

**SUPERBUS SERVICES:  
AN OVERVIEW OF  
OPPORTUNITIES**

**WELLINGTON REGIONAL COUNCIL**

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**BOOZ·ALLEN & HAMILTON (NEW ZEALAND) LTD**

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## EXECUTIVE SUMMARY

### PROJECT AIMS

Booz·Allen & Hamilton (NZ) Ltd was engaged by the Wellington Regional Council to investigate the potential for new/improved bus services which would have a primary focus of attracting people from cars rather than from rail. These 'Superbus' services would provide an equivalent level of service to the existing rail service, but not run in direct competition with it. In addition, the opportunities for commercial bus services which would increase public transport (PT) modal share were assessed.

### SUPERBUS OPPORTUNITIES

#### Regionwide Patterns

An analysis of opportunities for Superbus services was undertaken using the 1996 Census Journey to Work (JTW) data. The JTW data was used given that it is the most up-to-date data available for Wellington transport trips, and JTW trips are the major component of public transport peak trips (the public transport system is defined primarily by its peak service structure).

This analysis found that:

- The Wellington CBD is the major JTW destination within the region, both in terms of the total JTW trip market and public transport modal share.
- The next largest area is Lower Hutt, which only has 4% of the Wellington number of public transport JTW trips, and 14% of the total JTW trips.
- The Wellington CBD has a much higher PT modal share than the other areas: this will be partially due to the higher level of PT service, partially a result of non-PT factors (higher priced parking, higher level of road congestion).

#### Public Transport Modal Share

Further analysis examined differences in modal share throughout the region for JTW trips to the Wellington CBD. The key findings were that:

- There is no clear relationship between distance from the Wellington CBD and PT modal share.
- PT share appears to decrease with increased distance from the nearest rail station.
- Access mode/distance from the rail service has a substantial impact on PT modal share: Area Units within easy walking distance of the rail service have a much higher PT share than those further away where a bus feeder trip (or P+R, or long walk) is required.
- The positive impact of a higher frequency rail service on PT modal share.

#### New Direct Bus Services to CBD

Examination of the likely impact of introducing direct bus services from areas with lower than average PT modal share found that:

- There are opportunities available for complementing the existing rail service with new bus services, which would provide a level of service (especially in terms of access and frequency) similar to that of the rail service.
- These opportunities relate to Journey to Work (JTW) trips to the Wellington CBD from areas some distance from the rail service.
- The new bus services would result in an increase in the total PT share for CBD JTW trips. It is likely that a similar effect would be found with education and other CBD based peak trips.
- The train modal share from the areas with new bus services would decrease substantially.
- The increased PT share would come primarily from present car passengers and private car drivers.
- The number of people switching from car would be less than the number switching from train to bus.

### **Overall Conclusion: Superbus Services**

The overall finding is that there appears to be little if any scope for 'Superbus' services which attract more people from cars than from the rail service. However, the opportunity to increase PT share for peak period travel to the Wellington CBD is available if the WRC rail protection strategy were to be relaxed.

## **COMMERCIAL BUS SERVICES**

### **Opportunities**

The opportunities for new commercial bus services, where these could be used to increase total public transport modal share were examined (other opportunities for commercial services apart from those covered in this report will exist in different areas; however, these may not significantly increase PT modal share).

It was determined that new peak period commercial bus services to the Wellington CBD could be operated from:

- Wainuiomata
- Stokes Valley
- Hutt Central
- Western Hills
- North Upper Hutt
- Titahi Bay
- Whitby
- Waikanae
- Paraparaumu Beach
- Raumati

### **Commercial Viability**

Cost recovery is close to or above 100% for nearly all the bus services examined: only the Titahi Bay service may not be commercially viable. The highest cost recovery levels are expected for the Western Hills and Hutt Central services. In these two areas the present PT modal share is well below the wider area average, and a high number of new passengers would be generated



### **Impact on Public Transport Share**

Introducing these bus services would increase the total PT modal share in every case: increases would range from 2% to 16% of PT market trips (JTW trips excluding company car and slow mode). However, rail patronage would decrease. The rail patronage reduction is estimated at 443,000 passengers a year on the Hutt line, and 204,000 passengers a year on the Paraparaumu line. This would equate to a reduction in peak period rail trips to/from the Wellington CBD of around 18% on the Hutt line, and 11% on the Paraparaumu line.

Offsetting this rail patronage loss to some extent may be increased patronage resulting from increased capacity on peak services (given that seating capacity is being exceeded at some times on certain parts of the network, for example, Waterloo). Given the reduced rail passengers from these areas it may be possible to achieve reductions in bus operating costs for feeder services for the rail service.

### **Impact on Road Traffic**

Introducing the bus services will reduce peak period car vehicle trips on State Highway 1 and State Highway 2. Counter-balancing this to some extent is the increase in bus vehicle trips. The estimated annual congestion benefits are \$300,000 for State Highway 2 and \$200,000 for State Highway 1 (indicative only).

### **Overall Conclusion: Commercial Bus Services**

Opportunities exist for introducing new commercial bus services which could increase total PT modal share, particularly for peak period travel to the Wellington CBD. These bus services would, overall, reduce peak period traffic to the CBD. However, rail patronage would decrease to some extent.

## 1. INTRODUCTION

The Wellington Regional Council (WRC) presently has a policy of not allowing new bus services which would directly compete with the existing rail service (several competing bus services are provided under 'grandfather' rights). Booz·Allen & Hamilton (BAH) was engaged by the WRC to investigate the potential for new/improved bus services which would have a primary focus of attracting people from cars rather than from rail. This project was to assess the possibilities for 'Superbus' services which would provide an equivalent level of service to the existing rail service, but not run in direct competition with it.

This project is part of a wider WRC review of its rail protection policy. One of the options being considered is allowing bus services which compete with the rail service where these are provided commercially (without regional council subsidy).

This report sets out the results of our analysis.

The remainder of the report is structured as follows:

- Chapter 2 - sets out the identification of potential Superbus services, and assessment of their impact on rail patronage
  - Chapter 3 - identifies potential new commercial bus services if the rail protection policy was relaxed to allow these; and, provides a financial and economic evaluation of the potential commercial services.
  - Chapter 4 - provides conclusions in regard to the scope for new Superbus services, and new commercial bus services in particular.
- Appendix A - series of maps showing modal Share for Wellington CBD journey to work trips.

## 2. ANALYSIS OF OPPORTUNITIES

### 2.1. OVERVIEW

The Wellington region is well served by public transport services; primarily bus services in Wellington City, and a combination of rail and bus services in the rest of the region. Although the region has five city centres within it, the single major traffic and passenger flow is movements to and from the Wellington City Central Business District (CBD).

Set out in Table 2.1 are the 1996 Census Journey to Work (JTW) trip numbers for each of the region's six city CBDs (as a workplace destination), and the next 2 highest areas for comparison.

Several comments can be made in regard to this table:

- Given that JTW trips are the major component of the peak public transport patronage, the dominance of the Wellington CBD is clearly shown in this table, both in terms of the total JTW trip market and particularly the public transport component.
- The next largest area is Lower Hutt, which only has 4% of the Wellington number of public transport JTW trips, and 14% of the total JTW trips.
- The Wellington CBD has a much higher PT modal share than the other areas: this will be partially due to the higher level of PT service, partially a result of non-PT factors (higher priced parking, higher level of road congestion).

**TABLE 2.1 1996 CENSUS JOURNEY TO WORK TRIPS BY MODE/DESTINATION**

| Area                   | Bus  | Train | Total PT | Total Trips <sup>1</sup> | PT Share (%) |
|------------------------|------|-------|----------|--------------------------|--------------|
| <b>Destination CBD</b> |      |       |          |                          |              |
| Wellington             | 8274 | 6903  | 15177    | 53952                    | 28.1         |
| Lower Hutt             | 516  | 126   | 642      | 7638                     | 8.4          |
| Upper Hutt             | 66   | 63    | 129      | 1692                     | 7.6          |
| Porirua                | 267  | 174   | 441      | 4035                     | 10.9         |
| Paraparaumu            | 42   | 21    | 63       | 2274                     | 2.8          |
| Masterton              | 42   | 21    | 63       | 3096                     | 2.0          |
|                        | 0    | 0     | 0        | 0                        |              |
| Petone                 | 87   | 165   | 252      | 3915                     | 6.4          |
| Gracefield             | 84   | 48    | 132      | 3432                     | 3.9          |
|                        | 9378 | 7521  | 16899    | 80034                    |              |

Note: (1) All modes, does not include Did not Work, and Worked at Home

### 2.2. ANALYSIS

Because of the dominance of the Wellington CBD in the transport system it was decided to focus on trips to it, given that new services serving this destination are most likely to be viable.

