Analysis of Patronage Data from Public Transport Case Studies, New Zealand

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Project Objective

Booz·Allen & Hamilton (New Zealand) Ltd was engaged by Transfund New Zealand (Transfund) to undertake a research project as part of Transfund's 2000/2001 Research Programme:

> *to analyse the patronage and cost-effectiveness impacts of selected changes made to the public transport systems in Christchurch, Wellington and Auckland within the last five years, and hence to draw conclusions to assist regional councils in the development and monitoring of future system changes.*

Nine public transport initiatives in these three New Zealand cities were selected as case studies, and their impacts on patronage and cost-effectiveness assessed.

Case Studies

The case studies selected are shown in Table 1.

Table 1 Case Studies

Project	Region	Mode	Service Improvement Type	Start Date
Link Bus Service	AKL	Bus	New service – city centre circular	Feb 1997
007-Crosstown Route	AKL	Bus	Frequency increase – crosstown service	Nov 1996
Half Moon Bay Ferry	AKL	Ferry	New service – suburb to CBD	May 1999
Wellington Fare Increase	WGTN	Bus	Fare increase	Feb 2000
After Midnight Services	WGTN	Bus	New services – early morning weekend services (five services)	May 1999 & May, July, Oct 2000
Campus Connection	WGTN	Bus	Combination of two existing routes to produce a crosstown route; plus frequency increase	Feb 1999
Orbiter	CHC	Bus	New circumferential service with high frequencies	E-July 1999; W-Nov 2000
North East Restructure	CHC	Bus	Route restructures with frequency increases (all NE sector services)	Nov 2000
Lyttelton Service	CHC	Bus	Frequency increase	Nov 2000

Patronage Results

The new services examined (The Link, Half Moon Bay (HMB) Ferry, After Midnight, and Orbiter) all achieved good ridership levels within the first 12 months of operation, with passenger trips per service trip (mostly) ranging from 17 to 46. The case studies involving service enhancements to existing services (007-Crosstown, Campus Connection, North East Restructure, Lyttelton) all experienced patronage increases within the first 12 months of the service change, with the size of the increase relative to the size of the service enhancement.

Service Elasticity Comparisons

Of the nine schemes examined, only the Lyttelton scheme represents a typical estimation involving frequency increases on an existing service. The 'short-run' (10-12 months) frequency elasticity for this scheme was 0.58 for weekdays, 0.17 for Sundays, which is broadly consistent with the typical short-run figures reported internationally (0.4-0.5); while the Sunday figure is low, but not outside the range found for some other weekend frequency increases.

For the Christchurch North East Route Restructure, the weekday (0.48) service elasticity is very much in the typical range suggested above. This suggests that the most of the increase in patronage might have been achieved through simple frequency increases; and that the restructuring component of the scheme has had limited success in generating additional patronage. Both the Campus Connection scheme (0.75) and the Orbiter Full Loop (0.78 weekday) scheme show relatively high service elasticities. However as these are new or modified routes, it is not possible to make sensible comparisons with the international evidence relating to service frequencies.

Comparisons with a Previous Mode

Market research data relating to passengers previous travel mode was available for the Link, 007-Crosstown, Half Moon Bay Ferry; and the Orbiter. This research indicated that 18-54% of passengers previously travelled as car drivers, and 53-93% previously travelled by a motorised mode. A previous BAH research project (in 2000) reviewed the international evidence on 'diversion rates', i.e. the proportion of any change in total public transport trips (associated with a service or fare change) that was diverted to/from various alternative modes. In general, allowing for the particular nature of the four schemes analysed, the alternative mode results correspond reasonably well with the wider evidence

Timescale Implications

The patronage response over time to the case studies was analysed. The main findings were that:

- Weekday patronage increases after 10 – 12 months were in the range 28% to 74% above the 1 – 3 months average increase (with the exception of the Christchurch North East Restructure).
- Weekend patronage increases after 10 – 12 months (relative to the 1 – 3 month average) show a greater spread than for the weekdays, but appear not significantly different.
- Where longer term data is available (the Link, 007-Crosstown), patronage still appears to be increasing up to at least year 4. The total increases by year 4 are about 15% higher (Link) and 30% higher (007-Crosstown) than the increases shown by year 1 (months 10-12).

These results appear to be broadly consistent with the rather limited international evidence (and thus add materially to this evidence). Also, the results do suggest that the success of a service enhancement scheme can be reasonably judged after 12 months of operation, provided allowance is made for the further response likely beyond this time.

Synergy and Other Effects

Three of the case studies involved more than one type of service change (Campus Connection, Orbiter, North East Restructure). Synergy effects do appear to have occurred on the Campus Connection and the Orbiter whereby patronage gains over and above that expected by the service increase involved have been achieved.

On the basis of the limited evidence available from these case studies, there does appear to be merit in seeking to provide crosstown journey capability, in particular in cases where this enhances access to significant destinations.

Cost-Effectiveness

The following comments can be made regarding the cost-effectiveness of the case study services:

- The new services examined, with cost-recovery levels above 50% after 12 months of operation, compared well with the system-wide average cost-recovery levels.
- The net cost per passenger trip for new services, generally under $1.00, also compared well with the system-wide average levels.
- The service increases to existing services were generally not as cost-effective as the new services, and did not generally compare as well with system-wide averages.
- Existing service frequency increases may generally be incremental (e.g. passengers/ vehicle km), and in the order of half that for the existing service, given the typical service elasticity value.
- New services depend on the situation, but, if a significant gap in the system has been identified (e.g. The Link, Orbiter), its performance could be expected to approach (if not exceed) the performance of the existing system.

Project Monitoring & Evaluation

The approach followed in this project to analyse the impacts of public transport service-enhancement initiatives and new services provides a framework for evaluating such initiatives. The main topics which need to covered in an analysis of patronage data are:

- *Project Definition* – the service enhancement/new service needs to be defined in such a way so that the effects of competing and/or complementary services can be identified.
- *Control Services* – ensuring that suitable control services will also be monitored is essential for identifying the marginal impact of the service under investigation.
- *Before and After Patronage and Revenue Data* –before and after data is required for both the service being examined and the control services. The analysis will be more accurate where at least 2 years of before data and 1-2 years of after data are available. Ideally both patronage and revenue data will be available to estimate net cost impacts as well as patronage impacts.
- *Service Level Data* – a time series of service level data (e.g. service km) is required to derive service level elasticities.
- *Cost Data* – tender prices were found to be not always a good indicator of actual gross costs. A cost model is therefore helpful to allow calculation of cost-effectiveness indicators.

- *Abstraction from Other Public Transport Services* – any evaluation undertaken should account for passengers who switch from other public transport services to avoid over-estimation of perceived patronage increase. Market research is the most effective way of identifying the proportion of new passengers 'abstracted' from other services. Before and after patronage data for each of the services from which passengers might be abstracted can be useful, though this is difficult in practice.
- *Impacts on Road Traffic* – market research data can also be used in wider evaluation studies of the economic impact of public transport improvements, in terms of impacts on road traffic.
- *Performance Indicators* – those used in this report provide appropriate measures of patronage impacts, cost-effectiveness, and service elasticities, and also a coherent indication of the relative performance of a new service and/or service enhancement.

Abstract

A research project was undertaken in 2001 to analyse the patronage and cost-effectiveness impacts of nine public transport enhancement initiatives (the case studies) in three New Zealand cities (Christchurch, Wellington, Auckland). The patronage impacts and service elasticity values were assessed for each case study, along with an analysis of previous travel mode, patronage growth patterns, synergy effects, and cost effectiveness. Patronage increases were generally greater for new services than for enhancements to existing services, and the service enhancements to existing services were generally not as cost-effective as the new services. Patronage was found to continue increasing after 12 months, but only by 15-30% over the next 3 years. The success of a service enhancement scheme can therefore be reasonably judged after 12 months of operation provided allowance is made for the further increase likely beyond this time. Service elasticity values derived were generally within typical internationally reported values. Synergy effects, whereby patronage gains over and above that expected by the service increase occurred, were found on two cross-town services. The main topics which need to covered in an analysis of patronage data are given.

1. Introduction

Booz·Allen & Hamilton (New Zealand) Ltd (BAH) was engaged by Transfund New Zealand (Transfund) to undertake a research project · as part of Transfund's 2000/2001 Research Programme:

> *to analyse the patronage and cost-effectiveness impacts of selected changes made to the public transport systems in Christchurch, Wellington and Auckland within the last five years, and hence to draw conclusions to assist regional councils in the development and monitoring of future system changes.*

Nine public transport initiatives from these three New Zealand cities were selected as case studies, and their impacts on patronage and cost-effectiveness assessed. This report sets out the results of this analysis.

Representatives from the Auckland, Wellington and Canterbury Regional Councils, along with a·major public transport operator (Stagecoach New Zealand), formed the Steering Committee for this project, and acted as project peer reviewers.

The remainder of this report is set out as follows:

Chapter 2	-	summarises the case study projects, and the analysis approach used.
Chapter 3	-	presents the case study analysis results.
Chapter 4	-	provides commentary on the case study results, particularly in the context of international evidence.
Chapter 5	-	outlines possible guidelines for the future monitoring of public transport improvement projects.
Appendix 1	-	provides a fuller summary of the case study analysis results.
Appendix 2	-	comprises the regional database data.

2. Case Study Approach

2.1 The Case Studies

Nine case studies were selected in conjunction with the Auckland, Wellington and Canterbury regional councils. The selection criteria used were:

- Data Availability: the extent to which data are available to analyse the patronage impacts of the improvement.
- Degree of Impact: the expected proportionate change in patronage over the services affected.
- Ability to Analyse: the extent to which the impact of the improvement can be discerned from other changes and trends.
- Wider Relevance: the extent to which the results could be useful for evaluating future projects.

Ideally improvement initiatives would have rated well on all these criteria. For an initiative to be included as a case study project it needed to rate well on both Degree of Impact and Data Availability. The case studies selected are shown in Table 2.1. Eight of the case studies related to bus services, and one to a new ferry service. Of the bus case studies, two related to new circumferential routes; two to frequency increases in existing services; one to network restructuring in a sector; one to connecting two routes to provide a cross-town service; one to a set of new (late night) services; and one to a city-wide fare increase.

Table 2.1 **Case studies from the three cities.**
(AKL Auckland, WGN Wellington, CHC Christchurch)

Project	Region	Mode	Service Improvement Type	Start Date
Link Bus Service	AKL	Bus	New service – city centre circular	Feb 1997
007-Crosstown Route	AKL	Bus	Frequency increase – crosstown service	Nov 1996
Half Moon Bay Ferry	AKL	Ferry	New service – suburb to CBD	May 1999
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North East Restructure	CHC	Bus	Route restructures with frequency increases (all NE sector services)	Nov 2000
Lyttelton Service	CHC	Bus	Frequency increase	Nov 2000

2.2 Analysis Approach

The analysis approach used is outlined below.

2.2.1 Demand Analysis

2.2.1.1 *Actual Change*

The data provided by regional councils and operators (Section 2.3) were analysed to identify both the immediate and longer term impact on patronage and revenue of the service change. This was done by comparing 'before' patronage and revenue (average of 3 months before the change) with 'after' patronage and revenue. The patronage and revenue 3 months after the change (average of first 3 months), and then at yearly intervals (i.e. 12 months after change, 24 months after, etc.) were determined, and the proportionate change was assessed. This represents the change in 'actual patronage' (i.e. number of users on the service).

2.2.1.2 *Adjustment for Patronage Trend (Controls)*

A control route was derived for each case study project and the patronage trend of the control route was identified. The control routes were routes which had not experienced any significant changes (in service levels, etc.) over the time period that was examined, and were similar to the services that were analysed. For some of the case studies, where it was difficult to identify a single route which could act as a suitable control on its own, a full sector or urban area was used as the control route (with the case study patronage excluded).

The post-change case study 'actual patronage' was adjusted for the control route patronage trend factor. The difference between the 'trend adjusted' patronage and 'before' patronage represents the growth in patronage attributable to the service change rather than to other factors (i.e. those which have been affecting all similar public transport services).

2.2.1.3 *Adjustment for Abstraction from Other Services*

Improvements to a particular public transport service often result in passengers switching to that service from other public transport services. This 'abstraction' factor means that all new patronage on the service does not necessarily reflect a net increase in public transport usage. The most effective way to ascertain the extent of this abstraction is by user surveys on the new or changed services to establish the prior travel mode of new users. Some market research had been carried out on four of the case study services, and this provided a good indication of the level of abstraction for these services. The level of abstraction was estimated for the other services within a range from our best estimate to a plausible maximum level. The 'trend adjusted' patronage was then further adjusted to take the abstraction factor into account. The resulting patronage figure represented the net increase in public transport patronage in the area or region resulting from the service change.

2.2.1.4 *Other Modes*

Where market research data was available, the proportion of new passengers switching from other modes (apart from bus) was determined. Particular focus was directed on previous car drivers, and the cost involved in attracting car drivers to switch to public transport was derived for each case study.

2.2.2 Supply Analysis

2.2.2.1 *Service Vehicle Kilometres*[1]

In many cases the regional council or operator provided the service vehicle kilometres (service km)[1] which were operated at different times for the case study project. However, in some cases these were not available. The approach generally adopted then was to estimate service km based on the timetable in existence at the time, and the average vehicle trip length.

2.2.2.2 *Costing*

Both gross costs and net costs (i.e. gross costs less revenue) were determined for the case studies at different time periods (as applicable). Again, the regional councils were generally able to provide this data (from tender/contract information). However, in a number of cases costing data were either not available, or the data available were not considered to be an accurate reflection of the actual costs. In these cases, a costing model was developed (with vehicle km[1], vehicle hours[1], and peak vehicles[1] as inputs), and industry unit costs were used to determine indicative costs for the service.

2.2.3 Performance Indicators

The performance indicators listed in Table 2.2 were derived for each of the public service case studies by time period and before/after patronage trend and abstraction.

Table 2.2 Performance indicators of the nine case studies.

Name	Description
% Vehicle Km Change	(New vehicle km less 'before' vehicle km)/ before vehicle km
% Passenger Trips Change	New passenger trips less before passenger trips / before passenger trips
Passenger Trips/Vehicle Km	Change in passenger trips/ change in vehicle km
Passenger Trips/Service Trips	Change in passenger trips/ change in service trips
Cost Recovery	Fare revenue / gross cost (total cost of providing service, including both capital and operating costs)
Net Cost/Passenger Trips	(Gross cost less fare revenue) / passenger trips
Net Cost/Change in Car Driver Trips	(Gross cost less fare revenue) / number of new passenger trips previously car driver

1 Service vehicle km – number of kilometres a public service vehicle is in-service, i.e. available for public use
Vehicle km – total number of kilometres a public service vehicle operates, i.e. total distance of both in-service and dead running
Vehicle hours – total number of hours a public service vehicle operates, i.e. includes in-service and dead running time
Peak vehicles – number of public service vehicles required to provide the service at peak times

2.2.4 Elasticity Analysis

Service-km elasticity values were calculated for the case study projects which involved a change in the level of service as measured by change in service km. Both an 'arc elasticity' and a 'point elasticity' were calculated. The 'point elasticity' (E), also known as 'log elasticity', has the following formulation:

$$E = (\text{Ln } P_1 - \text{Ln } P_0) / (\text{Ln } S_1 - \text{Ln } S_0)$$

where: E is elasticity
P is patronage
S is service km

The point elasticity is the most appropriate elasticity formulation for assessing a wide range of service changes on a consistent basis. The point elasticity results therefore have been reported in Chapter 3.

2.3 Data Sources

The data sources used for each of the case studies are summarised in Table 2.3.

Table 2.3 Sources of patronage data.

Project	Patronage		Market Research	Cost Data
	Case Study Service	Control Route	(Previous Mode)	
Link Bus Service	RC contract data	RC contract data	Op Survey	RC contract data
007-Crosstown Route	RC contract data	RC contract data	RC Survey	RC contract data
Half Moon Bay Ferry	RC contract data	RC contract data	RC Survey	Analysis of RC Contract Data & Op data
Wellington Fare Increase	Op data	NA	NA	NA
After Midnight' Services	RC contract data	Op data	NA	RC contract data
Campus Connection	RC contract data	Op data	NA	RC contract data
Orbiter	RC contract data	RC contract data	RC Survey	BAH Cost Model
North East Restructure	RC contract data	RC contract data	NA	RC contract data
Lyttelton Service	RC contract data	RC contract data	NA	RC contract data

RC - Regional Council, Op – Operator, NA – not available

2.4 Regional Database

Before commencing the project, it had been considered that assembling a database of patronage trends and the main patronage 'drivers' (demographic, economic, private transport costs, etc.) for each region may assist to "account for any external region wide influences on patronage ...", as discussed in the Study Brief. However, this approach was not as useful as initially envisaged, given that:

1. The Data Required was Not Readily Available

Relatively full patronage trend and demographic/economic trend data could be gathered only for the Auckland region. Even the Auckland data series has significant limitations in that data for most demographic/economic variables are not available from 1996 (last Census for which data are currently available). No accurate patronage trend data is available for the Wellington region, and we had difficulty in obtaining demographic/economic data for Christchurch.

2. Unable to Perform Statistical Analysis

Given that the changes in variables do not tend to correspond in a simple manner with changes in patronage, drawing conclusions as to the relative impact of different factors on patronage is not possible. To draw meaningful conclusions with this type of data set would have required multi-regression analysis, which was not included in the Study Brief. (Also, the small number of data points would have meant that multi-regression analysis would not have produced accurate results for this particular data set, as a minimum of 30 data points for each variable is required to produce useful results.)

3. Control Route/Total Analysis Produced Good Results

As indicated above, control routes and totals for all the nine case study services could be identified, which enabled the underlying patronage trend to be measured. There was therefore no need to also allow for external factors affecting patronage, as these were incorporated in the control route/total trends.

The data gathered for each of the three regions are attached as Appendix 2.

3. Case Study Results

The results of the case study analysis are presented in detail in Appendix 1 (apart from Wellington Fare Increase), and are summarised below. The Wellington Fares analysis is summarised in the Booz·Allen & Hamilton (NZ) report "Wellington Fares Study", produced for Wellington Regional Council.

3.1 Patronage Impacts

Table 3.1 summarises the service performance of the service improvement projects (excluding the Wellington fare increase) 12 months after the service change/ commencement. Note in some cases data is currently only available for 6 or 8 months after. The top section of the table provides results for the new/improved service as a whole, while the bottom section reports incremental results after allowing for the underlying patronage trend and abstraction from other public transport services (this latter section therefore represents new public transport passengers gained from the incremental service change). The Passenger Trips/Service Trips performance indicator was calculated for each case study; however, it has not been reported to preserve patronage confidentiality.

3.1.1 Service Performance

The new services examined (The Link, Half Moon Bay (HMB) Ferry, After Midnight, and Orbiter) all achieved good ridership levels within the first 12 months of operation, with passenger trips per service trip ranging from 17 to 46. The only exception to this was the Kapiti After Midnight service which, with a substantially lower patronage level, has recently been terminated. The Orbiter also performed very well at weekends with average ridership levels similar to weekdays, while The Link Saturday ridership was higher than weekday ridership (although Sunday ridership was only half that of a weekday).

The case studies involving service enhancements to existing services (007 Crosstown, Campus Connection, North East Restructure, Lyttelton) all experienced patronage increases within the first 12 months of the service change, with the size of the increase relative to the size of the service enhancement. Thus, the 007 Crosstown service, which had the largest service increase at 913%, achieved the largest patronage increase at 619%. The Campus Connection with the smallest service increase, 6%, had the smallest patronage increase, 5%.

Table 3.1 Service performance of eight public transport improvement case studies.

Service	Period	% Vehicle Km Change	% Passenger Trips Change	Passenger Trips/ Vehicle Km	Passenger Trips/ Service Trips	Elasticity - Service Km	Cost Recovery (%)	Net Cost / Passenger Trips ($)	% New Trips ex Car Driver	Net Cost / Change in Car Driver Trips
Performance of Service										
The Link	Weekday			2.49			66	0.45		
	Saturday			3.23			82	0.19		
	Sunday			1.18			52	0.80		
007 Crosstown	Weekday	913	619	0.53			27	4.06		
	Saturday		27	0.38			27	3.97		
	Sunday		160	0.40			29	3.93		
Half Moon Bay Ferry	Weekday			2.66			61	3.03		
After Midnight										
- Wellington	Weekend			0.94			104	-0.12		
- Hutt Valley	Weekend			0.43			80	1.14		
- Porirua	Weekend			0.33			58	2.75		
- Johnsonville	Weekend			0.56			63	1.81		
- Kapiti	Weekend			0.09			20	27.37		
Campus Connection	Mon - Sun	6	5	2.03			77	0.53		
Orbiter **	Weekday	128	133	0.85			51	0.92		
	Saturday	128	110	0.67			59	0.67		
	Sunday	128	130	0.82			64	0.55		
North East Restructure	Weekday	47	19	1.04			50	0.95		
	Saturday	40	60	1.13			55	0.80		
	Sunday	55	36	0.83			40	1.43		
Lyttelton Frequency Increase	Weekday	36	22	0.72			36	1.71		
	Saturday	0	14	0.83			42	1.34		
	Sunday	53	17	0.57			29	2.41		
Incremental Impact (after allowing for Trend and Best Abstraction)										
The Link	Weekday			1.75			46	1.00	54	1.86
	Saturday			2.27			57	0.63	54	1.17
	Sunday			0.83			36	1.51	54	2.79
007 Crosstown	Weekday	913	434	0.35		0.72	19	6.71	29	22.99
	Saturday		27	0.27			19	6.28	29	21.52
	Sunday		159	0.28			21	6.29	29	21.53
Half Moon Bay Ferry	Weekday			2.15			49	4.88	40	12.19
After Midnight										
- Wellington	Weekend			0.88			97	0.08		
- Hutt Valley	Weekend			0.41			76	1.45		
- Porirua	Weekend			0.31			55	3.10		
- Johnsonville	Weekend			0.53			60	2.07		
- Kapiti	Weekend			0.08			19	29.17		
Campus Connection	Mon - Sun	6	4	1.53		0.75	115	-0.37		
Orbiter **	Weekday	128	181	0.75		1.25	49	1.02	18	5.59
	Saturday	128	156	0.52		1.14	48	1.05	18	5.74
	Sunday	128	204	0.78		1.35	65	0.52	18	2.86
North East Restructure	Weekday	47	16	0.44		0.39	32	2.10		
	Saturday	40	61	1.49		1.40	116	-0.13		
	Sunday	55	25	0.43		0.51	29	2.37		
Lyttelton Frequency Increase	Weekday	36	19	0.44		0.58	12	7.32		
	Saturday			0.84		0.00	42	1.31		
	Sunday	53	8	0.11		0.17	3	27.35		

Note: Results for Orbiter, North East Restructure & Lyttelton Frequency Increase are based on 8 months data; After-Midnight results: Kapiti on 6 months data, Johnsonville on 9 months data, Porirua on 11 months data.

3.1.2 Incremental Impacts

As indicated above, the Incremental Impact section of Table 3.1 provides performance indicators relating to the incremental service and additional public transport passengers. Thus, the passenger trips/ service trips column represents the net additional public transport passenger trips made for the additional service trips provided (but is not shown to preserve patronage confidentiality).

The new services examined were successful in attracting significant new public transport patronage with average new passenger trips/ service trips for weekday services ranging from 17 to 37. Weekend services also performed well with the weekend Orbiter and Link services not far behind the weekday services in new public transport trips. The After Midnight weekend services also performed well, and only the Kapiti service 'under-performed'.

As might be expected, the service increases on existing services also resulted in new public transport passengers, but not to the same extent as for the new services. The average new passenger trips/ service trips for weekday services for this group ranged from 8 to 15 (but is not shown to preserve patronage confidentiality).

3.2 Patronage Growth Patterns

Table 3.2 shows the patronage growth patterns for the case study services after the underlying patronage trend has been accounted for. In this table the average patronage over the first 3 months of the new service/after service change are taken as the base (100), with increases over that level represented by the change in the index.

This table shows that almost all the services showed further patronage increases after the first 3 months of operation. New services experienced patronage increases of between 7% and 152% from 1-3 months to 10-12 months. In most cases, however, the increase in patronage from 1-3 months to 10-12 months was substantially less than 100% indicating that most of the first year patronage growth is experienced in the first 3 months after the introduction of the new service. Where new services patronage has been monitored after the first 12 months, the rate of increase has been much lower than in the first year of operation. The Link weekday service, for example, only experienced a 12% patronage increase in its second year of operation.

As seen in Table 3.2, where enhancements to existing services were made, patronage also increased after the first 3 months of operation. The patronage increases from 1-3 months to 10-12 months were spread over a very wide range, ranging from 5% for the Campus Connection to 353% for the North East (NE) Restructure. However, the larger increases such as the NE restructure generally involved later increases on a very small initial patronage increase.

As for new services, where patronage data is available for existing services at 2 years (months 22-24) after a service enhancement, patronage was found to continue growing in the second year of operation, although at a lower level than in the first year.

For the two services (one new service and one existing service) for which 4 year data is available, the weekday patronage only grew by a further 3-6% over the third and fourth years of operation (combined).

Table 3.2 Patronage growth patterns for the nine case studies.

Service	Period	Patronage Growth (%) Months After Service Commencement/Change				
		1-3	10-12	22-24	34-36	46-48
New Services						
The Link	Weekday	100	128	143	129	147
	Saturday	100	179	201	136	217
	Sunday	100	169	190		
HMB Ferry	Weekday	100	252	207		
After Midnight						
- Wellington	Weekend	100	224			
- Hutt Valley	Weekend	100	129			
- Porirua	Weekend	100	117			
- Johnsonville	Weekend	100	160			
- Kapiti	Weekend	100	131			
Orbiter – West	Weekday	100	174			
	Saturday	100	107			
	Sunday	100	130			
Enhancements to Existing Services						
Campus Connection	Mon - Sun	100	105	108		
007-Crosstown	Weekday	100	134	166	167	176
	Saturday	100	127	132	163	141
	Sunday	100	259	251	333	369
Orbiter - Full Loop (West + East)	Weekday	100	148			
	Saturday	100	128			
	Sunday	100	136			
North East Restructure	Weekday	100	453			
	Saturday	100	143			
	Sunday	100	105			
Lyttelton Frequency Increase	Weekday	100	165			
	Saturday	100	326			
	Sunday	100	107			

Note: (i) New services indexed patronage represents growth in total service patronage.
(ii) Enhancements to existing services patronage is growth in change in patronage.
(iii) Campus Connection included in New Services as patronage declined initially, making comparisons of percentage change in patronage not useful.

3.3 Previous Travel Modes

Table 3.3 shows the previous travel mode of new public transport passengers for the four case studies for which market research data was available. Of new passengers on these services, 50% to 83% had previously travelled as car driver, car passenger, or by motorcycle. This shows their relative success in attracting people out of motorised travel modes onto public transport. The most successful project in this regard was the Half Moon Bay Ferry (83%), which reflects the generally greater attractiveness that a ferry has for car users over buses.

The proportion of new passengers who cited car driver as their previous mode for the journey they would have made on public transport service ranged from 18% (Orbiter) to 54% (The Link). Car passenger was also a significant prior mode for new passengers with around 30% of 007-Crosstown and Orbiter new passengers in this category. (The HMB Ferry value is an estimate only.)

A significant proportion of new passengers on all of these services, apart from the HMB Ferry, had previously walked. This was particularly the case for The Link, with 41% of new passengers previously walking. Only the Orbiter attracted a substantial proportion of cyclists, with 18% of new passengers previously cycling.

Table 3.3 Previous travel mode for new public transport passengers.

Service	% of New Public Transport Trips								
	Car Driver	Car Pass-enger	Motor-cycle	Taxi	Subtotal Motorised	Walk	Cycle	Other	Total
The Link	54	4		1	59	41			100
007-Crosstown	30	31		7	68	23	4	5	100
HMB Ferry	40	40	3	10	93			7	100
Orbiter	18	30	2	3	53	17	18	12	100

Note: HMB Ferry values are estimated based on total car plus motorcycle = 83%

3.4 Service Elasticity Results

Table 3.4 shows the service km (point) elasticity results for the case studies which involved an increase in service km. The range for weekday service elasticities after 12 months was 0.48 to 0.78 (the Lyttelton, Orbiter and North East Restructure results are actually 8-month results). As would be expected from the discussion above regarding patronage growth patterns, this table shows that the longer term elasticities are significantly higher than the short-term elasticities. The 007-Crosstown service elasticity, for example, is 0.80 after 2 years compared to 0.62 after 3 months.

Some care needs to be taken when interpreting several of these elasticity results. A number of these case studies involved other changes in addition to service km increases. This could account for the high elasticity value for the Campus Connection, which also involved facilitation of crosstown travel. The Orbiter, which shows a high value (after only 8 months), effectively involved commencement of a new service (Eastern Orbiter), and the 007-Crosstown service opened up new opportunities for crosstown travel at peak times.

Table 3.4 Service level elasticity results for case studies that involved increased service km. (Point Elasticity of Demand versus Change in Bus Kilometres)

Service	Period	Service Level Elasticity Months After Service Commencement/Change				
		1-3	10-12	22-24	34-36	46-48
Frequency Increase						
007-Crosstown	Weekday	0.62	0.72	0.80	0.80	0.82
Lyttelton Frequency Increase	Weekday	0.36	0.58			
	Sunday	0.16	0.17			
Frequency Increase plus New Journey Options						
Campus Connection	Mon - Sun	–0.13	0.75	1.28		
Orbiter (Full Loop)	Weekday	0.58	0.78			
	Saturday	0.55	0.66			
	Sunday	0.70	0.87			
Route Restructure (including Frequency Increase)						
North East Restructure	Weekday	0.11	0.48			
	Saturday	1.01	1.35			
	Sunday	0.83	0.87			

Note: Lyttelton, Orbiter & North East Restructure results after 10-12 months are actually for 6-8 months

3.5 Fare & Petrol Elasticity Results

The impacts of the 2000 Wellington bus fare increase on patronage were analysed. In addition, given that the price of petrol increased substantially over the analysis period, the impact of the petrol price increases was also assessed. Multi-regression analysis was carried out to determine log (point) elasticity values for fares and petrol price (real). The results are shown in Table 3.5.

Table 3.5 Elasticity results for Wellington (Region) Fare Increase.

Analysis Period	Fares Elasticity		Petrol Price Elasticity		Time Trend (%/year)	
	Mean	Range	Mean	Range	Mean	Range
Wellington						
All	–0.69	–0.46 to –0.91	0.18	0.13 to 0.24	0.01	–0.40 to 0.43
Peak	–0.50	–0.18 to –0.82	0.29	0.21 to 0.37	–0.98	–0.40 to –1.57
Off-peak	–0.83	–0.58 to –1.07	0.11	0.05 to 0.17	0.75	0.31 to 1.20
Hutt Valley						
All			0.16	0.00 to 0.32	4.1	1.93 to 6.25

3.6 Cost & Cost-Effectiveness Impacts

Table 3.1 includes cost-effectiveness measures for the case study services, being primarily cost recovery and net cost per passenger trip. In addition, the net cost per passenger switching from car driver is derived.

3.6.1 Service Performance

The new services examined all achieved cost recovery levels (Table 3.1) above 50% after 12 months of operation (apart from the Kapiti After Midnight service). The net cost per passenger trip was generally under $1.00, although the HMB Ferry was higher at $3.03 per passenger. However, this reflects a ferry service's substantially higher cost structure. Again, the Kapiti After Midnight service performed poorly at $27.37 per passenger trip.

The service increases to existing services were generally not as cost-effective as the new services, with cost recovery levels for weekday services ranging from 27% (007-Crosstown) to 77% (Campus Connection), and net cost per passenger trip levels ranging from $0.53 (Campus Connection) to $4.06 (007-Crosstown).

3.6.2 Incremental Impacts

After allowing for the underlying patronage trend and abstraction from other public transport services, the new services still performed well with cost recovery levels around 50% after 12 months (Table 3.1). Net cost per incremental passenger levels were also generally below $1.00, although all of the After Midnight services, apart from Wellington City, were over $1.00 per passenger.

As above, analysis of the incremental impact of service increases to existing services found that these were not as cost-effective as the new services examined.

4. Commentary & Conclusions

4.1 Comparisons of Elasticities of Demand

Elasticities of demand in relation to service levels may be derived for a variety of different types of service changes, e.g. changes in frequency, route, network structure, etc. Changes in frequency (or headway) on an existing route are the most common type, with results from many international studies available.

The findings from such international studies, as they would apply to typical urban bus services, may be summarised as follows:

- Elasticities increase as service frequencies reduce (at least for the range of frequencies typical of urban bus services). Service elasticities for a 30-minute frequency would be around double those for a 10-minute frequency.
- Elasticities tend to be higher than average for shorter trips (where walking/cycling is a strong alternative).
- Long-run elasticities are probably significantly larger than short-run elasticities, particularly for peak services, although the evidence is very limited.

The weight of international (and previous New Zealand) evidence would indicate a typical short-run frequency elasticity (i.e. applying after 6-12 months from the change) of about 0.4 to 0.5, increasing in the long run (say 5 years or more of results) to about 0.6 to 0.9. However, the evidence also indicates a considerable range about these typical values, reasons for which are often unclear.

Of the nine schemes examined, only the Lyttelton scheme represents a typical estimation involving frequency increases on an existing service. (The Auckland 007-Crosstown scheme started from a very low level of service; and all the other schemes essentially involved new or restructured routes.)

For the Lyttelton scheme, the 'short-run' (10-12 months) frequency elasticity was 0.58 for weekdays, 0.17 for Sundays. The weekday figure is broadly consistent with the typical short-run figures suggested above, while the Sunday figure is low, but not outside the range found for some other weekend frequency increases.

For the Christchurch North East Restructure scheme (Table 3.4), the weekday service elasticity (0.48) is very much in the typical range suggested above. This suggests that most of the increase in patronage might have been achieved through simple frequency increases, and that the restructuring component of the scheme has had limited success in generating additional patronage. However, the very high weekend elasticities (1.35 Saturday and 0.87 Sunday) suggest that the restructuring has been more successful in relation to the weekend market.

Both the Campus Connection scheme (0.75) and the Orbiter Full Loop (0.78 weekday) scheme show relatively high service elasticities. However, as these are new or modified routes, it is not possible to make sensible comparisons with the international evidence relating to service frequencies.

4.2 Comparisons of Previous Travel Modes

A previous BAH research project for Transfund New Zealand (BAH 2000), reviewed the international evidence on 'diversion rates', i.e. the proportion of any change in total public transport trips (associated with a service or fare change) that was diverted to/from various alternative modes. The main conclusions of that project, in the New Zealand context, were:

- While there is substantial variability between schemes, countries and situations, typical diversion rates to/from each mode relevant to the New Zealand urban context are in the following range:
  - Car driver 35 – 40%
  - Car passenger 15 – 20%
  - Walk/cycle 10 – 40% (heavily dependent on situation)
  - No similar trip 20 – 35%
- The 'base' car driver diversion rate recommended for use in New Zealand urban/metropolitan centres (35%–40%) would be appropriate for assessing market responses to major public transport development schemes, most service enhancement schemes, and general fare changes.
- Higher than standard diversion rates would be appropriate for schemes particularly oriented to motorists (e.g. Park & Ride schemes); lower than standard diversion rates would be appropriate to schemes with a more 'social' focus (e.g. off-peak fare discounts).
- The data were insufficient to be able to disaggregate (with any confidence) average diversion rates by market segment (e.g. trip purpose/time period, size of urban area, CBD[2] versus non-CBD destinations).

For the Transfund 'Patronage Funding' project, diversion rates were estimated by BAH as summarised in Table 4.1.

Table 4.1 Diversion rates derived for patronage funding (PF) project.
(Diversion rates per passenger trip, average peak and off-peak)

Alternative Mode	Auckland		Wellington		Christchurch	
	Bus	Rail	Ferry	Bus	Rail	Ferry
Car Driver	32	48	72	32	62	32+
Car Passenger	27+	26	14	18	19	23+
Taxi	9	5	2	11	3	6
Cycle	4	4	2	2	1	16
Walk	14	3	–	25	2	12
No Trip	14	14	10	12	13	11
Total	100	100	100	100	100	100

[2] CBD – Central Business District

The Previous Travel Mode results of the analysis of the four schemes for which market research was available (Table 3.3) may be compared with the above results. The main findings are as follows:

- **007-Crosstown**. The alternative mode share compares reasonably closely with the Patronage Funding (PF) estimates for Auckland Buses.
- **Orbiter**. The alternative mode share comparison with the PF Christchurch Bus figures is less close in this case. The Orbiter has fewer car driver trips, more walk trips than the PF estimates. This probably reflects on a service with a larger than typical proportion of shorter distance trips.
- **The Link**. This is an atypical bus service, and hence it is not surprising that the alternative modes differ substantially from the PF Auckland Bus estimates. The high proportion of trips with car driver as alternative travel mode is surprising.
- **Half Moon Bay Ferry**. The total car/motorcycles trip proportion (83%) is close to the PF Auckland Ferry figure of 86%.

In general, allowing for the particular nature of the four schemes analysed, the alternative mode results correspond reasonably well with the wider evidence.

4.3 Timescale Implications

Internationally, the extent of evidence on how responses to service changes build up over time is rather limited. (Rather more evidence is available that relates to changes in fare elasticities over time.) Some of the most relevant evidence on service elasticities is as follows:

- Typical United Kingdom (UK) service elasticities are around 0.4 within one year, and around 0.9 within 7 years (Dargay & Hanley 2001).
- On average, 'long-run' elasticities are around 50% greater than 'short-run' elasticities, although these appear to vary by day of week/time of day (Preston 1998).
- Analysis of service changes on existing routes in Portland (USA) indicated that ridership changes occurred over a period of 1 to 10 months (Kyte et al. 1988).
- USA evidence relating to new routes indicates that 1 to 3 years are needed to reach their full ridership potential (Pratt et al. 1981).

In summary, this indicates that:

- The long-run response (5+ years) is typically around 1.5 to 2.0 times the short-run (3-6 months) response
- Most of the response occurs within the first 12 months of a change, but significant further response may continue for a further 2 years (or more).
- The speed of response appears to be faster for frequency changes on existing routes than for new services.

The patronage response over time to the analysed New Zealand schemes is summarised in Table 3.2, which shows the **patronage growth** after 1, 2, 3 and 4 years (where available) relative to the **growth average** of the first 3 months. While there are some difficulties in generalising from these results, the broad findings are as follows:

- Weekday patronage increases after 10 – 12 months were in the range 28% to 74% above the 1 – 3 months average increase (with the exception of the Christchurch North East Restructure).
- Weekend patronage increases after 10 – 12 months (relative to the 1 – 3 month average) show a greater spread than for the weekdays, but appear to be not significantly different.
- Where longer term data is available (The Link, 007-Crosstown), patronage still appears to be increasing up to at least year 4. The total increases by year 4 are about 15% higher (The Link) and 30% higher (007-Crosstown) than the increases shown by year 1 (months 10 – 12).

In summary, the results for the schemes analysed appear to be broadly consistent with the rather limited international evidence (and thus add materially to this evidence). Also, the results do suggest that the success of a service enhancement scheme can be reasonably judged after 12 months of operation, provided allowance is made for the further response likely beyond this time.

