3.4 Secondary distribution methodology

Since the primary distribution methodology can only be applied to Table 24 (DZN x Industry x Mode x Employment), it is necessary to have a secondary distribution methodology for all other tables that contain locality dump codes. For these tables, although it is not possible to maintain exact variable integrity it is obviously still desirable to maximise the correspondence between locality dump employment and

distributed employment for each category in the table. The secondary distribution will vary slightly depending on which variables a particular table contains. Secondary tables may contain DZN and Industry, DZN and Mode, or only DZN, and the secondary distribution method varies depending on which of these combinations each table contains.

Tables containing DZN and Industry

Continuing with the current example, the task is to distribute the following data in Table 21:

ABS_DZN	Industry	Occupation	Sex	Employment
6483	7	3	2	10

We cannot use the primary distribution methodology which would examine the data for candidate zones within Table 21. Instead, we have to satisfy the requirement that TDC_DZN totals must be the same across all tables. Since *Industry x Mode* has been made the priority variable combination, the TDC_DZN totals for Industry and Mode derived by distributing locality dump employment in Table 24 represent constraints on all other tables.

If a table other than Table 24 contains an Industry or Mode variable, then the result of distributing locality dump employment for that table must be consistent with the Industry or Mode totals, respectively, for Table 24. This consistency is achieved by applying the employment distribution for candidate zones by Industry or Mode in Table 24 to the data in the other table.

To make clear what is meant here, for a table containing DZN and Industry, assume that the distributed locality dump employment in Table 24 for Industry = 7 is as follows (with employment referring to employment *before* primary distribution of locality dump employment has taken place):

ABS_DZN	Industry	Mode	Employment
0266	7	1	50
0266	7	4	150
0267	7	1	250
0267	7	2	50
0267	7	3	200
0269	7	1	150
0269	7	7	150

From these records we compile the total for each DZN and Industry combination:

ABS_DZN	Industry	Employment	
0266	7	50 + 150	= 200
0267	7	250 + 50 + 200	= 500
0269	7	150 + 150	= 300
			1,000

and hence the distribution for the candidate zones:

ABS_DZN	Industry	Employment
0266	7	200/1000 = 20%
0267	7	500/1000 = 50%
0269	7	300/1000 = 30%

These proportions are then applied to the locality dump employment to distribute the data in Table 21:

ABS_DZN	Industry	Occupation	Sex	Employment
0266	7	3	2	Dump employment (10) * 20% = 2
0267	7	3	2	Dump employment (10) * 50% = 5
0269	7	3	2	Dump employment (10) * 30% = 3

As a result of this secondary distribution, the frequencies for secondary variables (Occupation and Sex) are maintained, but the employment distribution is determined by the primary Industry variable.

This process is complicated by the randomisation undertaken by ABS. Because of randomisation, some locality dump records containing 1 or 2 people may be randomised to 0 in Table 24 and 3 in another table. If this occurs, a locality dump code appearing in a secondary table may not exist in Table 24, consequently the secondary distribution process needs to be based on an intermediate table which includes all locality dump codes (whether or not they are in Table 24), but with their corresponding candidate zones weighted according to Table 24.

Tables containing DZN and Mode

For tables containing Mode rather than Industry the secondary distribution process is identical to that outlined for Industry, except that the Table 24 Mode distribution, rather than the Industry distribution, is used as a constraint.

Tables containing DZN but neither Industry nor Mode

The secondary distribution process when tables contain neither Industry nor Mode is based simply on the level of employment in each DZN. Locality dump data in Table 22 is distributed using this method. Table 22 may contain the following record:

ABS_DZN	Hours worked	Status	Occupation	Sex	Employment
6483	6	2	3	1	10

To distribute this employment from the locality dump, the employment distribution for candidate zones only in Table 24 is applied to Table 22.