The analysis was undertaken using the 1996 Census JTW data:

- This data was available in an Origin-Destination format from Statistics New

Zealand.

- It is the most up-to-date origin-destination data available for Wellington transport trips. The most recent general travel survey carried out in Wellington was the GATS survey in 1989.
- JTW trips are the major component of public transport peak trips; and, the public transport system is defined primarily by its peak service structure.

The tasks carried out, and results obtained, are summarised below.

### 2.2.1. JTW Modal Share

The modal share for JTW trips to the Wellington CBD was determined for each Statistics New Zealand (STATS) Area Unit (AU). A series of maps showing this output are attached as Appendix A. Table 2.2 below summarises the findings for each main area within the region. For this analysis people who didn't work on census day, and people who worked at home were excluded. In this way a picture of the average day's trip matrix was obtained (given that on any one day a certain proportion of people will work at home or not go to work).

Several comments can be made about the results:

- Wellington City has the highest proportion of JTW trips with their destination as the (Wellington) CBD. This proportion decreases with distance from the CBD.
- The Wairarapa has the highest PT modal share for JTW trips to the CBD at 61%, followed by Lower Hutt and Porirua (36-37%) and Upper Hutt and Kapiti (34-35%). The Wellington PT modal share is substantially lower at 23% (in part because of the high proportion of slow mode trips).
- Bus is the major PT mode for Wellington City, with train the major PT mode for all other areas.
- Car trips make up the majority of CBD JTW trips for all areas apart from the Wairarapa. The car mode share is about 34% for Wairarapa, about 50% for Wellington (excl Wgtn Nth), about 60% for Hutt Valley, Porirua and Kapiti; and about 70% for Wellington North. Slow mode is a small proportion of all trips in all areas apart from Wellington (excl Wgtn Nth), where walk trips are 21% of CBD JTW trips.

TABLE 2.2 MODAL SHARE - JTW TRIPS TO WELLINGTON CBD (%) - 1996 CENSUS

| Origin Area         | Traian | Bus  | Pr Car | Cpy Car | Pass -ger | Mt-Bike | Bicy -cle | Wal k | Ot-her | Totl | PT % | PT No | % Tot -CBD |
|---------------------|--------|------|--------|---------|-----------|---------|-----------|-------|--------|------|------|-------|------------|
| Wellington (exc WN) | 0.3    | 23.3 | 33.8   | 7.2     | 7.8       | 0.8     | 2.7       | 21.2  | 2.9    | 100  | 23.6 | 6306  | 51.6       |
| Wgtn N              | 7.9    | 15.2 | 48.0   | 10.1    | 13.3      | 1.4     | 1.3       | 0.9   | 1.9    | 100  | 23.1 | 1926  | 47.4       |
| Lower Hutt          | 31.6   | 5.5  | 37.9   | 10.3    | 9.7       | 1.1     | 0.9       | 0.7   | 2.3    | 100  | 37.0 | 3069  | 21.8       |
| Upper Hutt          | 32.2   | 2.8  | 35.1   | 11.3    | 14.5      | 1.4     | 0.9       | 0.6   | 1.2    | 100  | 34.9 | 831   | 16.3       |
| Porirua             | 33.9   | 2.5  | 36.0   | 11.9    | 13.1      | 0.4     | 0.2       | 0.4   | 1.6    | 100  | 36.4 | 2247  | 29.4       |
| Kapiti              | 27.9   | 5.8  | 33.8   | 14.5    | 14.9      | 0.4     | 0.2       | 0.4   | 2.1    | 100  | 33.8 | 537   | 16.1       |
| Wairarapa           | 58.5   | 2.8  | 18.9   | 9.4     | 5.7       | 0.9     | 0.0       | 0.9   | 2.9    | 100  | 61.3 | 195   | 2.6        |

### 2.2.2. PT Share

Given the focus on finding opportunities for bus services to complement the rail service the analysis was now focused on the rail corridor areas: most of Wellington City was therefore not included in the analysis.

The next step undertaken was to assess, for each AU, the PT modal share in terms of the potential CBD trip market. This market was taken to be the total of PT trips, Private Car Driver Trips, Motor Bike trips, and Car Passenger trips. Company Car trips were excluded given that this group are very unlikely to switch to PT in response to a PT service change. Slow mode (walk and cycle) were also excluded as they are only a very small proportion of trips for the areas being assessed, and are more likely to be influenced by weather than by PT service changes.

Figures 2.1-2.5 show the PT modal share for each of the areas being assessed. From these figures it can be seen that within each area there are AUs with a substantially lower PT modal share than the area average. For example, in Lower Hutt the Western Hills area has a PT share just over 30% whereas the city average is 43%.

### 2.2.3. Factors Behind PT Share

This task involved analysing the data to determine to what extent the differences between AU modal share could be readily explained in terms of the PT service provided. The analysis was undertaken using Lower Hutt as the case study area.

The analysis was done in two steps:

- Firstly, on the basis of the distance of each AU from the Wellington CBD: within an area, such as Lower Hutt, there is no clear relationship between distance from the Wellington CBD and PT share.
- Secondly, on the basis of access mode/distance to nearest rail station, and rail service frequency at that station.
  - PT share appears to decrease with increased distance from the nearest rail station.
  - The AUs were grouped into three access groups: easy walk, bus, and long walk (no bus to rail). The long walk group was subsequently removed given that virtually all areas have a bus running through them, apart from outlying areas (eg Pencarrow).
  - Three rail frequency groups were also initially used: A - around 10 mins peak period average (Waterloo, Taita, Petone), B - around 17 mins (rest of main Hutt line), and C-around 27 mins (Melling Line). The A and B frequency groups were subsequently collapsed into one group given that there was not a large difference between them in terms of PT share.

A summary of the second part of the analysis is shown below.

### Lower Hutt to Wgtn CBD JTW Trips - PT Modal Share (%)

| Access Mode   | Rail Service Frequency |               | All |
|---------------|------------------------|---------------|-----|
|               | High Frequency         | Low Frequency |     |
| Easy Walk     | 53                     | 52            | 53  |
| Bus/Long Walk | 40                     | 33            | 38  |
| All           | 45                     | 38            | 43  |

This clearly shows:

- That access mode/distance from the rail service has a substantial impact on PT modal share: AUs within easy walking distance of the rail service have a much higher PT share than those further away where a bus feeder trip (or P+R, or long walk) is required.
- The positive impact of a higher frequency rail service on PT modal share.

These results are as one would expect given known relationships between PT service and patronage. What this analysis does, however, is establish that these relationships are discernible at the AU level; and, identify areas where improvements in PT service could improve overall PT modal share.

#### 2.2.4. Impact of New Bus Services

The next stage of the analysis assessed the likely impact of introducing direct CBD bus services in AUs with lower than average PT share. Clearly the areas with the greatest potential for improved PT share are those which presently have a low frequency rail service and bus access to that service. In Lower Hutt the Western Hills falls into this category. The next best candidate areas are those which presently have bus access to a high frequency rail service. Wainuiomata falls into this category.

An assessment of the likely impact on CBD JTW modal share from introducing direct bus services from the Western Hills and Wainuiomata to the CBD is shown in Table 2.3. This assessment is based on the following assumptions:

- Providing a direct CBD bus service in these areas within easy walking distance of users' homes will achieve a similar modal share as for areas within easy walk distance of the rail service. Thus, the Western Hills, a 'low frequency bus access area' has an existing PT modal share of around 30%. Providing a direct bus within easy walking distance should improve modal share to something close to that for the 'low frequency easy walk' area, around 50%.
- Although a rail system is generally considered to generate additional patronage over and above that which an equivalent bus service would attract (due to a perceived higher level of service, comfort etc), the ability of the bus service to provide greater penetration of the CBD than the existing rail service would counter-balance this to some extent. We have assumed that a direct bus will achieve 80-100% of the rail service modal share.
- Providing a direct bus service at existing rail service frequencies will result in



a transfer of existing rail passengers to the bus. The exact extent of this mode switching is unclear. We have assumed that the majority of existing passengers would switch, with around 33% remaining on the rail.