4.4 Synergy & Other Effects

Three of the case studies involved more than one type of service change:

- Campus Connection: involved both a service frequency increase and a joining of two routes to facilitate cross-town travel.
- Orbiter: instituting the East Orbiter in addition to the West Orbiter involved both an increase in service kilometres provided and a joining of the loop, thereby facilitating circumferential travel (i.e. right around most of the city).
- North East Restructure: involved individual route restructures, service frequency increases, and institution of express bus services.

As indicated above, the weekday service elasticity for the North East Restructure was within the expected range. This implies that the restructuring component of the scheme had very limited success in generating additional patronage, and that the 'synergy' effects were very small. (The Saturday service elasticity was, however, higher than expected and synergy effects may have been experienced in regard to these services.)

The Campus Connection service enhancement resulted in a service elasticity of 0.75 after 10-12 months, and 1.28 after 22-24 months. These values are substantially higher than the typical range for service frequency increases, and suggest that additional passengers were generated from the new crosstown journey capability engendered by joining two routes. The provision of access to educational institutions

by the new route was also most likely a factor in its success given that students have a higher public transport trip rate than average.

The extension of the Orbiter to provide a full circumferential loop around Christchurch also resulted in a higher than typical service elasticity for a service frequency increase (0.78 for weekdays after 10-12 months). The fact that the elasticity is approaching 1.0 indicates that the Orbiter extension (per vehicle km) is nearly as well used as the original Orbiter. This most likely reflects two factors: the 'new service' phenomenon, whereby new services are often able to attract totally new groups of users if the service provided is significantly different to the existing service; and the 'crosstown journey' capability as discussed regarding the Campus Connection service. In this case, the full Orbiter actually enables people to travel right around the whole city, and this appears to attract additional passengers to that generated by a typical service level increase.

In summary, synergy effects do appear to have occurred on two of the case study services (Campus Connection, North East Restructure) whereby patronage gains over and above that expected by the service increase involved have been achieved. On the basis of the (limited) evidence available from these case studies, there does appear to be merit in seeking to provide crosstown journey capability, particularly in cases where this enhances access to significant destinations.

4.5 Cost-Effectiveness

The following comments can be made regarding the cost-effectiveness of the case study services:

- The new services examined, with cost-recovery levels above 50% after 12 months of operation, compared well with the system-wide average cost-recovery levels (e.g. 56% for contracted services in Wellington).
- The net cost per passenger trip for new services, generally under $1.00, also compared well with the system-wide average levels (e.g. $0.97 per bus trip in Auckland, $0.81 per bus trip in Wellington, and $0.96 per bus trip in Christchurch[3]).
- The service increases to existing services were generally not as cost-effective as the new services, and did not generally compare as well with system-wide averages.
- Existing service frequency increases may generally be expected to be incremental (e.g. passengers/vehicle km) and in the order of half that for the existing service, given the typical service elasticity value.
- New services depend on the situation, but if a significant gap in the system has been identified (e.g. The Link, Orbiter), its performance could be expected to approach (if not exceed) the performance of the existing system.

[3] Statistics for 1999/00 as provided by Regional Councils for Patronage Funding project.

5. Project Monitoring & Evaluation

The approach followed in this project to analyse the impacts of public transport service-enhancement initiatives and new services provides a framework for evaluating such initiatives. The main topics which need to be covered in an analysis of patronage data are:

- *Project Definition* – the service enhancement/new service needs to be defined in such a way so that the effects of competing and/or complementary services can be identified.
- *Control Services* – ensuring that suitable control services will also be monitored is essential for identifying the marginal impact of the service under investigation. These control services should not experience any significant changes (in service levels, etc.) over the time period being examined, and be broadly similar types of service or operation.
- *Before and After Patronage and Revenue Data* – clearly before and after data is required for both the service being examined and the control services. Weekly data is most useful as monthly data is made up of different numbers of weekdays. The analysis will be more accurate where at least 2 years of before data and 1-2 years of after data are available. Where possible 52-week moving averages should be calculated as these remove the seasonality impact, which can significantly distort period on period analyses. Ideally both patronage and revenue data will be available so that: net cost impacts can be estimated as well as patronage impacts; and average fares can be calculated to identify any fare change impacts separate to the service level change being investigated.
- *Service Level Data* – a time series of service level data (e.g. service km) is also required to enable service level elasticities to be derived. Such data was very difficult to obtain for the case studies investigated in this project, and does not appear to be systematically maintained by regions or operators.
- *Cost Data* – in undertaking this project, tender prices were found to be not always a good indicator of actual gross costs (given that operators often 'strategically' tender on specific services). A cost model is therefore helpful to allow calculation of cost-effectiveness indicators.
- *Abstraction from Other Public Transport Services* – any evaluation undertaken should account for passengers who switch from other public transport services. If these are not taken into account, the perceived patronage increase will often be significantly over-estimated. Market research is the most effective way of identifying the proportion of new passengers 'abstracted' from other services, generally consisting of on-board user surveys. The key question in these surveys is users' previous travel mode for the trip being made on the new/enhanced service. Estimates of the abstraction effect can also be made through examining the before and after patronage data for each of the services from which passengers might be abstracted. However, this is difficult in practice, particularly where only small patronage changes are involved.

- *Impacts on Road Traffic* – market research data can also be used as input to wider evaluation studies of the economic impact of public transport improvements, in terms of impacts on road traffic.
- *Performance Indicators* – those used in this report provide appropriate measures of patronage impacts, cost-effectiveness, and service elasticities. Taken together they also provide a coherent indication of the relative performance of a new service and/or service enhancement.

6. References

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Appendix 1 Case Study Analyses

This appendix summarises the analyses carried out for each of the eight public transport service improvement projects selected as case studies. The case studies were:

#A The Link
#B 007-Crosstown
#C Half Moon Bay Ferry
#D After Midnight
#E Campus Connection
#F Orbiter
#G North East Restructure
#H Lyttelton Frequency Increase

Note: the Wellington Fare Increase project is covered by a separate report: *Wellington Fares Study*, Booz•Allen & Hamilton (NZ) Ltd, June 2001.

#A The Link

A1 Project Description

The Link is an inner city loop service which runs around the central city area of Auckland City. As seen on the attached map, The Link does in fact link all of the main activities and attractions in the Auckland City centre. Before The Link was instituted, bus users needed to transfer between several bus routes to travel around the loop (e.g. from Ponsonby to Newmarket).

The Link was instituted in February 1997 with new super-low floor buses and a separate brand name. A relatively high frequency service was set up (every 10 minutes, 6am-6pm, Monday to Friday, and 30 minutes in evenings and weekends), with services operating in both directions around the loop (clockwise and anti-clockwise). The evening and weekend frequency was increased to every 20 minutes on 28 October 1997. Initially, standard fares were charged. This was changed in September 1998 to a flat fare of $1.00 for all passengers to remove the need to provide change for the different fares available for different groups.

A2 Market Research

An on-board self-completion survey of Link passengers was carried out in May 1997. This survey found that:

- 56% of users were employed, and 34% were students.
- For their trip on The Link, 38% of users transferred to The Link from other buses, and 29% from their own car. Most of the remainder walk to The Link.
- 45% of users were going to/from work, 31% to/from school/Polytech/University, and 14% shopping. Only 4% were sightseeing.
- 39% of passengers used The Link because of its convenient timetable, 29% for its fast ride to destination, 21% because it was easier than using a car, and 19% because of its cheap fare.
- The highest used bus stops on the loop were Ponsonby (29% On), Newmarket (25% On), Downtown (16% On), and Parnell (14% On).
- 29% of users indicated they previously used other buses for the trips made on The Link before it commenced. 71% of users previously made their trip by alternative modes, split as follows: 41% of those who previously used alternative modes walked, 54% drove a car, 4% carpooled, and 1% went by taxi.

This survey showed that The Link is primarily a worker/education service rather than a shopping/sightseeing service. The combination of a relatively high frequency and direct route (no transfers) appears to have been the main attraction to users.

Based on the survey results it would appear that The Link created a substantial number of new bus passengers, at least for the trip around The Link loop.

A3 Patronage Impact

The patronage pattern of The Link is shown in Figures A1-A3, and is summarised in the attached Summary Sheets. Several points can be noted:

- Monday to Friday (weekday) patronage has continued to grow over the four years since the service commenced, with Year 1 patronage 30% above the first 3-month level, and Year 4 patronage 79% above the first 3 months.
- Saturday patronage has grown at an even higher rate than weekday patronage, with Year 1 patronage 81% above the first 3-month level, and Year 4 patronage 164% above the first 3 months. However, the Saturday service frequency was increased during the second year of operation by 49%, which will have also had a positive impact on patronage.
- Sunday patronage showed a similar pattern to Saturday patronage. However, frequency increases were implemented in the first 12 months of operation for these services.

As alluded to above, several significant changes to the service have occurred over its 4 years of operation:

- Evening and weekend frequencies were increased from 30 minutes to 20 minutes on 28 October 1997.
- A standard $1 flat fare was introduced for all passengers in September 1998, which had the effect of increasing the average fare.
- The America Cup was held in Auckland in December 1999/Jan-Feb 2000.
- In September 2000 more buses were provided to operate the morning peak service, thereby increasing morning peak service reliability.

All these changes would have had an impact on patronage. However, it is not possible to draw out the size of the individual effects from the data.

A4 Control Route and Patronage Trend

The Auckland urban area total bus patronage was used as the control route for The Link service. As can be seen in the Summary Sheets, analysis of this control route indicated a 1.1% patronage increase 'trend' in the first 12 months of the Link's operation, and 17.9% over the first 4 years of operation. Taking this trend into account reduces the 12-month weekday patronage increase over the 3-month level from 30% to 28%, and reduces the 4-year weekday increase from 79% to 47%. These are the patronage increases attributable to The Link's features (most likely branding, high frequency) and supportive transport infrastructure changes (e.g. Auckland City is removing all uncontrolled parking in the city centre and city fringe areas), rather than to other factors affecting all Auckland bus services.

A5 Impact on Other Bus Services

As indicated above, a survey of The Link users found that 29% previously travelled on other bus services. This 'abstraction factor' was applied to the patronage results (see Summary Sheets) to determine the gain in new public transport (PT) users, and to enable production of service performance indicators based solely on these new PT users (see below).

A6 Elasticity Appraisal

As The Link was a new service, rather than an improvement to an existing service, an elasticity appraisal is not possible.

A7 Performance Indicators

Service performance indicators were calculated for The Link by time period (Monday to Friday, Saturday, Sunday), and for four situations:

- Actual change;
- After trend adjustment, but no abstraction;
- After trend adjustment plus our best estimate of abstraction;
- After trend adjustment plus our estimate of plausible maximum abstraction.

The results are shown in the attached Summary Sheets. The Patronage Trips/Service Trips performance indicator has been calculated but it has not been reported to preserve patronage confidentiality.

The Link : Monday to Friday **Summary Sheet**

Service Start Date 17 Feb 1997
Average Passenger Trip Length 4.0

Monday to Friday

	Percentage Change				
	3 mth	12 mth	2 yr	3 yr	4 yr
Service Trips		0%	0%	0%	0%
Service Km		0%	0%	0%	0%
Pass Trips		30%	53%	44%	79%
Pass Km		30%	53%	44%	79%
Gross Cost		2%	2%	10%	22%
Revenue		28%	59%	61%	102%
Net Cost		-27%	-60%	-45%	-64%
Trend Factor	0.0%	1.1%	6.5%	10.4%	17.9%
Abstraction Factor - Best Estimate	29.0%	29.0%	29.0%	29.0%	29.0%
- Plausible Max	29.0%	29.0%	29.0%	29.0%	29.0%
After Trend & Abstraction(zero/best/max)		0%	0%	0%	0%
Pass Trips - after trend & zero Ab		28%	43%	29%	47%
- after trend & best Ab		28%	43%	29%	47%
- after trend & max Ab		28%	43%	29%	47%
Pass Km - after trend & zero Ab		28%	43%	29%	47%
- after trend & best Ab		28%	43%	29%	47%
- after trend & max Ab		28%	43%	29%	47%
Revenue - after trend & zero Ab		27%	49%	45%	66%
- after trend & best Ab		27%	49%	45%	66%
- after trend & max Ab		27%	49%	45%	66%
Net Cost - after trend & zero Ab		-26%	-49%	-27%	-25%
- after trend & best Ab		-13%	-26%	-10%	-3%
- after trend & max Ab		-13%	-26%	-10%	-3%
Performance Indicators - Actual (ie before Trend Adjustment & Abstraction)					
Subsidy/pass trip	0.80	0.45	0.21	0.31	0.16
Subsidy/pass km	0.20	0.11	0.05	0.08	0.04
Cost Recovery	0.52	0.66	0.81	0.76	0.86
Pass Trips/ Service Trips					
Pass Trips/ Km	1.92	2.49	2.93	2.76	3.43
Pass Km/ Km	7.68	9.96	11.71	11.06	13.73
Gross Cost / Pass Trips	1.66	1.30	1.11	1.27	1.14
Gross Cost / Pass Km	0.42	0.33	0.28	0.32	0.28
Gross Cost / Veh Km	3.19	3.25	3.25	3.52	3.91
Net Cost / Veh Km	1.54	1.12	0.61	0.85	0.56
Point Elasticity					
Performance Indicators - After Trend Adjustment & Abstraction = 0					
Subsidy/pass trip	0.80	0.46	0.28	0.45	0.41
Subsidy/pass km	0.20	0.12	0.07	0.11	0.10
Cost Recovery	0.52	0.65	0.76	0.68	0.70
Pass Trips/ Service Trips					
Pass Trips/ Km	1.92	2.46	2.74	2.48	2.82
Pass Km/ Km	7.68	9.85	10.96	9.91	11.28
Gross Cost / Pass Trips	1.66	1.32	1.19	1.42	1.38
Gross Cost / Pass Km	0.42	0.33	0.30	0.36	0.35
Gross Cost / Veh Km	3.19	3.25	3.25	3.52	3.91
Net Cost / Veh Km	1.54	1.14	0.78	1.13	1.16
Point Elasticity					
Performance Indicators - After Trend Adjustment & Best Estimate Abstraction					
Subsidy/pass trip	1.48	1.00	0.77	1.04	0.98
Subsidy/pass km	0.37	0.25	0.19	0.26	0.24
Cost Recovery	0.37	0.46	0.54	0.48	0.50
Pass Trips/ Service Trips					
Pass Trips/ Km	1.36	1.75	1.94	1.76	2.00
Pass Km/ Km	5.45	7.00	7.78	7.04	8.01
Gross Cost / Pass Trips	2.34	1.86	1.67	2.00	1.95
Gross Cost / Pass Km	0.59	0.46	0.42	0.50	0.49
Gross Cost / Veh Km	3.19	3.25	3.25	3.52	3.91
Net Cost / Veh Km	2.02	1.75	1.49	1.82	1.95
Point Elasticity					
Performance Indicators - After Trend Adjustment & Plausible Max Abstraction					
Subsidy/pass trip	1.48	1.00	0.77	1.04	0.98
Subsidy/pass km	0.37	0.25	0.19	0.26	0.24
Cost Recovery	0.37	0.46	0.54	0.48	0.50
Pass Trips/ Service Trips					
Pass Trips/ Km	1.36	1.75	1.94	1.76	2.00
Pass Km/ Km	5.45	7.00	7.78	7.04	8.01
Gross Cost / Pass Trips	2.34	1.86	1.67	2.00	1.95
Gross Cost / Pass Km	0.59	0.46	0.42	0.50	0.49
Gross Cost / Veh Km	3.19	3.25	3.25	3.52	3.91
Net Cost / Veh Km	2.02	1.75	1.49	1.82	1.95
Point Elasticity					

The Link : Saturday **Summary Sheet**

Service Start Date 17 Feb 1997
Average Passenger Trip Length 4.0

Saturday **Daily**

	Percentage Change				
	3 mth	12 mth	2 yr	3 yr	4 yr
Service Trips		0.0%	48.6%	48.6%	48.6%
Service Km		0.0%	48.6%	48.6%	48.6%
Pass Trips		81.1%	114.5%	51.5%	164.1%
Pass Km		81.1%	114.5%	51.5%	164.1%
Gross Cost		38.6%	38.6%	39.5%	39.7%
Revenue		77.1%	121.8%	70.7%	201.1%
Net Cost		-29.8%	-109.3%	-16.0%	-247.0%
Trend Factor		1.1%	6.5%	10.4%	17.9%
Abstraction Factor - Best Estimate	29.0%	29.0%	29.0%	29.0%	29.0%
- Plausible Max	29.0%	29.0%	29.0%	29.0%	29.0%
After Trend & Abstraction(zero/best/max)					
Pass Trips - after trend & zero Ab		79.1%	100.6%	35.8%	117.0%
- after trend & best Ab		79.1%	100.6%	35.8%	117.0%
- after trend & max Ab		79.1%	100.6%	35.8%	117.0%
Pass Km - after trend & zero Ab		79.1%	100.6%	35.8%	117.0%
- after trend & best Ab		79.1%	100.6%	35.8%	117.0%
- after trend & max Ab		79.1%	100.6%	35.8%	117.0%
Revenue - after trend & zero Ab		75.2%	107.5%	53.0%	147.3%
- after trend & best Ab		75.2%	107.5%	53.0%	147.3%
- after trend & max Ab		75.2%	107.5%	53.0%	147.3%
Net Cost - after trend & zero Ab		-26.5%	-83.8%	15.4%	-151.5%
- after trend & best Ab		8.1%	-18.8%	28.2%	-49.9%
- after trend & max Ab		8.1%	-18.8%	28.2%	-49.9%
Performance Indicators - Actual (ie before Trend Adjustment & Abstraction)					
Subsidy/pass trip	0.49	0.19	-0.02	0.27	-0.27
Subsidy/pass km	0.12	0.05	-0.01	0.07	-0.07
Cost Recovery	63.98%	81.76%	102.41%	78.31%	137.89%
Pass Trips/ Service Trips					
Pass Trips/ Km	1.78	3.23	2.58	1.82	3.17
Pass Km/ Km	7.14	12.92	10.30	7.28	12.69
Gross Cost / Pass Trips	1.36	1.04	0.88	1.25	0.72
Gross Cost / Pass Km	0.34	0.26	0.22	0.31	0.18
Gross Cost / Veh Km	2.42	3.36	2.26	2.27	2.28
Net Cost / Veh Km	0.87	0.61	-0.05	0.49	-0.86
Arc Elasticity	0.00	0.00	0.38	0.00	0.94
Performance Indicators - After Trend Adjustment & Abstraction = 0					
Subsidy/pass trip	0.49	0.20	0.04	0.42	-0.12
Subsidy/pass km	0.12	0.05	0.01	0.10	-0.03
Cost Recovery	63.98%	80.88%	95.79%	70.19%	113.28%
Pass Trips/ Service Trips					
Pass Trips/ Km	1.78	3.20	2.41	1.63	2.61
Pass Km/ Km	7.14	12.78	9.64	6.52	10.42
Gross Cost / Pass Trips	1.36	1.05	0.94	1.39	0.87
Gross Cost / Pass Km	0.34	0.26	0.23	0.35	0.22
Gross Cost / Veh Km	2.42	3.36	2.26	2.27	2.28
Net Cost / Veh Km	0.87	0.64	0.10	0.68	-0.30
Point Elasticity					
Performance Indicators - After Trend Adjustment & Best Estimate Abstraction					
Subsidy/pass trip	1.04	0.63	0.42	0.99	0.24
Subsidy/pass km	0.26	0.16	0.11	0.25	0.06
Cost Recovery	45.43%	57.43%	68.01%	49.83%	80.43%
Pass Trips/ Service Trips					
Pass Trips/ Km	1.27	2.27	1.71	1.16	1.85
Pass Km/ Km	5.07	9.08	6.84	4.63	7.40
Gross Cost / Pass Trips	1.91	1.48	1.32	1.96	1.23
Gross Cost / Pass Km	0.48	0.37	0.33	0.49	0.31
Gross Cost / Veh Km	2.42	3.36	2.26	2.27	2.28
Net Cost / Veh Km	1.32	1.43	0.72	1.14	0.45
Point Elasticity					
Performance Indicators - After Trend Adjustment & Plausible Max Abstraction					
Subsidy/pass trip	1.04	0.63	0.42	0.99	0.24
Subsidy/pass km	0.26	0.16	0.11	0.25	0.06
Cost Recovery	45.43%	57.43%	68.01%	49.83%	80.43%
Pass Trips/ Service Trips					
Pass Trips/ Km	1.27	2.27	1.71	1.16	1.85
Pass Km/ Km	5.07	9.08	6.84	4.63	7.40
Gross Cost / Pass Trips	1.91	1.48	1.32	1.96	1.23
Gross Cost / Pass Km	0.48	0.37	0.33	0.49	0.31
Gross Cost / Veh Km	2.42	3.36	2.26	2.27	2.28
Net Cost / Veh Km	1.32	1.43	0.72	1.14	0.45
Point Elasticity					

The Link : Sunday **Summary Sheet**

Service Start Date 17 Feb 1997
Average Passenger Trip Length 4.0

Sunday **Daily**

	Percentage Change				
	3 mth	12 mth	2 yr	3 yr	4 yr
Service Trips		47.1%	47.1%		
Service Km		47.1%	47.1%		
Pass Trips		70.9%	103.3%		
Pass Km		70.9%	103.3%		
Gross Cost		15.3%	15.3%		
Revenue		68.8%	102.3%		
Net Cost		-13.8%	-32.1%		
Trend Factor		1.1%	6.5%		
Abstraction Factor - Best Estimate	29.0%	29.0%	29.0%		
- Plausible Max	29.0%	29.0%	29.0%		
After Trend & Abstraction(zero/best/max)					
Pass Trips - after trend & zero Ab		69.1%	90.2%		
- after trend & best Ab		69.1%	90.2%		
- after trend & max Ab		69.1%	90.2%		
Pass Km - after trend & zero Ab		69.1%	90.2%		
- after trend & best Ab		69.1%	90.2%		
- after trend & max Ab		69.1%	90.2%		
Revenue - after trend & zero Ab		67.0%	89.2%		
- after trend & best Ab		67.0%	89.2%		
- after trend & max Ab		67.0%	89.2%		
Net Cost - after trend & zero Ab		-12.8%	-25.0%		
- after trend & best Ab		-1.9%	-9.4%		
- after trend & max Ab		-1.9%	-9.4%		
Performance Indicators - Actual (ie before Trend Adjustment & Abstraction)					
Subsidy/pass trip	1.59	0.80	0.53		
Subsidy/pass km	0.40	0.20	0.13		
Cost Recovery	35%	52%	62%		
Pass Trips/ Service Trips					
Pass Trips/ Km	1.01	1.18	1.40		
Pass Km/ Km	4.05	4.70	5.60		
Gross Cost / Pass Trips	2.46	1.66	1.40		
Gross Cost / Pass Km	0.62	0.42	0.35		
Gross Cost / Veh Km	2.49	1.95	1.95		
Net Cost / Veh Km	1.61	0.95	0.74		
Arc Elasticity	0.00	0.00	0.00		
Performance Indicators - After Trend Adjustment & Abstraction = 0					
Subsidy/pass trip	1.59	0.82	0.63		
Subsidy/pass km	0.40	0.21	0.16		
Cost Recovery	35.29%	51.09%	57.91%		
Pass Trips/ Service Trips					
Pass Trips/ Km	1.01	1.16	1.31		
Pass Km/ Km	4.05	4.65	5.23		
Gross Cost / Pass Trips	2.46	1.68	1.49		
Gross Cost / Pass Km	0.62	0.42	0.37		
Gross Cost / Veh Km	2.49	1.95	1.95		
Net Cost / Veh Km	1.61	0.96	0.82		
Point Elasticity					
Performance Indicators - After Trend Adjustment & Best Estimate Abstraction					
Subsidy/pass trip	2.60	1.51	1.24		
Subsidy/pass km	0.65	0.38	0.31		
Cost Recovery	25.06%	36.28%	41.11%		
Pass Trips/ Service Trips					
Pass Trips/ Km	0.72	0.83	0.93		
Pass Km/ Km	2.87	3.30	3.72		
Gross Cost / Pass Trips	3.47	2.37	2.10		
Gross Cost / Pass Km	0.87	0.59	0.53		
Gross Cost / Veh Km	2.49	1.95	1.95		
Net Cost / Veh Km	1.87	1.25	1.15		
Point Elasticity					
Performance Indicators - After Trend Adjustment & Plausible Max Abstraction					
Subsidy/pass trip	2.60	1.51	1.24		
Subsidy/pass km	0.65	0.38	0.31		
Cost Recovery	25.06%	36.28%	41.11%		
Pass Trips/ Service Trips					
Pass Trips/ Km	0.72	0.83	0.93		
Pass Km/ Km	2.87	3.30	3.72		
Gross Cost / Pass Trips					
Gross Cost / Pass Km	0.87	0.59	0.53		
Gross Cost / Veh Km	2.49	1.95	1.95		
Net Cost / Veh Km	1.87	1.25	1.15		
Point Elasticity					

Figure A1 'The Link' Daily Passengers (6 months average)
(Monday - Friday Services)

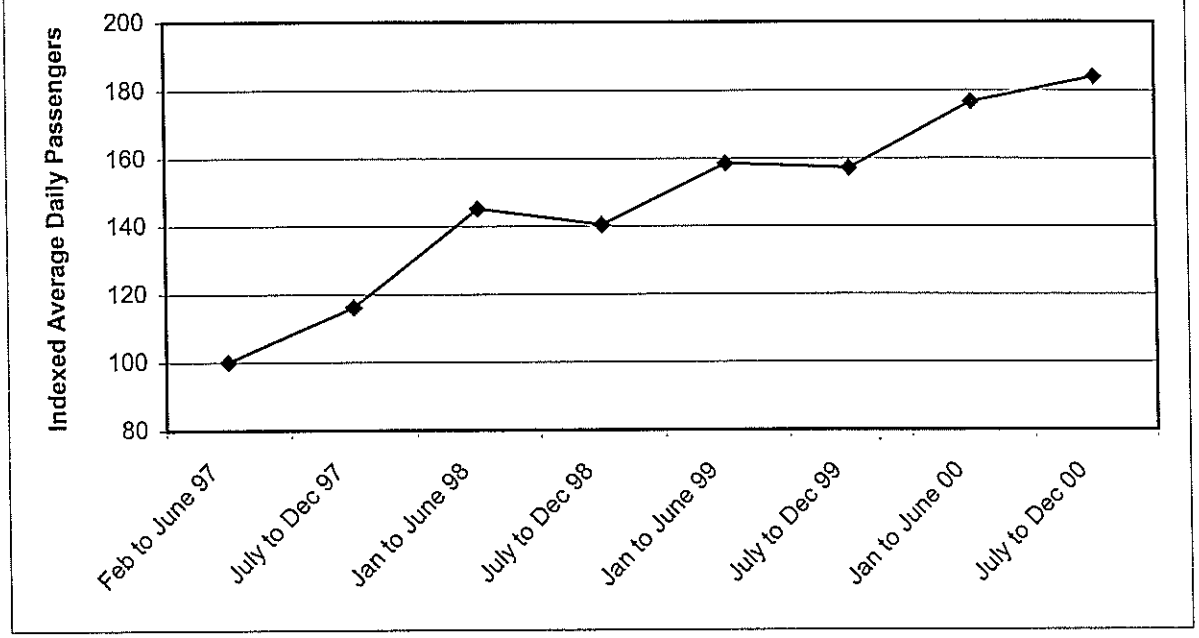


Figure A2 'The Link' Daily Patronage (6 months average)
(Saturday service)

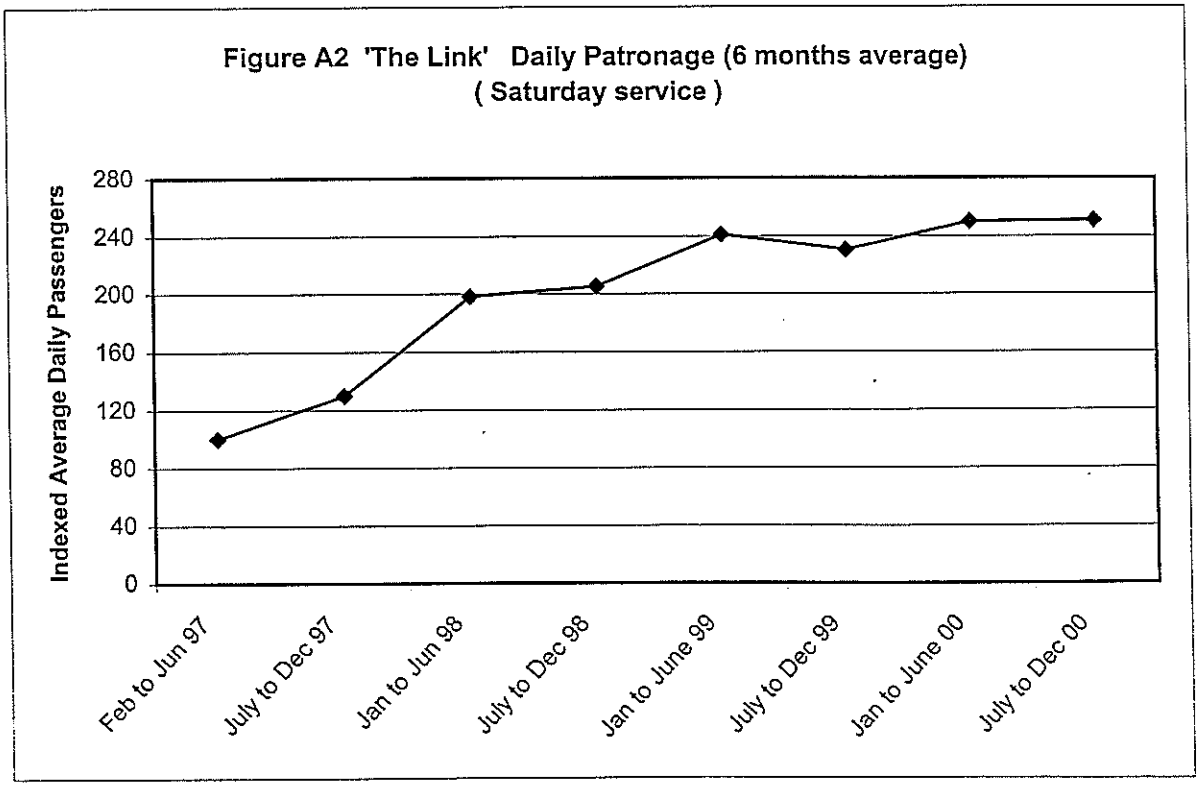


Figure A3 'The Link' Daily Patronage (6 months average)
(Sunday service)

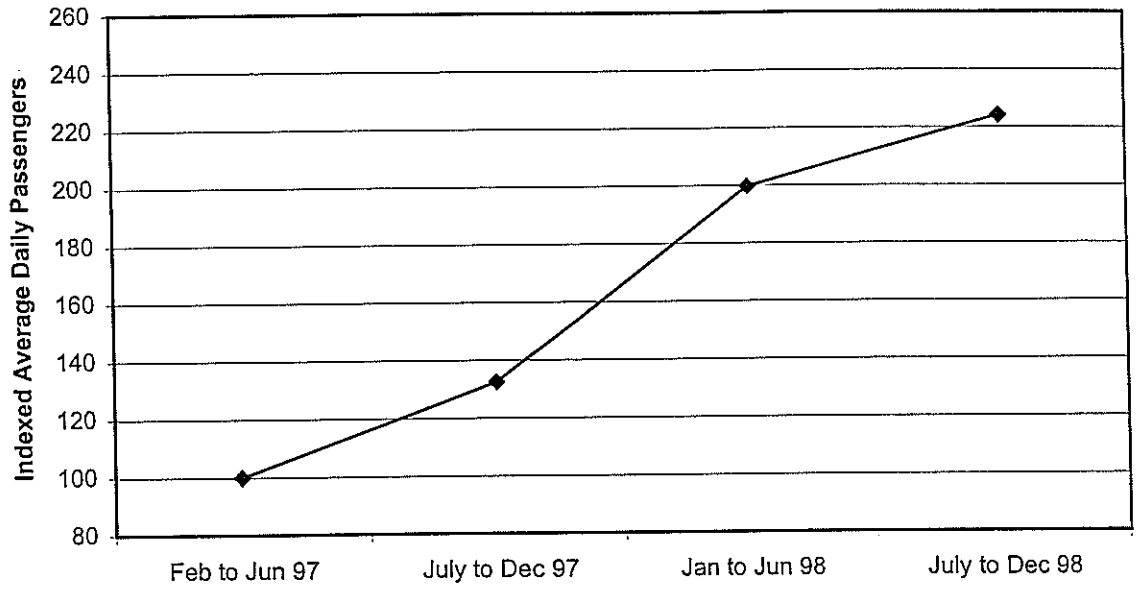


Figure A4 Auckland Area Daily Bus Patronage

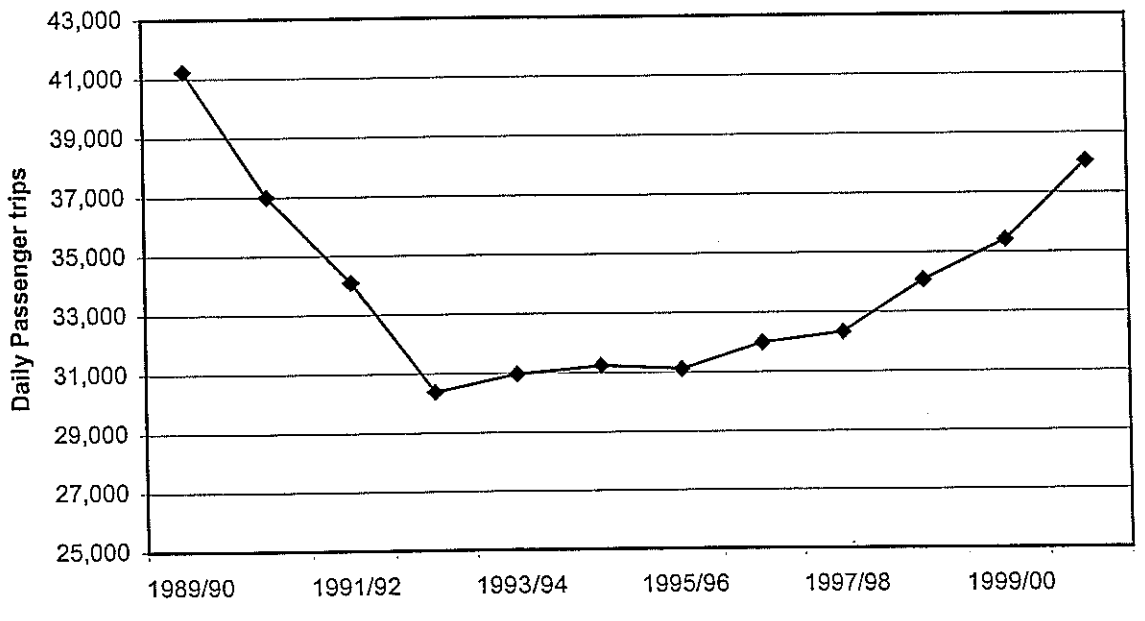
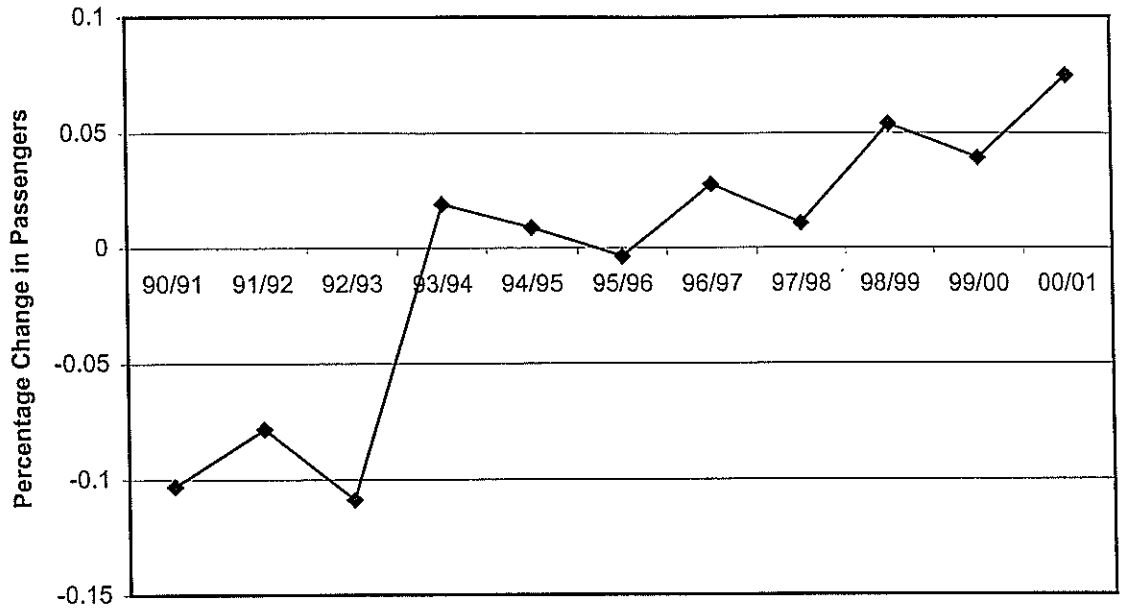
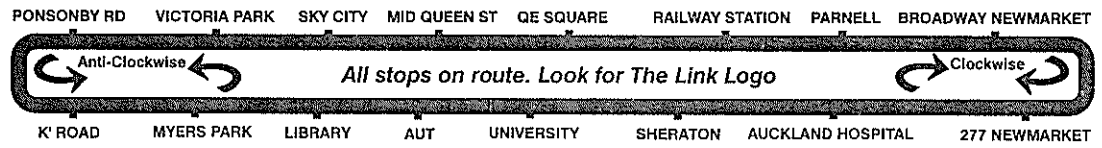
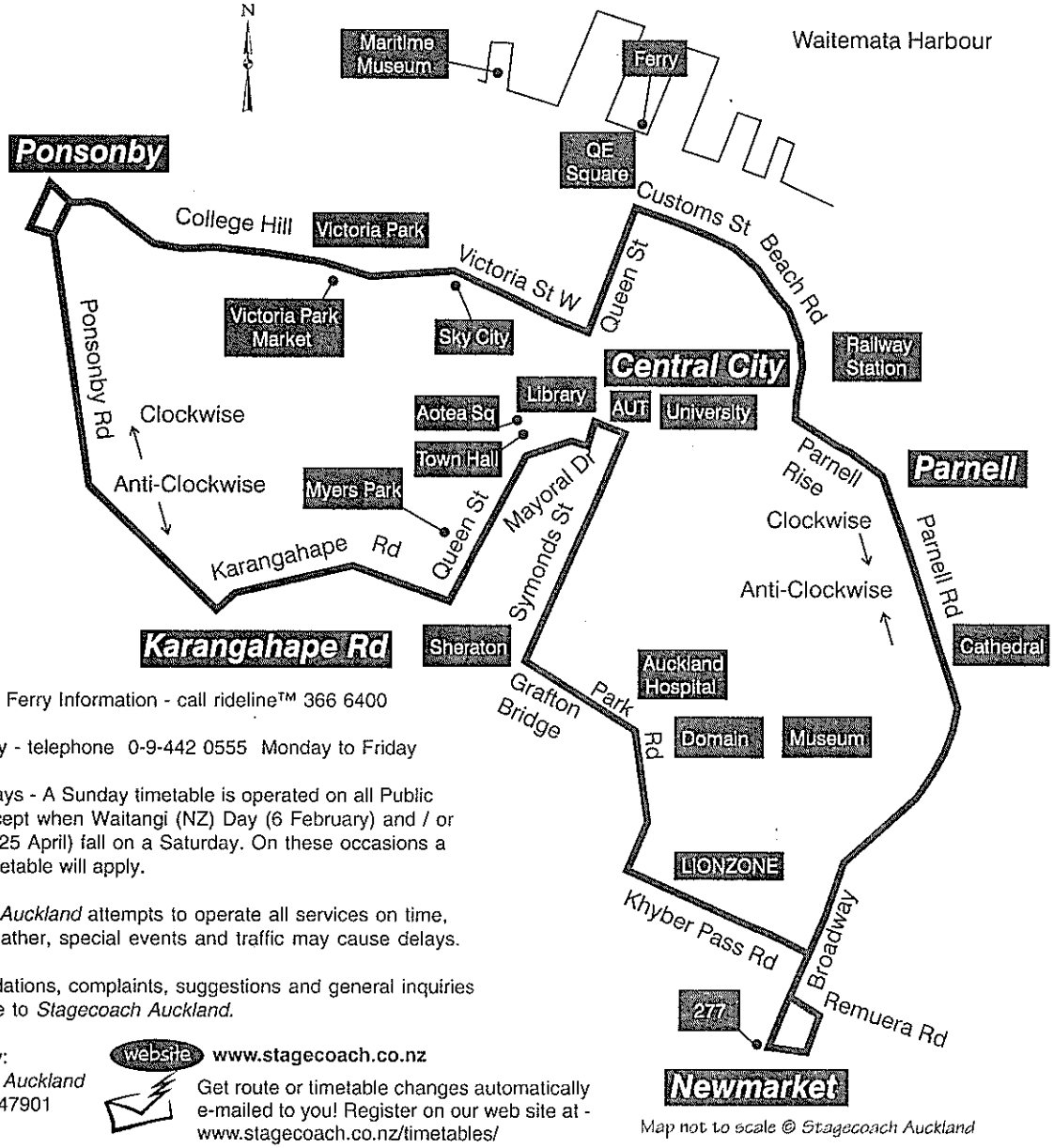


Figure A5 Auckland Bus Patronage: % Change







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Saturday 7.00am to 6.00pm

15 Every 15 minutes
Evenings to 11.30pm
Sunday
7.00am to 11.30pm

Issue No. 102

#B 007-Crosstown Service

B1 Project Description

The 007-Crosstown bus service runs east-west across Auckland City between St Heliers in the east, and Point Chevalier in the west. This service thus provides a crosstown link rather than a radial service centred on the Auckland City centre (as most Auckland City bus services are). As can be seen on the attached map, the 007 service runs past a number of key destinations including UNITEC, St Lukes Mall, Greenlane and National Womens Hospitals, Alexandra Park Raceway, Logan Campbell Centre, Remuera Village Shops, Meadowbank Shopping Centre, and the Auckland University Tamaki Campus.