Thus, from Table 24, we have the following records:

ABS_DZN	Industry	Mode	Employment
0266	7	1	50
0266	5	2	50
0267	7	1	270
0267	5	5	80
0267	4	6	320
0269	7	1	150
0269	3	2	150

From these records we compile the total for each DZN only:

ABS_DZN	Employment	
0266	50 + 50	= 100
0267	250 + 80 + 270	= 600
0269	150 + 150	= 300
		1,000

and hence the distribution for the candidate zones:

ABS_DZN	Employment
0266	100/1000 = 10%
0267	600/1000 = 60%
0269	300/1000 = 30%

These proportions are then applied to the locality dump employment to distribute the data in Table 22:

ABS_DZN	Hrs wrkd	Status	Occupation	Sex	Employment
0266	6	2	3	1	Dump employment (10) * 10%= 1
0267	6	2	3	1	Dump employment (10) * 60%= 6
0269	6	2	3	1	Dump employment (10) * 30%= 3

2.4 Additional processing issues

Section 2.3 provides a broad outline of the distribution process. However, there are a number of sub-processes which are necessary for the overall process to work properly. These sub-processes are discussed in this section, rather than in Section 2.3, to avoid having too much detail in the broad outline.

2.4.1 Weighting of candidate zones

It was explained in Section 2.2 that for each locality dump code there is a list of candidate zones to which locality dump employment is distributed. What was not addressed at that stage was the complication that *a zone may exist on more than one candidate zone list.* For example, ABS_DZN 0266 is a candidate zone for five locality dumps, "Bexley", "Hurstville", "Kingsgrove", "Peakhurst" and "Penshurst", which means it has five times more chance of obtaining distributed data than a zone which is only on one candidate list.

Given the fact that each candidate zone can appear a different number of times on candidate lists, *there needs to be a weight attached to each candidate zone to allow for the number of times that zone appears in candidate zone listings.* TDC has no reason to believe that workers in some areas are significantly more likely than workers in other areas to report only locality of employment, consequently the weight allocated is simply the reciprocal of the number of times the zone appears in a candidate zone list. Hence, the overall weight for ABS_DZN 0266 would be 1/5 = 20%.

In practice, the calculation and allocation of weights is more complex than just counting the number of times a zone appears in candidate zone lists *overall.* The weights need to be applied for each *combination* of the primary variables (Industry and Mode), and for a particular Industry and Mode combination a zone might not actually be a candidate zone.

Consider again the example of ABS_DZN 0266. The weight of 20% calculated previously will only be correct if there are actually five locality dump code records for a particular Industry and Mode combination. If, for Industry = 7 and Mode = 1 there was employment for locality dumps "Hurstville", "Kingsgrove", "Peakhurst" and "Penshurst", but none for "Bexley", then for Industry = 7 and Mode =1 ABS_DZN 0266 would only be on *four* candidate zone lists, and hence its weight for imputation of the combination Industry = 7 and Mode =1 would 1/4 = 25%.

2.4.2 Rounding

When distributing locality dump employment on the basis of candidate zone proportions the resulting imputed employment may be a non-integer value. It is necessary to use rounding rules to ensure final imputed employment is an integer value.

2.4.3 Rounding rules

The rounding rules applied are as follows:

where:

N = Locality dump employment

$C_1 ... C_n$ = Distributed employment to candidate zones (non-integer)

$CR_1 ... CR_n$ = Distributed employment to candidate zones (rounded, initially made equal to the integer component of $C_1 ... C_n$)

Steps:

1. CR = integer component of C
2. S = Sum $CR_1...CR_n$, i.e. sum of integer component of all candidates
3. D = N - S
4. DC = C - CR, i.e. Decimal component of C.
5. If D = 0 then no further processing is necessary.
6. If D > 0, add 1 to D of the CRs (the CRs with the largest DCs).
7. Ensure final sum of CR = N (manual intervention if not)

Note: As CR is set to be the integer component of C initially, D should always be greater than or equal to zero.

2.4.4 Checking the imputation process

TDC undertook a series of checks to ensure the imputation process was working as expected. Checks conducted included:

1. Total frequency before imputation is equal to total frequency after imputation.
2. Total frequency for locality dumps is equal to total frequency distributed from locality dumps.
3. Total frequency by SLA is identical before and after imputation.