**TABLE 2.3 IMPACT OF DIRECT BUS SERVICE ON CBD JTW MODAL SHARE (%)**

| Area                           | Existing Modal Share (%) |     |       | With Direct Bus Service |       |       |             |                   |          |
|--------------------------------|--------------------------|-----|-------|-------------------------|-------|-------|-------------|-------------------|----------|
|                                | Train                    | Bus | Total | Total PT                | Train | Bus   | PT Increase | Decrease in Train | From Car |
| <b>Western Hills</b>           |                          |     |       |                         |       |       |             |                   |          |
| Normandale                     | 30                       | 0   | 30    | 40-50                   | 10    | 30-40 | 10-20       | 20                | 10-20    |
| Belmont                        | 29                       | 1   | 30    | 40-50                   | 10    | 30-40 | 10-20       | 19                | 10-20    |
| Kelson                         | 31                       | 1   | 32    | 40-50                   | 10    | 30-40 | 8-18        | 21                | 8-18     |
| <b>Wainuiomata<sup>1</sup></b> |                          |     |       |                         |       |       |             |                   |          |
| Parkway                        | 25                       | 14  | 39    | 44-55                   | 8     | 36-47 | 5-16        | 17                | 5-16     |
| Arakura                        | 32                       | 11  | 43    | 44-55                   | 11    | 33-44 | 1-12        | 21                | 1-12     |
| Homedale E                     | 22                       | 11  | 33    | 44-55                   | 7     | 37-48 | 11-22       | 15                | 11-22    |
| Homedale W                     | 31                       | 11  | 42    | 44-55                   | 10    | 34-45 | 2-13        | 21                | 2-13     |

Notes (1) All Wainuiomata areas presently have several direct bus services

The following points can be noted:

- Providing direct bus services will increase total PT modal share for CBD JTW trips.
- In every case train modal share will decrease.
- A significant switch from car to PT can be achieved.

### 2.3. CONCLUSIONS

The following conclusions can be made from the analysis conducted:

- There are opportunities available for complementing the existing rail service with new bus services, which would provide a level of service (especially in terms of access and frequency) equivalent to that of the rail service.
- These new bus services would result in an increase in the total PT share for CBD JTW trips. It is likely that a similar effect would be found with education and other CBD based peak trips.
- The train modal share from the areas with new bus services would decrease substantially.
- The increased PT share would come primarily from present car passengers and private car drivers.
- The number of people switching from car would be less than the number switching from train to bus.

The overall finding is that there appears to be little if any scope for 'Superbus' services which attract more people from cars than from the rail service. However, the opportunity to increase PT share for peak period travel to the Wellington CBD is available if the WRC rail protection strategy was to be relaxed.