The 007 service currently has a 10-minute frequency during the peak (7-9am and 4-6pm), a half-hour frequency during the interpeak (9am – 3pm), and an hourly service in the evenings (after 7pm). A half-hourly service is provided on Saturdays and an hourly service on Sundays. This level of service has been provided since November 1996. Before this a minimal interpeak service was provided (4 trips in each direction). The route remained essentially the same at the November 1996 change, with only a relatively minor route alteration at the eastern end of the route.

B2 Market Research

In October and November 1998 the Auckland Regional Council (ARC) carried out on-board surveys of the 007 service, from which 216 completed surveys were obtained. This survey was aimed at determining the type of improvements to the service that passengers wanted. In addition, several questions sought to ascertain what travel modes passengers used before travelling on the 007 service. Although the question design tended to obscure the results, it appears that 29.2% of users previously used other public transport before using the 007 service. This compared favourably with the 27.8% of users who indicated they would use other public transport if the 007 bus service was not available.

B3 Patronage Impact

The patronage pattern of the 007 service is shown in Figures B1-B6, and is summarised in the attached Summary Sheets. Several points can be noted:

- Monday to Friday (weekday) patronage increased by 459% in the first 3 months after the service increase, and has continued to grow in the 4 years since implementation. Patronage after 1 year of operation of the new service was 619% above the previous level (35% above the 3-month level); and after 4 years was 998% above the previous level.
- Before the November 1996 change there were no weekend services. The new Saturday services have shown steady growth over the last 4 years, with Year 1 patronage 27% above 3-month patronage, and Year 4 patronage 70% above the 3-month level. Sunday patronage has shown much higher growth with Year 1 patronage being 160% above 3-month patronage, and Year 4 patronage 346% above the 3-month level.

No significant changes have been made to the service since the November 1996 change.

B4 Control Route and Patronage Trend

The Auckland urban area total bus patronage was used as the control route for the 007 service. As can be seen in the Summary Sheets, analysis of this control route indicated a 1.1% patronage increase 'trend' in the first 12 months of the improved 007 route's operation, and 17.9% over the first 4 years of operation. Taking this trend into account reduces the 12-month weekday patronage increase over the 3-month level from 619% to 612%, and reduces the 4-year weekday increase from 998% to 802%. These are the patronage increases attributable to the 007 level of service improvements.

B5 Impact on Other Bus Services

The service improvements on the 007 route in December 1996 are likely to have had some impact on patronage on other bus services. The size of this impact would have been relative to the number of people already making this trip by bus on other routes, which would have required passengers to travel into the central city and to transfer buses. The user survey carried out by the ARC found that 29% of users had come from other public transport, and this has been taken as the 'abstraction factor'. This 'abstraction factor' was applied to the patronage results (see Summary Sheets) to determine the gain in new public transport (PT) users, and to enable production of service performance indicators based solely on these new PT users (see below).

B6 Elasticity Appraisal

This project included a service frequency increase on the existing Monday to Friday service. Arc elasticities and point (log) elasticities were calculated for change in service km. The point elasticity (for the actual patronage change) at 3 months was 0.74, increasing to 1.03 after 4 years. These results are within the range of expected service km elasticities (0.5-0.7 short-run, with long-run elasticities up to twice short-run).

B7 Performance Indicators

Service performance indicators were calculated for the 007 service by time period (Monday to Friday, Saturday, Sunday), and for four situations:

- Actual change
- After trend adjustment, but no abstraction,
- After trend adjustment plus our best estimate of abstraction,
- After trend adjustment plus our estimate of plausible maximum abstraction.

The results are shown in the attached Summary Sheets. The Patronage Trips/Service Trips performance indicator has been calculated, but it has not been reported to preserve patronage confidentiality.

007 Crosstown: Monday to Friday **Summary Sheet**

Service Change Date 11 November 1996
Average Passenger Trip Length 5.8

Monday to Friday **Daily**

	Percentage Change				
	3 mth	12 mth	2 yr	3 yr	4 yr
Service Trips	788.9%	788.9%	788.9%	788.9%	788.9%
Service Km	912.6%	912.6%	912.6%	912.6%	912.6%
Pass Trips	459.1%	619.2%	816.7%	859.8%	997.9%
Pass Km	459.1%	619.2%	816.7%	859.8%	997.9%
Gross Cost	914.9%	914.9%	914.9%	914.9%	914.9%
Revenue	807.9%	945.5%	1127.5%	1098.3%	1231.9%
Net Cost	952.1%	904.3%	841.1%	851.2%	804.9%
Trend Factor	0.7%	1.1%	6.5%	10.4%	17.9%
Abstraction Factor - Best Estimate	29.0%	29.0%	29.0%	29.0%	29.0%
- Plausible Max	29.0%	29.0%	29.0%	29.0%	29.0%
After Trend & Abstraction(zero/best/max)					
Pass Trips - after trend & zero Ab	455.2%	611.6%	757.4%	760.2%	801.9%
- after trend & best Ab	323.2%	434.2%	537.8%	539.7%	569.4%
- after trend & max Ab	323.2%	434.2%	537.8%	539.7%	569.4%
Pass Km - after trend & zero Ab	455.2%	611.6%	757.4%	760.2%	801.9%
- after trend & best Ab	323.2%	434.2%	537.8%	539.7%	569.4%
- after trend & max Ab	323.2%	434.2%	537.8%	539.7%	569.4%
Revenue - after trend & zero Ab	801.6%	934.4%	1048.2%	974.0%	994.2%
- after trend & best Ab	569.1%	663.4%	744.2%	691.5%	705.8%
- after trend & max Ab	569.1%	663.4%	744.2%	691.5%	705.8%
Net Cost - after trend & zero Ab	954.3%	908.2%	868.6%	894.4%	887.4%
- after trend & best Ab	1035.0%	1002.3%	974.2%	992.5%	987.5%
- after trend & max Ab	1035.0%	1002.3%	974.2%	992.5%	987.5%
Performance of Service - Actual (ie before Trend Adjustment & Abstraction)					
Subsidy/pass trip	5.47	4.06	2.99	2.88	2.40
Subsidy/pass km	0.94	0.70	0.51	0.50	0.41
Cost Recovery	23.06%	26.55%	31.17%	30.43%	33.83%
Δ Pass Trips/ Δ Service Trips					
Δ Pass Trips/ Δ Km	0.41	0.53	0.67	0.70	0.81
Δ Pass Km/ Δ Km	2.38	3.06	3.90	4.08	4.67
Δ Gross Cost / Δ Pass Trips	7.11	5.53	4.34	4.14	3.62
Δ Gross Cost / Δ Pass Km	1.23	0.95	0.75	0.71	0.62
Δ Gross Cost / Δ Veh Km	2.92	2.92	2.92	2.92	2.92
Δ Net Cost / Δ Veh Km	2.25	2.14	2.01	2.03	1.93
Arc Elasticity	0.58	0.78	1.04	1.09	1.26
Point Elasticity	0.74	0.85	0.96	0.98	1.03
Incremental Impact - After Trend Adjustment & Abstraction = 0					
Subsidy/pass trip	6.10	4.32	3.34	3.42	3.22
Subsidy/pass km	1.05	0.74	0.58	0.59	0.55
Cost Recovery	22.6%	26.3%	29.5%	27.4%	28.0%
Δ Pass Trips/ Δ Service Trips					
Δ Pass Trips/ Δ Km	0.37	0.50	0.62	0.62	0.65
Δ Pass Km/ Δ Km	2.15	2.89	3.58	3.59	3.79
Δ Gross Cost / Δ Pass Trips	11.09	1.01	0.82	0.81	0.77
Δ Gross Cost / Δ Pass Km	1.36	1.01	0.82	0.81	0.77
Δ Gross Cost / Δ Veh Km	2.92	2.92	2.92	2.92	2.92
Δ Net Cost / Δ Veh Km	2.26	2.15	2.06	2.12	2.10
Arc Elasticity	0.50	0.67	0.83	0.83	0.88
Point Elasticity	0.74	0.85	0.93	0.93	0.95
Incremental Impact - After Trend Adjustment & Best Estimate Abstraction					
Subsidy/pass trip	9.31	6.71	5.27	5.35	5.04
Subsidy/pass km	1.61	1.16	0.91	0.92	0.87
Cost Recovery	16.0%	18.7%	21.0%	19.5%	19.9%
Δ Pass Trips/ Δ Service Trips					
Δ Pass Trips/ Δ Km	0.26	0.35	0.44	0.44	0.46
Δ Pass Km/ Δ Km	1.53	2.05	2.54	2.55	2.69
Δ Gross Cost / Δ Pass Trips	11.09	8.26	6.67	6.64	6.30
Δ Gross Cost / Δ Pass Km	1.91	1.42	1.15	1.15	1.09
Δ Gross Cost / Δ Veh Km	2.92	2.92	2.92	2.92	2.92
Δ Net Cost / Δ Veh Km	2.45	2.37	2.31	2.35	2.34
Arc Elasticity	0.35	0.48	0.59	0.59	0.62
Point Elasticity	0.62	0.72	0.80	0.80	0.82
Incremental Impact - After Trend Adjustment & Plausible Max Abstraction					
Subsidy/pass trip	9.31	6.71	5.27	5.35	5.04
Subsidy/pass km	1.61	1.16	0.91	0.92	0.87
Cost Recovery	16.0%	18.7%	21.0%	19.5%	19.9%
Δ Pass Trips/ Δ Service Trips					
Δ Pass Trips/ Δ Km	0.26	0.35	0.44	0.44	0.46
Δ Pass Km/ Δ Km	1.53	2.05	2.54	2.55	2.69
Δ Gross Cost / Δ Pass Trips	11.09	8.26	6.67	6.64	6.30
Δ Gross Cost / Δ Pass Km	1.91	1.42	1.15	1.15	1.09
Δ Gross Cost / Δ Veh Km	2.92	2.92	2.92	2.92	2.92
Δ Net Cost / Δ Veh Km	2.45	2.37	2.31	2.35	2.34
Arc Elasticity	0.35	0.48	0.59	0.59	0.62
Point Elasticity	0.62	0.72	0.80	0.80	0.82

007 Crosstown: Saturday **Summary Sheet**

Service Change Date 11 November 1996
Average Passenger Trip Length 6.0

Saturday **Daily**

	Percentage Change				
	3 mth	12 mth	2 yr	3 yr	4 yr
Service Trips	0.0%	0.0%	0.0%	0.0%	0.0%
Service Km	0.0%	0.0%	0.0%	0.0%	0.0%
Pass Trips	0.0%	27.1%	40.5%	80.4%	70.5%
Pass Km	0.0%	27.1%	40.5%	80.4%	70.5%
Gross Cost	0.0%	0.0%	0.0%	0.0%	0.0%
Revenue	0.0%	18.1%	25.4%	42.0%	29.7%
Net Cost	0.0%	-5.5%	-7.7%	-12.7%	-9.0%
Trend Factor	0.7%	1.1%	6.5%	10.4%	17.9%
Abstraction Factor - Best Estimate	29.0%	29.0%	29.0%	29.0%	29.0%
- Plausible Max	29.0%	29.0%	29.0%	29.0%	29.0%
After Trend & Abstraction(zero/best/max)					
Pass Trips - after trend & zero Ab	0.0%	26.6%	32.3%	62.8%	41.0%
- after trend & best Ab	0.0%	26.6%	32.3%	62.8%	41.0%
- after trend & max Ab	0.0%	26.6%	32.3%	62.8%	41.0%
Pass Km - after trend & zero Ab	0.0%	26.6%	32.3%	62.8%	41.0%
- after trend & best Ab	0.0%	26.6%	32.3%	62.8%	41.0%
- after trend & max Ab	0.0%	26.6%	32.3%	62.8%	41.0%
Revenue - after trend & zero Ab	0.0%	17.6%	18.1%	28.2%	7.3%
- after trend & best Ab	0.0%	17.6%	18.1%	28.2%	7.3%
- after trend & max Ab	0.0%	17.6%	18.1%	28.2%	7.3%
Net Cost - after trend & zero Ab	0.0%	-5.3%	-5.4%	-8.4%	-2.2%
- after trend & best Ab	0.0%	-3.4%	-3.5%	-5.5%	-1.4%
- after trend & max Ab	0.0%	-3.4%	-3.5%	-5.5%	-1.4%
Performance Indicators - Actual (ie before Trend Adjustment & Abstraction)					
Subsidy/pass trip	5.34	3.97	3.51	2.58	2.85
Subsidy/pass km	0.89	0.66	0.58	0.43	0.47
Cost Recovery	23.21%	27.40%	29.11%	32.97%	30.10%
Δ Pass Trips/ Δ Service Trips					
Δ Pass Trips/ Δ Km	0.30	0.38	0.42	0.55	0.52
Δ Pass Km/ Δ Km	1.81	2.31	2.55	3.27	3.09
Δ Gross Cost / Δ Pass Trips	6.95	5.47	4.95	3.85	4.08
Δ Gross Cost / Δ Pass Km	1.16	0.91	0.82	0.64	0.68
Δ Gross Cost / Δ Veh Km	2.10	2.10	2.10	2.10	2.10
Δ Net Cost / Δ Veh Km	1.61	1.52	1.49	1.41	1.47
Arc Elasticity					
Point Elasticity					
Performance Indicators - After Trend Adjustment & Abstraction = 0					
Subsidy/pass trip	5.39	4.03	3.85	3.03	3.74
Subsidy/pass km	0.90	0.67	0.64	0.50	0.62
Cost Recovery	23.05%	27.11%	27.23%	29.55%	24.72%
Δ Pass Trips/ Δ Service Trips					
Δ Pass Trips/ Δ Km	0.30	0.38	0.40	0.49	0.42
Δ Pass Km/ Δ Km	1.80	2.28	2.38	2.93	2.54
Δ Gross Cost / Δ Pass Trips	7.00	5.53	5.29	4.30	4.96
Δ Gross Cost / Δ Pass Km	1.17	0.92	0.88	0.72	0.83
Δ Gross Cost / Δ Veh Km	2.10	2.10	2.10	2.10	2.10
Δ Net Cost / Δ Veh Km	1.62	1.53	1.53	1.48	1.58
Arc Elasticity					
Point Elasticity					
Performance Indicators - After Trend Adjustment & Best Estimate Abstraction					
Subsidy/pass trip	8.24	6.28	6.01	4.78	5.76
Subsidy/pass km	1.37	1.05	1.00	0.80	0.96
Cost Recovery	16.37%	19.25%	19.33%	20.98%	17.55%
Δ Pass Trips/ Δ Service Trips					
Δ Pass Trips/ Δ Km	0.21	0.27	0.28	0.35	0.30
Δ Pass Km/ Δ Km	1.28	1.62	1.69	2.08	1.80
Δ Gross Cost / Δ Pass Trips	9.86	7.78	7.45	6.05	6.99
Δ Gross Cost / Δ Pass Km	1.64	1.30	1.24	1.01	1.17
Δ Gross Cost / Δ Veh Km	2.10	2.10	2.10	2.10	2.10
Δ Net Cost / Δ Veh Km	1.76	1.70	1.69	1.66	1.73
Arc Elasticity					
Point Elasticity					
Performance Indicators - After Trend Adjustment & Plausible Max Abstraction					
Subsidy/pass trip	8.24	6.28	6.01	4.78	5.76
Subsidy/pass km	1.37	1.05	1.00	0.80	0.96
Cost Recovery	16.37%	19.25%	19.33%	20.98%	17.55%
Δ Pass Trips/ Δ Service Trips					
Δ Pass Trips/ Δ Km	0.21	0.27	0.28	0.35	0.30
Δ Pass Km/ Δ Km	1.28	1.62	1.69	2.08	1.80
Δ Gross Cost / Δ Pass Trips	9.86	7.78	7.45	6.05	6.99
Δ Gross Cost / Δ Pass Km	1.64	1.30	1.24	1.01	1.17
Δ Gross Cost / Δ Veh Km	2.10	2.10	2.10	2.10	2.10
Δ Net Cost / Δ Veh Km	1.76	1.70	1.69	1.66	1.73
Arc Elasticity					
Point Elasticity					

007 Crosstown: Sunday **Summary Sheet**

Service Change Date 11 November 1996
Average Passenger Trip Length 6.1

Sunday	**Daily**					
		Percentage Change				
		3 mth	**12 mth**	**2 yr**	**3 yr**	**4 yr**
Service Trips			0.0%	0.0%	0.0%	0.0%
Service Km			0.0%	0.0%	0.0%	0.0%
Pass Trips			160.4%	166.3%	268.7%	345.8%
Pass Km			160.4%	166.3%	268.7%	345.8%
Gross Cost			0.0%	0.0%	0.0%	0.0%
Revenue			-17.3%	-14.7%	-5.1%	9.3%
Net Cost			9.5%	8.0%	2.8%	-5.1%
Trend Factor		0.7%	1.1%	6.5%	10.4%	17.9%
Abstraction Factor - Best Estimate		29.0%	29.0%	29.0%	29.0%	29.0%
- Plausible Max		29.0%	29.0%	29.0%	29.0%	29.0%
After Trend & Abstraction(zero/best/max)						
Pass Trips - after trend & zero Ab			159.5%	150.8%	232.7%	268.7%
- after trend & best Ab			159.5%	150.8%	232.7%	268.7%
- after trend & max Ab			159.5%	150.8%	232.7%	268.7%
Pass Km - after trend & zero Ab			159.5%	150.8%	232.7%	268.7%
- after trend & best Ab			159.5%	150.8%	232.7%	268.7%
- after trend & max Ab			159.5%	150.8%	232.7%	268.7%
Revenue - after trend & zero Ab			-17.6%	-19.6%	-14.4%	-9.6%
- after trend & best Ab			-17.6%	-19.6%	-14.4%	-9.6%
- after trend & max Ab			-17.6%	-19.6%	-14.4%	-9.6%
Net Cost - after trend & zero Ab			9.5%	10.6%	7.8%	5.2%
- after trend & best Ab			5.9%	6.5%	4.8%	3.2%
- after trend & max Ab			5.9%	6.5%	4.8%	3.2%
Performance Indicators - Actual (ie before Trend Adjustment & Abstraction)						
Subsidy/pass trip		9.35	3.93	3.80	2.61	1.99
Subsidy/pass km		1.53	0.64	0.62	0.43	0.33
Cost Recovery		35.40%	29.28%	30.21%	33.58%	38.68%
Δ Pass Trips/ Δ Service Trips						
Δ Pass Trips/ Δ Km		0.15	0.40	0.41	0.57	0.69
Δ Pass Km/ Δ Km		0.94	2.45	2.51	3.47	4.20
Δ Gross Cost / Δ Pass Trips		14.48	5.56	5.44	3.93	3.25
Δ Gross Cost / Δ Pass Km		2.37	0.91	0.89	0.64	0.53
Δ Gross Cost / Δ Veh Km		2.23	2.23	2.23	2.23	2.23
Δ Net Cost / Δ Veh Km		1.44	1.58	1.56	1.48	1.37
Arc Elasticity						
Point Elasticity						
Performance Indicators - After Trend Adjustment & Abstraction = 0						
Subsidy/pass trip		9.46	3.99	4.17	3.06	2.70
Subsidy/pass km		1.55	0.65	0.68	0.50	0.44
Cost Recovery		35.15%	28.97%	28.25%	30.09%	31.78%
Δ Pass Trips/ Δ Service Trips						
Δ Pass Trips/ Δ Km		0.15	0.40	0.38	0.51	0.57
Δ Pass Km/ Δ Km		0.93	2.43	2.34	3.11	3.45
Δ Gross Cost / Δ Pass Trips		14.58	5.62	5.81	4.38	3.95
Δ Gross Cost / Δ Pass Km		2.39	0.92	0.95	0.72	0.65
Δ Gross Cost / Δ Veh Km		2.23	2.23	2.23	2.23	2.23
Δ Net Cost / Δ Veh Km		1.45	1.59	1.60	1.56	1.52
Arc Elasticity						
Point Elasticity						
Performance Indicators - After Trend Adjustment & Best Estimate Abstraction						
Subsidy/pass trip		15.41	6.29	6.54	4.85	4.31
Subsidy/pass km		2.53	1.03	1.07	0.80	0.71
Cost Recovery		24.96%	20.57%	20.06%	21.37%	22.56%
Δ Pass Trips/ Δ Service Trips						
Δ Pass Trips/ Δ Km		0.11	0.28	0.27	0.36	0.40
Δ Pass Km/ Δ Km		0.66	1.72	1.66	2.21	2.45
Δ Gross Cost / Δ Pass Trips		20.54	7.92	8.19	6.17	5.57
Δ Gross Cost / Δ Pass Km		3.37	1.30	1.34	1.01	0.91
Δ Gross Cost / Δ Veh Km		2.23	2.23	2.23	2.23	2.23
Δ Net Cost / Δ Veh Km		1.68	1.77	1.79	1.76	1.73
Arc Elasticity						
Point Elasticity						
Performance Indicators - After Trend Adjustment & Plausible Max Abstraction						
Subsidy/pass trip		15.41	6.29	6.54	4.85	4.31
Subsidy/pass km		2.53	1.03	1.07	0.80	0.71
Cost Recovery		24.96%	20.57%	20.06%	21.37%	22.56%
Δ Pass Trips/ Δ Service Trips						
Δ Pass Trips/ Δ Km		0.11	0.28	0.27	0.36	0.40
Δ Pass Km/ Δ Km		0.66	1.72	1.66	2.21	2.45
Δ Gross Cost / Δ Pass Trips		20.54	7.92	8.19	6.17	5.57
Δ Gross Cost / Δ Pass Km		3.37	1.30	1.34	1.01	0.91
Δ Gross Cost / Δ Veh Km		2.23	2.23	2.23	2.23	2.23
Δ Net Cost / Δ Veh Km		1.68	1.77	1.79	1.76	1.73
Arc Elasticity						
Point Elasticity						

Figure B1 007 Crosstown Bus Service
Monday - Friday Patronage

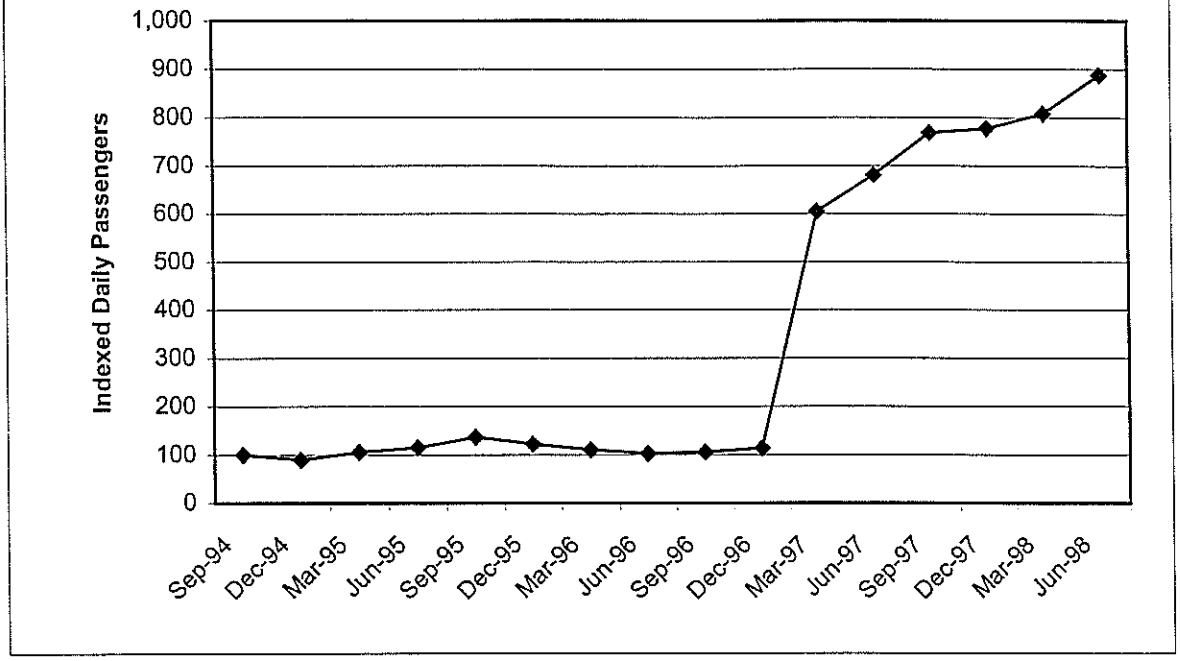


Figure B2 007 Crosstown Service- Monday to Friday
12 Month Rolling total Ave Patronage

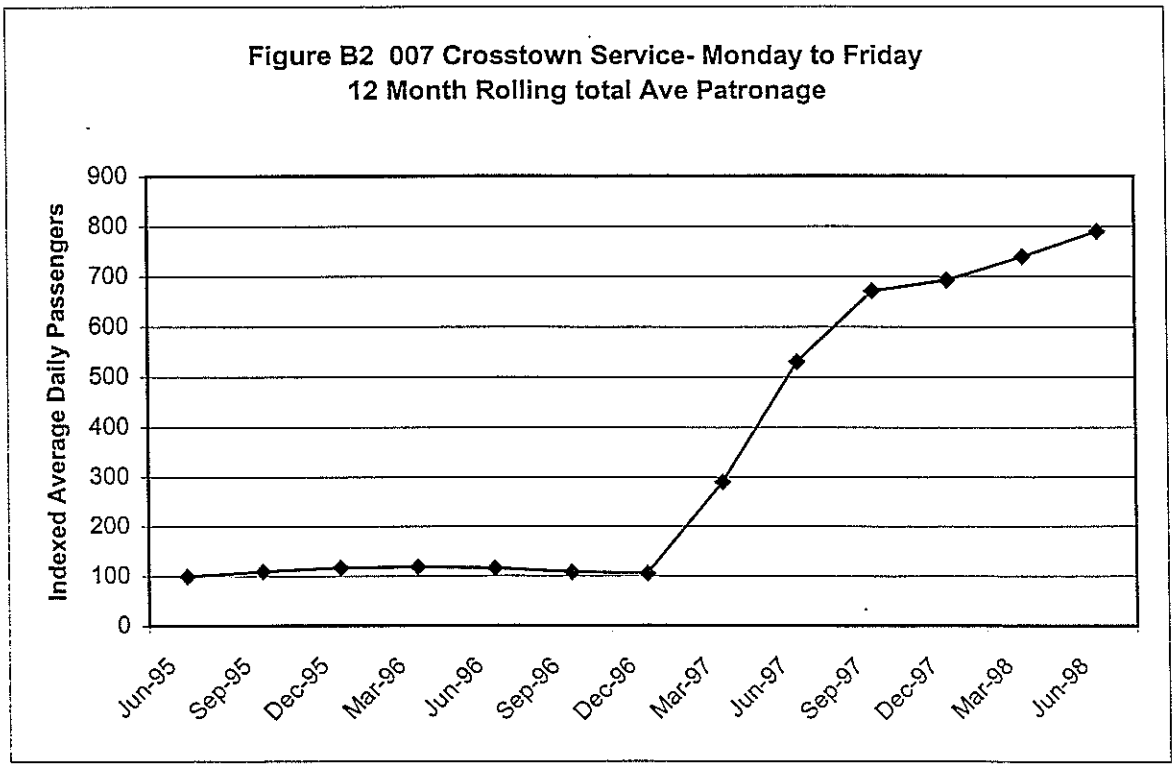


Figure B3 007 Crosstown Daily Patronage - Saturday

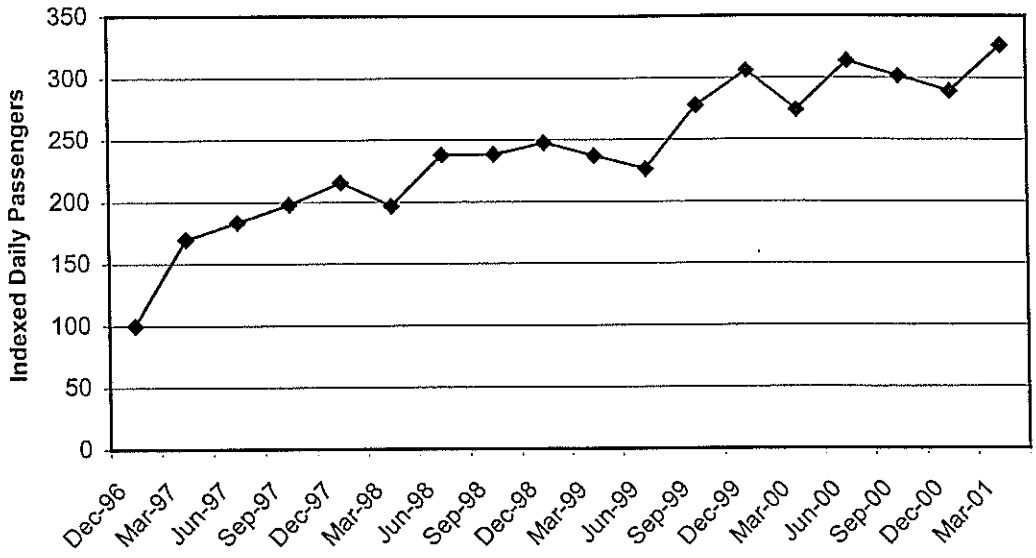


Figure B4 007 Crosstown Saturday Patronage - 12 Month Rolling Average

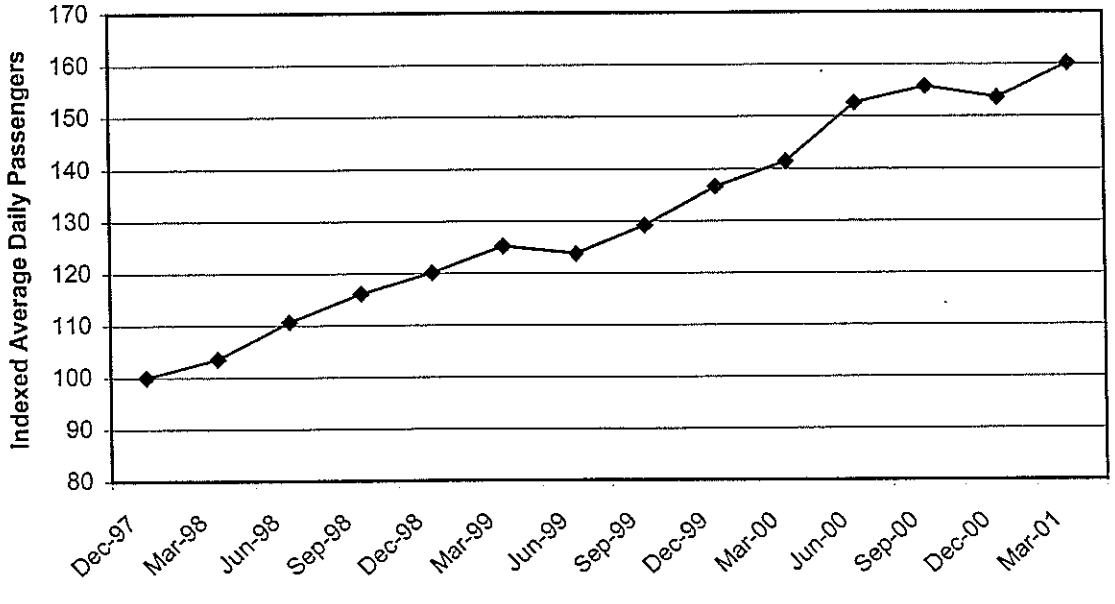
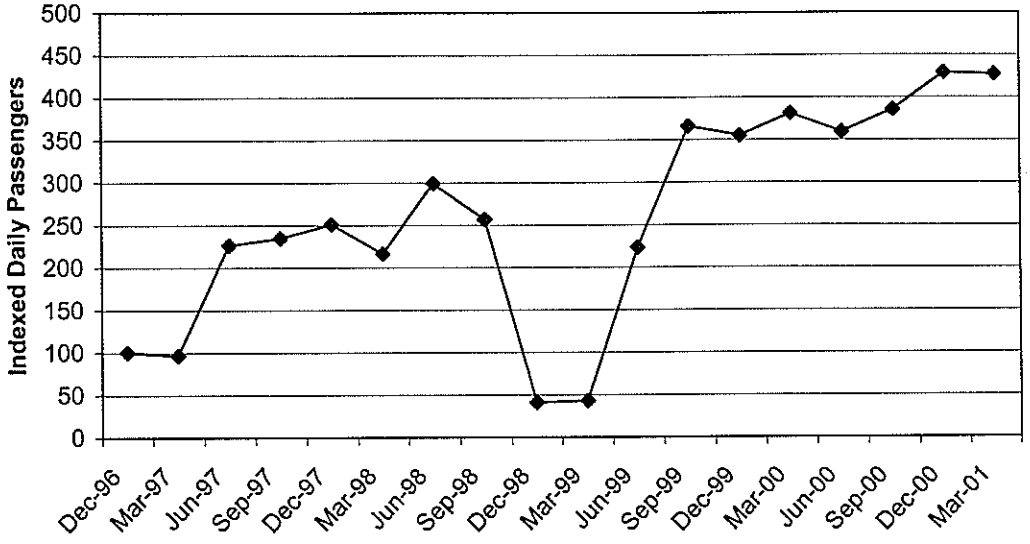
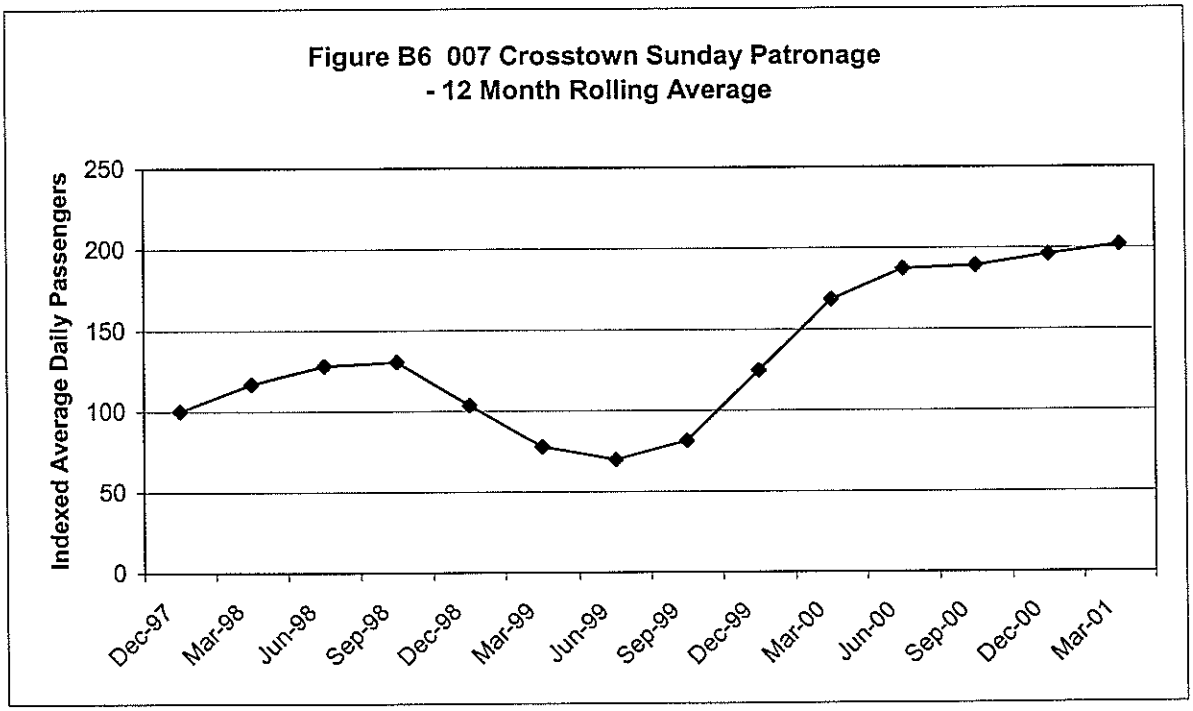


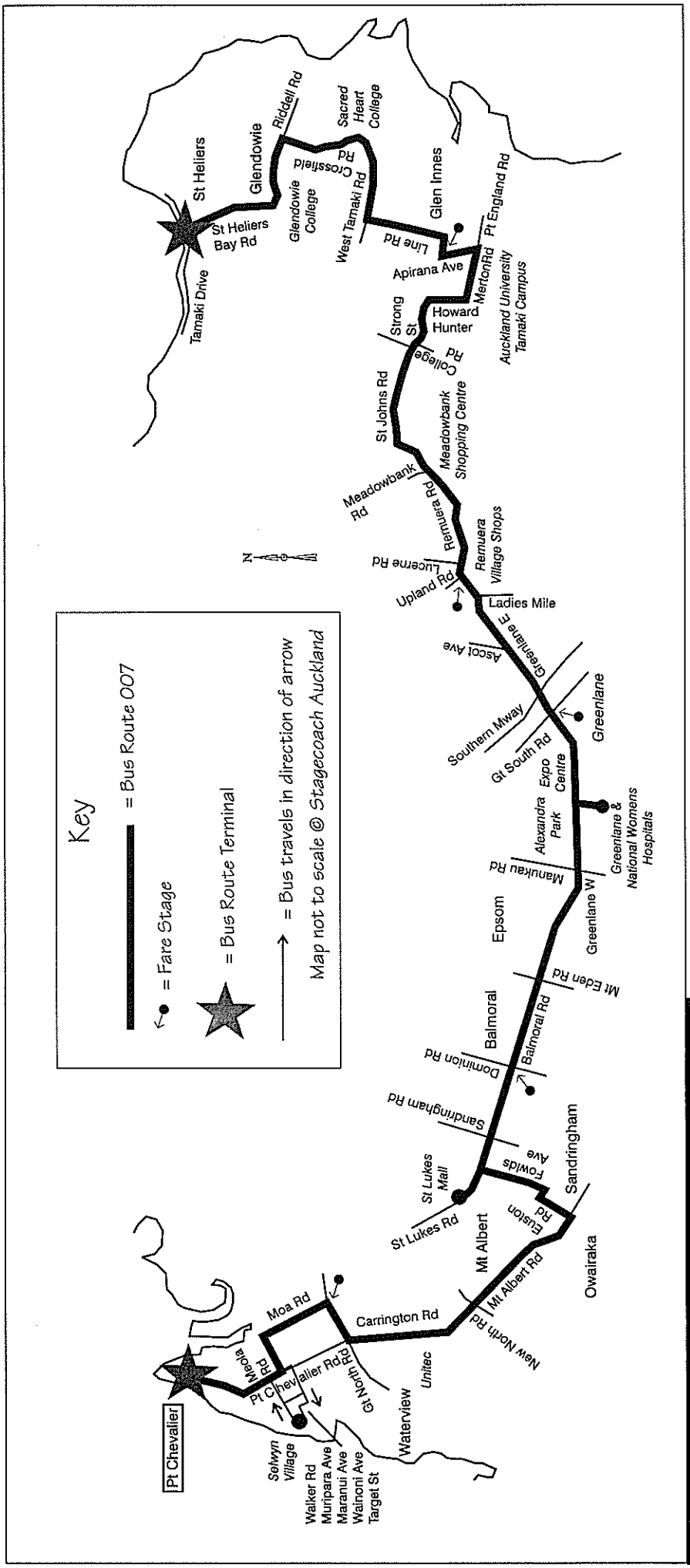
Figure B5 007 Crosstown Daily Patronage - Sunday



Note: December 98 and March 99 data suspect

Figure B6 007 Crosstown Sunday Patronage - 12 Month Rolling Average





Route 007

Effective from 19 March 2001

#C Half Moon Bay Ferry

C1 Project Description

A ferry service was instituted in May 1999 between Half Moon Bay and Auckland City central. Three peak services each way, and a two-hourly service during the day is provided. The ferry runs between 7am (from Half Moon Bay) and 8pm (from Auckland) weekdays. No weekend service is provided.