In addition, a number of individual locality dumps were tracked through the imputation process, to check that each step produced the results expected.

3. SUMMARY

The following provides a summary outline of the major steps in the distribution of locality dump employment.

3.1 Compile candidate zones

For each locality dump compile a list of candidate zones (CZs) for distribution of employment:

Locality dump code → CZ_1 ... CZ_n

3.2 Distribute employment for each locality dump record in primary table

For the primary table (Table 24: DZN x Industry x Mode x Employment) distribute locality dump employment, ensuring variable integrity is retained for each record, and the distribution of locality dump employment is consistent with the distribution of candidate zone employment for each record:

ABS_DZN	Industry	Mode	Employment
Locality dump code	*X*	*Y*	*N*
↘			
CZ_1	X	Y	C_1
.	X	Y	.
.	X	Y	.
.	X	Y	.
CZ_n	X	Y	C_n

4. Variable integrity is maintained since Sum(C_1...C_n) = N for Industry = X and Mode = Y.
5. Distribution of locality dump employment (C_1...C_n) for Industry = X and Mode = Y is identical to distribution of employment for CZ_1...CZ_n for Industry = X and Mode = Y.

3.3 Distribute employment for each locality dump record in secondary tables

ABS_DZN	Industry	Occupation	Employment
Locality dump code	*X*	*Y*	*N*
↘			
CZ_1	X	Y	C_1
.	X	Y	.
.	X	Y	.
.	X	Y	.
CZ_n	X	Y	C_n

6. Variable integrity is also maintained in secondary tables since Sum(C_1...C_n)= N for Industry = X and Occupation = Y.
7. Distribution of locality dump employment (C_1...C_n) for Industry = X and Occupation = Y is determined by distribution of locality dump employment for CZ_1...CZ_n for primary variable (Industry or Mode), in this case Industry = X.

PART D

COMPARING 1996 AND 1991 JOURNEY TO WORK DATA

1. 'CHANGES' IN EMPLOYMENT BETWEEN 1991 AND 1996

During the JTW validation process, TDC investigated cases where comparisons of 1996 and 1991 JTW data indicated significant differences in employment between Censuses for particular zones. These investigations revealed a number of cases where what appeared to be significant 'movement' of employment between 1991 and 1996 was actually likely to be the result of improvements in the indexes in 1996, and thus an artefact of processing, rather than a reflection of genuine change. The zones affected are discussed in detail below.

1.1 DZNs 5756 and 5757 (Port Kembla area)

In both the 1991 and 1996 indexes, Darcy Street, Port Kembla was incorrectly coded to DZN 5756 rather than to the correct DZN 5757. TDC identified this error during validation, and as a result requested movement of 2,234 people working in Metal Product Manufacturing (ANZSIC Code 27) from DZN 5756 to DZN 5757. This will have the effect of showing a significant employment 'decrease' in DZN 5756 and an 'increase' in DZN 5757 for 1996, but these changes reflect only the fact that this major coding error was undetected in 1991 and corrected for 1996.

1.2 DZNs 3788 and 3904 (Wickham area)

For DZN 3788, the 1996 JTW data shows a significant decrease of approximately 2,000 people. This 'decrease' is likely to be at least partly due to differences between the 1991 and 1996 indexes.

In 1991, the street number range 801-9999 Hunter Street, Wickham was incorrectly coded to DZN 3788, whereas in 1996 it was correctly coded to 3904. In addition, in 1991, Hunter Street, Wickham 'no number given' was coded to DZN 3788, whereas in 1996 it was coded to DZN 3904. In 1991, best-fit zone for 'no number given' records appears to have been based solely on which zone contained the highest number range. However, in 1996 best-fit zone was generally based on which zone was most likely to contain employment. In this case, DZN 3904 is closer to the Newcastle CBD than DZN 3788, and is thus more likely to be the zone referred to by Hunter Street, Wickham 'no number given' records.