FIGURE 2.1 PT MODAL SHARE 1996 CENSUS : LOWER HUTT

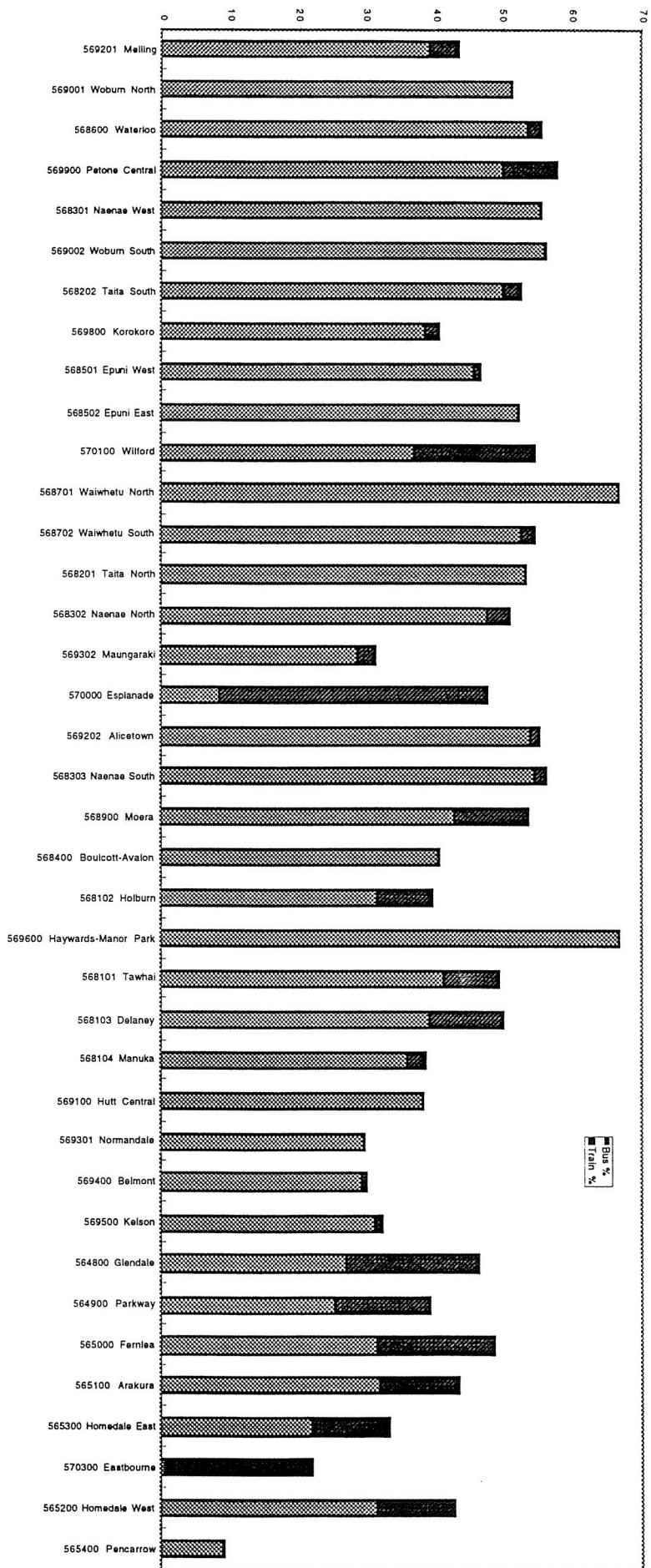


FIGURE 2.2 PT MODAL SHARE 1996 CENSUS : UPPER HUTT

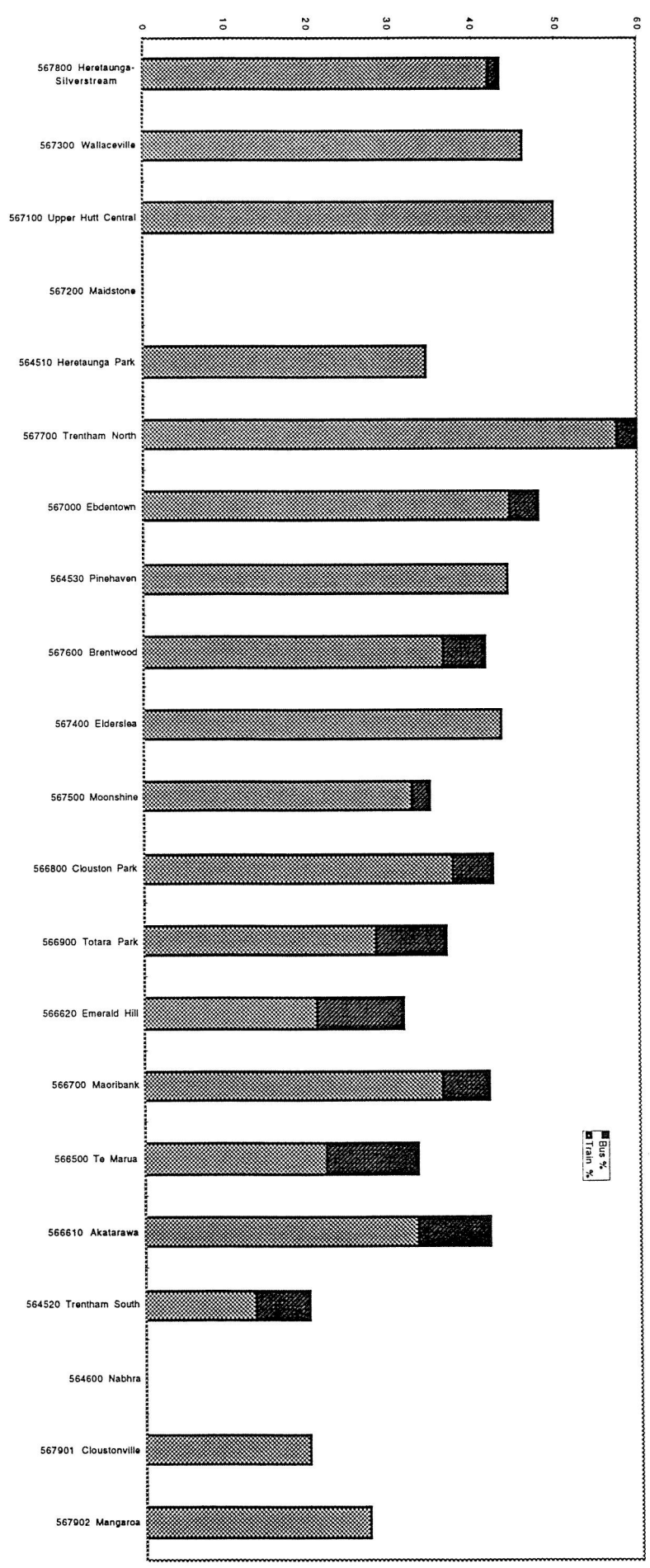


FIGURE 2.3 PT MODAL SHARE 1996 CENSUS : JOHNSONVILLE

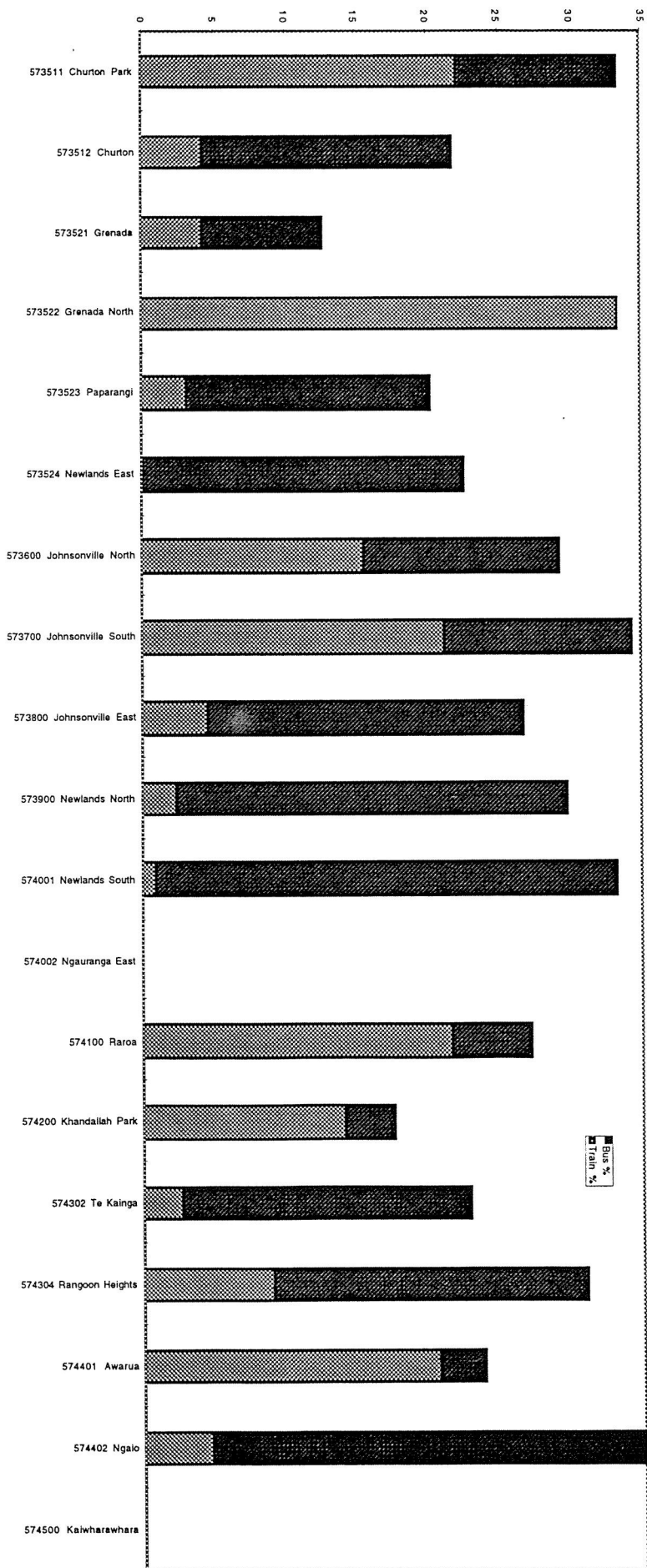


FIGURE 2.4 PT MODAL SHARE 1996 CENSUS : PORIRUA

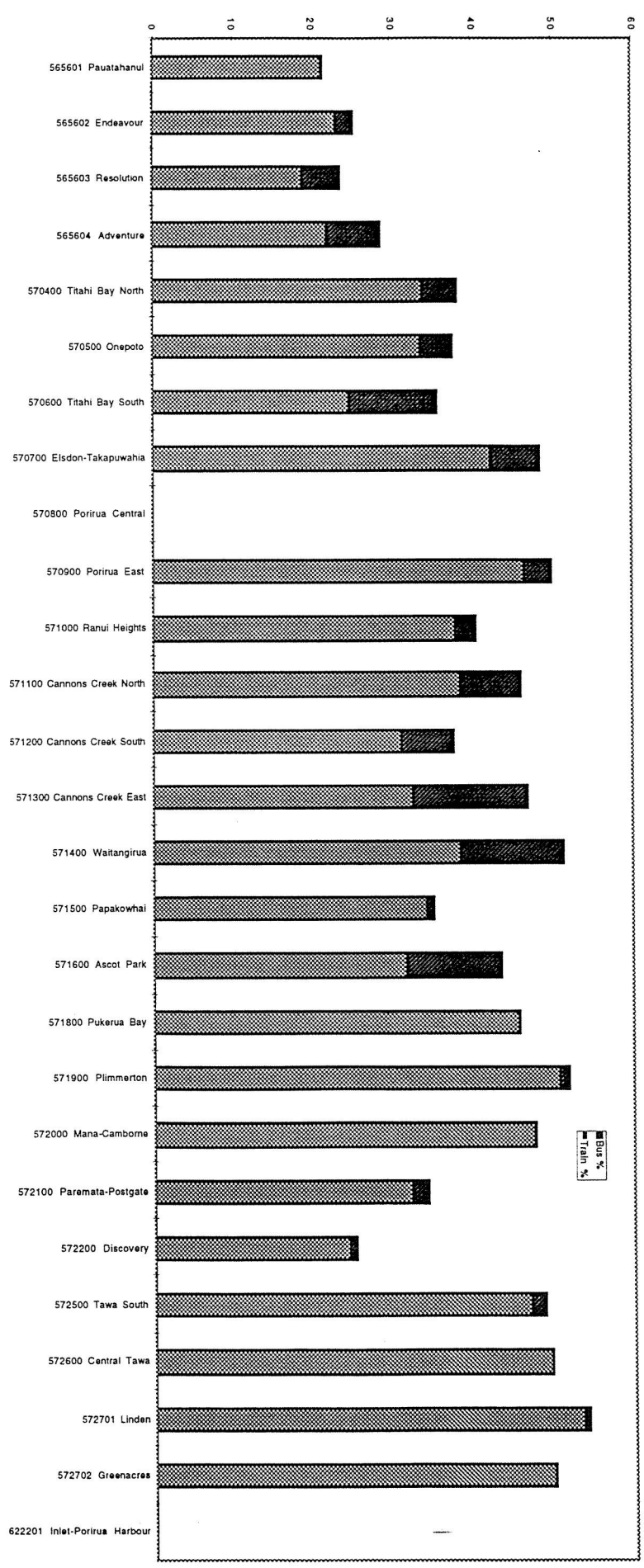
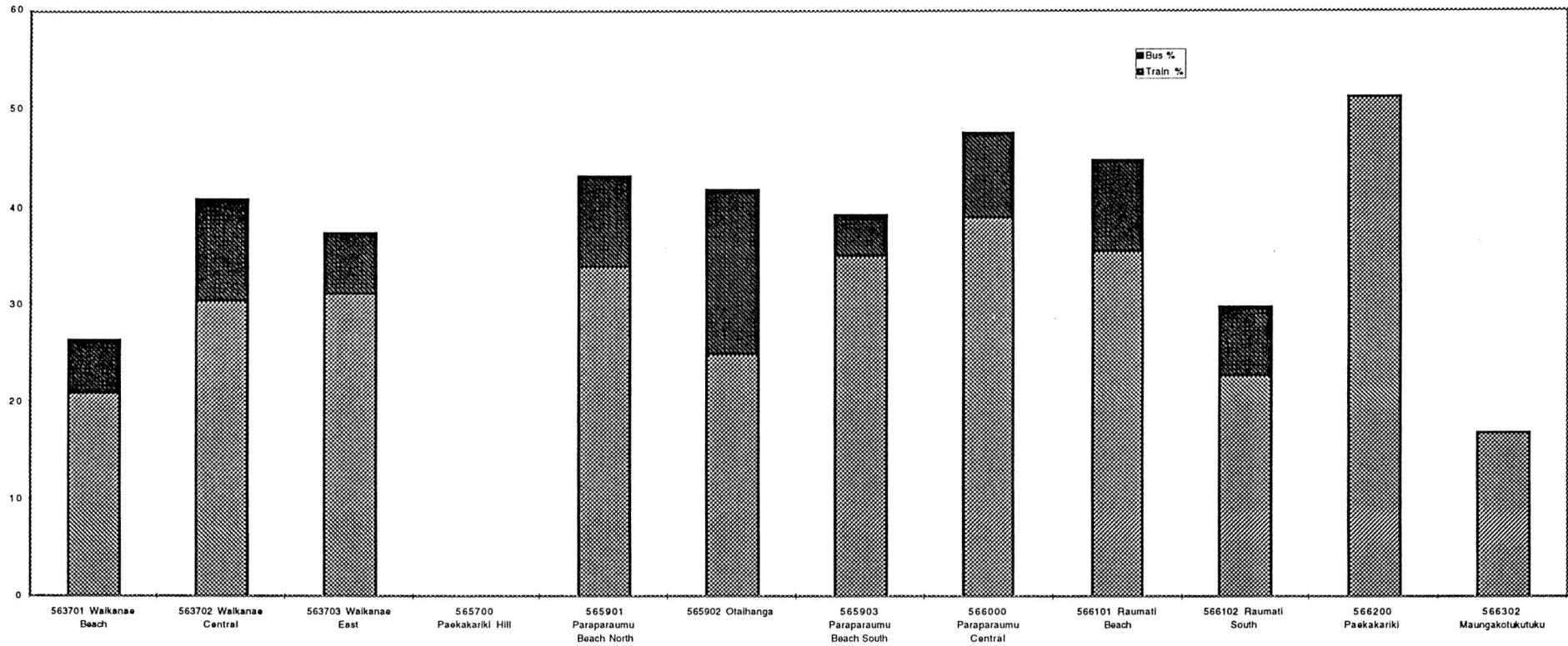