C2 Market Research

A survey of morning ferry passengers travelling from Half Moon Bay was carried out on Wednesday, 21 July 1999. The main points from the passenger survey were:

- *Trip Purpose:* 78.9% of respondents were travelling to work, with 13.6% travelling to education (school/university).
- *Frequency:* 58.5% of respondents travel 5 days a week on the ferry. 62.1% of workers, and 60% of education travellers, commute by ferry 5 days a week
- *Other modes:* 89.8% of respondents travelled both ways on the ferry; 8.8% travel one way by bus, and 3.4% travel one way by car/motorbike. Nearly all the workers (95.7%) travelled both ways on the ferry, while 35% of students travelled only one way by ferry.
- *Prior mode:* 70.7% of respondents travelled by car/motorbike before using the ferry, and 15% previously travelled by bus. This means that 83% of previously non-PT users travelled by car/motorbike before using the ferry. 73.3% of workers and 55% of students previously travelled by car; while 13.8% of workers and 30% of students previously travelled by bus.
- *Reason for using Ferry:* the two most frequent reasons for using the ferry were because it is relaxing and stress-free (62.7%), no traffic hassles (43%), and time savings (35.9%). Other frequent reasons included no parking hassles (19%), convenience (19%), reliability/guaranteed arrival time (16.9%), enjoyable (16.2%), cost saving (10.6%), and save on parking fees (10.6%).
- *Residential address:* 36.1% of respondents lived in Howick, 30.8% in Bucklands Beach, 13.5% in Half Moon Bay, and 9.8% in Pakuranga. 54.2% of respondents who used to take the bus before the ferry service started, live in Bucklands Beach.
- *Travel mode to Ferry:* 86.4% of respondents travelled by car/motorbike to the Half Moon Bay marina, 9.5% walked. 70.1% of respondents drove themselves to the ferry and 15% got dropped off.
- *Bus to Ferry:* 39.9% of respondents would not use a feeder bus service to the ferry, and the main reasons were driving was quicker/easier (17.8%), utilising car en route (10.9%), and walking was quicker (8.9%). 31.9% of respondents would use a bus service. 28.3% of respondents were undecided, with their decision dependent on the bus timetable, route and cost.
- *Destination:* 95.9% of respondents were travelling to the CBD, with 92.5% of respondents walking to their destination and 3.4% catching the Link bus.

C3 Patronage Impact

The patronage pattern of the Half Moon Bay (HMB) ferry service is shown in Figures C1-C2, and is summarised in the attached Summary Sheet. Several points can be noted:

- Monday to Friday (weekday) patronage has increased substantially since service commenced 2 years ago. Year 1 patronage was 166% above the first 3-month level, and Year 2 patronage was 125% above the first 3-month level.
- The high Year 1 patronage was related to the holding of the America Cup in Auckland from December 1999 to January/February 2000. Patronage has since re-stabilised at a lower level, although still over double the first 3-month's patronage.

C4 Control Route and Patronage Trend

The Auckland urban area total public transport patronage was used as the control route for the HMB ferry service. The total ferry patronage was not used as a control due to the number of changes in ferry service operations over the analysis period. In addition, the HMB ferry patronage was a substantial proportion of total ferry patronage. As can be seen in the Summary Sheets, analysis of this control route indicated a 5% patronage increase 'trend' in the first 12 months of the ferry's operation, and a 7.7% increase in the second year. Taking this trend into account reduces the 12-month weekday patronage increase over the 3-month level from 166% to 152%.

C5 Impact on Other Public Transport Services

The user survey carried out on the HMB ferry found that 15% travelled by bus prior to the ferry's commencement. This corresponds relatively well with the perception of the bus operator in the area (Howick and Eastern) that only a relatively small number of their passengers switched to ferry when it first commenced. They also note there has been no growth on the express bus corridor (which competes with the ferry), whereas other routes have grown by 2%-3%. This may be a result of the growth going to the ferry instead.

An 'abstraction factor' of 15% was applied to the patronage results (see Summary Sheets) to determine the gain in new PT users, and to enable production of service performance indicators based solely on these new PT users (see below).

C6 Elasticity Appraisal

As the HMB ferry was a new service, rather than an improvement to an existing service, an elasticity appraisal was not possible.

C7 Performance Indicators

Service performance indicators were calculated for the HMB ferry for four situations:

- Actual change,
- After trend adjustment, but no abstraction,
- After trend adjustment plus our best estimate of abstraction,
- After trend adjustment plus our estimate of plausible maximum abstraction.

The results are shown in the attached Summary Sheets. The Patronage Trips/Service Trips performance indicator has been calculated, but it has not been reported to preserve patronage confidentiality.

HALF MOON BAY FERRY : Monday to Friday — Summary Sheet

Service Start Date 10 May 1999
Average Passenger Trip Length 16.0

Monday to Friday — Daily

	Percentage Change		
	3 mth	12 mth	2 yr
Service Trips		0.0%	0.0%
Service Km		0.0%	0.0%
Pass Trips		165.6%	124.6%
Pass Km		165.6%	124.6%
Gross Cost		0.0%	0.0%
Revenue		162.4%	126.3%
Net Cost		-49.1%	-38.2%
Trend Factor		5.0%	7.7%
Abstraction Factor - Best Estimate	15.0%	15.0%	15.0%
- Plausible Max	15.0%	15.0%	15.0%
After Trend & Abstraction(zero/best/max)			
Pass Trips - after trend & zero Ab		152.3%	107.4%
- after trend & best Ab		152.3%	107.4%
- after trend & max Ab		152.3%	107.4%
Pass Km - after trend & zero Ab		152.3%	107.4%
- after trend & best Ab		152.3%	107.4%
- after trend & max Ab		152.3%	107.4%
Revenue - after trend & zero Ab		149.3%	108.9%
- after trend & best Ab		149.3%	108.9%
- after trend & max Ab		149.3%	108.9%
Net Cost - after trend & zero Ab		-45.1%	-32.9%
- after trend & best Ab		-36.7%	-26.7%
- after trend & max Ab		-36.7%	-26.7%
Performance Indicators - Actual (ie before Trend Adjustment & Abstraction)			
Subsidy/pass trip	15.80	3.03	4.35
Subsidy/pass km	0.99	0.19	0.27
Cost Recovery	23%	61%	52%
Pass Trips/ Service Trips			
Pass Trips/ Km	1.00	2.66	2.25
Pass Km/ Km	16.04	42.61	36.04
Gross Cost / Pass Trips	20.57	7.74	9.16
Gross Cost / Pass Km	1.29	0.48	0.57
Gross Cost / Veh Km	20.63	20.63	20.63
Net Cost / Veh Km	15.84	8.07	9.80
Point Elasticity			
Performance Indicators - After Trend Adjustment & Abstraction = 0			
Subsidy/pass trip	15.80	3.44	5.11
Subsidy/pass km	0.99	0.21	0.32
Cost Recovery	23%	58%	48%
Pass Trips/ Service Trips			
Pass Trips/ Km	1.00	2.53	2.08
Pass Km/ Km	16.04	40.48	33.27
Gross Cost / Pass Trips	20.57	8.15	9.92
Gross Cost / Pass Km	1.29	0.51	0.62
Gross Cost / Veh Km	20.63	20.63	20.63
Net Cost / Veh Km	15.84	8.70	10.63
Point Elasticity			
Performance Indicators - After Trend Adjustment & Best Estimate Abstraction			
Subsidy/pass trip	19.43	4.88	6.86
Subsidy/pass km	1.21	0.30	0.43
Cost Recovery	20%	49%	41%
Pass Trips/ Service Trips			
Pass Trips/ Km	0.85	2.15	1.77
Pass Km/ Km	13.64	34.41	28.28
Gross Cost / Pass Trips	24.20	9.59	11.67
Gross Cost / Pass Km	1.51	0.60	0.73
Gross Cost / Veh Km	20.63	20.63	20.63
Net Cost / Veh Km	16.56	10.49	12.13
Point Elasticity			
Performance Indicators - After Trend Adjustment & Plausible Max Abstraction			
Subsidy/pass trip	19.43	4.88	6.86
Subsidy/pass km	1.21	0.30	0.43
Cost Recovery	20%	49%	41%
Pass Trips/ Service Trips			
Pass Trips/ Km	0.85	2.15	1.77
Pass Km/ Km	13.64	34.41	28.28
Gross Cost / Pass Trips	24.20	9.59	11.67
Gross Cost / Pass Km	1.51	0.60	0.73
Gross Cost / Veh Km	20.63	20.63	20.63
Net Cost / Veh Km	16.56	10.49	12.13
Point Elasticity			

Figure C1 Half Moon Bay Ferry Patronage (1st 12 months)

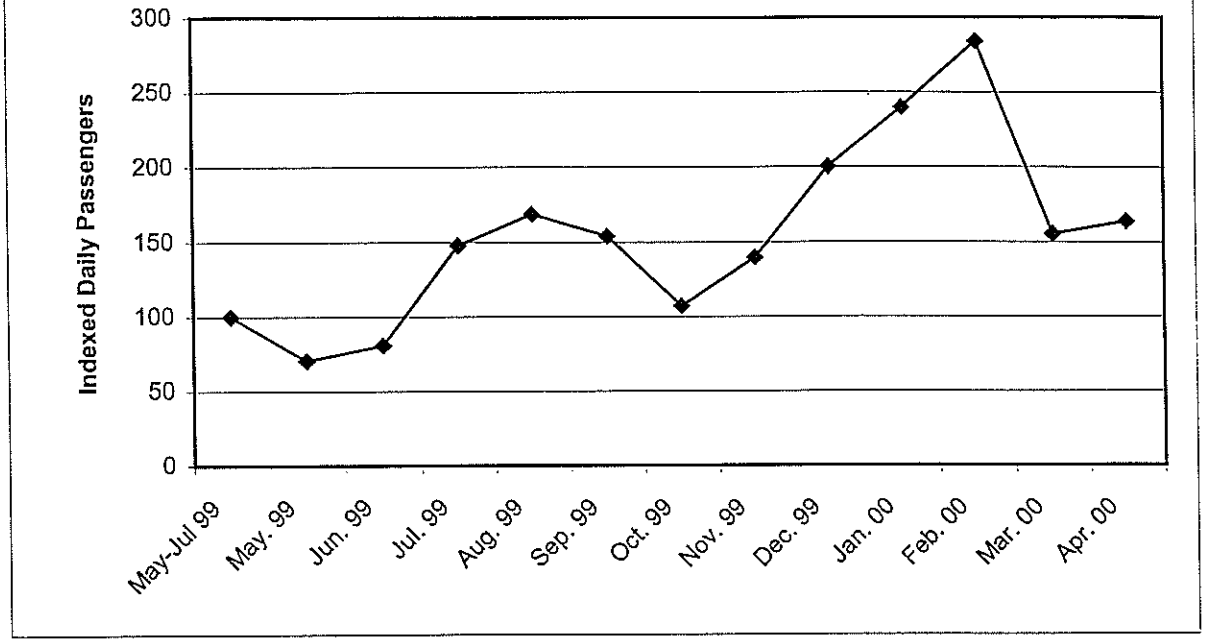
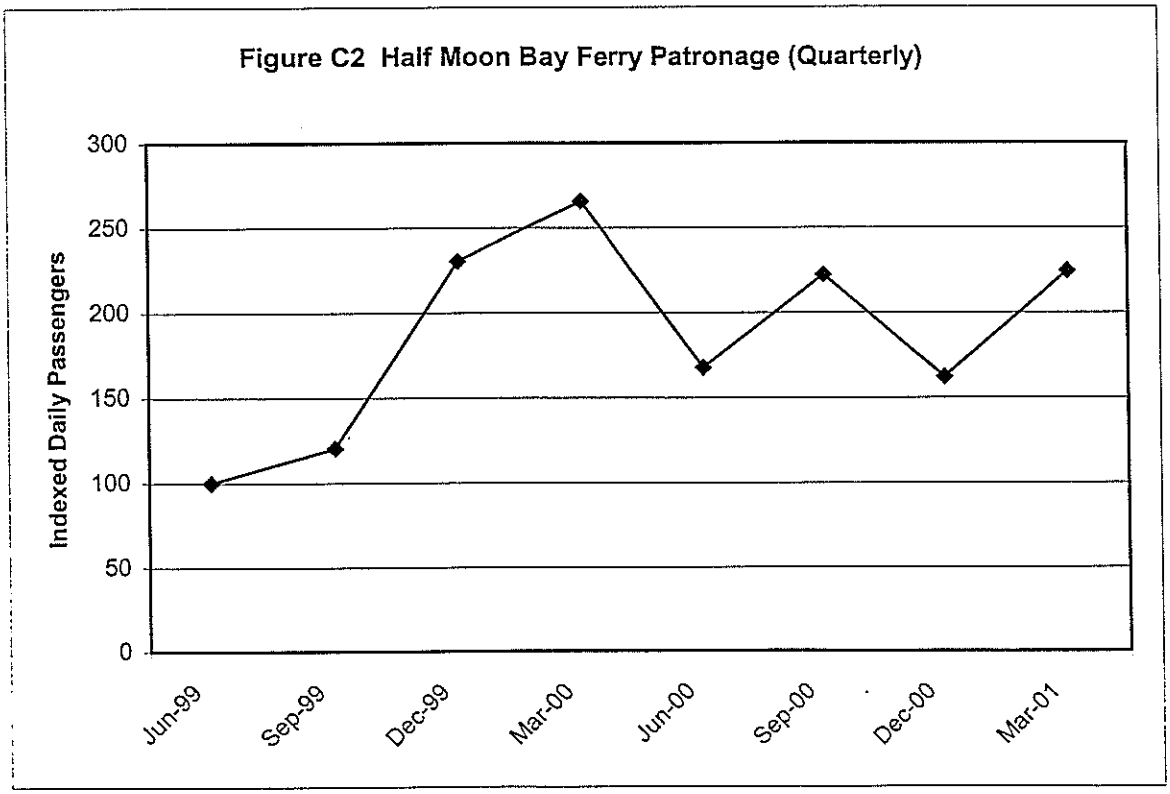


Figure C2 Half Moon Bay Ferry Patronage (Quarterly)



#D After-Midnight Services

D1 Project Description

The After-Midnight bus services run in the early hours of Saturday and Sunday mornings in Wellington. These services were developed by the Wellington Regional Council (WRC) in conjunction with local youth councils to meet the gap in public transport services at that time (trains and buses ceased around 11.30pm – Midnight).

The first After-Midnight service was instituted for Wellington City with three services on a trial basis in May 1999. With the success of the Wellington City services, new services to the Hutt Valley and Porirua were instituted in May 2000, with a service to Johnsonville/Newlands added in July 2000. A service to the Kapiti Coast was also introduced in October 2000. Three trips are provided on each service, departing the city centre at 1am, 2am, and 3am (the exception is the Kapiti service which has only one trip leaving at 2am).

A flat fare is charged on each service: $3.50 for Wellington City services, $5 for Hutt Valley and Porirua services, and $10 for the Kapiti Coast service (a stage fare of $5 is charged for travel to Mana and Plimmerton). By comparison: $3.50 is the maximum adult cash fare for Wellington City bus travel (5-9 section fare), a rail adult cash fare to Lower Hutt (Naenae) is $3.50 and to Upper Hutt is $5.50, a rail adult cash fare to Porirua is $3.50, to Mana is $4.20, and to Paraparaumu is $7.20.

D2 Market Research

No user market research has been carried out for these services.

D3 Patronage Impact

The patronage patterns of the After-Midnight services are shown in Figures D1-D5, and are summarised in the attached Summary Sheets. Several points can be noted:

- Wellington City routes – year 1 patronage was 127% above the 3-month level.
- Johnsonville – 9 month patronage was 60% above the 3 month level.
- Porirua – 11 month patronage was 17% above the 3-month level.
- Hutt Valley – year 1 patronage was 66% above the 3-month level.
- Kapiti – 6 month patronage was 31% above the 3-month level.

D4 Control Route and Patronage Trend

The Wellington City bus service patronage was used as the control route for the After-Midnight services. This data was available only until the end of 2000, meaning that patronage trend data is only available for the first 6 months for most services. This trend has been taken into account.

D5 Impact on Other PT Services

No evidence is available on the impact of the after-midnight services on other PT services. A range of 5-10% has been assumed for this impact. This assumes that some people previously returning home by bus or train at 11.30pm or midnight, are now staying later and using the after-midnight services.

D6 Elasticity Appraisal

As the After-Midnight services were new services, rather than improvements to an existing service, an elasticity appraisal was not possible.

D7 Performance Indicators

Service performance indicators were calculated for each of the After-Midnight services for four situations:

- Actual change,
- After trend adjustment, but no abstraction,
- After trend adjustment plus our best estimate of abstraction,
- After trend adjustment plus our estimate of plausible maximum abstraction.

The results are shown in the attached Summary Sheets. The Patronage Trips/Service Trips performance indicator has been calculated, but it has not been reported to preserve patronage confidentiality.

After Midnight Wellington: Weekend — Summary Sheet

Service Start Date 15 May 1999
Average Passenger Trip Length 15.48

Weekend	Weekend Ave 3 mth	After 6 mth	After 12 mth
		Percentage Change	
Service Trips		0.0%	0.0%
Service Km		0.0%	0.0%
Pass Trips		45.6%	126.7%
Pass Km		45.6%	126.7%
Gross Cost		0.0%	0.0%
Revenue		51.4%	156.1%
Net Cost		-35.2%	-106.7%
Trend Factor		0.8%	1.4%
Abstraction Factor - Best Estimate	5.0%	5.0%	5.0%
- Plausible Max	10.0%	10.0%	10.0%
After Trend & Abstraction(zero/best/max)		0.0%	0.0%
Pass Trips - after trend & zero Ab		44.5%	123.5%
- after trend & best Ab		44.5%	123.5%
- after trend & max Ab		44.5%	123.5%
Pass Km - after trend & zero Ab		44.5%	123.5%
- after trend & best Ab		44.5%	123.5%
- after trend & max Ab		44.5%	123.5%
Revenue - after trend & zero Ab		50.2%	152.4%
- after trend & best Ab		50.2%	152.4%
- after trend & max Ab		50.2%	152.4%
Net Cost - after trend & zero Ab		-34.3%	-104.2%
- after trend & best Ab		-31.5%	-95.7%
- after trend & max Ab		-28.9%	-87.8%
Performance Indicators - Actual (ie before Trend Adjustment & Abstraction)			
Subsidy/pass trip	3.90	1.74	-0.12
Subsidy/pass km	0.25	0.11	-0.01
Cost Recovery	41%	61%	104%
Pass Trips/ Service Trips			
Pass Trips/ Km	0.42	0.60	0.94
Pass Km/ Km	6.43	9.36	14.57
Gross Cost / Pass Trips	6.57	4.51	2.90
Gross Cost / Pass Km	0.42	0.29	0.19
Gross Cost / Veh Km	2.73	2.73	2.73
Net Cost / Veh Km	1.62	1.05	-0.11
Arc Elasticity			
Point Elasticity			
Performance Indicators - After Trend Adjustment & Abstraction = 0			
Subsidy/pass trip	3.90	1.77	-0.07
Subsidy/pass km	0.25	0.11	0.00
Cost Recovery	41%	61%	103%
Pass Trips/ Service Trips			
Pass Trips/ Km	0.42	0.60	0.93
Pass Km/ Km	6.43	9.29	14.37
Rev : Gross Cost	0.41	0.61	1.03
Gross Cost / Pass Km	0.42	0.29	0.19
Gross Cost / Veh Km	2.73	2.73	2.73
Net Cost / Veh Km	1.62	1.06	-0.07
Arc Elasticity			
Point Elasticity			
Performance Indicators - After Trend Adjustment & Best Estimate Abstraction			
Subsidy/pass trip	4.25	2.01	0.08
Subsidy/pass km	0.27	0.13	0.01
Cost Recovery	39%	58%	97%
Pass Trips/ Service Trips			
Pass Trips/ Km	0.39	0.57	0.88
Pass Km/ Km	6.11	8.82	13.65
Gross Cost / Pass Trips	6.91	4.78	3.09
Gross Cost / Pass Km	0.45	0.31	0.20
Gross Cost / Veh Km	2.73	2.73	2.73
Net Cost / Veh Km	1.67	1.15	0.07
Arc Elasticity			
Point Elasticity			
Performance Indicators - After Trend Adjustment & Plausible Max Abstraction			
Subsidy/pass trip	4.63	2.28	0.25
Subsidy/pass km	0.30	0.15	0.02
Cost Recovery	37%	55%	92%
Pass Trips/ Service Trips			
Pass Trips/ Km	0.37	0.54	0.84
Pass Km/ Km	5.79	8.36	12.93
Gross Cost / Pass Trips	7.30	5.05	3.26
Gross Cost / Pass Km	0.47	0.33	0.21
Gross Cost / Veh Km	2.73	2.73	2.73
Net Cost / Veh Km	1.73	1.23	0.21
Arc Elasticity			
Point Elasticity			

After Midnight Porirua: Weekend **Summary Sheet**

Service Start Date 13 May 2000
Average Passenger Trip Length 24.20

Weekend	**Weekend**		
	Percentage Change		
	3 mth	**6 mth**	**11 mth**
Service Trips		0.0%	0.0%
Service Km		0.0%	0.0%
Pass Trips		-1.4%	16.8%
Pass Km		-1.4%	16.8%
Gross Cost		0.0%	-4.0%
Revenue		0.0%	0.0%
Net Cost		0.0%	-9.0%
Trend Factor		1.2%	0.0%
Abstraction Factor - Best Estimate	5.0%	5.0%	5.0%
- Plausible Max	10.0%	10.0%	10.0%
After Trend & Abstraction(zero/best/max)			
Pass Trips - after trend & zero Ab		-2.6%	16.8%
- after trend & best Ab		-2.6%	16.8%
- after trend & max Ab		-2.6%	16.8%
Pass Km - after trend & zero Ab		-2.6%	16.8%
- after trend & best Ab		-2.6%	16.8%
- after trend & max Ab		-2.6%	16.8%
Revenue - after trend & zero Ab		-1.2%	0.0%
- after trend & best Ab		-1.2%	0.0%
- after trend & max Ab		-1.2%	0.0%
Net Cost - after trend & zero Ab		1.4%	-9.0%
- after trend & best Ab		1.3%	-8.5%
- after trend & max Ab		1.2%	-8.0%
Performance Indicators - Actual (ie before Trend Adjustment & Abstraction)			
Subsidy/pass trip	3.54	3.59	2.75
Subsidy/pass km	0.15	0.15	0.11
Cost Recovery	55%	55%	58%
Pass Trips/ Service Trips			
Pass Trips/ Km	0.28	0.28	0.33
Pass Km/ Km	6.82	6.72	7.96
Gross Cost / Pass Trips	7.94	8.06	6.52
Gross Cost / Pass Km	0.33	0.33	0.27
Gross Cost / Veh Km	2.24	2.24	2.15
Net Cost / Veh Km	1.00	1.00	0.91
Arc Elasticity	0.00	0.00	0.00
Performance Indicators - After Trend Adjustment & Abstraction = 0			
Subsidy/pass trip	3.54	3.68	2.75
Subsidy/pass km	0.15	0.15	0.11
Cost Recovery	55%	55%	58%
Pass Trips/ Service Trips			
Pass Trips/ Km	0.28	0.27	0.33
Pass Km/ Km	6.82	6.64	7.96
Gross Cost / Pass Trips	7.94	8.15	6.52
Gross Cost / Pass Km	0.33	0.34	0.27
Gross Cost / Veh Km	2.24	2.24	2.15
Net Cost / Veh Km	1.00	1.01	0.91
Arc Elasticity			
Performance Indicators - After Trend Adjustment & Best Estimate Abstraction			
Subsidy/pass trip	3.95	4.11	3.10
Subsidy/pass km	0.16	0.17	0.13
Cost Recovery	53%	52%	55%
Pass Trips/ Service Trips			
Pass Trips/ Km	0.27	0.26	0.31
Pass Km/ Km	6.48	6.31	7.57
Gross Cost / Pass Trips	8.36	8.58	6.87
Gross Cost / Pass Km	0.35	0.35	0.28
Gross Cost / Veh Km	2.24	2.24	2.15
Net Cost / Veh Km	1.06	1.07	0.97
Arc Elasticity			
Performance Indicators - After Trend Adjustment & Plausible Max Abstraction			
Subsidy/pass trip	4.42	4.59	3.48
Subsidy/pass km	0.18	0.19	0.14
Cost Recovery	50%	49%	52%
Pass Trips/ Service Trips			
Pass Trips/ Km	0.25	0.25	0.30
Pass Km/ Km	6.13	5.98	7.17
Gross Cost / Pass Trips	8.82	9.06	7.25
Gross Cost / Pass Km	0.36	0.37	0.30
Gross Cost / Veh Km	2.24	2.24	2.15
Net Cost / Veh Km	1.12	1.13	1.03
Arc Elasticity			

After Midnight Hutt Valley: Weekend **Summary Sheet**

Service Start Date 13 May 2000
Average Passenger Trip Length 18.45

Weekend	**Weekend**			
		Percentage Change		
		3 mth	**6 mth**	**12 mth**
Service Trips			0.0%	0.0%
Service Km			0.0%	0.0%
Pass Trips			65.6%	29.4%
Pass Km			65.6%	29.4%
Gross Cost			0.0%	0.0%
Revenue			8.2%	35.2%
Net Cost			-12.1%	-51.6%
Trend Factor			1.2%	0.0%
Abstraction Factor - Best Estimate		5.0%	5.0%	5.0%
	- Plausible Max	10.0%	10.0%	10.0%
After Trend & Abstraction(zero/best/max)				
Pass Trips	- after trend & zero Ab		63.7%	29.4%
	- after trend & best Ab		63.7%	29.4%
	- after trend & max Ab		63.7%	29.4%
Pass Km	- after trend & zero Ab		63.7%	29.4%
	- after trend & best Ab		63.7%	29.4%
	- after trend & max Ab		63.7%	29.4%
Revenue	- after trend & zero Ab		7.0%	35.2%
	- after trend & best Ab		7.0%	35.2%
	- after trend & max Ab		7.0%	35.2%
Net Cost	- after trend & zero Ab		-10.2%	-51.6%
	- after trend & best Ab		-9.1%	-45.7%
	- after trend & max Ab		-8.0%	-40.5%
Performance Indicators - Actual (ie before Trend Adjustment & Abstraction)				
Subsidy/pass trip		3.06	1.63	1.14
Subsidy/pass km		0.17	0.09	0.06
Cost Recovery		59%	64%	80%
Pass Trips/ Service Trips				
Pass Trips/ Km		0.33	0.55	0.43
Pass Km/ Km		6.17	10.21	7.98
Gross Cost / Pass Trips		7.55	4.56	5.83
Gross Cost / Pass Km		0.41	0.25	0.32
Gross Cost / Veh Km		2.52	2.52	2.52
Net Cost / Veh Km		1.02	0.90	0.49
Arc Elasticity		0.00	0.00	0.00
Performance Indicators - After Trend Adjustment & Abstraction = 0				
Subsidy/pass trip		3.06	1.68	1.14
Subsidy/pass km		0.17	0.09	0.06
Cost Recovery		59%	64%	80%
Pass Trips/ Service Trips				
Pass Trips/ Km		0.33	0.55	0.43
Pass Km/ Km		6.17	10.09	7.98
Gross Cost / Pass Trips		7.55	4.61	5.83
Gross Cost / Pass Km		0.41	0.25	0.32
Gross Cost / Veh Km		2.52	2.52	2.52
Net Cost / Veh Km		1.02	0.92	0.49
Point Elasticity				
Performance Indicators - After Trend Adjustment & Best Estimate Abstraction				
Subsidy/pass trip		3.46	1.92	1.45
Subsidy/pass km		0.19	0.10	0.08
Cost Recovery		56%	60%	76%
Pass Trips/ Service Trips				
Pass Trips/ Km		0.32	0.52	0.41
Pass Km/ Km		5.86	9.59	7.58
Gross Cost / Pass Trips		7.94	4.85	6.14
Gross Cost / Pass Km		0.43	0.26	0.33
Gross Cost / Veh Km		2.52	2.52	2.52
Net Cost / Veh Km		1.10	1.00	0.60
Point Elasticity				
Performance Indicators - After Trend Adjustment & Plausible Max Abstraction				
Subsidy/pass trip		3.90	2.19	1.79
Subsidy/pass km		0.21	0.12	0.10
Cost Recovery		53%	57%	72%
Pass Trips/ Service Trips				
Pass Trips/ Km		0.30	0.49	0.39
Pass Km/ Km		5.55	9.08	7.18
Gross Cost / Pass Trips		8.39	5.12	6.48
Gross Cost / Pass Km		0.45	0.28	0.35
Gross Cost / Veh Km		2.52	2.52	2.52
Net Cost / Veh Km		1.17	1.08	0.70
Point Elasticity				

After MidnightJohnsonville: Weekend **Summary Sheet**

Service Start Date 22 July 2000
Average Passenger Trip Length 18.45

Weekend	**Weekend**			
		Percentage Change		
	3 mth	**6 mth**	**9 mth**	
Service Trips		0.0%	0.0%	
Service Km		0.0%	0.0%	
Pass Trips		43.7%	60.0%	
Pass Km		43.7%	60.0%	
Gross Cost		0.0%	0.0%	
Revenue		39.4%	55.3%	
Net Cost		-27.1%	-38.0%	
Trend Factor		1.5%		
Abstraction Factor - Best Estimate	5.0%	5.0%	5.0%	
- Plausible Max	10.0%	10.0%	10.0%	
After Trend & Abstraction(zero/best/max)				
Pass Trips - after trend & zero Ab		41.5%	60.0%	
- after trend & best Ab		41.5%	60.0%	
- after trend & max Ab		41.5%	60.0%	
Pass Km - after trend & zero Ab		41.5%	60.0%	
- after trend & best Ab		41.5%	60.0%	
- after trend & max Ab		41.5%	60.0%	
Revenue - after trend & zero Ab		37.3%	55.3%	
- after trend & best Ab		37.3%	55.3%	
- after trend & max Ab		37.3%	55.3%	
Net Cost - after trend & zero Ab		-25.6%	-38.0%	
- after trend & best Ab		-23.5%	-34.9%	
- after trend & max Ab		-21.5%	-32.0%	
Performance Indicators - Actual (ie before Trend Adjustment & Abstraction)				
Subsidy/pass trip	4.67	2.37	1.81	
Subsidy/pass km	0.25	0.13	0.10	
Cost Recovery	41%	57%	63%	
Δ Pass Trips/ Δ Service Trips				
Δ Pass Trips/ Δ Km	0.35	0.50	0.56	
Δ Pass Km/ Δ Km	6.47	9.30	10.35	
Δ Gross Cost / Δ Pass Trips	7.88	5.48	4.92	
Δ Gross Cost / Δ Pass Km	0.43	0.30	0.27	
Δ Gross Cost / Δ Veh Km	2.76	2.76	2.76	
Δ Net Cost / Δ Veh Km	1.64	1.19	1.02	
Arc Elasticity				
Performance Indicators - After Trend Adjustment & Abstraction = 0				
Subsidy/pass trip	4.67	2.46	1.81	
Subsidy/pass km	0.25	0.13	0.10	
Cost Recovery	41%	56%	63%	
Δ Pass Trips/ Δ Service Trips				
Δ Pass Trips/ Δ Km	0.35	0.50	0.56	
Δ Pass Km/ Δ Km	6.47	9.15	10.35	
Δ Gross Cost / Δ Pass Trips	7.88	5.57	4.92	
Δ Gross Cost / Δ Pass Km	0.43	0.30	0.27	
Δ Gross Cost / Δ Veh Km	2.76	2.76	2.76	
Δ Net Cost / Δ Veh Km	1.64	1.22	1.02	
Point Elasticity				
Performance Indicators - After Trend Adjustment & Best Estimate Abstraction				
Subsidy/pass trip	5.08	2.75	2.07	
Subsidy/pass km	0.28	0.15	0.11	
Cost Recovery	39%	53%	60%	
Δ Pass Trips/ Δ Service Trips				
Δ Pass Trips/ Δ Km	0.33	0.47	0.53	
Δ Pass Km/ Δ Km	6.15	8.69	9.84	
Δ Gross Cost / Δ Pass Trips	8.29	5.86	5.18	
Δ Gross Cost / Δ Pass Km	0.45	0.32	0.28	
Δ Gross Cost / Δ Veh Km	2.76	2.76	2.76	
Δ Net Cost / Δ Veh Km	1.69	1.30	1.10	
Point Elasticity				
Performance Indicators - After Trend Adjustment & Plausible Max Abstraction				
Subsidy/pass trip	5.55	3.07	2.36	
Subsidy/pass km	0.30	0.17	0.13	
Cost Recovery	37%	50%	57%	
Δ Pass Trips/ Δ Service Trips				
Δ Pass Trips/ Δ Km	0.32	0.45	0.51	
Δ Pass Km/ Δ Km	5.82	8.24	9.32	
Δ Gross Cost / Δ Pass Trips	8.75	6.19	5.47	
Δ Gross Cost / Δ Pass Km	0.47	0.34	0.30	
Δ Gross Cost / Δ Veh Km	2.76	2.76	2.76	
Δ Net Cost / Δ Veh Km	1.75	1.37	1.19	
Point Elasticity				

After Midnight Kapiti: Weekend **Summary Sheet**

Service Start Date 10 October 2000
Average Passenger Trip Length 35

Weekend	**Weekend**		
		Percentage Change	
		3 mth	**6 mth**
Service Trips			0.0%
Service Km			0.0%
Pass Trips			30.9%
Pass Km			30.9%
Gross Cost			0.0%
Revenue			23.0%
Net Cost			-4.5%
Trend Factor			
Abstraction Factor - Best Estimate		5.0%	5.0%
- Plausible Max		10.0%	10.0%
After Trend & Abstraction(zero/best/max)			
Pass Trips - after trend & zero Ab			30.9%
- after trend & best Ab			30.9%
- after trend & max Ab			30.9%
Pass Km - after trend & zero Ab			30.9%
- after trend & best Ab			30.9%
- after trend & max Ab			30.9%
Revenue - after trend & zero Ab			23.0%
- after trend & best Ab			23.0%
- after trend & max Ab			23.0%
Net Cost - after trend & zero Ab			-4.5%
- after trend & best Ab			-4.3%
- after trend & max Ab			-4.0%
Performance Indicators - Actual (ie before Trend Adjustment & Abstraction)			
Subsidy/pass trip		37.52	27.37
Subsidy/pass km		1.07	0.78
Cost Recovery		16%	20%
Pass Trips/ Service Trips			
Pass Trips/ Km		0.07	0.09
Pass Km/ Km		2.33	3.05
Gross Cost / Pass Trips		44.90	34.30
Gross Cost / Pass Km		1.28	0.98
Gross Cost / Veh Km		2.99	2.99
Net Cost / Veh Km		2.50	2.39
Arc Elasticity		0.00	0.00
Performance Indicators - After Trend Adjustment & Abstraction = 0			
Subsidy/pass trip		37.52	27.37
Subsidy/pass km		1.07	0.78
Cost Recovery		16%	20%
Pass Trips/ Service Trips			
Pass Trips/ Km		0.07	0.09
Pass Km/ Km		2.33	3.05
Gross Cost / Pass Trips		44.90	34.30
Gross Cost / Pass Km		1.28	0.98
Gross Cost / Veh Km		2.99	2.99
Net Cost / Veh Km		2.50	2.39
Point Elasticity			
Performance Indicators - After Trend Adjustment & Best Estimate Abstraction			
Subsidy/pass trip		39.89	29.17
Subsidy/pass km		1.14	0.83
Cost Recovery		16%	19%
Pass Trips/ Service Trips			
Pass Trips/ Km		0.06	0.08
Pass Km/ Km		2.22	2.90
Gross Cost / Pass Trips		47.26	36.10
Gross Cost / Pass Km		1.35	1.03
Gross Cost / Veh Km		2.99	2.99
Net Cost / Veh Km		2.53	2.42
Point Elasticity			
Performance Indicators - After Trend Adjustment & Plausible Max Abstraction			
Subsidy/pass trip		42.51	31.18
Subsidy/pass km		1.21	0.89
Cost Recovery		15%	18%
Pass Trips/ Service Trips			
Pass Trips/ Km		0.06	0.08
Pass Km/ Km		2.10	2.75
Gross Cost / Pass Trips		49.89	38.11
Gross Cost / Pass Km		1.43	1.09
Gross Cost / Veh Km		2.99	2.99
Net Cost / Veh Km		2.55	2.45
Point Elasticity			