Overall, the 1996 'decrease' in employment for DZN 3788 of approximately 2,000 is offset by a combined 'increase' of the same amount in the adjoining zones (DZNs 3904, 3906 or 3800). Some of this employment movement may be genuine, but it

is likely that most of it arises from differences between the 1991 and 1996 indexes, with the 1996 indexes being more precise in the Newcastle CBD.

1.3 DZNs 0087, 0088 and 0089 (Woollahra area)

The 1996 JTW data shows a significant 'decrease' in employment for DZNs 0087, 0088 and 0089, but much of this 'change' is due to correction of errors in the 1991 indexes. In particular, in 1991 all odd numbers for Oxford St Darlinghurst were incorrectly coded to DZN 0087 (this zone should only include the even numbers on Oxford Street); this was corrected in 1996, with the result that employment in DZN 0087 'moves' to surrounding zones.

1.4 DZNs 0292 and DZN 0579 (Lucas Heights/Heathcote area)

The 1996 JTW data includes a 'decrease' of approximately 600 people for DZN 0292, and a commensurate 'increase' for DZN 0579. This change is due to the fact that in the 1991 indexes the suburb of Lucas Heights was a Level 1 entry for DZN 0292, so that any address reported for Lucas Heights was automatically coded to DZN 0292, irrespective of street name and number and employer name. A large number of people who work at the Australian Nuclear Science and Technology Organisation (ANSTO) site, which is in DZN 0579, report their address as Lucas Heights, and therefore were coded incorrectly in 1991 to DZN 0292. This was corrected for 1996.

1.5 DZN 0035 (Surry Hills/ Redfern area)

The 1996 JTW data shows a significant 'decrease' in employment for DZN 0035. This is at least partly due to the fact that in 1991, street number ranges 520 to 9998 and 557 to 9999 Elizabeth Street, Redfern were incorrectly coded to DZN 0035, though they clearly belong in DZN 0083 and DZN 0084, respectively. This was corrected for 1996.

1.6 DZN 0194 (Croydon/ Ashfield area)

The 1996 JTW data shows a significant 'decrease' in employment for DZN 0194. Although there would have been a genuine decrease in employment in this zone due to the closure of Western Suburbs Hospital after 1991, the decrease is probably partly due to the fact that in 1991 all odd street numbers, and 'no number given', for Liverpool Road (Hume Highway), Ashfield were incorrectly coded to 0194. This was corrected for 1996.

1.7 DZNs 0008 and 0010 (Circular Quay area)

The 1996 JTW data shows a significant 'increase' in Financial Services employment for DZN 0008, and a 'decrease' in DZN 0010. This is at least partly due to the fact that street numbers 50-60 Bridge Street, Sydney were incorrectly coded to DZN 0010 in 1991. This number range was correctly coded to DZN 0008 in 1996, therefore most of the 'decrease' in DZN 0010 employment, and a large part

of the 'increase' in DZN 0008 employment, simply reflects correct coding in 1996 compared with 1991.

1.8 DZN 3844 (Williamtown area)

The 1996 JTW data shows a significant 'increase' in employment from approximately 150 in 1991 to over 1,200 in 1996 for DZN 3844. This is due to Williamtown RAAF base being incorrectly coded in 1991 to surrounding zones, but being correctly coded to DZN 3844 in 1996. DZN 3845 (Tomago) and 3867 (Medowie) have thus 'lost' 400 and 200 defence personnel, respectively. In addition, there has been a genuine employment increase in this zone because the RAAF Logistics Support section moved from Melbourne to Williamtown between the 1991 and 1996 Censuses.

1.9 DZN 0135 and 0136 (Chifley/Long Bay area)

The 1996 JTW data shows a significant 'decrease' in employment in DZN 0135 and a commensurate 'increase' in employment in DZN 0136. This is due to the fact that in 1991 Anzac Parade 'no number given' for Chifley or Malabar was coded to DZN 0135. The majority of employment in this area is actually in DZN 0136 (Prince Henry Hospital). This was rectified for the 1996 indexes, and reflected in the figures for Hospital and Retail.