FIGURE 2.5 PT MODAL SHARE 1996 CENSUS : KAPITI



### 3. COMMERCIAL BUS SERVICES

#### 3.1. OPPORTUNITIES

##### 3.1.1. Areas Selected

The analysis outlined above was extended to identify areas where opportunities may exist to introduce new commercial bus services to the Wellington CBD. The main criteria used for selecting areas were:

- Bus access to rail service currently
- Scope to increase PT modal share
- None or few existing bus services to CBD.

Note: the opportunities identified here are not necessarily all opportunities for commercial bus services, but rather those which could significantly increase PT modal share.

On this basis the following areas were selected for further analysis:

**TABLE 3.1 POTENTIAL CBD COMMERCIAL BUS SERVICE AREAS**

| Area                | Rail Service Access             | Existing Bus Services to CBD (Am Peak) |
|---------------------|---------------------------------|--|
| <i>Lower Hutt</i>   |                                 |  |
| • Wainuiomata       | Bus service to Waterloo         | 2 direct services                      |
| • Stokes Valley     | Bus service to Taita            | 1 direct service                       |
| • Hutt Central      | Bus service to Petone           | None                                   |
| • Western Hills     | Bus service to Petone / Melling | None                                   |
| <i>Upper Hutt</i>   |                                 |  |
| • North Upper Hutt  | Bus service to Upper Hutt       | 2 direct services                      |
| <i>Porirua</i>      |                                 |  |
| • Titahi Bay        | Bus service to Porirua          | None                                   |
| • Whitby            | Bus service to Paremata         | None                                   |
| <i>Kapiti</i>       |                                 |  |
| • Waikanae          | Bus service to Paraparaumu      | 2 direct services                      |
| • Paraparaumu Beach | Bus service to Paraparaumu      | 2 direct services                      |
| • Raumati           | Bus service to Paraparaumu      | 2 direct services                      |

##### 3.1.2. Area Analysis

For each of the areas selected the likely impact on CBD JTW modal share from introducing direct bus services (at similar to existing rail service frequencies) was assessed. The results of this assessment are shown in Tables 3.2 and 3.3.

Several points need to be made about these results:

- Introducing bus services at the rail service frequency is assumed to increase total PT modal share to 90% of that which would be achieved for a rail service within easy walk distance of all JTW travellers. This allows for the rail mode preference which is largely compensated for by the greater CBD penetration of the bus service, and the removal of the need to transfer from bus/car to rail.

- It is assumed that 67% of existing rail users will switch to bus, with only 33% staying with rail. This reflects the greater attractiveness of the direct bus over the bus-car/rail trip. However, despite this some rail users will not switch, primarily due to personal convenience factors and unwillingness to change.

Several points can be noted in regard to these results:

- The modal changes achieved range from 2% - 16% of total 'PT market' trips (PT plus private car driver and car passenger). The largest changes would be achieved in the Western Hills and Whitby at 15-16%.
- The increase in bus passengers occurs mostly at the expense of the rail share (assumed to reduce by 75%).

**TABLE 3.2 IMPACT OF DIRECT BUS SERVICES ON MODAL SHARE - %**

| Area              | Existing - % of Total Trips <sup>1</sup> |     |    | With Direct Bus - % of Total Trips |     |    |               |             |
|-------------------|--|-----|----|------------------------------------|-----|----|---------------|-------------|
|                   | Train                                    | Bus | PT | Train                              | Bus | PT | Train<br>Decr | From<br>Car |
| <i>Lower Hutt</i> |  |     |    |                                    |     |    |               |             |
| Wainuiomata       | 27                                       | 14  | 41 | 9                                  | 39  | 48 | 18            | 6           |
| Stokes Valley     | 37                                       | 7   | 45 | 12                                 | 35  | 48 | 25            | 3           |
| Hutt Central      | 39                                       | 0   | 39 | 13                                 | 34  | 47 | 26            | 8           |
| Western Hills     | 31                                       | 1   | 32 | 10                                 | 37  | 47 | 20            | 15          |
| <i>Upper Hutt</i> |  |     |    |                                    |     |    |               |             |
| North Upper Hutt  | 30                                       | 8   | 38 | 10                                 | 30  | 40 | 20            | 2           |
| <i>Porirua</i>    |  |     |    |                                    |     |    |               |             |
| Titahi Bay        | 31                                       | 6   | 37 | 10                                 | 31  | 41 | 21            | 4           |
| Whitby            | 23                                       | 3   | 26 | 8                                  | 34  | 41 | 16            | 16          |
| <i>Kapiti</i>     |  |     |    |                                    |     |    |               |             |
| Waikanae          | 29                                       | 8   | 37 | 9                                  | 35  | 44 | 19            | 7           |
| Ppm Beach         | 35                                       | 6   | 41 | 11                                 | 33  | 44 | 23            | 3           |
| Raumati           | 29                                       | 8   | 37 | 10                                 | 34  | 44 | 20            | 7           |

Notes (1) Total Trips excludes company car and slow mode.

**TABLE 3.3 IMPACT OF DIRECT BUS SERVICES ON MODAL SHARE - NO OF DAILY TRIPS**

| Area              | Existing - No of Trips <sup>1</sup> |     |     | With Direct Bus - No of Trips |     |     |               |             |
|-------------------|-------------------------------------|-----|-----|-------------------------------|-----|-----|---------------|-------------|
|                   | Train                               | Bus | PT  | Train                         | Bus | PT  | Train<br>Decr | From<br>Car |
| <i>Lower Hutt</i> |                                     |     |     |                               |     |     |               |             |
| Wainuiomata       | 237                                 | 120 | 357 | 78                            | 334 | 412 | 159           | 55          |
| Stokes Valley     | 186                                 | 36  | 222 | 61                            | 176 | 238 | 125           | 16          |
| Hutt Central      | 273                                 | 0   | 273 | 90                            | 238 | 328 | 183           | 55          |
| Western Hills     | 450                                 | 21  | 471 | 149                           | 547 | 695 | 302           | 224         |
| <i>Upper Hutt</i> |                                     |     |     |                               |     |     |               |             |
| North Upper Hutt  | 177                                 | 45  | 222 | 58                            | 173 | 232 | 119           | 10          |
| <i>Porirua</i>    |                                     |     |     |                               |     |     |               |             |
| Titahi Bay        | 147                                 | 30  | 177 | 49                            | 149 | 197 | 98            | 20          |
| Whitby            | 192                                 | 21  | 213 | 63                            | 278 | 342 | 129           | 129         |
| <i>Kapiti</i>     |                                     |     |     |                               |     |     |               |             |
| Waikanae          | 72                                  | 21  | 93  | 24                            | 87  | 111 | 48            | 18          |
| Ppm Beach         | 99                                  | 18  | 117 | 33                            | 93  | 126 | 66            | 9           |
| Raumati           | 99                                  | 27  | 126 | 33                            | 117 | 149 | 66            | 23          |



### 3.2. BUS SERVICE OPERATIONS

Bus service options were developed for each of the above areas on the following basis:

- Peak period service only
- Direct routes from the origin area to the Wellington CBD
- Pick-up in origin area, express to CBD
- Services run to Courtenay Place, drop-off throughout CBD (pick-up on pm peak trip)
- Frequency similar to that of area's rail service (eg Lower Hutt frequency for Stokes Valley, Western Hills etc).