Figure D1 Wgtn City - Monthly Patronage (indexed)
Average weekend

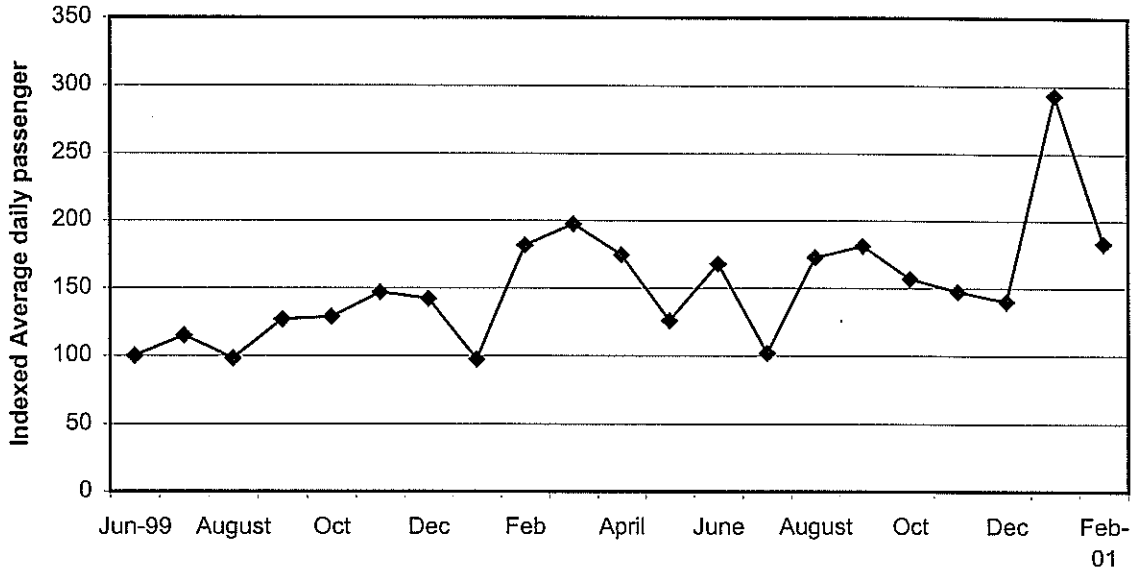


Figure D2 Porirua service weekend Patronage (Indexed)

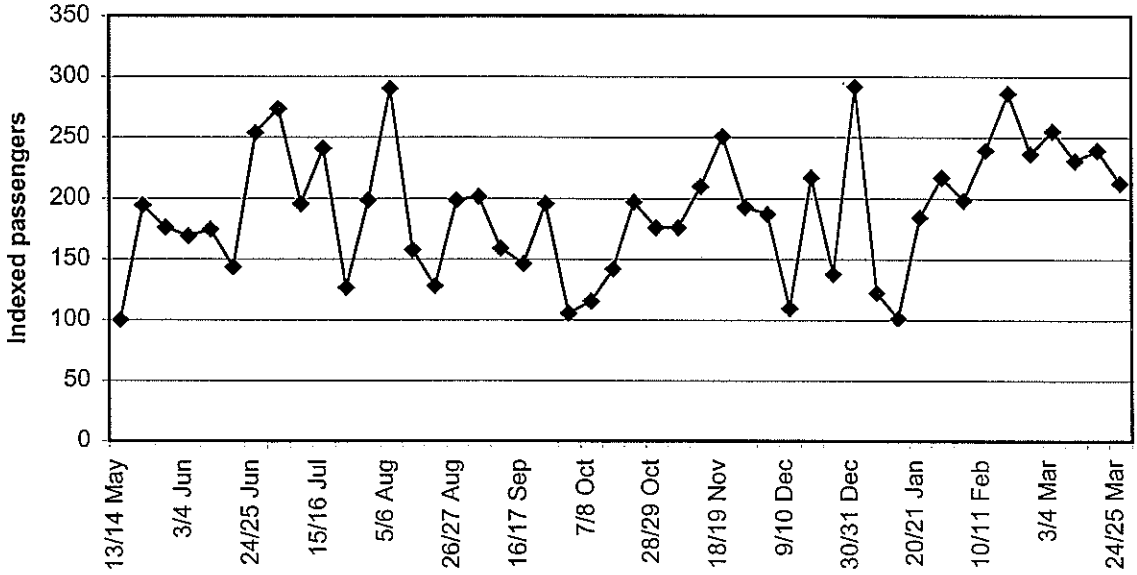


Figure D3 Hutt Valley Service weekend Patronage (Indexed)

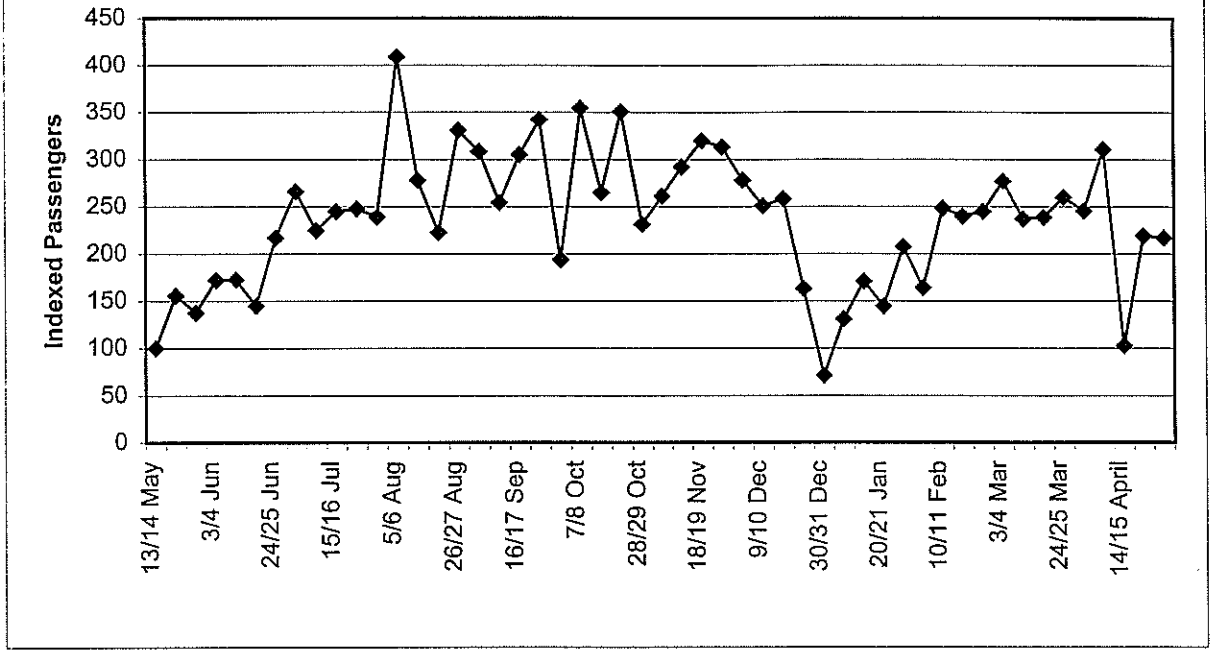
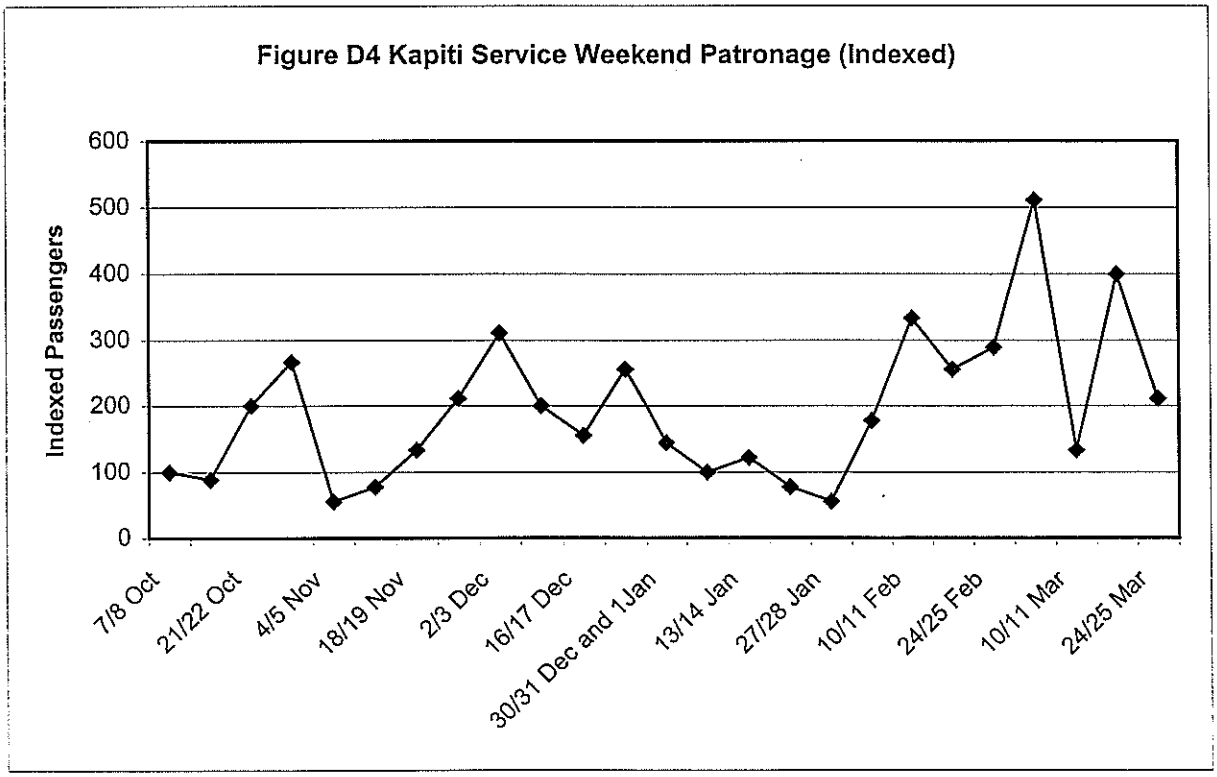


Figure D4 Kapiti Service Weekend Patronage (Indexed)



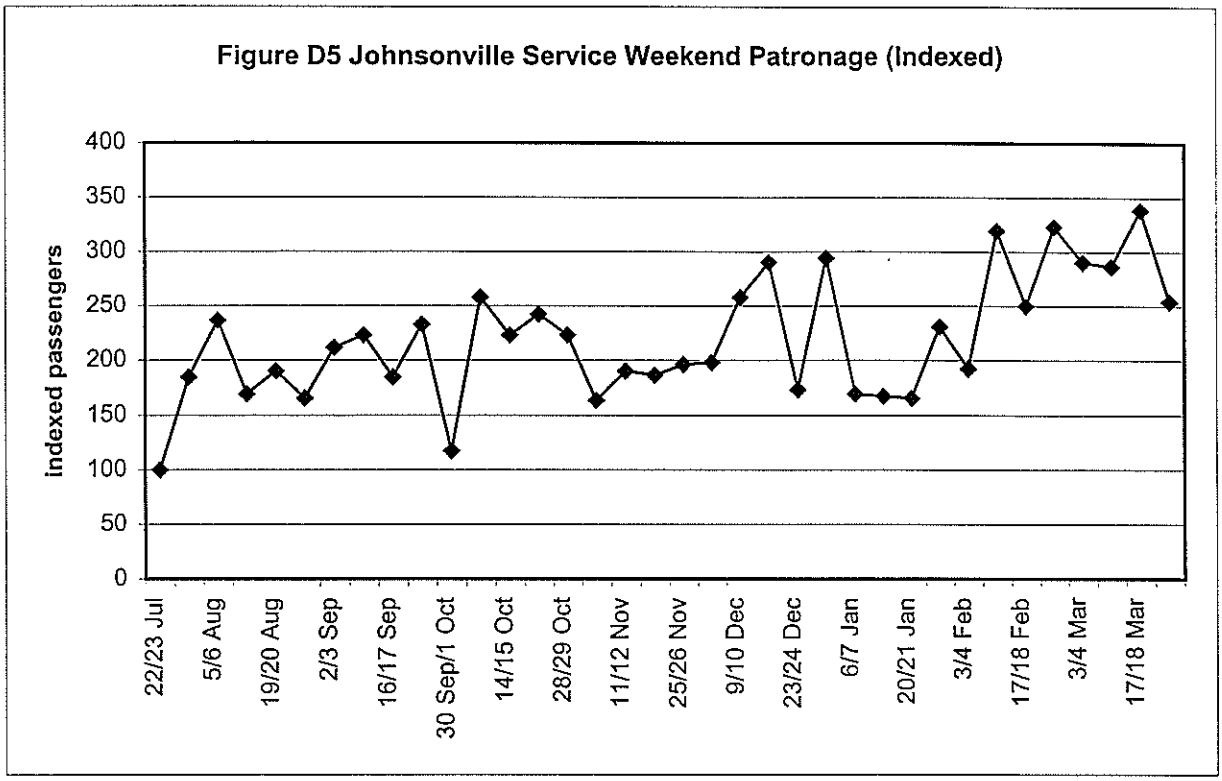
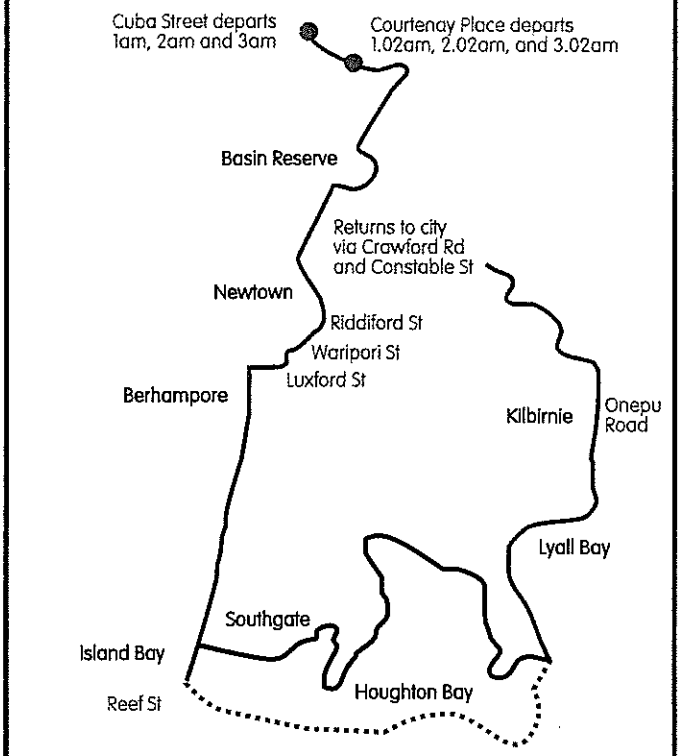


Figure D5 Johnsonville Service Weekend Patronage (Indexed)
indexed passengers
400
350
300
250
200
150
100
50
0
22/23 Jul
5/6 Aug
19/20 Aug
2/3 Sep
16/17 Sep
30 Sep/1 Oct
14/15 Oct
28/29 Oct
11/12 Nov
25/26 Nov
9/10 Dec
23/24 Dec
6/7 Jan
20/21 Jan
3/4 Feb
17/18 Feb
3/4 Mar
17/18 Mar

N1 ISLAND BAY / LYALL BAY

STANDARD ROUTE
THIS PART OF ROUTE AVAILABLE ON REQUEST

OPERATED BY STAGECOACH WELLINGTON

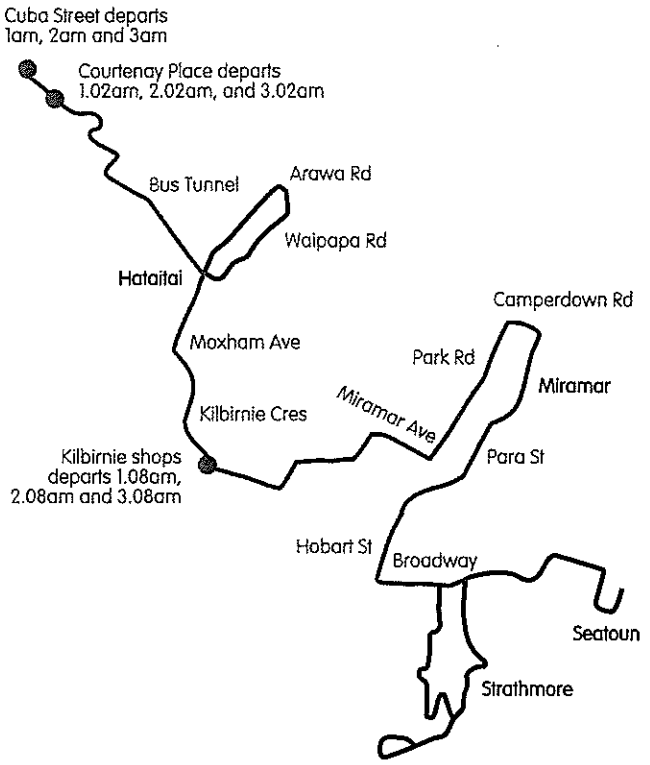


NOTE: ..... This bus will run via The Esplanade if there are no passengers for Southgate/Houghton Bay

N2 HATAITAI/MIRAMAR/STRATHMORE/SEATOUN

STANDARD ROUTE
THIS PART OF ROUTE AVAILABLE ON REQUEST

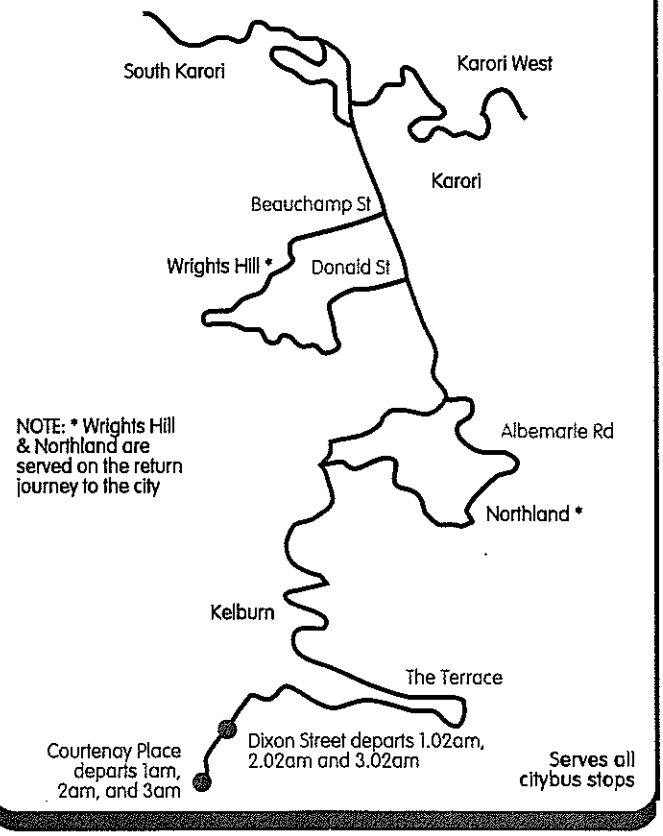
OPERATED BY STAGECOACH WELLINGTON



N3 KARORI / NORTHLAND

STANDARD ROUTE
THIS PART OF ROUTE AVAILABLE ON REQUEST

OPERATED BY STAGECOACH WELLINGTON



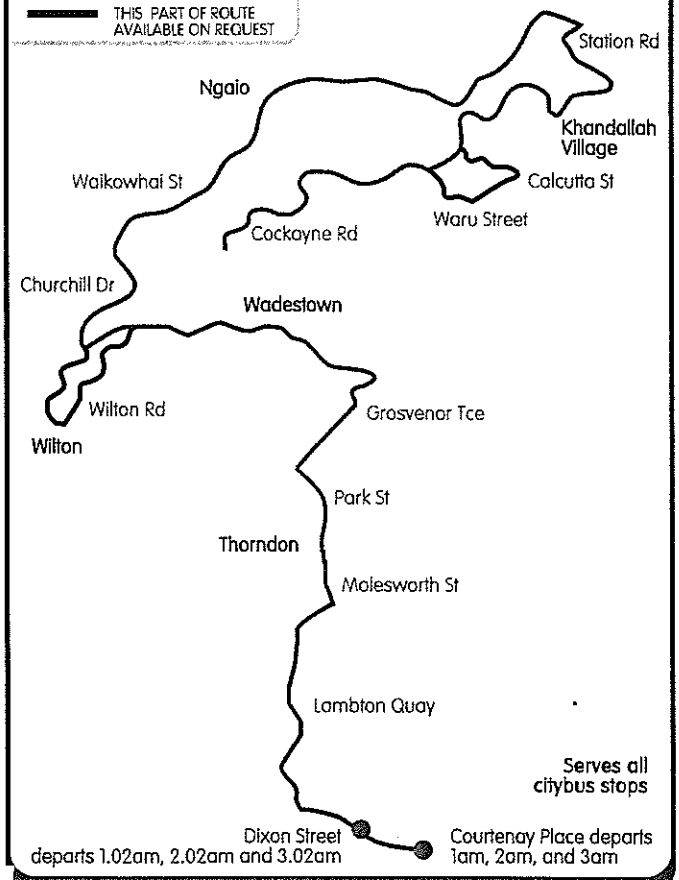
NOTE: * Wrights Hill & Northland are served on the return journey to the city

Serves all citybus stops

N4 WADESTOWN / KHANDALLAH

STANDARD ROUTE
THIS PART OF ROUTE AVAILABLE ON REQUEST

OPERATED BY STAGECOACH WELLINGTON

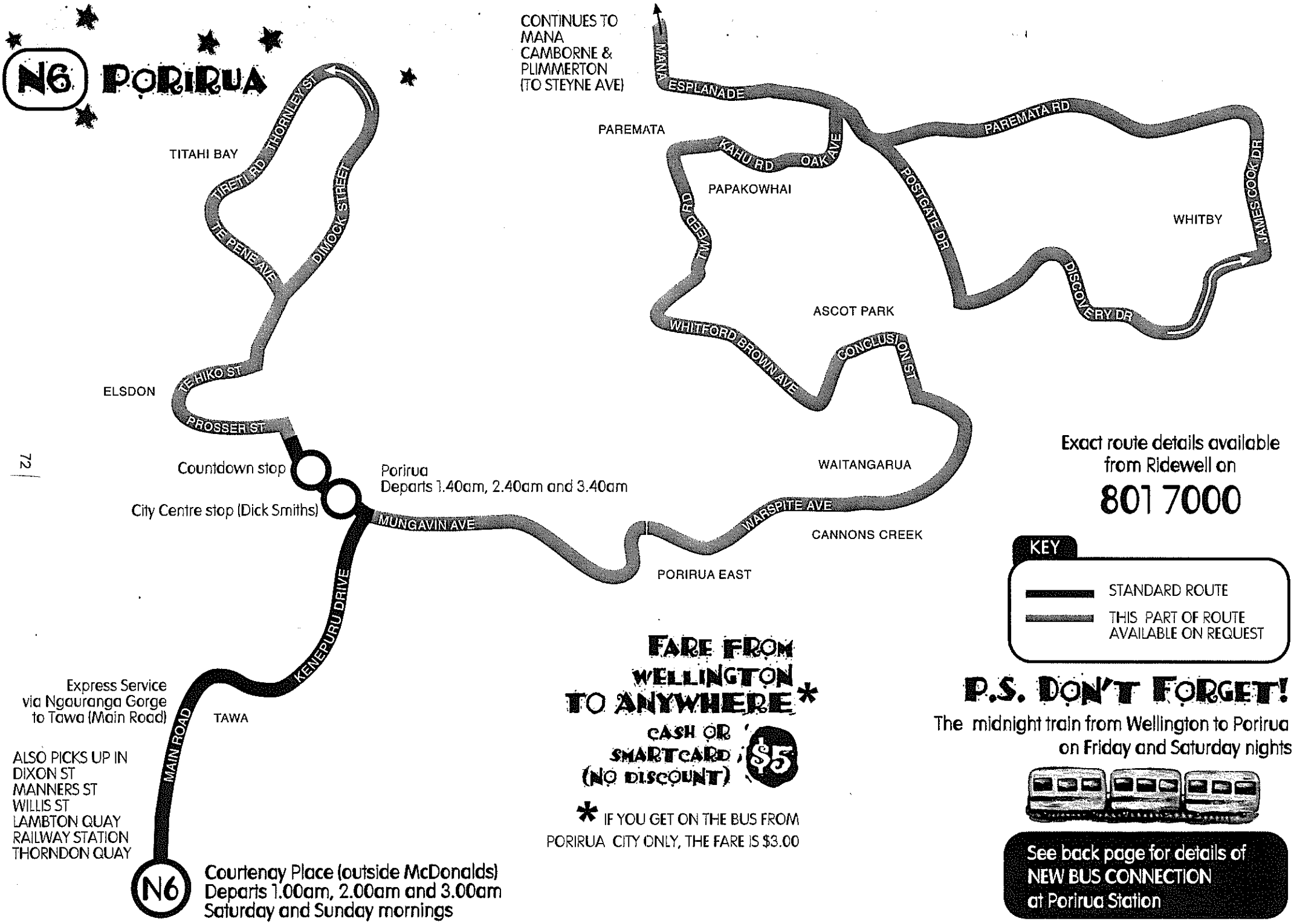


Serves all citybus stops

FARE $3.50 CASH FOR ALL JOURNEYS

FARE $3.50 CASH FOR ALL JOURNEYS

N6 PORIRUA



FARE FROM WELLINGTON TO ANYWHERE*

CASH OR SMARTCARD $5
(NO DISCOUNT)

* IF YOU GET ON THE BUS FROM PORIRUA CITY ONLY, THE FARE IS $3.00

Exact route details available from Ridewell on

801 7000

KEY

- STANDARD ROUTE
- THIS PART OF ROUTE AVAILABLE ON REQUEST

P.S. DON'T FORGET!

The midnight train from Wellington to Porirua on Friday and Saturday nights

See back page for details of NEW BUS CONNECTION at Porirua Station

ROUTES AND TIMETABLE
SATURDAY AND SUNDAY ONLY

FARE FROM WELLINGTON* TO ANYWHERE

$5 CASH OR FARECARD (NO DISCOUNT)

NO OTHER FARES APPLY

* IF YOU GET ON THE BUS FROM QUEENSGATE ONLY, THE FARE IS $3.00

KEY

- STANDARD ROUTE
- THIS PART OF ROUTE AVAILABLE ON REQUEST
- L8 ROUTE NUMBER
- L8 RETURN JOURNEY TO WELLINGTON VIA PETONE AT 1.25am AND 2.25am

TRANSFER at Queensgate (Bunny Street) to L22, L66 and L88 buses which depart 1.25am, 2.25am and 3.25am

Bunny St, Lower Hutt (Queensgate)

Waterloo Rd

Cambridge Tce

Kowhai St

Naenae Rd

Daysh St

High St

Eastern Hutt Rd

High St

Upper Hutt Station

Fergusson Dr

L22 NAENAE STOKES VALLEY UPPER HUTT

Stokes Valley Rd (as far as Kamahi St)

Norfolk St

Wellington Rd

Wise St

Cambridge Tce

Guthrie St

Waiwhetu Rd

Wainui Rd

Wainuiomata Roundabout

L66 WAINUIOMATA

Main Rd

Hine St (as far as Sunny Grove)

Victoria St

Cuba St

Jackson St

Victoria St

Cuba St

Jackson St

Woburn Rd

Ludlam Cres

Randwick Rd

Seaview Rd

Eastern Bays Marine Drive

Muritai

Bus Depot, Muritai Rd

L88 EASTBOURNE

Molesworth St

Lambton Quay

Willis St

Manner St

Dixon St

L8 PETONE/WELLINGTON
Departs Queensgate (Bunny Street) 1.25am and 2.25am

L8 COURTENAY PLACE (outside McDonalds)
Buses depart 1am, 2am and 3am for Queensgate

N7 KAPITI COAST

OPERATES ON SATURDAY AND SUNDAY MORNINGS ONLY

N7 Paraparaumu Station to Waikanae / Paraparaumu / Raumati

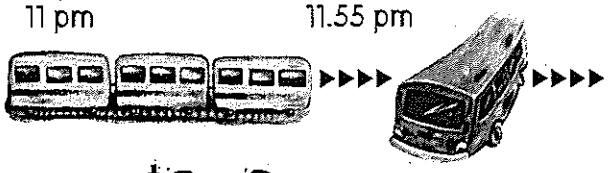
"Catch the train, then the bus..."

WELLINGTON RAILWAY STATION — PARAPARAUMU RAILWAY STATION

Train departs 11 pm

Train arrives 11.55 pm

Bus departs Paraparaumu Station 12 am



Bus fare $2.50 Cash or Smartcard

Bus Route

- Waikanae
- Waikanae Beach
- North Beach
- Paraparaumu Beach
- Raumati Beach
- Raumati South

To these areas on REQUEST - please ask your driver. Serves the same streets as the map below.

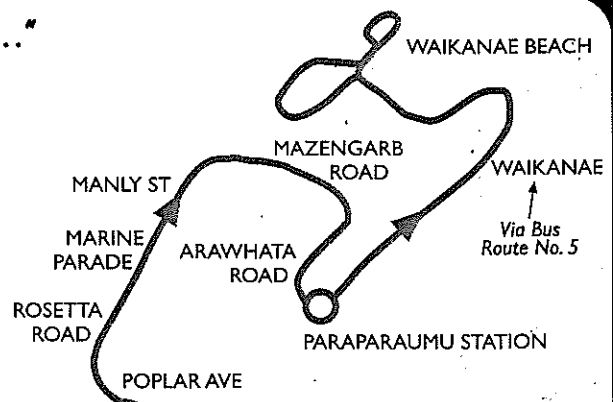
N7 Wellington to Kapiti Coast

"Take the bus all the way..."

Fares Cash or Smartcard

Wellington to Kapiti (includes Paekakariki) $10

Wellington to Mana, Plimmerton, Pukerua Bay $5



KEY

- STANDARD ROUTE
- THIS PART OF ROUTE AVAILABLE ON REQUEST

Direct route to Poplar Avenue but will drop off passengers along SH1 in Mana, Plimmerton and Pukerua Bay and drop off in Ames St / Beach Rd Paekakariki

Courtenay Place (outside McDonalds) — Bus departs 2am and also picks up in Dixon St, Manners St, Willis St, Lambton Quay, Railway Station and Thorndon Quay.

#E Campus Connection

E1 Project Description

The Campus Connection is a Wellington City crosstown bus service which runs from Karori in the west to Miramar in the east. This service was previously two separate services: the No. 18 service which ran from Karori past Victoria University and the Wellington Polytechnic to the Wellington Show Buildings in John Street; and the No. 9 service which ran from Miramar through Newtown past Wellington Hospital and Wellington Polytechnic to the city centre. The two routes were combined from February 1999 into a crosstown route which provides access to Wellington College of Education, Victoria University, Massey University (previously Wellington Polytechnic), Wellington Hospital, and Wellington Medical School. The route no longer goes to the city centre, but a high number of services from both Karori and Miramar do go to the city centre.

E2 Market Research

No user market research has been carried out for these services.

E3 Patronage Impact

The patronage pattern of the Campus Connection service is shown in Figures E1-E6, and is summarised in the attached Summary Sheet. Taking the total combined patronage of the previous routes 9 and 18 services as the previous patronage, the new route 18 (Campus Connection) service patronage decreased for the first 12 weeks (by 1%), but increased by 5% by the end of year 1, and by 10% by year 2. The initial apparent decrease in patronage may have been the result of passengers, who previously made the same journey on two buses (route 9 and then route 18, and vice-versa), were now making it on one bus. This would have reduced the number of passenger trips counted but not the actual number of passengers travelling. No data was available to determine the size of this effect.

E4 Control Route and Patronage Trend

The Wellington City bus service patronage (excluding routes 9 and 18 patronage) was used as the control route for the Campus Connection service. This showed a patronage trend of +0.7% over the first year of operation of the Campus Connection, and 2.1% over the first 2 years of operation. Applying this trend factor gives a year 1 patronage increase of 4.6%, and an 8% increase after 2 years.

E5 Impact on Other Public Transport Services

No evidence is available on the impact of the Campus Connection on other PT services. A range of 5-10% has been assumed for this impact. This assumes a certain degree of switching by people who previously took two buses (apart from routes 9 and 18) to reach the destinations on this route for whom the Campus Connection provides a more direct journey.

E6 Elasticity Appraisal

The Campus Connection involved two service improvements:

1. a frequency increase (from 235 trips to 250 trips a week for route 18); and
2. a joining of routes 18 and 9 which enabled cross-town travel, in particular, from Miramar to the universities and to teachers college. The service km elasticity values obtained reflect this joint effect, with the 2-year point elasticity of 1.28 being higher than what might be expected. (An expected range for the service km elasticity after 2 years would be 0.8 – 1.2.) Thus, combining the two routes together and facilitating cross-town travel appears to have increased (actual) patronage by 2-4%.

E7 Performance Indicators

Service performance indicators were calculated for the Campus Connection by time period (Monday to Sunday, only data available), and for four situations:

- Actual change,
- After trend adjustment, but no abstraction,
- After trend adjustment plus our best estimate of abstraction,
- After trend adjustment plus our estimate of plausible maximum abstraction.

The results are shown in the attached Summary Sheets. The Patronage Trips/Service Trips performance indicator has been calculated, but it has not been reported to preserve patronage confidentiality.