1.10 DZN 3907 (The Hill area - east of Newcastle CBD)

The 1996 JTW data shows a 'decrease' in employment of approximately 600 for DZN 3907. This is largely due to significant improvements in the indexes for 1996. The main improvement was to Bull Street, which had incorrect number range entries in 1991 that would have artificially inflated employment in DZN 3907.

1.11 DZNs 0032 and 0034 (Royal Prince Alfred Hospital)

Royal Prince Alfred Hospital (RPA), except for a comparatively small medical centre in DZN 0032, is wholly contained within DZN 0034. However, in the 1991 JTW nearly all the employment in the Health sector in this area is in DZN 0032. This error is undoubtedly due to the fact that in 1991 the index entry for Missenden Road, Camperdown 'no number' codes to DZN 0032. This was corrected for 1996, with the effect that approximately 2,000 people in Health 'move' from DZN 0032 to DZN 0034.

1.12 DZNs 0145, 0146 and 0147 (Mascot airport area)

The 1996 JTW data shows significant changes in this area, so these zones were scrutinised closely by TDC.

There has been a very large overall increase in employment in DZN 0145, with the major increases being approximately 1,300 in Manufacturing, 2,600 in Transport and 3,000 in Air and Space Transport and Services To Transport. A significant amount of this increase would be genuine increase due to the fact that Qantas Head

Office moved from the Sydney CBD to 203 Coward Street in this zone in October 1992.

Apart from the genuine increase in employment in this zone due to relocation of employees, much of the total increase in DZN 0145 is likely to be merely notional i.e. not due to a genuine change in work location but the result of administrative changes. Qantas were contacted and stated that there were approximately 7,300 employees at Head Office, including around 3,000 flight crew, who were instructed to report their work address as 203 Coward Street. This means that in 1996 they would have been coded to DZN 0145, whereas in 1991 they would most likely have been coded to the adjoining zone, DZN 0146 (Sydney Airport Domestic Terminal). This is probably the major reason that DZN 0146 showed a 'decrease' of 2,700 transport industry employees between 1991 and 1996.

In addition to the largely notional movement in employment between DZN 0145 and 0146, there is likely to have been similar movement between DZN 0146 and DZN 0147 (Sydney Airport International Terminal). Part of the 'decrease' in DZN 0146 is offset by an 'increase' in DZN 0147, and to some extent this is likely to be due to an error in the 1991 indexes whereby "International Terminal, Mascot" was coded to DZN 0146.

To summarise, not all the change in employment within zones 0145, 0146, 0147 reflects significant physical change in the location of employment, but rather change in official address that has 'moved' Qantas employees from DZN 0146 to 0145, complicated by an error in the 1991 indexes which when rectified 'moved' employees from DZN 0146 to DZN 0147. Therefore, for accurate quantification of changes in employment levels between 1991 and 1996 these three zones should really be regarded as one zone and analysed on that basis.

1.13 DZNs 0343 and 0712 (Fairfield area)

In 1991, DZN 0343 was split into two zones, DZN 0712 and DZN 0343 (with the latter retaining the same number, but comprising only a part of the original DZN 0343). However, during processing of the 1991 JTW employment data was not coded correctly to the new zones, with the result that in 1991 the majority of employment is shown in DZN 0343 rather than the correct DZN 0712 (which covers the retail and commercial centre of Fairfield).

In 1996, JTW data was coded correctly for these zones, so that the majority of employment is in DZN 0712. Because of the incorrect coding for 1991, direct comparison of 1991 and 1996 JTW data can only be made by combining data for DZN 0343 and 0712.

1.14 Nowra region

The 1996 JTW data shows a massive 'increase' in employment in Nowra. The reason for this is that in 1996 the TDC Study Area was extended to include all of the Shoalhaven SLA. As a result, the scope of the 1996 JTW included all people enumerated in Shoalhaven, rather than just those enumerated in Nowra, as was the

case in 1991. The employment 'increase' therefore is due to scope change; the 1991 data would have been a significant underenumeration, as it only counted people working in Nowra who also lived in Nowra.