Operating cost and revenue estimates were derived for each option using standard unit costs developed from other BAH sources, and average fares estimated from the present fare schedules.

Table 3.3 summarises the results. It should be noted that the operating cost figures provided are indicative only. They are based on effectively self-contained services, with some buses doing two peak trips. The financial performance of these services could be improved if the bus/driver could be utilised on other existing services, or if older buses were used (bus capital has been averaged over the life of the bus). These figures also allow for a profit margin.

**TABLE 3.3 DIRECT CBD BUS SERVICES: COSTS AND REVENUES - INDICATIVE**

| Area              | Daily Trips | Daily Passengers | Annual Operating Cost (\$000) | Annual Fare Revenue (\$000) | Revenue less Cost | Cost Recovery (%) |
|-------------------|-------------|------------------|-------------------------------|-----------------------------|-------------------|-------------------|
| <i>Lower Hutt</i> |             |                  |                               |                             |                   |                   |
| Wainuiomata       | 11          | 370              | 276.8                         | 283.3                       | 6.5               | 102               |
| Stokes Valley     | 6           | 220              | 198.1                         | 185.2                       | -12.9             | 93                |
| Hutt Central      | 11          | 400              | 232.0                         | 256.6                       | 24.5              | 111               |
| Western Hills     | 26          | 930              | 553.2                         | 598.6                       | 45.4              | 108               |
| <i>Upper Hutt</i> |             |                  |                               |                             |                   |                   |
| North Upper Hutt  | 6           | 210              | 230.4                         | 213.9                       | -16.5             | 93                |
| <i>Porirua</i>    |             |                  |                               |                             |                   |                   |
| Titahi Bay        | 5           | 170              | 151.9                         | 128.4                       | -23.5             | 85                |
| Whitby            | 12          | 420              | 373.6                         | 373.6                       | 0.9               | 100               |
| <i>Kapiti</i>     |             |                  |                               |                             |                   |                   |
| Waikanae          | 3           | 110              | 172.6                         | 167.5                       | -5.1              | 97                |
| Ppm Beach         | 4           | 130              | 178.4                         | 167.6                       | -10.9             | 94                |
| Raumati           | 4           | 150              | 201.3                         | 204.4                       | 3.1               | 102               |

Several comments can be made:

- Cost recovery is close to or above 100% for nearly all services: only the Titahi Bay service may not be commercially viable.
- The highest cost recovery levels are expected for the Western Hills and Hutt Central services. In these two areas the present PT modal share is well below

the wider area average, and a high number of new passengers would be generated.

- Bus operators could be expected, if given the opportunity, to try to run at least some commercial bus services from these areas, if not at the proposed frequencies.

### 3.3. IMPACTS ON RAIL SERVICE

Introducing these commercial bus services would reduce rail patronage and revenue. Table 3.4 shows the estimated impact of each of the proposed bus services. If all of the bus services outlined above were operated significant reductions in peak period rail trips to/from the Wellington CBD would occur: in the order of 18% of peak CBD trips on the Hutt line, and 11% on the Paraparaumu line.

**TABLE 3.4 DIRECT CBD BUS SERVICES: IMPACT ON RAIL SERVICE**

| Area              | Daily Reduction<br>in Rail Trips | Annual Reduction<br>in Rail Trips (000) | Annual Reduced<br>Revenue (\$000) |
|-------------------|----------------------------------|---|-----------------------------------|
| <i>Lower Hutt</i> |                                  |   |                                   |
| Wainuiomata       | 159                              | 79.4                                    | 190.6                             |
| Stokes Valley     | 125                              | 62.3                                    | 169.5                             |
| Hutt Central      | 183                              | 91.5                                    | 175.6                             |
| Western Hills     | 302                              | 150.8                                   | 289.4                             |
| <i>Upper Hutt</i> |                                  |   |                                   |
| North Upper Hutt  | 119                              | 59.3                                    | 208.7                             |
| Total Hutt Line   | 888                              | 443.3                                   | 1033.8                            |
| <i>Porirua</i>    |                                  |   |                                   |
| Titahi Bay        | 98                               | 49.3                                    | 114.3                             |
| Whitby            | 129                              | 64.3                                    | 180.1                             |
| <i>Kapiti</i>     |                                  |   |                                   |
| Waikanae          | 48                               | 24.1                                    | 135.1                             |
| Ppm Beach         | 66                               | 33.2                                    | 159.2                             |
| Raumati           | 66                               | 33.2                                    | 159.2                             |
| Total Ppm Line    | 407                              | 204.1                                   | 747.9                             |

### 3.4. IMPACTS ON ROAD TRAFFIC

The likely impact of the commercial bus services on road traffic was also assessed, and the results are shown in Table 3.5. Several comments can be made:

- The degree of impact on car vehicle trips is most substantial for the Western Hills service with 112 vehicle trips per day removed, followed by Whitby with 64. The number of vehicle trips removed is still significant for the Wainuiomata and Hutt Central services, but is not so for the other possible services.
- Counter balancing the reduction in car trips is the increase in bus vehicle trips.
- The estimated annual congestion benefits are \$309,000 for State Highway 2 and \$199,000 for State Highway 1.

TABLE 3.5 DIRECT CBD BUS SERVICES: IMPACT ON ROAD TRAFFIC

| Area              | Daily Reduction in Car Mode Trips | Daily Reduction in Car Vehicle Trips <sup>1</sup> | Daily Increase in Bus Vehicle Trips <sup>2</sup> | Annual Congestion Benefit (\$000) <sup>3</sup> |
|-------------------|-----------------------------------|---|--|--|
| <i>Lower Hutt</i> |                                   |   |  |  |
| Wainuiomata       | 55                                | 28  | 5  | 40.6   |
| Stokes Valley     | 16                                | 8   | 3  | -6.0   |
| Hutt Central      | 55                                | 27  | 6  | 36.0   |
| Western Hills     | 224                               | 112   | 13   | 253.2  |
| <i>Upper Hutt</i> |                                   |   |  |  |
| North Upper Hutt  | 10                                | 5   | 3  | -14.4  |
| SH 2 Impact       | 360                               | 180   | 30   | 309.4  |
| <i>Porirua</i>    |                                   |   |  |  |
| Titahi Bay        | 20                                | 10  | 2  | 9.9  |
| Whitby            | 129                               | 64  | 6  | 159.4  |
| <i>Kapiti</i>     |                                   |   |  |  |
| Waikanae          | 18                                | 9   | 2  | 15.2   |
| Ppm Beach         | 9                                 | 4   | 2  | -3.7   |
| Raumati           | 23                                | 12  | 2  | 18.1   |
| SH 1 Impact       | 199                               | 99  | 14   | 198.9  |

- Notes: (1) Assumed that 50% of car switchers are car drivers  
(2) Assumed one bus trip equivalent to three car trips in congestion impacts  
(3) Congestion benefit estimated at \$7.00 per car trip: Johnsonville Rail Options Study, Travers Morgan. This is used as an indicative cost only: other studies have derived a lower value for Transmission Gully.

## 4. CONCLUSIONS

### 4.1. SUPERBUS SERVICES

The following conclusions can be made in regard to the potential for 'Superbus' services:

- There are opportunities available for complementing the existing rail service with new bus services, which would provide a level of service (especially in terms of access and frequency) similar to that of the rail service.
- These opportunities relate to Journey to Work (JTW) trips to the Wellington CBD from areas some distance from the rail service.
- The new bus services would result in an increase in the total PT share for CBD JTW trips. It is likely that a similar effect would be found with education and other CBD based peak trips.
- The train modal share from the areas with new bus services would decrease substantially.
- The increased PT share would come primarily from present car passengers and private car drivers.
- The number of people switching from car would be less than the number switching from train to bus.

The overall finding is that there appears to be little if any scope for 'Superbus' services which attract more people from cars than from the rail service. However, the opportunity to increase PT share for peak period travel to the Wellington CBD is available if the WRC rail protection strategy were to be relaxed.