Campus Connection: Monday to Sunday **Summary Sheet**

Service Change Date 14 February 1999
Average Passenger Trip Length 5.0 5.4

Monday to Friday **Weekly**

	Percentage Change		
	12 week	52 week	98 week
Service Trips	8.5%	8.5%	8.5%
Service Km	5.8%	5.8%	5.8%
Pass Trips	-1.1%	5.3%	10.2%
Pass Km	7.0%	14.0%	19.3%
Gross Cost	5.8%	5.8%	5.8%
Revenue	-0.2%	10.2%	24.2%
Net Cost	14.8%	14.8%	14.8%
Trend Factor	-0.4%	0.7%	2.1%
Abstraction Factor - Best Estimate	5.0%	5.0%	5.0%
- Plausible Max	10.0%	10.0%	10.0%
After Trend & Abstraction(zero/best/max)			
Pass Trips - after trend & zero Ab	-0.7%	4.6%	7.9%
- after trend & best Ab	-0.7%	4.3%	7.5%
- after trend & max Ab	-0.7%	4.1%	7.1%
Pass Km - after trend & zero Ab	7.5%	13.2%	16.8%
- after trend & best Ab	7.5%	13.0%	16.4%
- after trend & max Ab	7.6%	12.7%	15.9%
Revenue - after trend & zero Ab	0.2%	9.5%	21.6%
- after trend & best Ab	0.2%	9.0%	20.5%
- after trend & max Ab	0.2%	8.5%	19.5%
Net Cost - after trend & zero Ab	21.7%	-4.6%	-39.1%
- after trend & best Ab	21.7%	-3.3%	-36.0%
- after trend & max Ab	21.8%	-1.9%	-33.0%
Performance of Service - Actual (ie before Trend Adjustment & Abstraction)			
Subsidy/pass trip	0.57	0.53	0.51
Subsidy/pass km	0.10	0.10	0.09
Cost Recovery	70%	77%	87%
Δ Pass Trips/ Δ Service Trips			
Δ Pass Trips/ Δ Km	1.91	2.03	2.13
Δ Pass Km/ Δ Km	10.34	11.01	11.52
Δ Gross Cost / Δ Pass Trips	2.01	1.89	1.80
Δ Gross Cost / Δ Pass Km	0.37	0.35	0.33
Δ Gross Cost / Δ Veh Km	3.84	3.84	3.84
Δ Net Cost / Δ Veh Km	1.09	1.09	1.09
Arc Elasticity	-0.20	0.92	1.75
Point Elasticity	-0.20	0.92	1.72
Incremental Impact - After Trend Adjustment & Abstraction = 0			
Subsidy/pass trip	-14.34	-0.49	-2.43
Subsidy/pass km	0.28	-0.03	-0.23
Cost Recovery	2%	121%	276%
Δ Pass Trips/ Δ Service Trips			
Δ Pass Trips/ Δ Km	-0.26	1.61	2.77
Δ Pass Km/ Δ Km	13.18	23.30	29.61
Δ Gross Cost / Δ Pass Trips	-15.44	2.51	0.13
Δ Gross Cost / Δ Pass Km	0.29	0.16	0.13
Δ Gross Cost / Δ Veh Km	3.84	3.84	3.84
Δ Net Cost / Δ Veh Km	3.75	-0.79	-6.75
Arc Elasticity	-0.13	0.79	1.36
Point Elasticity	-0.13	0.79	1.34
Incremental Impact - After Trend Adjustment & Best Estimate Abstraction			
Subsidy/pass trip	-15.11	-0.37	-2.36
Subsidy/pass km	0.28	-0.02	-0.22
Cost Recovery	2%	115%	262%
Δ Pass Trips/ Δ Service Trips			
Δ Pass Trips/ Δ Km	-0.25	1.53	2.63
Δ Pass Km/ Δ Km	13.25	22.87	28.86
Δ Gross Cost / Δ Pass Trips	-15.44	2.51	1.46
Δ Gross Cost / Δ Pass Km	0.29	0.17	0.13
Δ Gross Cost / Δ Veh Km	3.84	3.84	3.84
Δ Net Cost / Δ Veh Km	3.75	-0.56	-6.22
Arc Elasticity	-0.12	0.75	1.29
Point Elasticity	-0.13	0.75	1.28
Incremental Impact - After Trend Adjustment & Plausible Max Abstraction			
Subsidy/pass trip	-15.97	-0.23	-2.28
Subsidy/pass km	0.28	-0.01	-0.20
Cost Recovery	2%	109%	248%
Δ Pass Trips/ Δ Service Trips			
Δ Pass Trips/ Δ Km	-0.24	1.45	2.49
Δ Pass Km/ Δ Km	13.32	22.43	28.11
Δ Gross Cost / Δ Pass Trips	-16.30	2.65	1.54
Δ Gross Cost / Δ Pass Km	0.29	0.17	0.14
Δ Gross Cost / Δ Veh Km	3.84	3.84	3.84
Δ Net Cost / Δ Veh Km	3.76	-0.33	-5.69
Arc Elasticity	-0.12	0.71	1.22
Point Elasticity	-0.12	0.71	1.21

Figure E1 Line 9 Bus Weekly Patronage
(Feb.1998 - Feb. 1999)

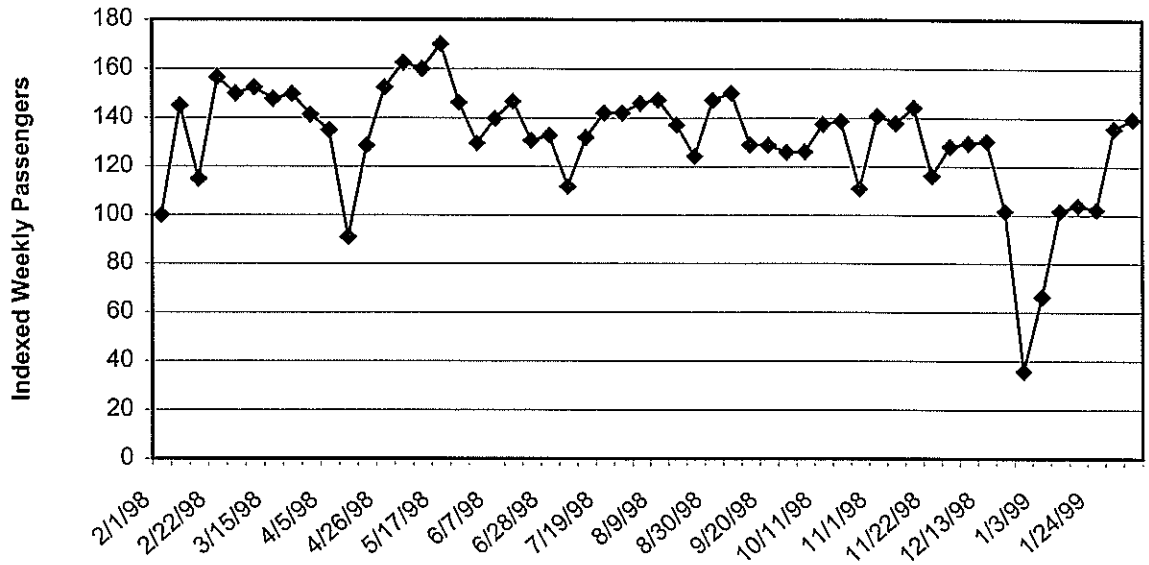


Figure E2 Line 18 Bus Weekly Patronage
(Feb.1998 - Feb. 1999)

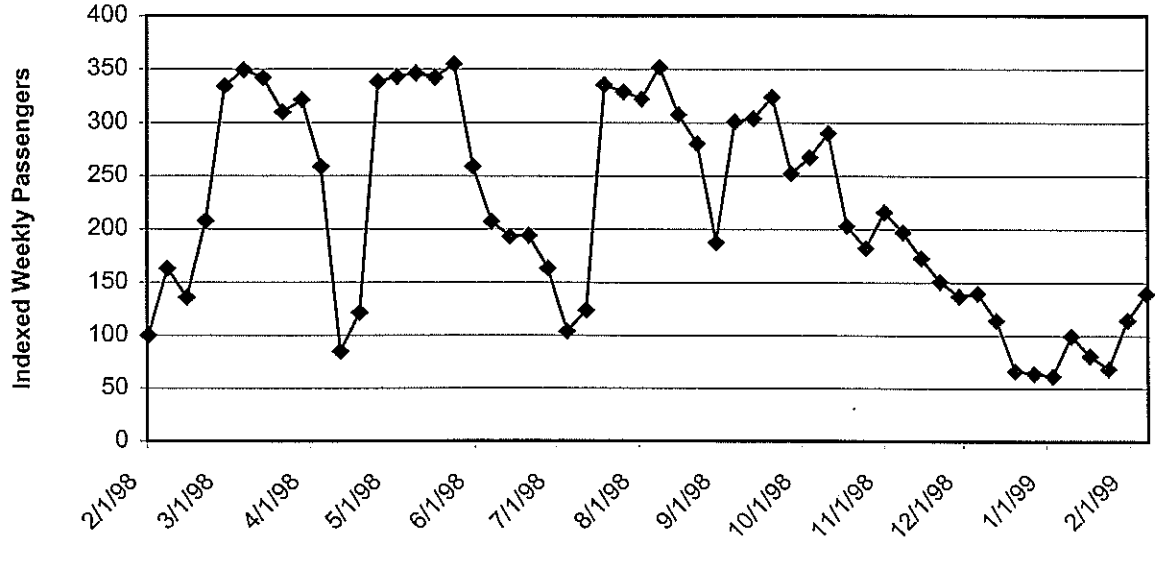


Figure E3 Combined Line 09 &18 Patronage (52 week Rolling Total)
(Jan.1999 - Jan.2001)

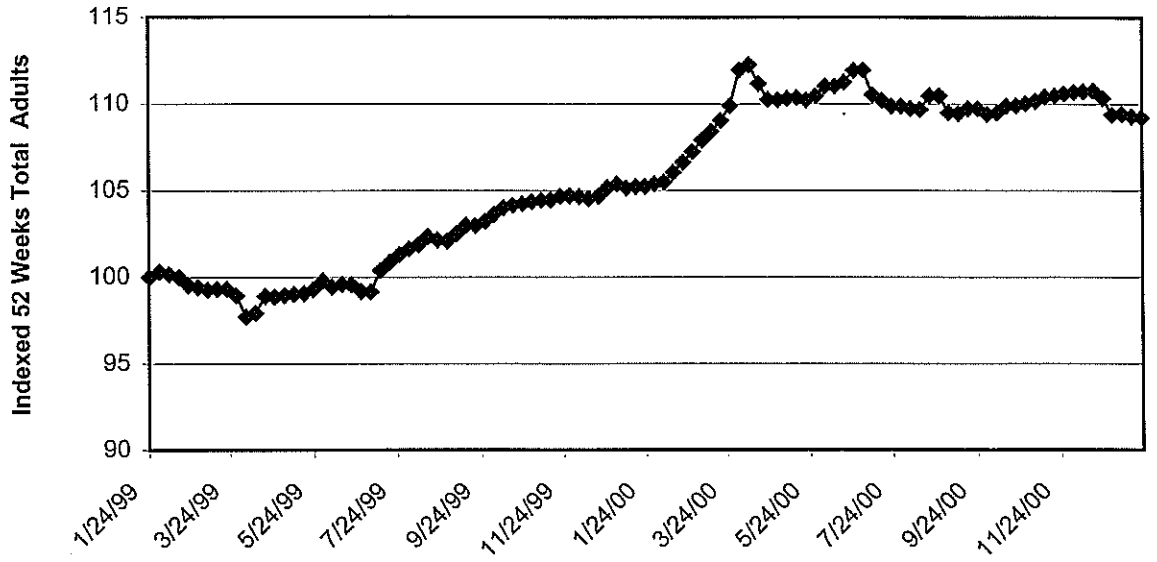


Figure E4 Combined Line 09 &18 Adult Patronage (52 week Rolling average)
(Jan.1999 - Jan.2001)

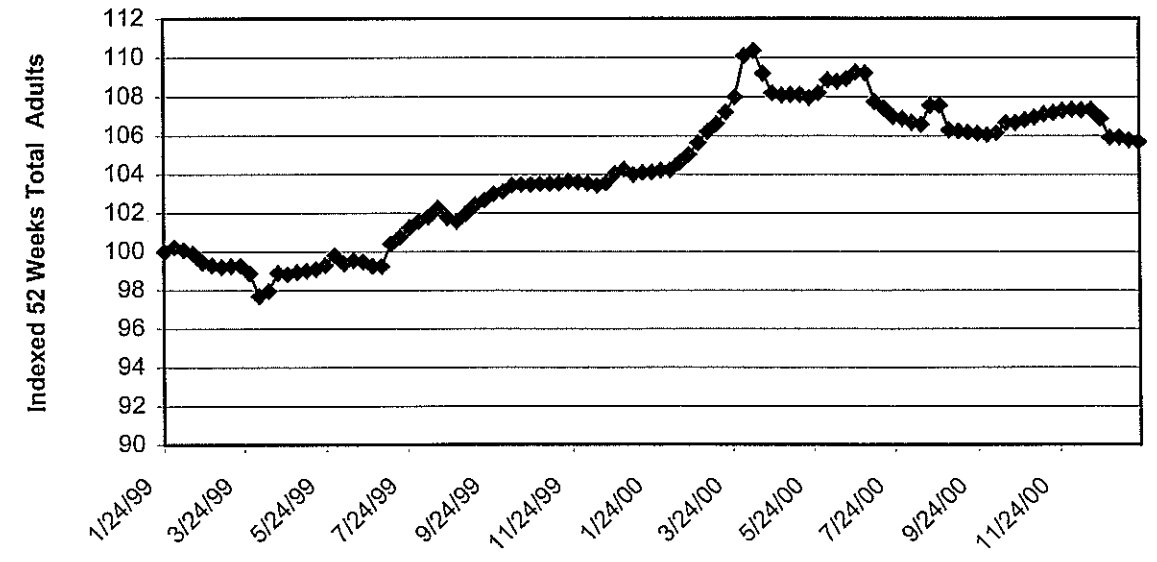


Figure E5 Combined Line 09 &18 Child Patronage (52 week Rolling Total)
(Jan.1999 - Jan.2001)

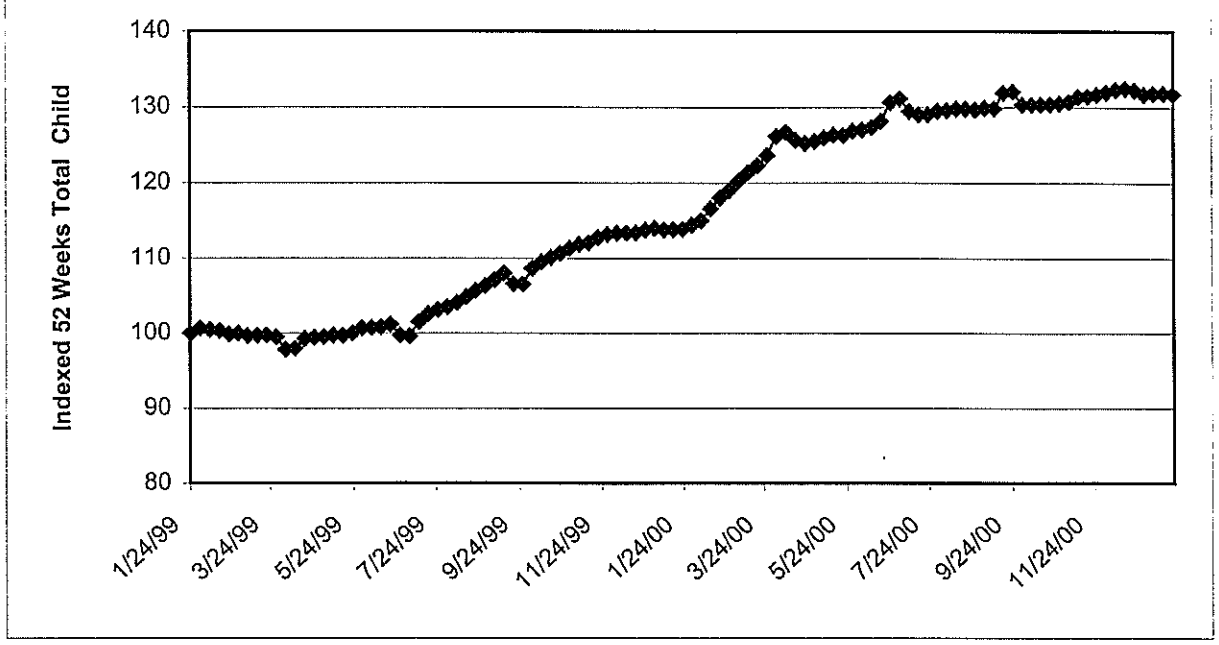
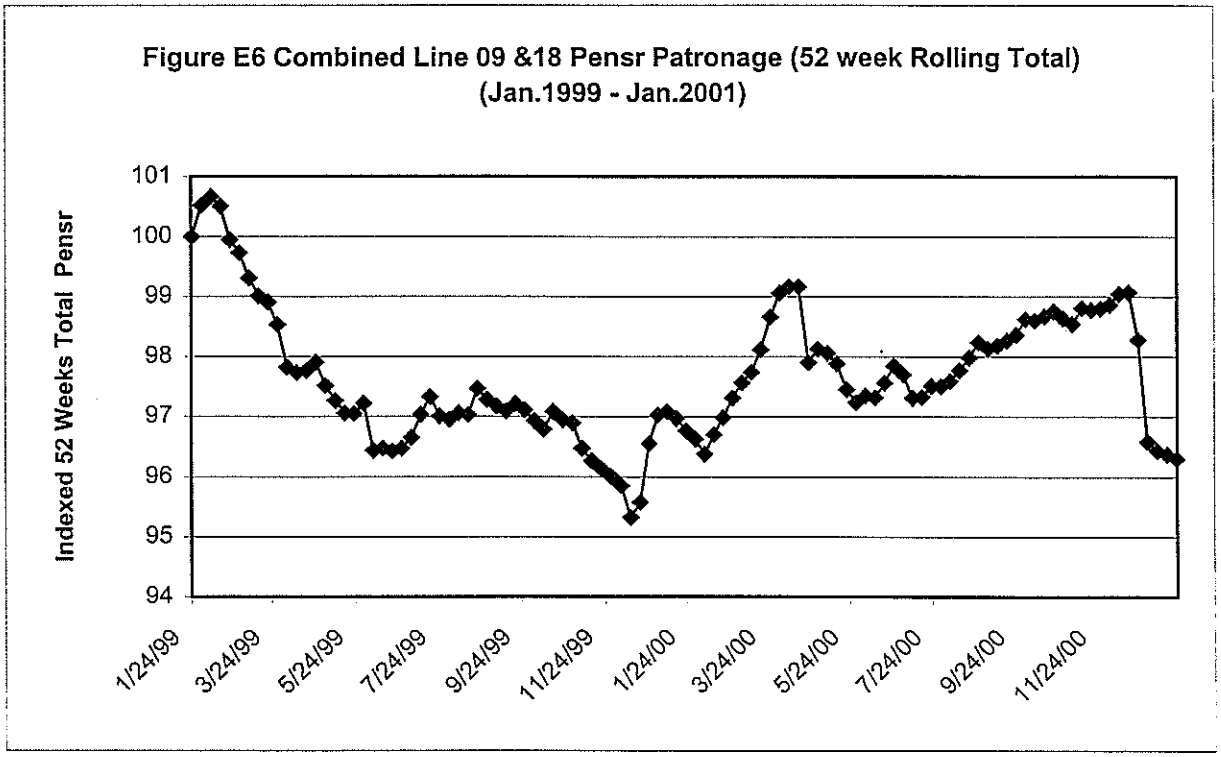
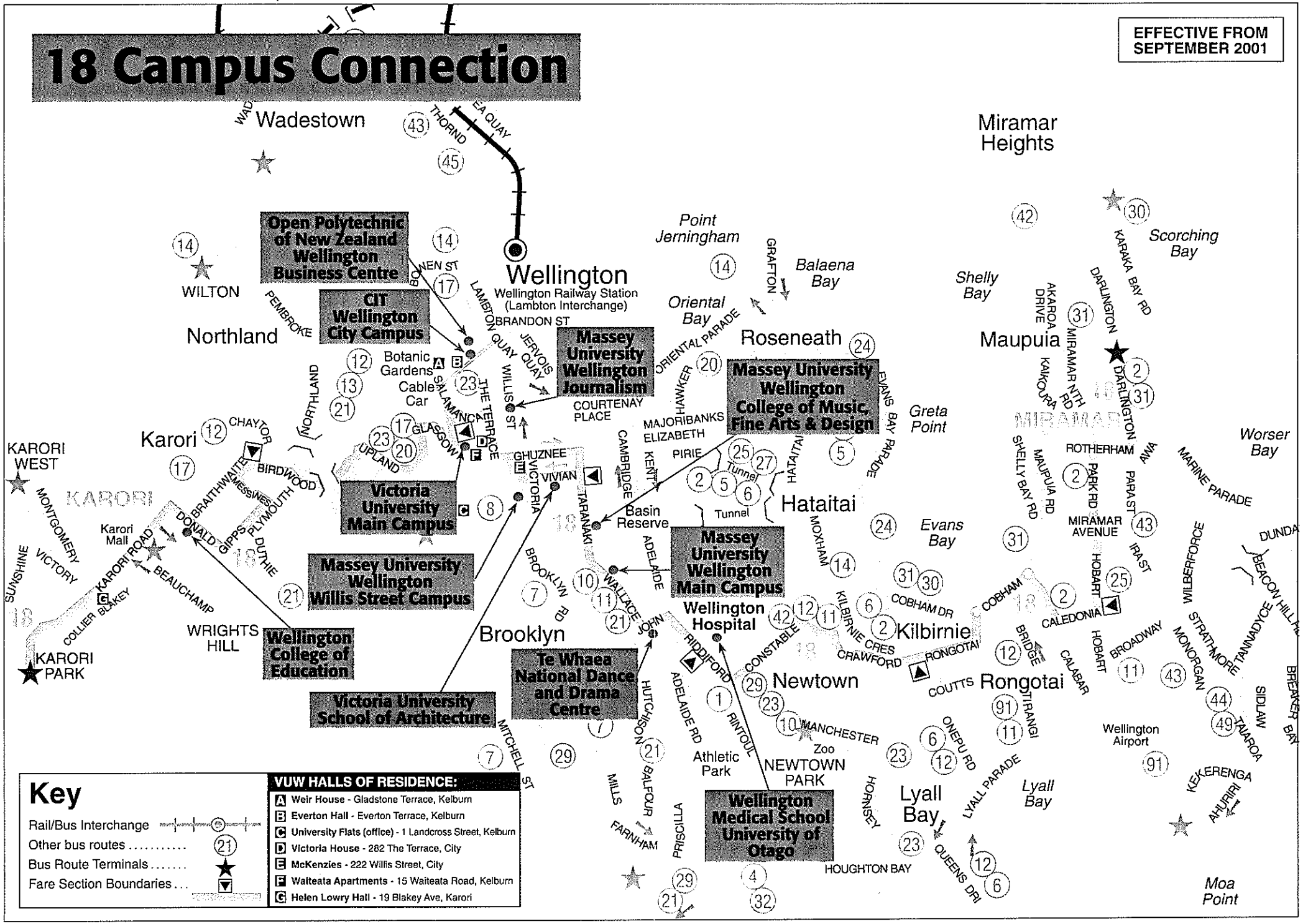


Figure E6 Combined Line 09 &18 Pensr Patronage (52 week Rolling Total)
(Jan.1999 - Jan.2001)



18 Campus Connection

EFFECTIVE FROM SEPTEMBER 2001



#F Orbiter

F1 Project Description

The Orbiter is a crosstown loop bus service in Christchurch which overlays the radial bus route system (virtually all other bus services run to and from the Christchurch CBD). A route map is attached. The Orbiter has been designed to link most of the major suburban shopping malls and a number of key education facilities (e.g. Canterbury University, College of Education, Christchurch Polytech Sullivan Avenue campus, and several high schools). The Orbiter was implemented in two stages: stage 1, the Western Orbiter, was the western half of the Orbiter loop, and commenced in July 1999; stage 2, the Eastern Orbiter, completed the loop, and commenced on 20 November 2000.

F2 Market Research

An on-board survey of the Orbiter was carried out in 2000. The survey was run Thursday to Sunday to obtain a representative sample of Orbiter passengers, and the results were 'weighted', based on the proportion of actual users in each day/time period. However, careful examination of the weighted results found that the weekday results had been 'under-weighted'. Notwithstanding this, the survey results relevant to former mode are outlined below:

- Approximately 1/3rd (32.6%) of trips were previously by bus, 2/3rd by other modes.
- Of the previous non-bus trips, 18% were as car-driver, and 30% were as car passenger. Most of the car-passenger trips involved the driver making a special trip, with only a minority where the "driver was going anyway". Bicycle (18%) and walk (17%) accounted for substantial alternative mode shares.
- The extent of completely generated/new trips appears to be very small, under 2%.

F3 Patronage Impact

The patronage patterns of the Orbiter are shown in Figures F1-F6, and are summarised in the attached Summary Sheets. These show patronage for Stage 1 (West Orbiter) for the first 16 months, and then the full Orbiter (West plus East) for the following 8 months. Several points can be noted:

- West Orbiter: Year 1 Monday to Friday patronage was 82% higher than 3 month patronage. Weekend patronage did not grow at the rate of weekday patronage: Saturday Year 1 patronage was only 16% above 3-month patronage, and Sunday was 32% higher.
- Full Orbiter: 3-month patronage for the full Monday to Friday Orbiter was 83% higher than the West Orbiter patronage just prior to introduction of the full service, and was 133% higher after 8 months of operation. Weekend patronage experienced a similar increase, with the Full Orbiter Saturday patronage being 110% higher than the West Saturday level after 8 months, and Sunday patronage 130% higher.

F4 Control Route and Patronage Trend

The North East bus services were used as a control route for the West Orbiter, given that the former services were not subject to any significant changes over this period. The patronage trend for the West Orbiter over the last 6 months of its operation was used as the base patronage trend for the full Orbiter.

Taking these trends into account reduces the Year 1 patronage increase over the 3-month level for the weekday West Orbiter service from 82% to 74%, and reduces the 8-month increase for the full weekday Orbiter over the West Orbiter from 133% to 130%.

F5 Impact on Other Bus Services

As indicated above, a survey of Orbiter users found that 32.6% previously travelled on other bus services. This 'abstraction factor' was applied to the patronage results (see Summary Sheets) to determine the gain in new public transport (PT) users, and to enable production of service performance indicators based solely on these new PT users (see below).

F6 Elasticity Appraisal

The introduction of the full Orbiter service in November 2000 involved a substantial service km increase (128% weekday service). Arc elasticities and point (log) elasticities were calculated for change in service km. The point elasticity (for the actual patronage change) for the weekday service at 3 months was 0.73, increasing to 1.03 after 8 months. These results are at the high end of the expected range of service km elasticities, and reflect the nature of the crosstown service which enables new journeys to be made by direct PT trips.

F7 Performance Indicators

Service performance indicators were calculated for the Orbiter by time period (Monday to Friday, Saturday, Sunday), and for four situations:

- Actual change,
- After trend adjustment, but no abstraction,
- After trend adjustment plus our best estimate of abstraction,
- After trend adjustment plus our estimate of plausible maximum abstraction.

The results are shown in the attached Summary Sheets. The Patronage Trips/Service Trips performance indicator has been calculated, but it has not been reported to preserve patronage confidentiality.

The Orbiter : Monday to Friday **Summary Sheet**

Service start Date : West Orbiter July 19999 , West+East Orbiter : Nov. 2000
Average Passenger Trip Length West 7.67 W+E 7.67
Average Fare $0.97

Monday - Friday	Ave	After			
		Percentage Change			
	3 mth	12 mth	16 mth	3 mth	8 mth
Service trips					
Service Km		0.0%	0.0%	128.1%	128.1%
Pass Trips		81.9%	90.7%	82.7%	133.0%
Pass Km		81.9%	90.7%	82.7%	133.0%
Gross Cost		0.0%	0.0%	109.1%	109.1%
Revenue		81.9%	90.7%	82.7%	133.0%
Net Cost		-26.1%	-28.9%	131.7%	88.6%
Trend Factor		4.5%	5.8%	3.1%	7.0%
Abstraction Factor - Best Estimat	32.6%	32.6%	32.6%	32.6%	32.6%
- Plausible Max	32.6%	32.6%	32.6%	32.6%	32.6%
After Trend & Abstraction(zero/best/max)					
Pass Trips - after trend & zero Ab		73.7%	79.7%	87.8%	129.9%
- after trend & best Ab		73.7%	166.6%	61.2%	89.5%
- after trend & max Ab		73.7%	166.6%	61.2%	89.5%
Pass Km - after trend & zero Ab		73.7%	79.7%	87.8%	129.9%
- after trend & best Ab		73.7%	166.6%	26.6%	54.9%
- after trend & max Ab		73.7%	166.6%	26.6%	54.9%
Revenue - after trend & zero Ab		73.7%	79.7%	87.8%	129.9%
- after trend & best Ab		73.7%	166.6%	61.2%	89.5%
- after trend & max Ab		73.7%	166.6%	61.2%	89.5%
Net Cost - after trend & zero Ab		-23.5%	-25.4%	125.4%	93.1%
- after trend & best Ab		-14.4%	-32.5%	145.9%	124.1%
- after trend & max Ab		-14.4%	-32.5%	145.9%	124.1%
Performance of service - Actual (ie before Trend Adjustment & Abstraction)					
Subsidy/pass trip	3.04	1.23	1.13	1.44	0.92
Subsidy/pass km	0.40	0.16	0.15	0.19	0.12
Cost Recovery	24%	44%	46%	40%	51%
Pass Trips/ Service Trips					
Pass Trips/ Km	0.44	0.80	0.84	0.67	0.85
Pass Km/ Km	3.36	6.12	6.42	5.14	6.55
Gross Cost / Pass Trips	4.01	2.20	2.10	2.41	1.89
Gross Cost / Pass Km	0.52	0.29	0.27	0.31	0.25
Gross Cost / Veh Km	1.76	1.76	1.76	1.61	1.61
Net Cost / Veh Km	1.33	0.98	0.95	0.96	0.78
Arc Elasticity				0.65	1.04
Point Elasticity				0.73	1.03
Incremental Impact - After Trend Adjustment & Abstraction = 0					
Subsidy/pass trip	3.04	1.34		1.80	0.90
Subsidy/pass km	0.40	0.17		0.23	0.12
Cost Recovery	0.24	0.42		35.0%	51.8%
Pass Trips/ Service Trips					
Pass Trips/ Km	0.44	0.76		0.54	0.80
Pass Km/ Km	3.36	5.84		4.14	6.13
Gross Cost / Pass Trips	4.01	2.31		0.36	0.24
Gross Cost / Pass Km	0.52	0.30		0.36	0.24
Gross Cost / Veh Km	1.76	1.76		1.50	1.50
Net Cost / Veh Km	1.33	1.02		0.97	0.72
Arc Elasticity				0.69	1.01
Point Elasticity				0.76	1.01
Incremental Impact - After Trend Adjustment & Best Estimate Abstraction					
Subsidy/pass trip	4.98	2.45		3.01	1.75
Subsidy/pass km	0.65	0.32		0.90	0.37
Cost Recovery	0.16	0.28		24.4%	35.7%
Pass Trips/ Service Trips					
Pass Trips/ Km	0.30	0.51		0.38	0.55
Pass Km/ Km	2.27	3.94		1.25	2.59
Gross Cost / Pass Trips	5.95	3.42		3.98	2.72
Gross Cost / Pass Km	0.78	0.45		1.19	0.58
Gross Cost / Veh Km	1.76	1.76		1.50	1.50
Net Cost / Veh Km	1.47	1.26		1.13	0.96
Arc Elasticity				0.48	0.70
Point Elasticity				0.58	0.78
Incremental Impact - After Trend Adjustment & Plausible Max Abstraction					
Subsidy/pass trip	4.98	2.45		3.01	1.75
Subsidy/pass km	0.65	0.32		0.90	0.37
Cost Recovery	0.16	0.28		24.4%	35.7%
Pass Trips/ Service Trips					
Pass Trips/ Km	0.30	0.51		0.38	0.55
Pass Km/ Km	2.27	3.94		1.25	2.59
Gross Cost / Pass Trips	5.95	3.42		3.98	2.72
Gross Cost / Pass Km	0.78	0.45		1.19	0.58
Gross Cost / Veh Km	1.76	1.76		1.50	1.50
Net Cost / Veh Km	1.47	1.26		1.13	0.96
Arc Elasticity				0.48	0.70
Point Elasticity				0.58	0.78

The Orbiter : Saturday — Summary Sheet

Service start Date : West Orbiter July 19999 , West+East Orbiter : Nov. 2000
Average Passenger Trip Length West 7.67 W+E 7.67
Average Fare $0.97

Saturday	Ave	After			
		Percentage Change			
	3 mth	12 mth	16 mth	3 mth	8 mth
Service trips					
Service Km		0.0%	0.0%	128.1%	128.1%
Pass Trips		15.5%	97.2%	67.3%	110.5%
Pass Km		15.5%	97.2%	67.3%	110.5%
Gross Cost		0.0%	0.0%	113.5%	113.5%
Revenue		15.5%	97.2%	67.3%	110.5%
Net Cost		-6.8%	-42.4%	182.3%	117.9%
Trend Factor		7.5%	13.3%	7.8%	17.6%
Abstraction Factor - Best Estimat	32.6%	32.6%	32.6%	32.6%	32.6%
- Plausible Max	32.6%	32.6%	32.6%	32.6%	32.6%
After Trend & Abstraction(zero/best/max)					
Pass Trips - after trend & zero Ab		6.9%	71.0%	77.8%	100.0%
- after trend & best Ab		6.9%	153.7%	57.5%	72.4%
- after trend & max Ab		6.9%	153.7%	57.5%	72.4%
Pass Km - after trend & zero Ab		6.9%	71.0%	77.8%	100.0%
- after trend & best Ab		6.9%	153.7%	19.9%	34.8%
- after trend & max Ab		6.9%	153.7%	19.9%	34.8%
Revenue - after trend & zero Ab		6.9%	71.0%	77.8%	100.0%
- after trend & best Ab		6.9%	153.7%	57.5%	72.4%
- after trend & max Ab		6.9%	153.7%	57.5%	72.4%
Net Cost - after trend & zero Ab		-3.0%	-30.9%	151.9%	128.0%
- after trend & best Ab		-1.8%	-39.5%	173.8%	157.8%
- after trend & max Ab		-1.8%	-39.5%	173.8%	157.8%
Performance of service - Actual (ie before Trend Adjustment & Abstraction)					
Subsidy/pass trip	2.23	1.80	0.65	1.10	0.67
Subsidy/pass km	0.29	0.23	0.08	0.14	0.09
Cost Recovery	30%	35%	60%	47%	59%
Pass Trips/ Service Trips					
Pass Trips/ Km	0.37	0.43	0.73	0.54	0.67
Pass Km/ Km	2.84	3.28	5.61	4.11	5.17
Gross Cost / Pass Trips	3.20	2.77	1.62	2.07	1.64
Gross Cost / Pass Km	0.42	0.36	0.21	0.27	0.21
Gross Cost / Veh Km	1.18	1.18	1.18	1.11	1.11
Net Cost / Veh Km	0.83	0.77	0.48	0.59	0.45
Arc Elasticity				0.53	0.86
Point Elasticity				0.62	0.90
Incremental Impact - After Trend Adjustment & Abstraction = 0					
Subsidy/pass trip	2.23	2.02		1.76	1.15
Subsidy/pass km	0.29	0.26		0.23	0.15
Cost Recovery	0.30	0.32		0.36	0.46
Pass Trips/ Service Trips					
Pass Trips/ Km	0.37	0.40		0.38	0.49
Pass Km/ Km	2.84	3.04		2.95	3.79
Gross Cost / Pass Trips	3.20	2.99		0.36	0.28
Gross Cost / Pass Km	0.42	0.39		0.36	0.28
Gross Cost / Veh Km	1.18	1.18		1.05	1.05
Net Cost / Veh Km	0.83	0.80		0.68	0.57
Arc Elasticity				0.61	0.78
Point Elasticity				0.70	0.84
Incremental Impact - After Trend Adjustment & Best Estimate Abstraction					
Subsidy/pass trip	3.77	3.47		2.72	1.96
Subsidy/pass km	0.49	0.45		1.03	0.53
Cost Recovery	0.20	0.22		0.26	0.33
Pass Trips/ Service Trips					
Pass Trips/ Km	0.25	0.27		0.28	0.36
Pass Km/ Km	1.92	2.05		0.75	1.32
Gross Cost / Pass Trips	4.74	4.44		3.69	2.93
Gross Cost / Pass Km	0.62	0.58		1.39	0.80
Gross Cost / Veh Km	1.18	1.18		1.05	1.05
Net Cost / Veh Km	0.94	0.93		0.77	0.70
Arc Elasticity				0.45	0.56
Point Elasticity				0.55	0.66
Incremental Impact - After Trend Adjustment & Plausible Max Abstraction				0.00	0.00
Subsidy/pass trip	3.77	3.47		2.72	1.96
Subsidy/pass km	0.49	0.45		1.03	0.53
Cost Recovery	0.20	0.22		0.26	0.33
Pass Trips/ Service Trips					
Pass Trips/ Km	0.25	0.27		0.28	0.36
Pass Km/ Km	1.92	2.05		0.75	1.32
Gross Cost / Pass Trips	4.74	4.44		3.69	2.93
Gross Cost / Pass Km	0.62	0.58		1.39	0.80
Gross Cost / Veh Km	1.18	1.18		1.05	1.05
Net Cost / Veh Km	0.94	0.93		0.77	0.70
Arc Elasticity				0.45	0.56
Point Elasticity				0.55	0.66

The Orbiter : Sunday — Summary Sheet

Service start Date : West Orbiter July 19999 , West+East Orbiter : Nov. 2000
Average Passenger Trip Length West 7.67 W+E 7.67
Average Fare $0.97
0

Sunday	Ave 3 mth	After 12 mth	16 mth	3 mth	8 mth
		Percentage Change			
Service trips					
Service Km		0.0%	0.0%	128.1%	128.1%
Pass Trips		32.4%	102.7%	90.8%	129.9%
Pass Km		32.4%	102.7%	90.8%	129.9%
Gross Cost		0.0%	0.0%	111.9%	111.9%
Revenue		32.4%	102.7%	90.8%	129.9%
Net Cost		-13.3%	-42.2%	142.2%	86.0%
Trend Factor		1.5%	10.3%	1.1%	2.6%
Abstraction Factor - Best Estimat	32.6%	32.6%	32.6%	32.6%	32.6%
- Plausible Max	32.6%	32.6%	32.6%	32.6%	32.6%
After Trend & Abstraction(zero/best/max)					
Pass Trips - after trend & zero Ab		30.5%	81.8%	110.3%	149.8%
- after trend & best Ab		30.5%	169.7%	78.1%	104.7%
- after trend & max Ab		30.5%	169.7%	78.1%	104.7%
Pass Km - after trend & zero Ab		30.5%	81.8%	110.3%	149.8%
- after trend & best Ab		30.5%	169.7%	41.8%	68.3%
- after trend & max Ab		30.5%	169.7%	41.8%	68.3%
Revenue - after trend & zero Ab		30.5%	81.8%	110.3%	149.8%
- after trend & best Ab		30.5%	169.7%	78.1%	104.7%
- after trend & max Ab		30.5%	169.7%	78.1%	104.7%
Net Cost - after trend & zero Ab		-12.5%	-33.6%	113.6%	69.3%
- after trend & best Ab		-7.4%	-41.4%	149.9%	120.0%
- after trend & max Ab		-7.4%	-41.4%	149.9%	120.0%
Performance of service - Actual (ie before Trend Adjustment & Abstraction)					
Subsidy/pass trip	2.36	1.55	0.67	0.86	0.55
Subsidy/pass km	0.31	0.20	0.09	0.11	0.07
Cost Recovery	29%	39%	59%	53%	64%
Pass Trips/ Service Trips					
Pass Trips/ Km	0.40	0.53	0.82	0.68	0.82
Pass Km/ Km	3.09	4.09	6.26	5.23	6.31
Gross Cost / Pass Trips	3.33	2.52	1.64	1.83	1.52
Gross Cost / Pass Km	0.43	0.33	0.21	0.24	0.20
Gross Cost / Veh Km	1.34	1.34	1.34	1.25	1.25
Net Cost / Veh Km	0.95	0.82	0.55	0.58	0.45
Arc Elasticity				0.71	1.01
Point Elasticity				0.78	1.01
Incremental Impact - After Trend Adjustment & Abstraction = 0					
Subsidy/pass trip	2.36	1.58		0.89	0.40
Subsidy/pass km	0.31	0.21		0.12	0.05
Cost Recovery	29%	38%		52.2%	70.8%
Pass Trips/ Service Trips					
Pass Trips/ Km	0.40	0.53		0.63	0.86
Pass Km/ Km	3.09	4.03		4.83	6.56
Gross Cost / Pass Trips	3.33	2.55		0.24	0.18
Gross Cost / Pass Km	0.43	0.33		0.24	0.18
Gross Cost / Veh Km	1.34	1.34		1.17	1.17
Net Cost / Veh Km	0.95	0.83		0.56	0.34
Arc Elasticity				0.86	1.17
Point Elasticity				0.90	1.11
Incremental Impact - After Trend Adjustment & Best Estimate Abstraction					
Subsidy/pass trip	3.97	2.82		1.66	0.99
Subsidy/pass km	0.52	0.37		0.40	0.20
Cost Recovery	20%	26%		36.9%	49.5%
Pass Trips/ Service Trips					
Pass Trips/ Km	0.27	0.35		0.45	0.60
Pass Km/ Km	2.08	2.72		1.83	2.99
Gross Cost / Pass Trips	4.94	3.79		2.63	1.96
Gross Cost / Pass Km	0.64	0.49		0.64	0.39
Gross Cost / Veh Km	1.34	1.34		1.17	1.17
Net Cost / Veh Km	1.08	1.00		0.74	0.59
Arc Elasticity				0.61	0.82
Point Elasticity				0.70	0.87
Incremental Impact - After Trend Adjustment & Plausible Max Abstraction					
Subsidy/pass trip	3.97	2.82		1.66	0.99
Subsidy/pass km	0.52	0.37		0.40	0.20
Cost Recovery	20%	26%		36.9%	49.5%
Pass Trips/ Service Trips					
Pass Trips/ Km	0.27	0.35		0.45	0.60
Pass Km/ Km	2.08	2.72		1.83	2.99
Gross Cost / Pass Trips	4.94	3.79		2.63	1.96
Gross Cost / Pass Km	0.64	0.49		0.64	0.39
Gross Cost / Veh Km	1.34	1.34		1.17	1.17
Net Cost / Veh Km	1.08	1.00		0.74	0.59
Arc Elasticity				0.61	0.82
Point Elasticity				0.70	0.87