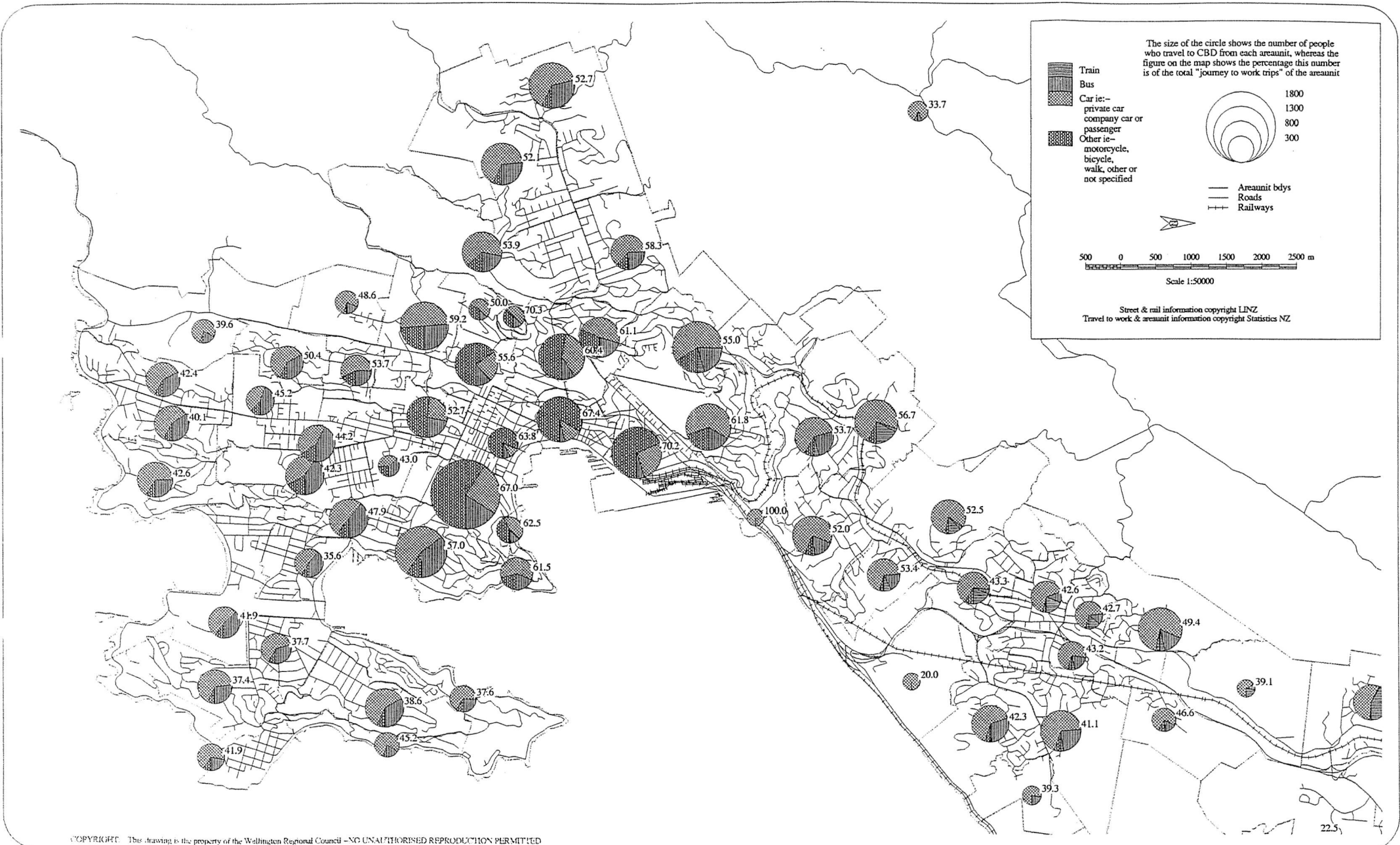
### 4.2. COMMERCIAL BUS SERVICES

The following conclusions can be made in regard to the opportunities for new commercial bus services, where these could be used to increase total public transport (PT) modal share (other opportunities for commercial services apart from those covered in this report will exist in different areas; however, these may not significantly increase PT modal share):

- New peak period commercial bus services to the Wellington CBD could be operated from:
  - Wainuiomata
  - Stokes Valley
  - Hutt Central
  - Western Hills
  - North Upper Hutt
  - Titahi Bay

- Whitby
  - Waikanae
  - Paraparaumu Beach
  - Raumati
- 
- Introducing these bus services would increase the total PT modal share in every case: increases would range from 2% to 16% of PT market trips (JTW trips excluding company car and slow mode).
  - Cost recovery is close to or above 100% for nearly all the bus services examined: only the Titahi Bay service may not be commercially viable.
  - The highest cost recovery levels are expected for the Western Hills and Hutt Central services. In these two areas the present PT modal share is well below the wider area average, and a high number of new passengers would be generated.
  - The result of introducing these bus services would be a reduction in rail patronage. This patronage reduction is estimated at 443,000 passengers a year on the Hutt line, and 204,000 passengers a year on the Paraparaumu line. This would equate to a reduction in peak period rail trips to/from the Wellington CBD of around 18% on the Hutt line, and 11% on the Paraparaumu line
  - Offsetting this rail patronage loss to some extent may be increased patronage resulting from increased capacity on peak services (given that seating capacity is being exceeded at some times on certain parts of the network, for example, Waterloo).
  - Given the reduced rail passengers from these areas it may be possible to achieve reductions in bus operating costs for feeder services for the rail service.
  - Introducing the bus services will reduce peak period car vehicle trips on State Highway 1 and State Highway 2. Counter-balancing this to some extent is the increase in bus vehicle trips. The estimated annual congestion benefits are \$300,000 for State Highway 2 and \$200,000 for State Highway 1 (indicative only).

## APPENDIX A Modal Share for Wellington CBD Journey to Work Trips



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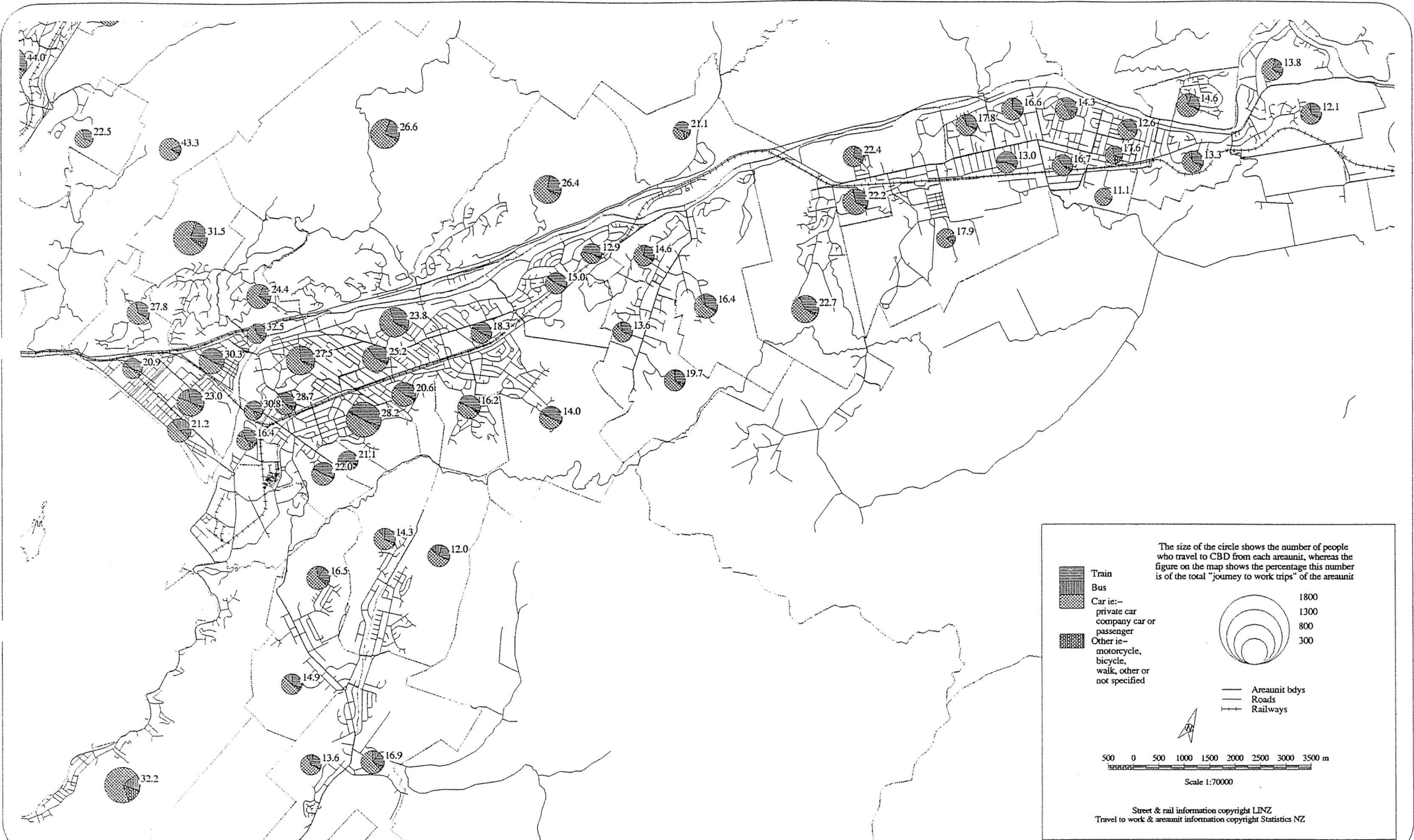
# Wellington