Figure F1 Orbiter Patronage - Monday to Friday

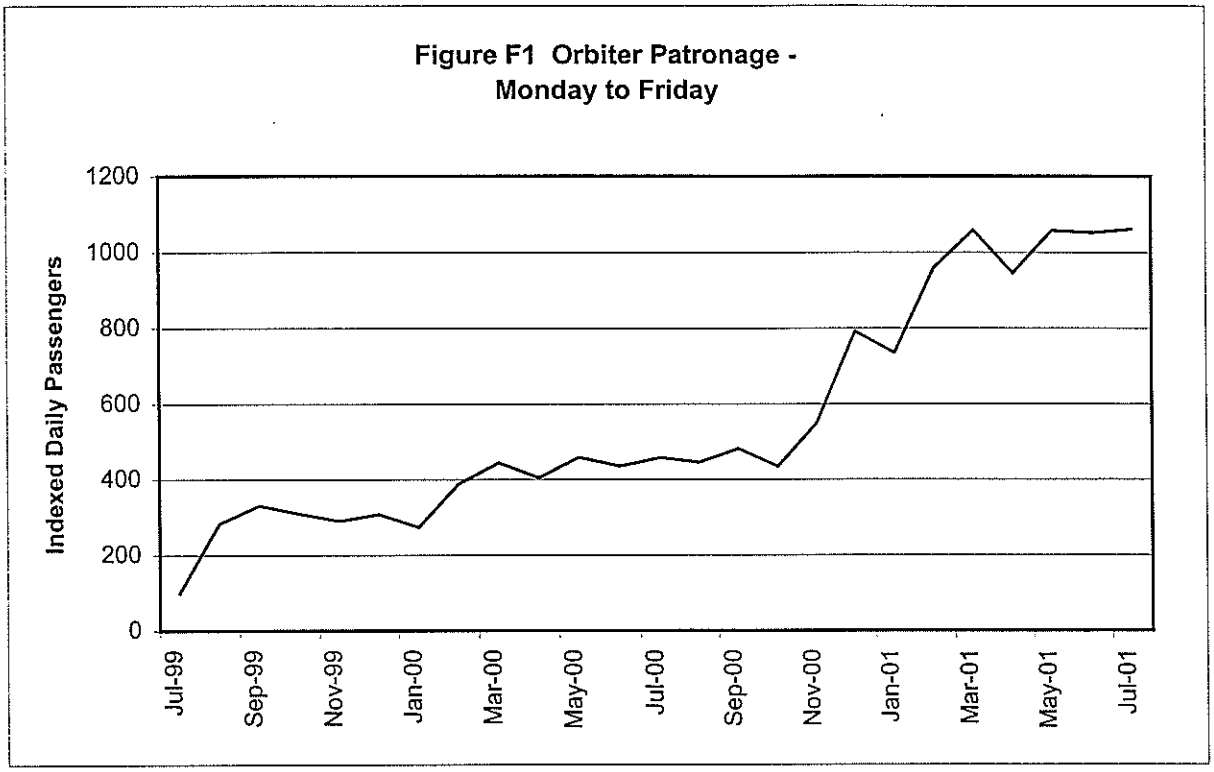


Figure F2 Orbiter Patronage - Monday to Friday (12 month average)

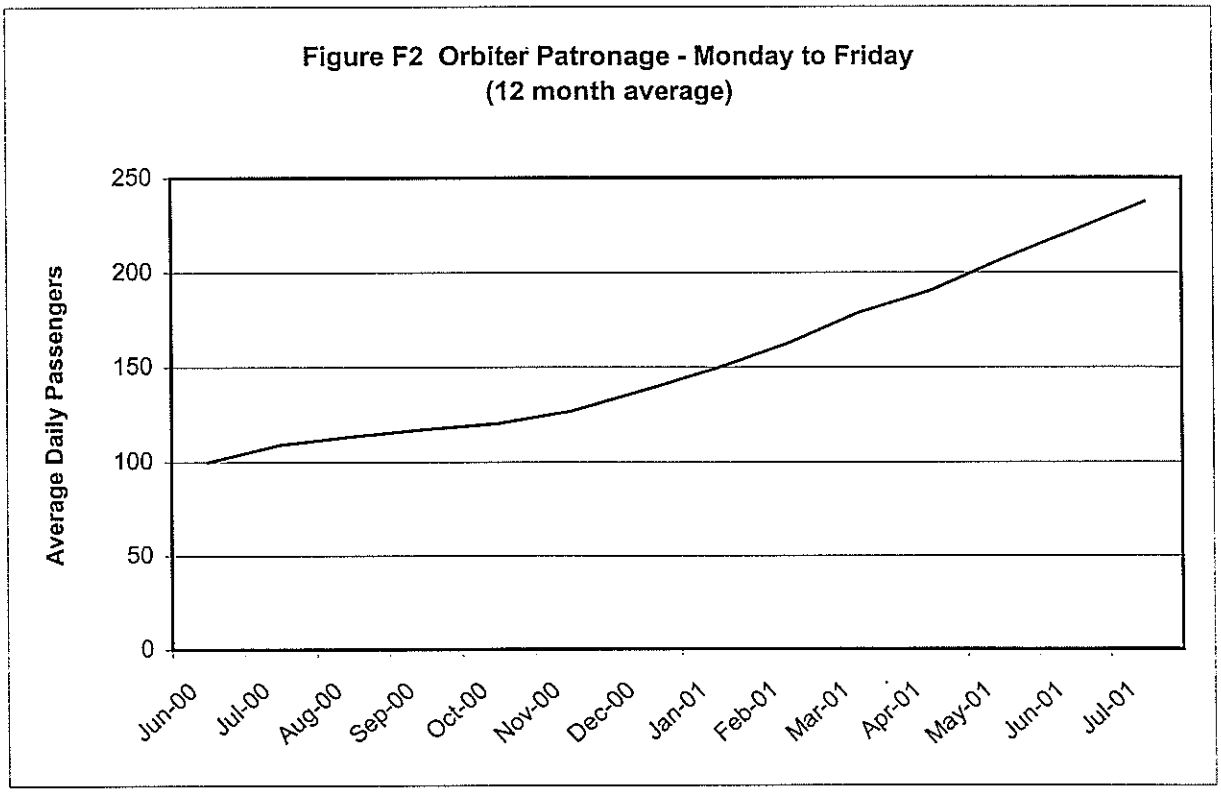


Figure F3 Orbiter patronage - Saturday

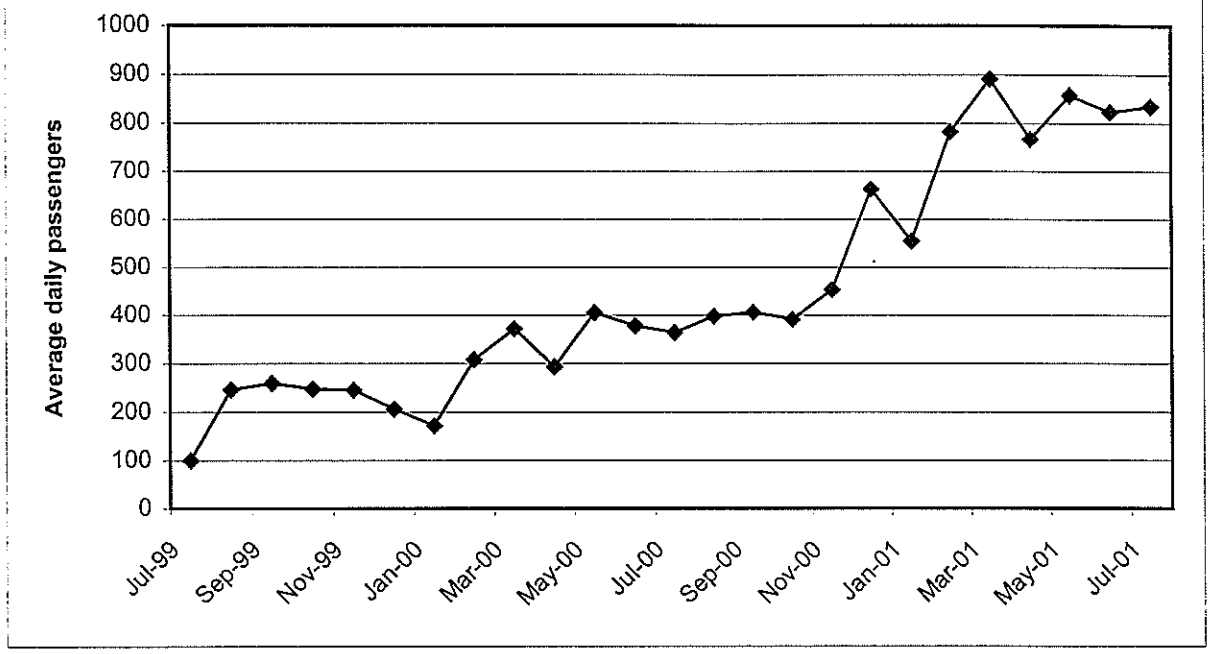


Figure F4 Orbiter patronage - Saturday
(12 month average)

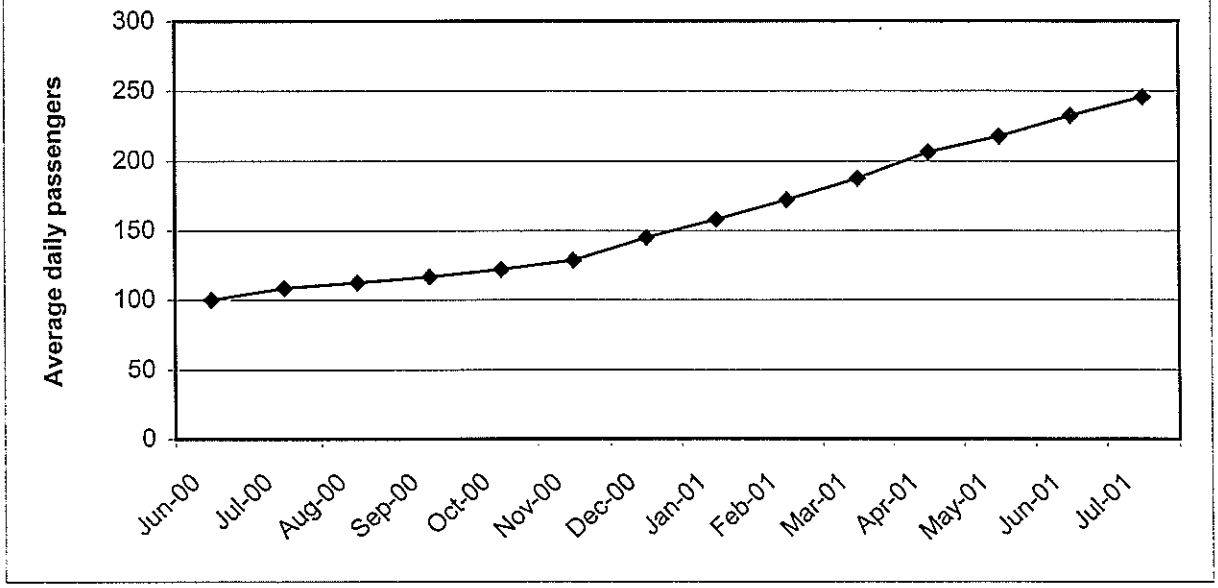


Figure F5 Orbiter patronage - Sunday

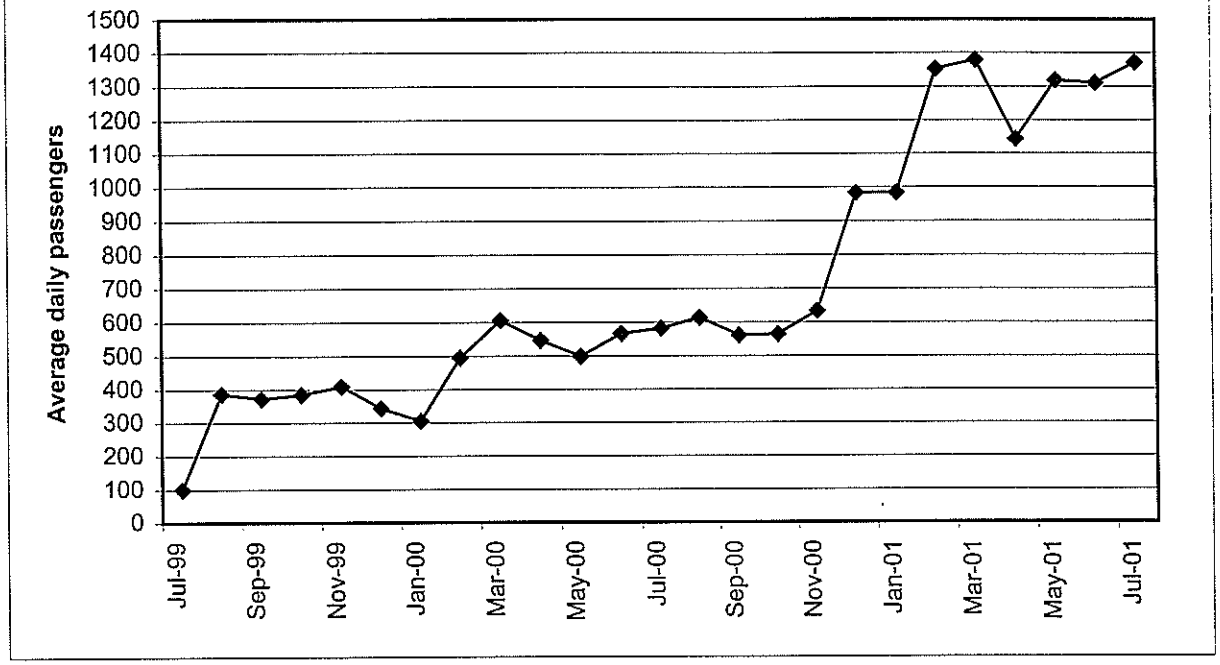
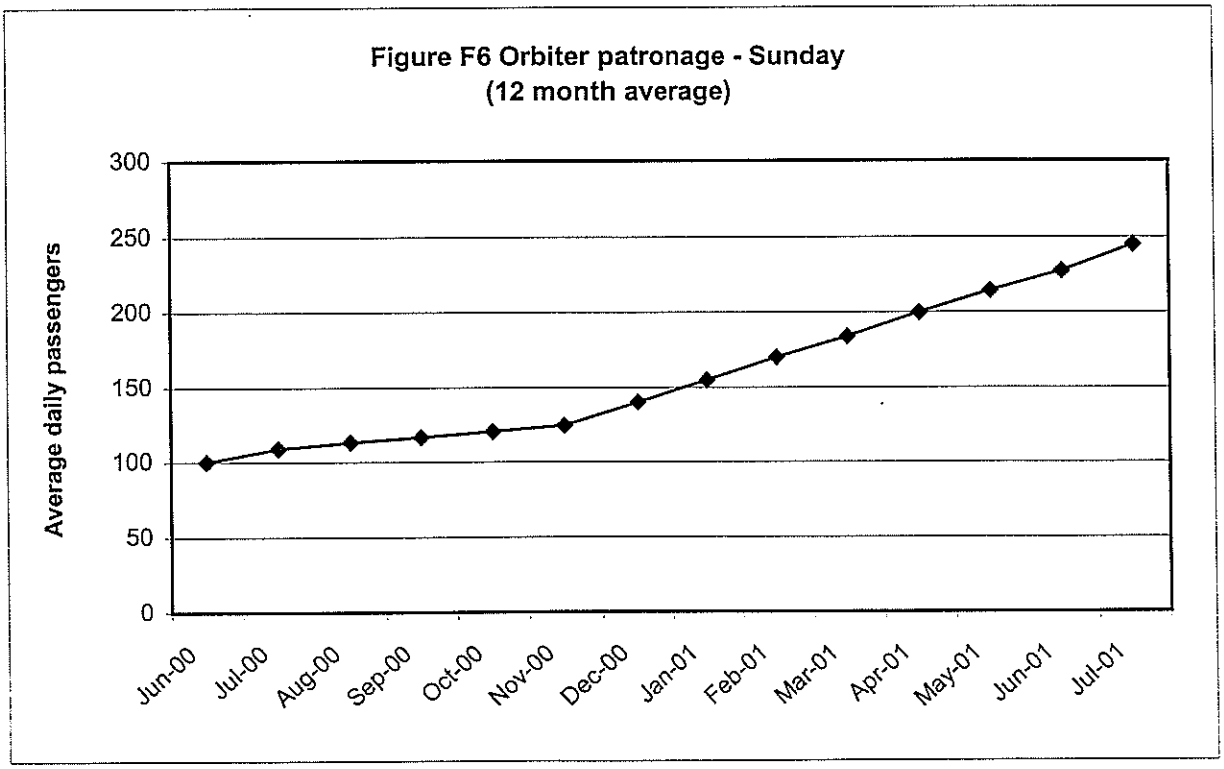
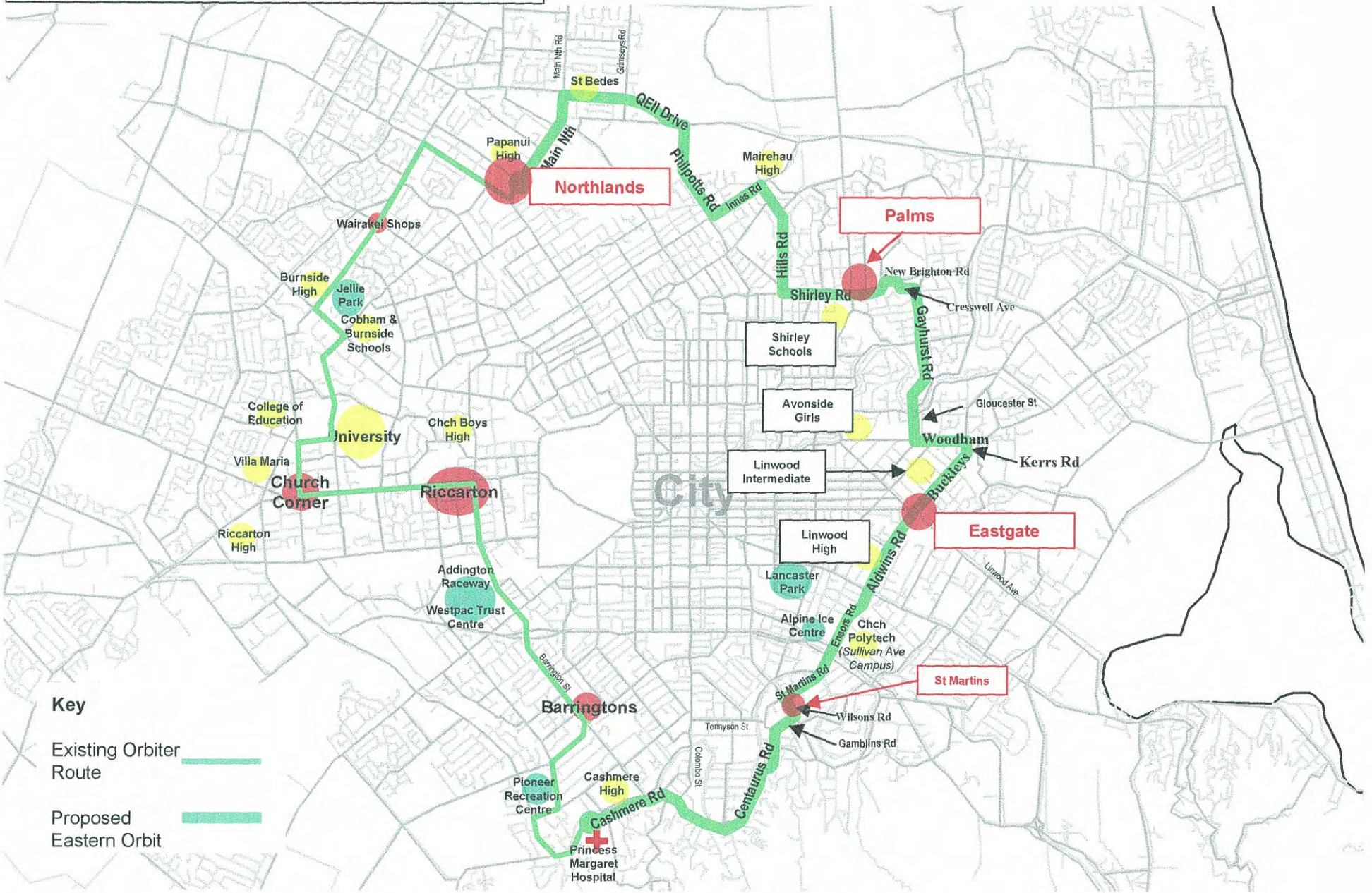


Figure F6 Orbiter patronage - Sunday
(12 month average)



Eastern Orbiter
(as from November 2000)



#G North East Restructure

G1 Project Description

This project involved a restructure of the bus services in the Christchurch North East area from 20 November 2000. Route maps showing service routes before and after the restructure are attached. The route/service restructure included the following changes:

- Increases in service frequencies on the main trunk routes;
- Removal of low frequency branches and loops
- Improved connections between suburban malls and centres
- New express peak services
- Improved transfer opportunities.

In addition, a new peripheral terminal system was instituted in the central city with the aim of removing parked buses from the Cathedral Square area.

G2 Market Research

Extensive consultation with users and the community was carried out prior to the service restructure, and the proposed service changes were modified to take user and community views into account. No user market research has been carried out since introduction of the services; and therefore no direct evidence is available on previous mode of new bus users.

G3 Patronage Impact

The patronage patterns of the North East services are shown in Figures G1-G6, and are summarised in the attached Summary Sheets. Several points can be noted:

- Monday to Friday (weekday) patronage increased by 4% in the first 3 months after the service restructure, and had increased by 19% after 8 months.
- Weekend patronage also increased substantially. Saturday patronage had increased 42% after 3 months, and 60% after 8 months; and Sunday patronage had increased 29% after 3 months, and 36% after 8 months.
- The peripheral terminal system added an additional 10% service km (27% of total service increase). Although these additional service km do provide greater coverage of the city centre for passengers, they are primarily repositioning km and will not have produced the patronage impact that could be expected from a standard 10% service km increase.

G4 Control Route and Patronage Trend

Total Christchurch patronage less the Orbiter and North East patronage has been used as the control route for the North East services. Taking these trends into account reduces the 8-month patronage increase for the weekday North East services from 19% to 16%.

G5 Impact on Other Bus Services

As this project involved a restructure of bus services within an area, some degree of existing passengers switching between bus services to best meet their travel requirements will have occurred. However, all new patronage will represent new bus trips where people have either switched from other travel modes, or are making journeys they previously did not make.

G6 Elasticity Appraisal

This project included a service frequency increase over all time periods. Arc elasticities and point (log) elasticities were calculated for change in service km. The weekday point elasticity for the weekday service (actual patronage change) at 3 months was 0.11 increasing to 0.48 after 8 months (after allowing for underlying patronage trend and best estimate of abstraction).

G7 Performance Indicators

Service performance indicators were calculated for the North East Restructure by time period (Monday to Friday, Saturday, Sunday), and for four situations:

- Actual change,
- After trend adjustment, but no abstraction,
- After trend adjustment plus our best estimate of abstraction,
- After trend adjustment plus our estimate of plausible maximum abstraction.

The results are shown in the attached Summary Sheets. The Patronage Trips/Service Trips performance indicator has been calculated, but it has not been reported to preserve patronage confidentiality.

The North East: Monday to Friday — Summary Sheet

Service start Date : Nov. 2000
Average Passenger Trip Length 7.6
Average Fare $0.97

Monday - Friday (Daily)

	Percentage Change	
	3 mth	8 mth
Service Trips	19.0%	19.0%
Service Km	37.0%	37.0%
Pass Trips	4.5%	18.6%
Pass Km	4.5%	18.6%
Gross Cost	27.8%	27.8%
Revenue	4.5%	18.6%
Net Cost	55.6%	38.8%
Trend Factor	0.8%	1.9%
Abstraction Factor - Best Estimat	1.0%	1.0%
- Plausible Max	5.0%	5.0%
After Trend & Abstraction(zero/best/max)		
Pass Trips - after trend & zero Ab	3.6%	16.3%
- after trend & best Ab	3.5%	16.2%
- after trend & max Ab	3.4%	15.5%
Pass Km - after trend & zero Ab	3.6%	16.3%
- after trend & best Ab	3.5%	16.2%
- after trend & max Ab	3.4%	15.5%
Revenue - after trend & zero Ab	3.6%	16.3%
- after trend & best Ab	3.5%	16.2%
- after trend & max Ab	3.4%	15.5%
Net Cost - after trend & zero Ab	56.7%	41.5%
- after trend & best Ab	56.7%	41.7%
- after trend & max Ab	56.9%	42.5%
Performance of Service - Actual (ie before Trend Adjustment & Abstraction)		
Subsidy/pass trip	1.21	0.95
Subsidy/pass km	0.16	0.13
Cost Recovery	44%	50%
Pass Trips/ Service Trips		
Pass Trips/ Km	1.26	1.43
Pass Km/ Km	9.58	10.87
Gross Cost / Pass Trips	2.18	1.92
Gross Cost / Pass Km	0.29	0.25
Gross Cost / Veh Km	2.75	2.75
Net Cost / Veh Km	1.53	1.36
Arc Elasticity	0.12	0.50
Point Elasticity	0.14	0.54
Incremental Impact - After Trend Adjustment & Abstraction = 0		
Subsidy/pass trip	12.90	2.07
Subsidy/pass km	1.70	0.27
Cost Recovery	7%	32%
Pass Trips/ Service Trips		
Pass Trips/ Km	0.16	0.73
Pass Km/ Km	1.22	5.54
Gross Cost / Pass Trips	14.01	0.40
Gross Cost / Pass Km	1.82	0.40
Gross Cost / Veh Km	2.22	2.22
Net Cost / Veh Km	2.06	1.51
Arc Elasticity	0.10	0.44
Point Elasticity	0.11	0.48
Incremental Impact - After Trend Adjustment & Best Estimate Abstraction		
Subsidy/pass trip	13.04	2.10
Subsidy/pass km	1.72	0.28
Cost Recovery	7%	32%
Pass Trips/ Service Trips		
Pass Trips/ Km	0.16	0.72
Pass Km/ Km	1.20	5.49
Gross Cost / Pass Trips	14.01	3.07
Gross Cost / Pass Km	1.84	0.40
Gross Cost / Veh Km	2.22	2.22
Net Cost / Veh Km	2.07	1.52
Arc Elasticity	0.10	0.44
Point Elasticity	0.11	0.48
Incremental Impact - After Trend Adjustment & Plausible Max Abstraction		
Subsidy/pass trip	13.63	2.23
Subsidy/pass km	1.79	0.29
Cost Recovery	7%	30%
Pass Trips/ Service Trips	3	12
Pass Trips/ Km	0.15	0.69
Pass Km/ Km	1.16	5.27
Gross Cost / Pass Trips	14.60	3.20
Gross Cost / Pass Km	1.92	0.42
Gross Cost / Veh Km	2.22	2.22
Net Cost / Veh Km	2.07	1.55
Arc Elasticity	0.09	0.42
Point Elasticity	0.11	0.46

The North East: Saturday — Summary Sheet

Service start Date : Nov. 2000
Average Passenger Trip Length 7.6
Average Fare $0.97

Saturday	Percentage Change	
	3 mth	8 mth
Service Trips	17.3%	17.3%
Service Km	42.1%	42.1%
Pass Trips	42.2%	59.7%
Pass Km	42.2%	59.7%
Gross Cost	22.0%	22.0%
Revenue	42.2%	59.7%
Net Cost	7.5%	-5.2%
Trend Factor	-0.5%	-1.0%
Abstraction Factor - Best Estimat	1.0%	1.0%
- Plausible Max	5.0%	5.0%
After Trend & Abstraction(zero/best/max)		
Pass Trips - after trend & zero Ab	42.9%	61.3%
- after trend & best Ab	42.4%	60.7%
- after trend & max Ab	40.7%	58.3%
Pass Km - after trend & zero Ab	42.9%	61.3%
- after trend & best Ab	42.4%	60.7%
- after trend & max Ab	40.7%	58.3%
Revenue - after trend & zero Ab	42.9%	61.3%
- after trend & best Ab	42.4%	60.7%
- after trend & max Ab	40.7%	58.3%
Net Cost - after trend & zero Ab	7.0%	-6.3%
- after trend & best Ab	7.3%	-5.9%
- after trend & max Ab	8.5%	-4.1%
Performance of Service - Actual (ie before Trend Adjustment & Abstraction)		
Subsidy/pass trip	1.02	0.80
Subsidy/pass km	0.13	0.11
Cost Recovery	49%	55%
Pass Trips/ Service Trips		
Pass Trips/ Km	1.37	1.53
Pass Km/ Km	10.38	11.66
Gross Cost / Pass Trips	1.99	1.77
Gross Cost / Pass Km	0.26	0.23
Gross Cost / Veh Km	2.71	2.71
Net Cost / Veh Km	1.39	1.23
Arc Elasticity	1.00	1.42
Point Elasticity	1.00	1.33
Incremental Impact - After Trend Adjustment & Abstraction = 0		
Subsidy/pass trip	0.22	-0.14
Subsidy/pass km	0.03	-0.02
Cost Recovery	82%	117%
Pass Trips/ Service Trips		
Pass Trips/ Km	1.39	1.99
Pass Km/ Km	10.56	15.11
Gross Cost / Pass Trips	1.20	0.11
Gross Cost / Pass Km	0.16	0.11
Gross Cost / Veh Km	1.65	1.65
Net Cost / Veh Km	0.31	-0.28
Arc Elasticity	1.02	1.46
Point Elasticity	1.01	1.36
Incremental Impact - After Trend Adjustment & Best Estimate Abstraction		
Subsidy/pass trip	0.23	-0.13
Subsidy/pass km	0.03	-0.02
Cost Recovery	81%	116%
Pass Trips/ Service Trips		
Pass Trips/ Km	1.38	1.97
Pass Km/ Km	10.45	14.96
Gross Cost / Pass Trips	1.20	0.84
Gross Cost / Pass Km	0.16	0.11
Gross Cost / Veh Km	1.65	1.65
Net Cost / Veh Km	0.32	-0.26
Arc Elasticity	1.01	1.44
Point Elasticity	1.01	1.35
Incremental Impact - After Trend Adjustment & Plausible Max Abstraction		
Subsidy/pass trip	0.28	-0.09
Subsidy/pass km	0.04	-0.01
Cost Recovery	77%	111%
Pass Trips/ Service Trips		
Pass Trips/ Km	1.32	1.89
Pass Km/ Km	10.03	14.35
Gross Cost / Pass Trips	1.25	0.88
Gross Cost / Pass Km	0.16	0.12
Gross Cost / Veh Km	1.65	1.65
Net Cost / Veh Km	0.37	-0.18
Arc Elasticity	0.97	1.38
Point Elasticity	0.97	1.31

The North East: Sunday — Summary Sheet

Service start Date :	Nov. 2000
Average Passenger Trip Length	7.6
Average Fare	$0.97

Sunday	Percentage Change	
	3 mth	8 mth
Service Trips	23.0%	23.0%
Service Km	29.6%	29.6%
Pass Trips	28.9%	36.2%
Pass Km	28.9%	36.2%
Gross Cost	34.6%	34.6%
Revenue	28.9%	36.2%
Net Cost	38.4%	33.5%
Trend Factor	3.5%	7.9%
Abstraction Factor - Best Estimat	1.0%	1.0%
- Plausible Max	5.0%	5.0%
After Trend & Abstraction(zero/best/max)		
Pass Trips - after trend & zero Ab	24.3%	25.4%
- after trend & best Ab	24.1%	25.2%
- after trend & max Ab	23.1%	24.1%
Pass Km - after trend & zero Ab	24.3%	25.4%
- after trend & best Ab	24.1%	25.2%
- after trend & max Ab	23.1%	24.1%
Revenue - after trend & zero Ab	24.3%	25.4%
- after trend & best Ab	24.1%	25.2%
- after trend & max Ab	23.1%	24.1%
Net Cost - after trend & zero Ab	41.4%	40.7%
- after trend & best Ab	41.6%	40.9%
- after trend & max Ab	42.2%	41.5%
Performance of service - Actual (ie before Trend Adjustment & Abstraction)		
Subsidy/pass trip	1.56	1.43
Subsidy/pass km	0.21	0.19
Cost Recovery	38%	40%
Pass Trips/ Service Trips		
Pass Trips/ Km	1.07	1.13
Pass Km/ Km	8.14	8.61
Gross Cost / Pass Trips	2.53	2.40
Gross Cost / Pass Km	0.33	0.32
Gross Cost / Veh Km	2.71	2.71
Net Cost / Veh Km	1.68	1.62
Arc Elasticity	0.98	1.22
Point Elasticity	0.98	1.19
Incremental Impact - After Trend Adjustment & Abstraction = 0		
Subsidy/pass trip	2.48	2.33
Subsidy/pass km	0.33	0.31
Cost Recovery	28%	29%
Pass Trips/ Service Trips		
Pass Trips/ Km	0.89	0.92
Pass Km/ Km	6.73	7.03
Gross Cost / Pass Trips	3.49	0.43
Gross Cost / Pass Km	0.45	0.43
Gross Cost / Veh Km	3.05	3.05
Net Cost / Veh Km	2.20	2.16
Arc Elasticity	0.82	0.86
Point Elasticity	0.84	0.87
Incremental Impact - After Trend Adjustment & Best Estimate Abstraction		
Subsidy/pass trip	2.52	2.37
Subsidy/pass km	0.33	0.31
Cost Recovery	28%	29%
Pass Trips/ Service Trips		
Pass Trips/ Km	0.88	0.92
Pass Km/ Km	6.66	6.96
Gross Cost / Pass Trips	3.49	3.34
Gross Cost / Pass Km	0.46	0.44
Gross Cost / Veh Km	3.05	3.05
Net Cost / Veh Km	2.20	2.17
Arc Elasticity	0.81	0.85
Point Elasticity	0.83	0.87
Incremental Impact - After Trend Adjustment & Plausible Max Abstraction		
Subsidy/pass trip	2.66	2.51
Subsidy/pass km	0.35	0.33
Cost Recovery	27%	28%
Pass Trips/ Service Trips		
Pass Trips/ Km	0.84	0.88
Pass Km/ Km	6.39	6.68
Gross Cost / Pass Trips	3.63	3.48
Gross Cost / Pass Km	0.48	0.46
Gross Cost / Veh Km	3.05	3.05
Net Cost / Veh Km	2.24	2.20
Arc Elasticity	0.78	0.82
Point Elasticity	0.80	0.83

Figure G1 North East Patronage - Monday to Friday (Jan 97 to Jul 01)

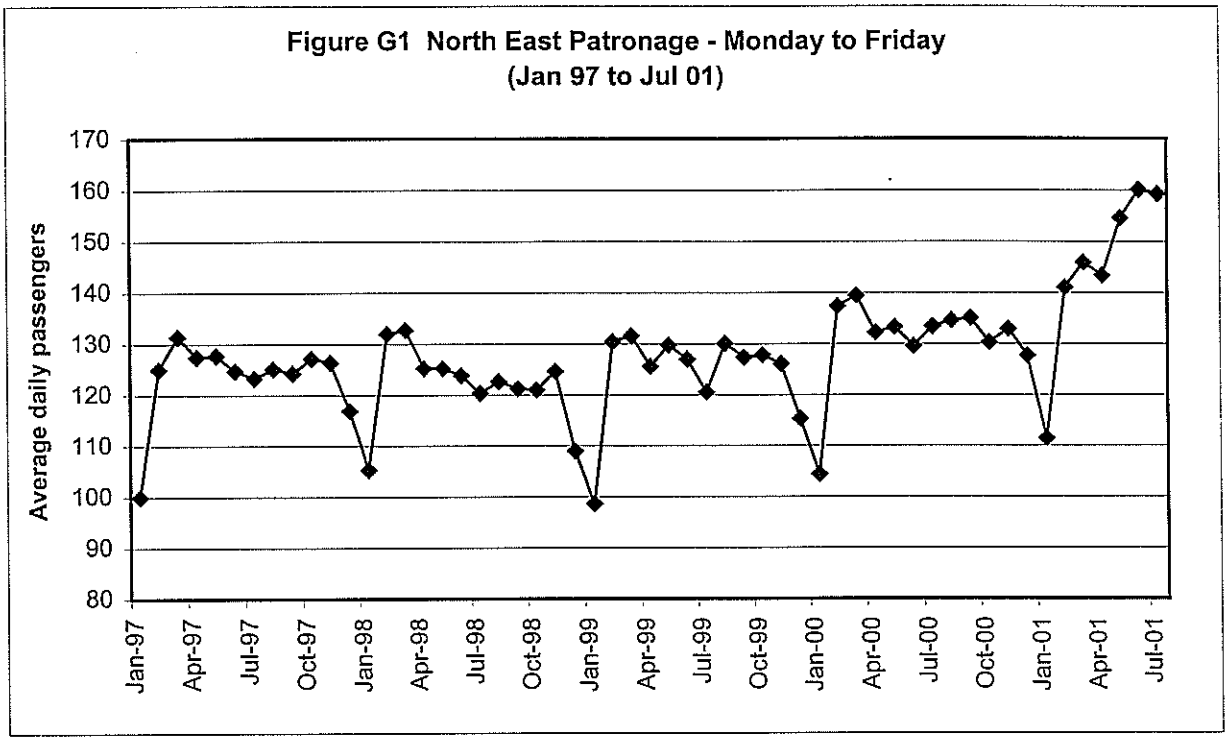


Figure G2 North East Patronage - Monday to Friday (12 month average)

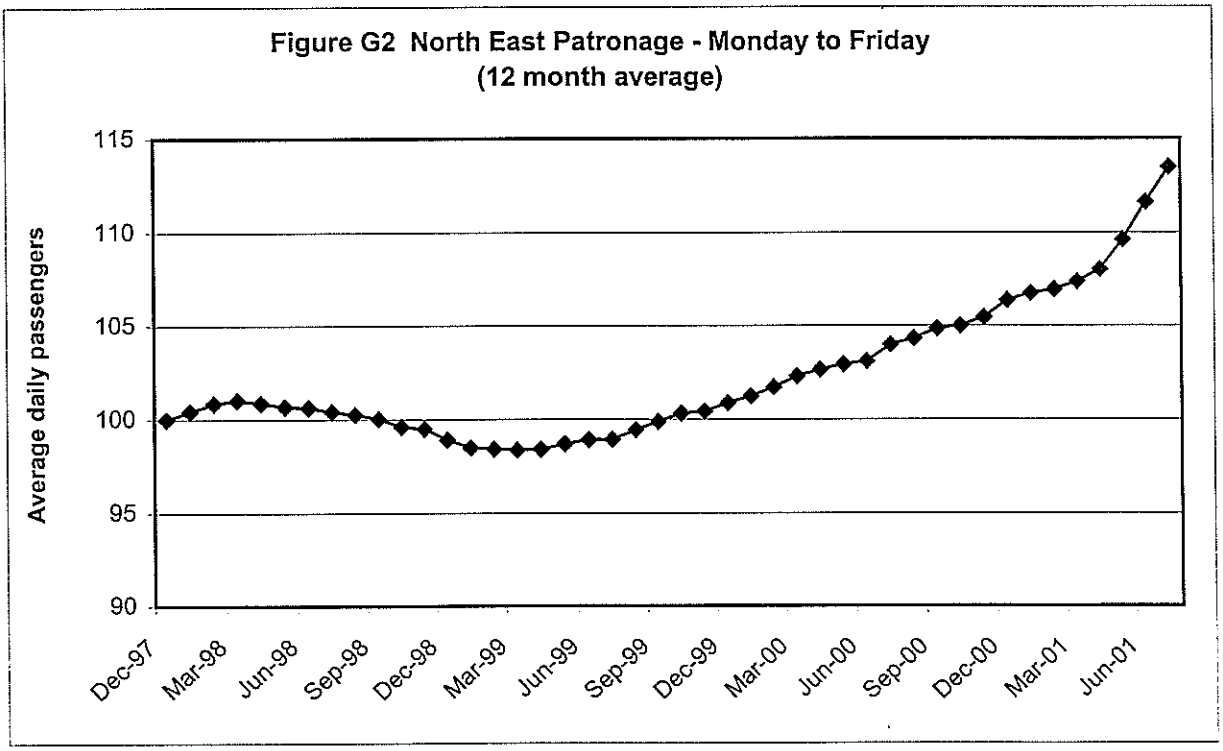


Figure G3 North East Patronage - Saturday
(Jan 97 to Jul 01)