## Census 96 "Journey to Work figures" to the Wellington CBD

Scale: 1:50000

Date: 27-MAY-1998





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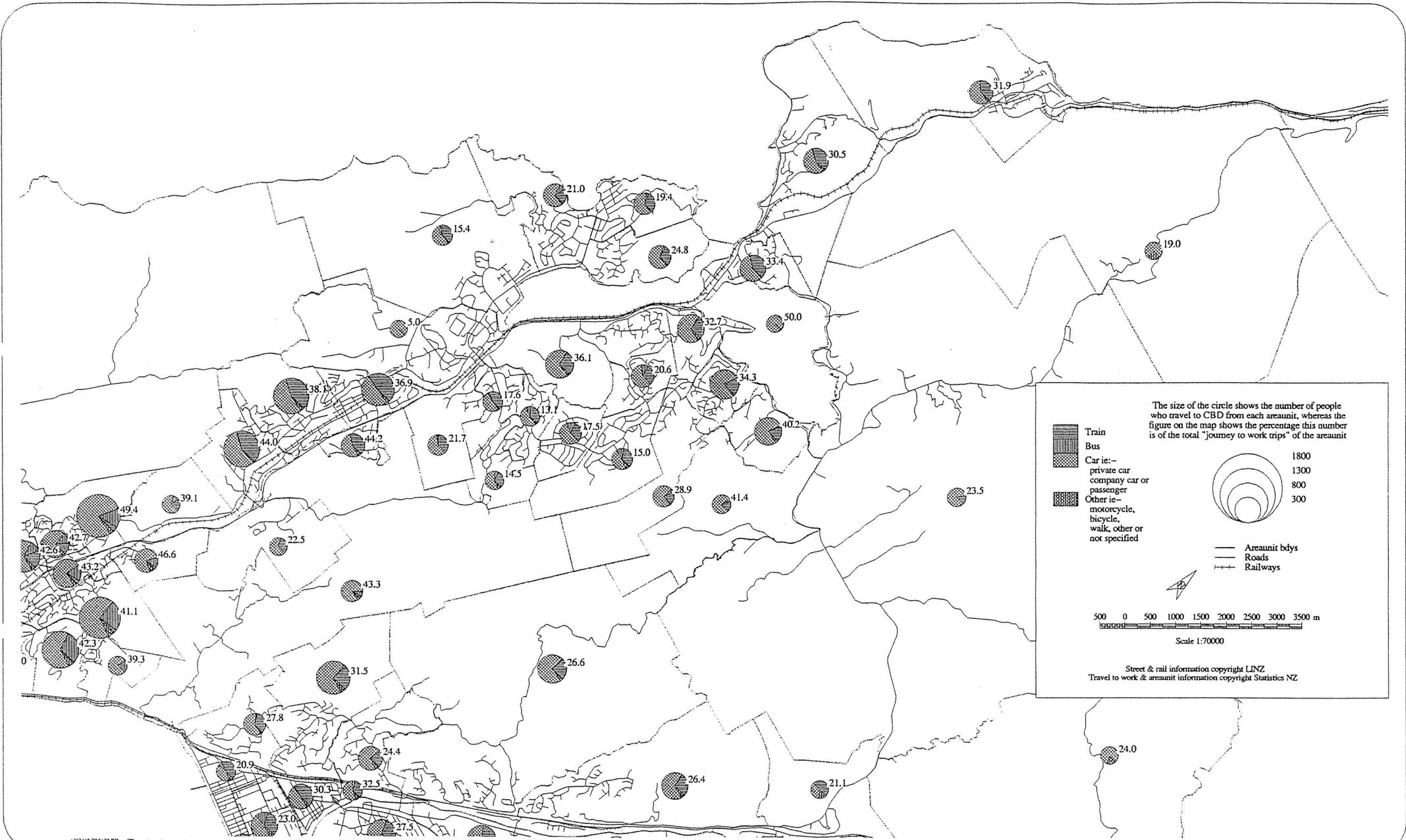


# Hutt Valley

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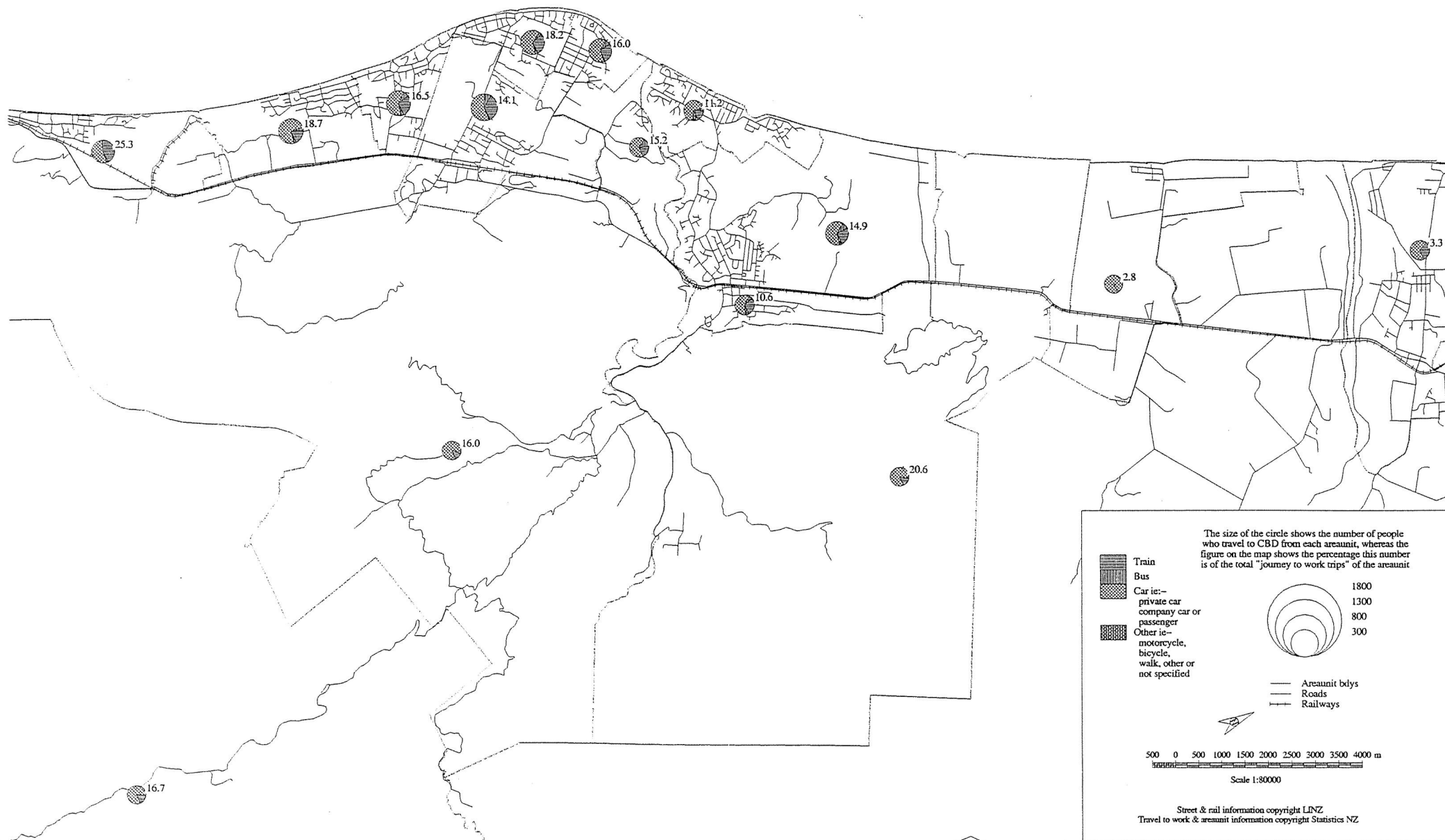


# Porirua

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