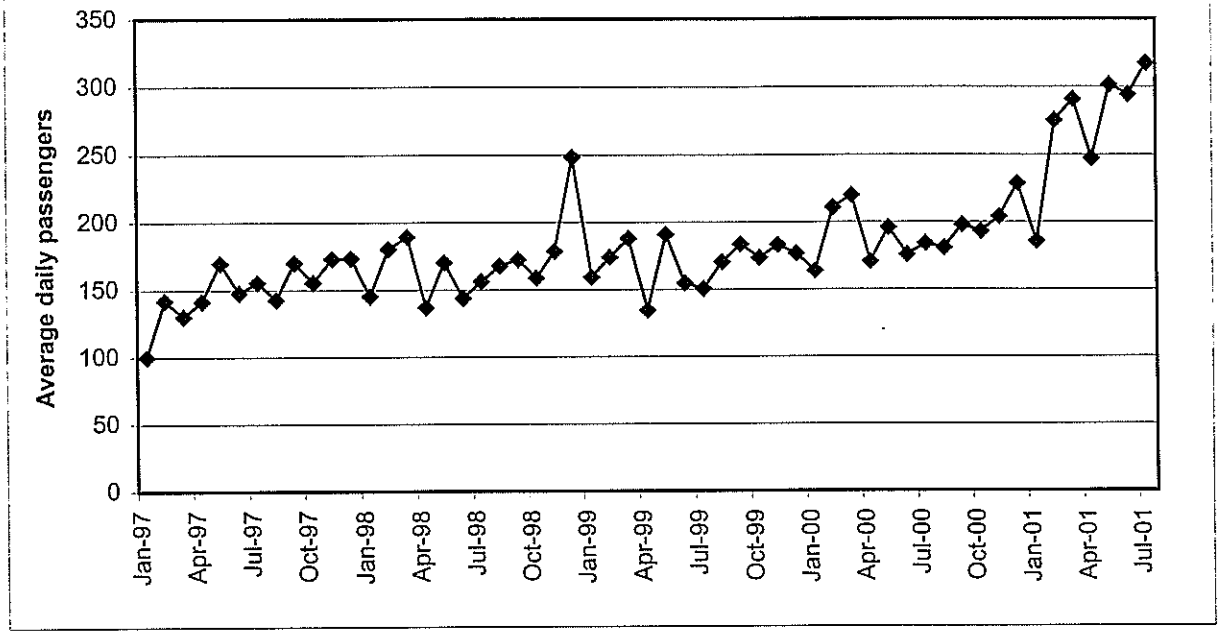


Figure G4 North East Patronage - Saturday
(12 month average)

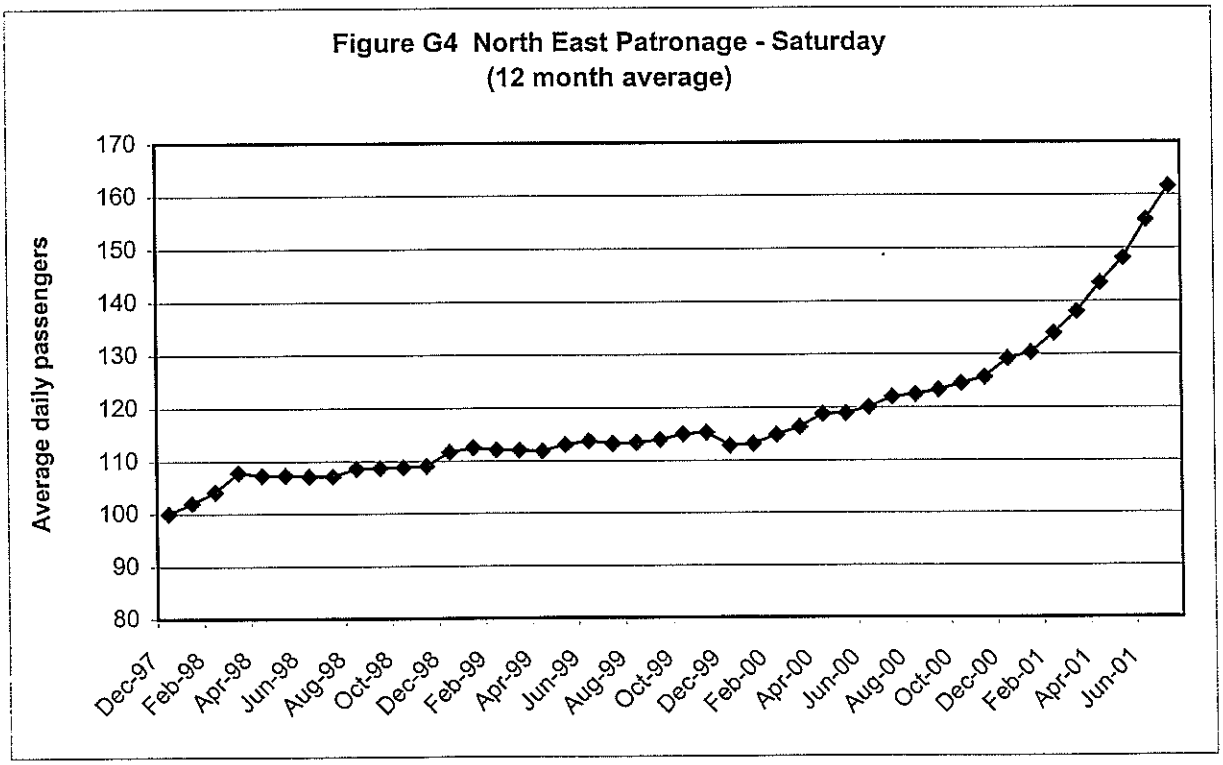


Figure G5 North East Patronage - Sunday
(Jan 97 to Jul 01)

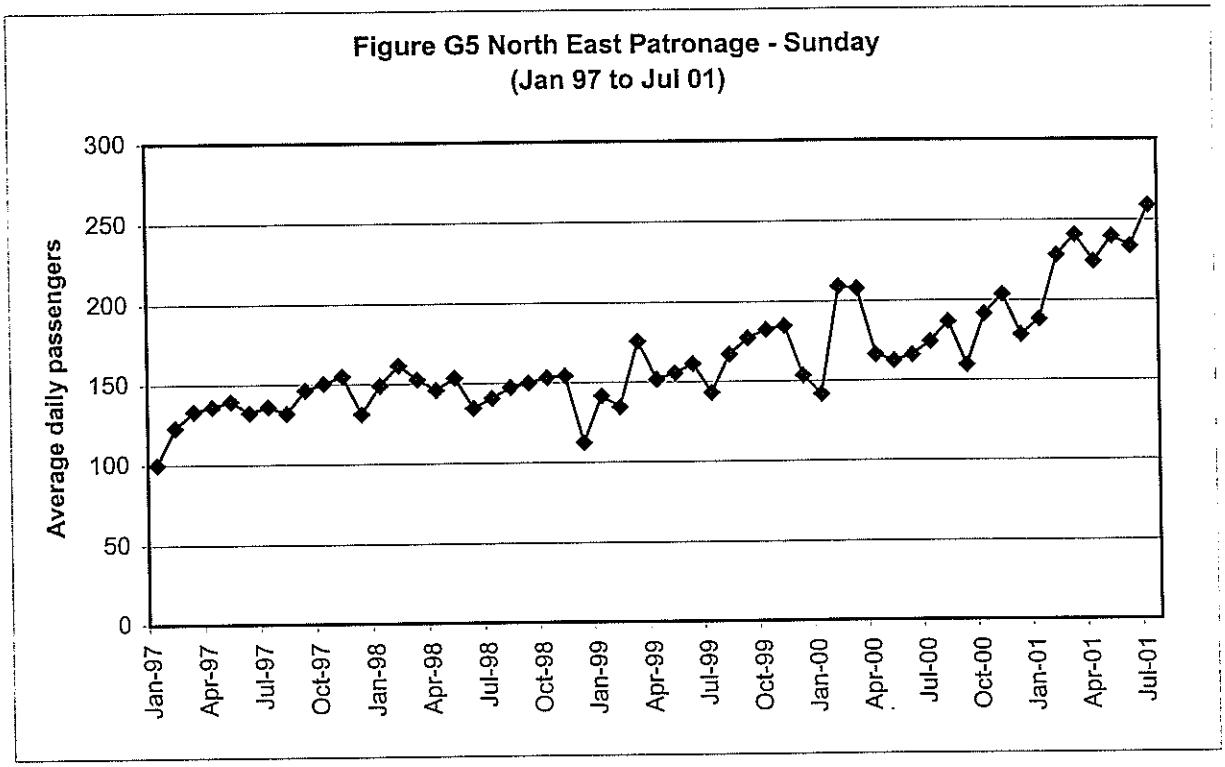
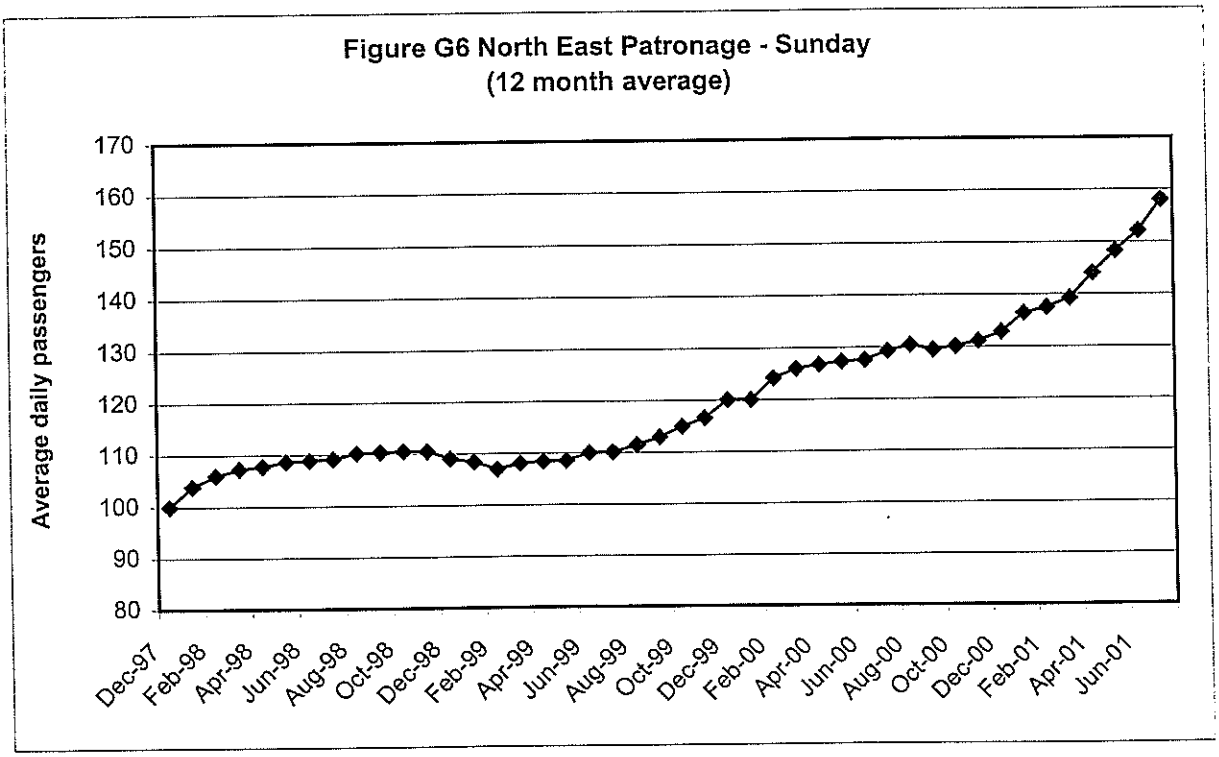


Figure G6 North East Patronage - Sunday
(12 month average)



MAP A1

NE Bus Review
Final Routes

As at March 2000
(Following from consultation)

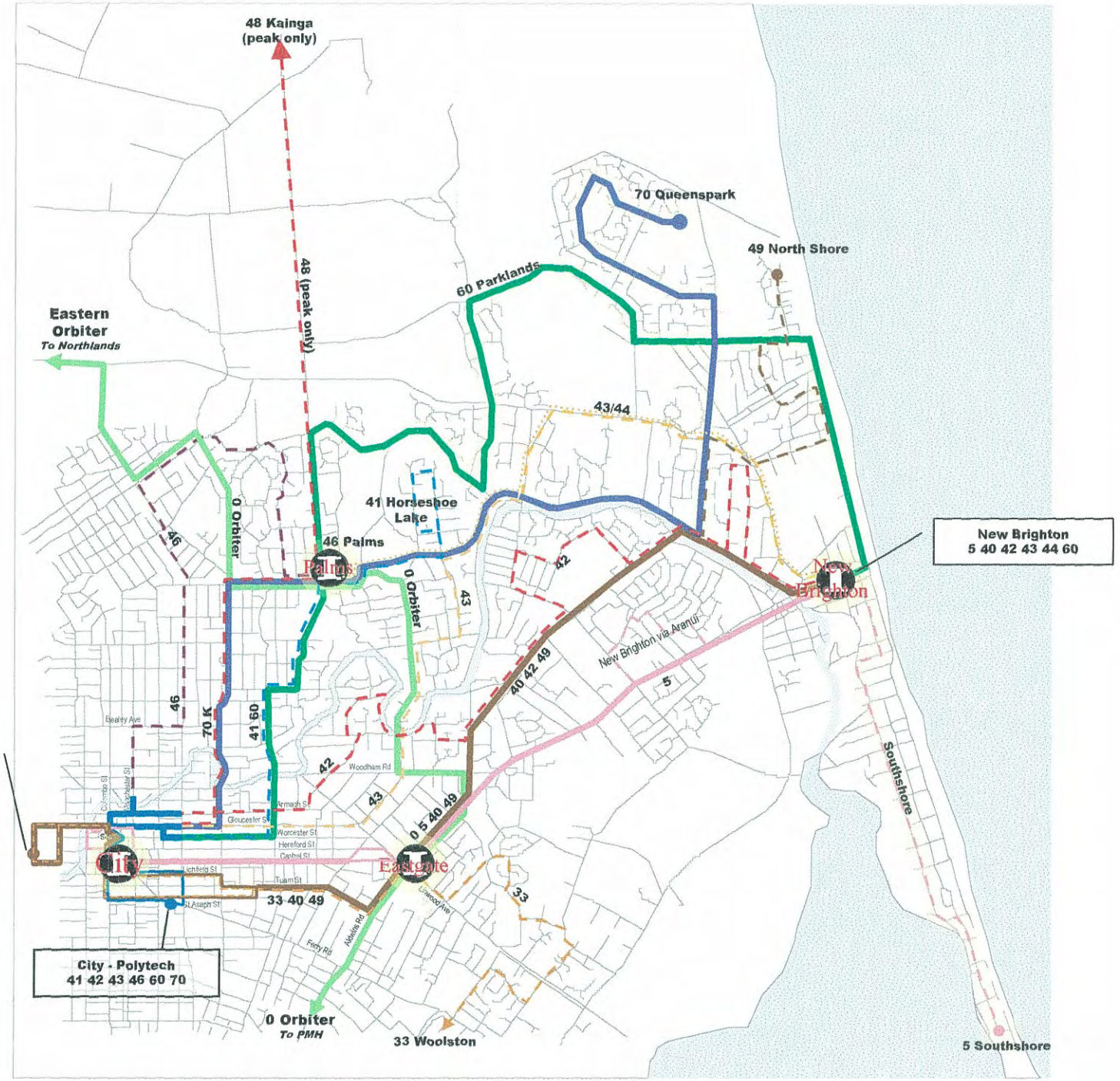
- 0 - Orbiter
- 5 - New Brighton / Southshore
- 46 - Shirley
- 33 - Woolston
- 40 - Wainoni
- 49 - North Shore
- 42 - Avondale
- 43 - Burwood
- 44 - New Brighton/ Palms
  Trial service until east-west Brighton-University link implemented.
- 60 - Parklands
- 41 - Horseshoe Lake
- 70 - Queenspark
- 48 - Kainga

Primary "A" Routes
15 minutes or less between buses during weekdays

Secondary "B" Routes
20 minutes or more between buses during weekdays

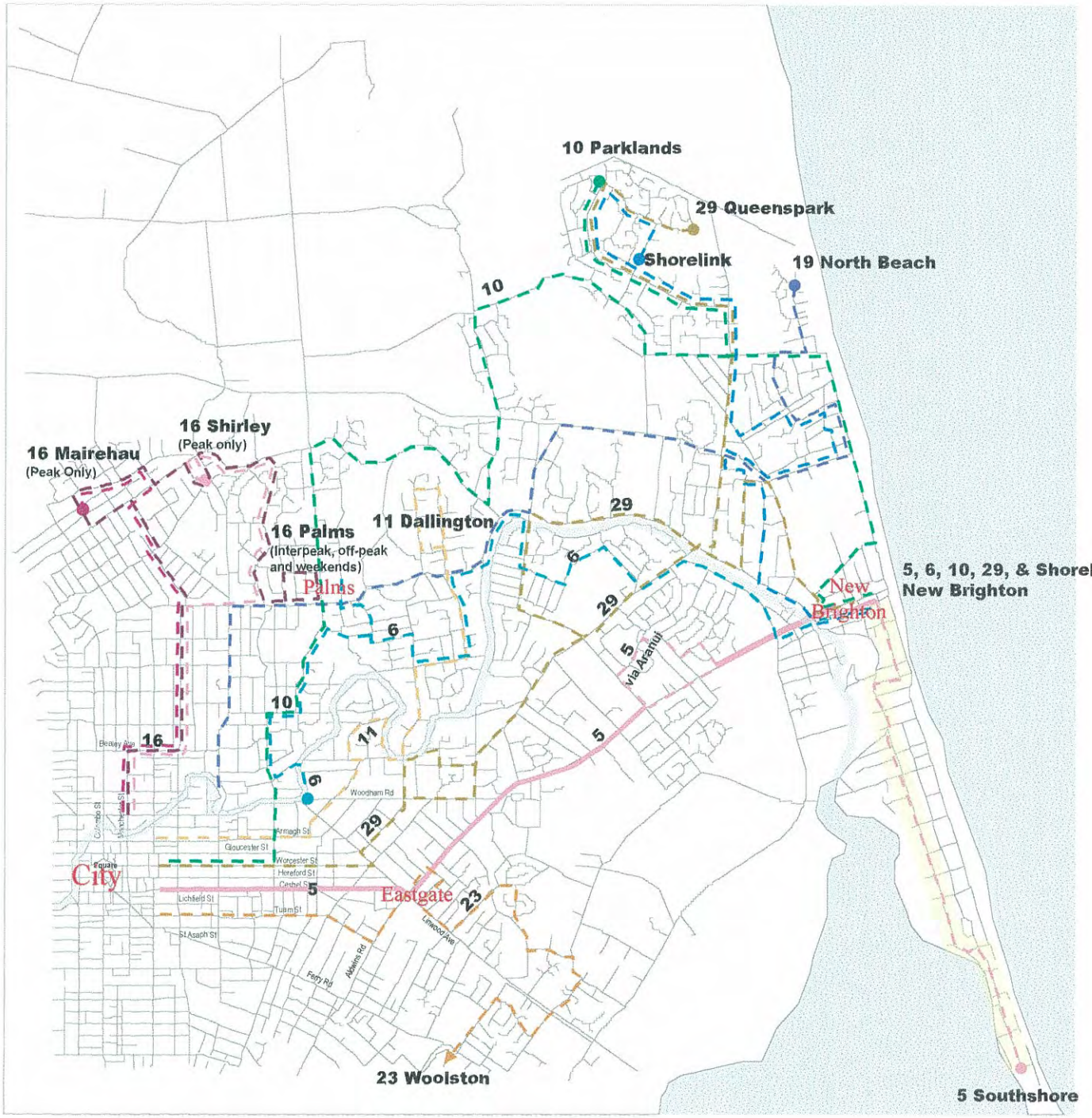
Express Service
Peak time express bus service to city available on these routes.

Interchange Point



MAP A2

NE Bus Review
Existing Network



Key

Indicative Only

Primary "A" Routes
15 minutes or less between buses during weekdays

Secondary "B" Routes
20 minutes or more between buses during weekdays

Express Service
Peak time express bus service to city available on these routes.

#H Lyttelton Frequency Increase

H1 Project Description

This project involved a frequency increase from 20 November 2000 on the Monday to Friday (weekday) Lyttelton bus service, with peak headways reducing from 20 minutes to 15 minutes. In addition, the route was extended at the city centre end to the Christchurch Casino. The Sunday service frequency was also increased. In addition, a new peripheral terminal system was instituted in the central city with the aim of removing parked buses from the Cathedral Square area.

The completion of the Orbiter, with the introduction of the Eastern Orbiter, also occurred at the same time as the Lyttelton frequency increase. The Orbiter route crosses the Lyttelton route but serves different destinations.

Another concurrent change was an improvement in the Diamond Harbour ferry service frequency. The ferry acts as a feeder service to the Lyttelton bus service for Diamond Harbour residents.

H2 Market Research

Extensive consultation with users and the community was carried out prior to the service changes, and the proposed service changes were modified to take user and community views into account. No user market research has been carried out since introduction of the services; and therefore no direct evidence is available on previous mode of new bus users.

H3 Patronage Impact

The patronage patterns of the Lyttelton bus service are shown in Figures H1-H6, and are summarised in the attached Summary Sheets. Several points can be noted:

- Monday to Friday (weekday) patronage increased by 13% in the first 3 months after the service increase, and by 22% after 8 months.
- Sunday patronage increased by 11% in the first 3 months after the service increase, and by 17% after 8 months.
- Interestingly, Saturday patronage also increased by 14% after 8 months. This was despite service frequency not increasing.
- The peripheral terminal system added an additional 10% service km (27% of total service increase). Although these additional service km do provide greater coverage of the city centre for passengers, they are primarily repositioning km and will not have produced the patronage impact that could be expected from a standard 10% service km increase.
- The impact of the introduction of the Eastern Orbiter on the Lyttelton service is unclear.

H4 Control Route and Patronage Trend

Total Christchurch patronage less the Orbiter and North East patronage has been used as the control route for the Lyttelton bus service increase. Taking these trends into account reduces the 8-month patronage increase for the weekday Lyttelton bus services from 22% to 19%.

H5 Impact on Other Bus Services

The only possible impact on other bus services from the Lyttelton Frequency Increase services would have been at stops closer to the city centre where passengers have a choice of routes. However, this effect is most likely to have been very small.

H6 Elasticity Appraisal

This project included a service frequency increase on the existing Monday to Friday and Sunday services. Arc elasticities and point (log) elasticities were calculated for change in service km. The point elasticity for the weekday service (actual patronage change) at 3 months was 0.36, increasing to 0.58 after 6 months.

H7 Performance Indicators

Service performance indicators were calculated for the Lyttelton bus service by time period (Monday to Friday, Saturday, Sunday), and for four situations:

- Actual change,
- After trend adjustment, but no abstraction,
- After trend adjustment plus our best estimate of abstraction,
- After trend adjustment plus our estimate of plausible maximum abstraction.

The results are shown in the attached Summary Sheets. The Patronage Trips/Service Trips performance indicator has been calculated, but it has not been reported to preserve patronage confidentiality.

Lyttelton: Monday to Friday — **Summary Sheet**

Service start Date : Nov. 2000
Average Passenger Trip Length 7.6
Average Fare $0.97

Monday - Friday

	Percentage Change	
	3 mth	8 mth
Service Trips	36.5%	36.5%
Service Km	35.9%	35.9%
Pass Trips	12.8%	21.8%
Pass Km	12.8%	21.8%
Gross Cost	98.0%	98.0%
Revenue	12.8%	21.8%
Net Cost	220.1%	207.2%
Trend Factor	0.8%	1.9%
Abstraction Factor - Best Estimat	0.0%	0.0%
- Plausible Max	0.0%	0.0%
After Trend & Abstraction(zero/best/max)		
Pass Trips - after trend & zero Ab	11.8%	19.5%
- after trend & best Ab	11.8%	19.5%
- after trend & max Ab	11.8%	19.5%
Pass Km - after trend & zero Ab	11.8%	19.5%
- after trend & best Ab	11.8%	19.5%
- after trend & max Ab	11.8%	19.5%
Revenue - after trend & zero Ab	11.8%	19.5%
- after trend & best Ab	11.8%	19.5%
- after trend & max Ab	11.8%	19.5%
Net Cost - after trend & zero Ab	221.4%	210.5%
- after trend & best Ab	221.4%	210.5%
- after trend & max Ab	221.4%	210.5%
Performance of Service - Actual (ie before Trend Adjustment & Abstraction)		
Subsidy/pass trip	1.92	1.71
Subsidy/pass km	0.25	0.22
Cost Recovery	34%	36%
Pass Trips/ Service Trips		
Pass Trips/ Km	0.67	0.72
Pass Km/ Km	5.08	5.49
Gross Cost / Pass Trips	2.89	2.68
Gross Cost / Pass Km	0.38	0.35
Gross Cost / Veh Km	1.93	1.93
Net Cost / Veh Km	1.28	1.23
Arc Elasticity	0.36	0.61
Point Elasticity	0.39	0.64
Incremental Impact - After Trend Adjustment & Abstraction = 0		
Subsidy/pass trip	12.69	7.32
Subsidy/pass km	1.67	0.96
Cost Recovery	7%	12%
Pass Trips/ Service Trips		
Pass Trips/ Km	0.27	0.44
Pass Km/ Km	2.02	3.32
Gross Cost / Pass Trips	13.66	1.09
Gross Cost / Pass Km	1.80	1.09
Gross Cost / Veh Km	3.62	3.62
Net Cost / Veh Km	3.37	3.20
Arc Elasticity	0.33	0.54
Point Elasticity	0.36	0.58
Incremental Impact - After Trend Adjustment & Best Estimate Abstraction		
Subsidy/pass trip	12.69	7.32
Subsidy/pass km	1.67	0.96
Cost Recovery	7%	12%
Pass Trips/ Service Trips		
Pass Trips/ Km	0.27	0.44
Pass Km/ Km	2.02	3.32
Gross Cost / Pass Trips	13.66	8.29
Gross Cost / Pass Km	1.80	1.09
Gross Cost / Veh Km	3.62	3.62
Net Cost / Veh Km	3.37	3.20
Arc Elasticity	0.33	0.54
Point Elasticity	0.36	0.58
Incremental Impact - After Trend Adjustment & Plausible Max Abstraction		
Subsidy/pass trip	12.69	7.32
Subsidy/pass km	1.67	0.96
Cost Recovery	7%	12%
Pass Trips/ Service Trips		
Pass Trips/ Km	0.27	0.44
Pass Km/ Km	2.02	3.32
Gross Cost / Pass Trips	13.66	8.29
Gross Cost / Pass Km	1.80	1.09
Gross Cost / Veh Km	3.62	3.62
Net Cost / Veh Km	3.37	3.20
Arc Elasticity	0.33	0.54
Point Elasticity	0.36	0.58

Lyttelton : Saturday — Summary Sheet

Service start Date : Nov. 2000
Average Passenger Trip Length 7.6
Average Fare $0.97

Saturday

	Percentage Change	
	3 mth	8 mth
Service Trips	0.0%	0.0%
Service Km	0.0%	0.0%
Pass Trips	4.3%	14.1%
Pass Km	4.3%	14.1%
Gross Cost	45.0%	45.0%
Revenue	4.3%	14.1%
Net Cost	91.7%	80.5%
Trend Factor	-0.5%	-1.0%
Abstraction Factor - Best Estimat	0.0%	0.0%
- Plausible Max	0.0%	0.0%
After Trend & Abstraction(zero/best/max)		
Pass Trips - after trend & zero Ab	4.7%	15.3%
- after trend & best Ab	4.7%	15.3%
- after trend & max Ab	4.7%	15.3%
Pass Km - after trend & zero Ab	4.7%	15.3%
- after trend & best Ab	4.7%	15.3%
- after trend & max Ab	4.7%	15.3%
Revenue - after trend & zero Ab	4.7%	15.3%
- after trend & best Ab	4.7%	15.3%
- after trend & max Ab	4.7%	15.3%
Net Cost - after trend & zero Ab	91.2%	79.1%
- after trend & best Ab	91.2%	79.1%
- after trend & max Ab	91.2%	79.1%
Performance of Service - Actual (ie before Trend Adjustment & Abstraction)		
Subsidy/pass trip	1.55	1.34
Subsidy/pass km	0.20	0.18
Cost Recovery	38%	42%
Pass Trips/ Service Trips		
Pass Trips/ Km	0.76	0.83
Pass Km/ Km	5.79	6.34
Gross Cost / Pass Trips	2.52	2.31
Gross Cost / Pass Km	0.33	0.30
Gross Cost / Veh Km	1.92	1.92
Net Cost / Veh Km	1.18	1.11
Point Elasticity		
Performance of Service - After Trend Adjustment & Abstraction = 0		
Subsidy/pass trip	1.54	1.31
Subsidy/pass km	0.20	0.17
Cost Recovery	39%	42%
Pass Trips/ Service Trips		
Pass Trips/ Km	0.77	0.84
Pass Km/ Km	5.82	6.40
Gross Cost / Pass Trips	2.51	2.28
Gross Cost / Pass Km	0.33	0.30
Gross Cost / Veh Km	1.92	1.92
Net Cost / Veh Km	1.18	1.11
Point Elasticity		
Performance of Service - After Trend Adjustment & Best Estimate Abstraction		
Subsidy/pass trip	1.54	1.31
Subsidy/pass km	0.20	0.17
Cost Recovery	39%	42%
Pass Trips/ Service Trips		
Pass Trips/ Km	0.77	0.84
Pass Km/ Km	5.82	6.40
Gross Cost / Pass Trips	2.51	2.28
Gross Cost / Pass Km	0.33	0.30
Gross Cost / Veh Km	1.92	1.92
Net Cost / Veh Km	1.18	1.11
Point Elasticity		
Performance of Service - After Trend Adjustment & Plausible Max Abstraction		
Subsidy/pass trip	1.54	1.31
Subsidy/pass km	0.20	0.17
Cost Recovery	39%	42%
Pass Trips/ Service Trips		
Pass Trips/ Km	0.77	0.84
Pass Km/ Km	5.82	6.40
Gross Cost / Pass Trips	2.51	2.28
Gross Cost / Pass Km	0.33	0.30
Gross Cost / Veh Km	1.92	1.92
Net Cost / Veh Km	1.18	1.11
Point Elasticity		

Lyttelton : Sunday — Summary Sheet

Service start Date : Nov. 2000
Average Trip Length 7.6
Average Fare $0.97

Sunday

	Percentage Change 3 mth	8 mth
Service Trips	53.3%	53.3%
Service Km	52.6%	52.6%
Pass Trips	11.1%	17.0%
Pass Km	11.1%	17.0%
Gross Cost	122.3%	122.3%
Revenue	11.1%	17.0%
Net Cost	256.2%	249.2%
Trend Factor	3.5%	7.9%
Abstraction Factor - Best Estimat	0.0%	0.0%
- Plausible Max	0.0%	0.0%
After Trend & Abstraction(zero/best/max)		
Pass Trips - after trend & zero Ab	7.2%	7.7%
- after trend & best Ab	7.2%	7.7%
- after trend & max Ab	7.2%	7.7%
Pass Km - after trend & zero Ab	7.2%	7.7%
- after trend & best Ab	7.2%	7.7%
- after trend & max Ab	7.2%	7.7%
Revenue - after trend & zero Ab	7.2%	7.7%
- after trend & best Ab	7.2%	7.7%
- after trend & max Ab	7.2%	7.7%
Net Cost - after trend & zero Ab	260.9%	260.3%
- after trend & best Ab	260.9%	260.3%
- after trend & max Ab	260.9%	260.3%
Performance of Service - Actual (ie before Trend Adjustment & Abstraction)		
Subsidy/pass trip	2.58	2.41
Subsidy/pass km	0.34	0.32
Cost Recovery	27%	29%
Pass Trips/ Service Trips		
Pass Trips/ Km	0.54	0.57
Pass Km/ Km	4.13	4.35
Gross Cost / Pass Trips	3.55	3.38
Gross Cost / Pass Km	0.47	0.44
Gross Cost / Veh Km	1.93	1.93
Net Cost / Veh Km	1.41	1.38
Arc Elasticity	0.21	0.32
Point Elasticity	0.25	0.37
Incremental Impact - After Trend Adjustment & Abstraction = 0		
Subsidy/pass trip	29.26	27.35
Subsidy/pass km	3.85	3.60
Cost Recovery	3.2%	3.4%
Pass Trips/ Service Trips		
Pass Trips/ Km	0.10	0.11
Pass Km/ Km	0.78	0.83
Gross Cost / Pass Trips	30.23	3.73
Gross Cost / Pass Km	3.98	3.73
Gross Cost / Veh Km	3.09	3.09
Net Cost / Veh Km	2.99	2.98
Arc Elasticity	0.14	0.15
Point Elasticity	0.16	0.17
Incremental Impact - After Trend Adjustment & Best Estimate Abstraction		
Subsidy/pass trip	29.26	27.35
Subsidy/pass km	3.85	3.60
Cost Recovery	3.2%	3.4%
Pass Trips/ Service Trips		
Pass Trips/ Km	0.10	0.11
Pass Km/ Km	0.78	0.83
Gross Cost / Pass Trips	30.23	28.32
Gross Cost / Pass Km	3.98	3.73
Gross Cost / Veh Km	3.09	3.09
Net Cost / Veh Km	2.99	2.98
Arc Elasticity	0.14	0.15
Point Elasticity	0.16	0.17
Incremental Impact - After Trend Adjustment & Plausible Max Abstraction		
Subsidy/pass trip	29.26	27.35
Subsidy/pass km	3.85	3.60
Cost Recovery	3.2%	3.4%
Pass Trips/ Service Trips		
Pass Trips/ Km	0.10	0.11
Pass Km/ Km	0.78	0.83
Gross Cost / Pass Trips	30.23	28.32
Gross Cost / Pass Km	3.98	3.73
Gross Cost / Veh Km	3.09	3.09
Net Cost / Veh Km	2.99	2.98
Arc Elasticity	0.14	0.15
Point Elasticity	0.16	0.17

Figure H1 Lyttelton Patronage - Monday to Friday

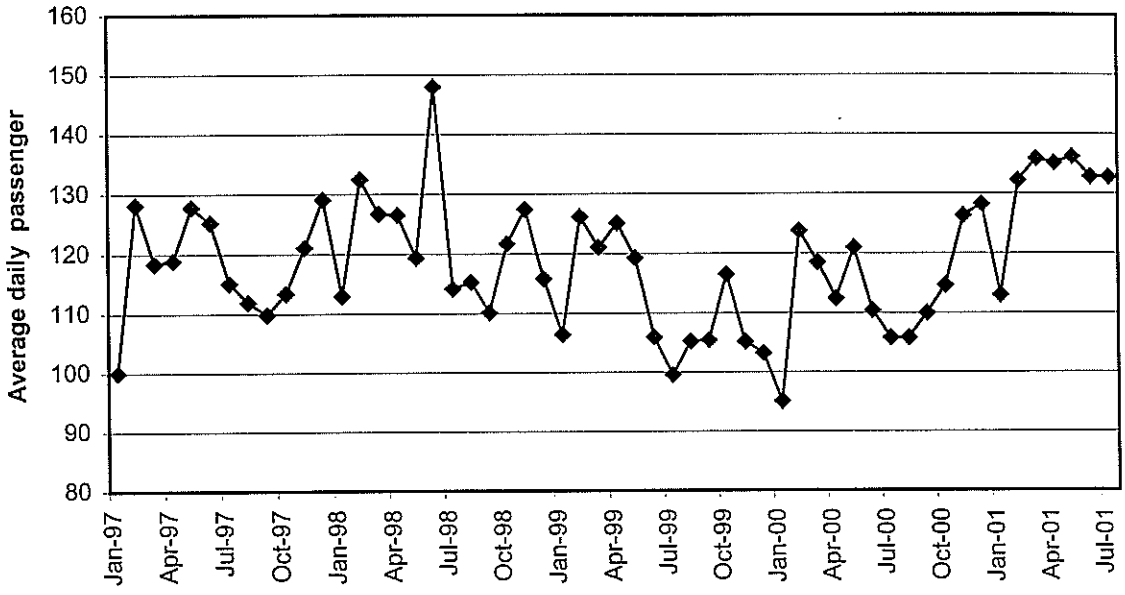


Figure H2 Lyttelton Patronage - Monday to Friday
(12 Month average)

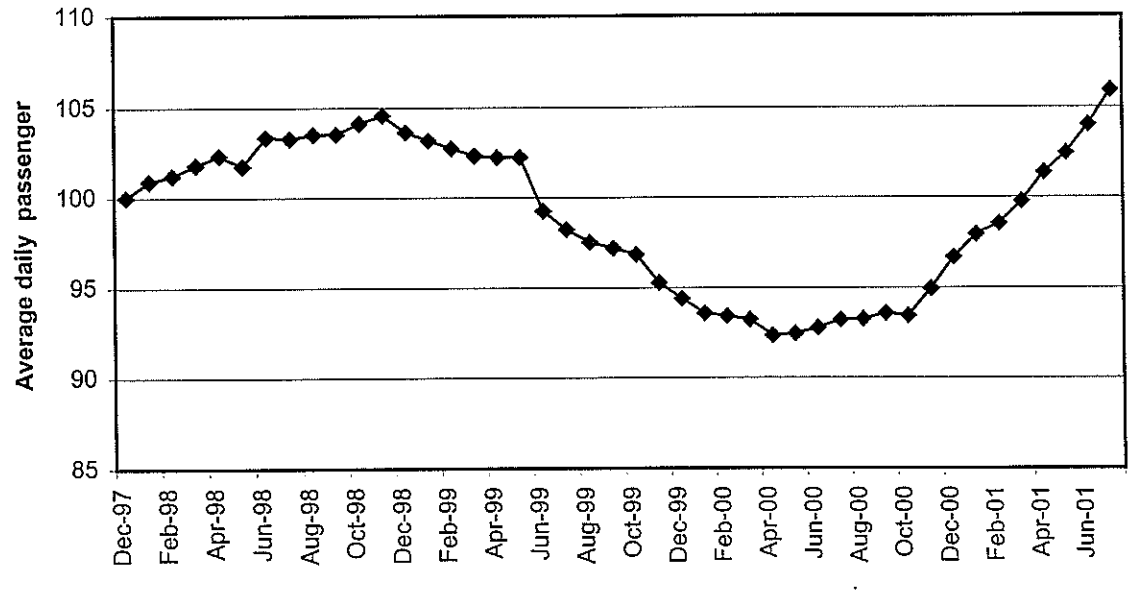


Figure H3 Lyttelton Patronage - Saturday

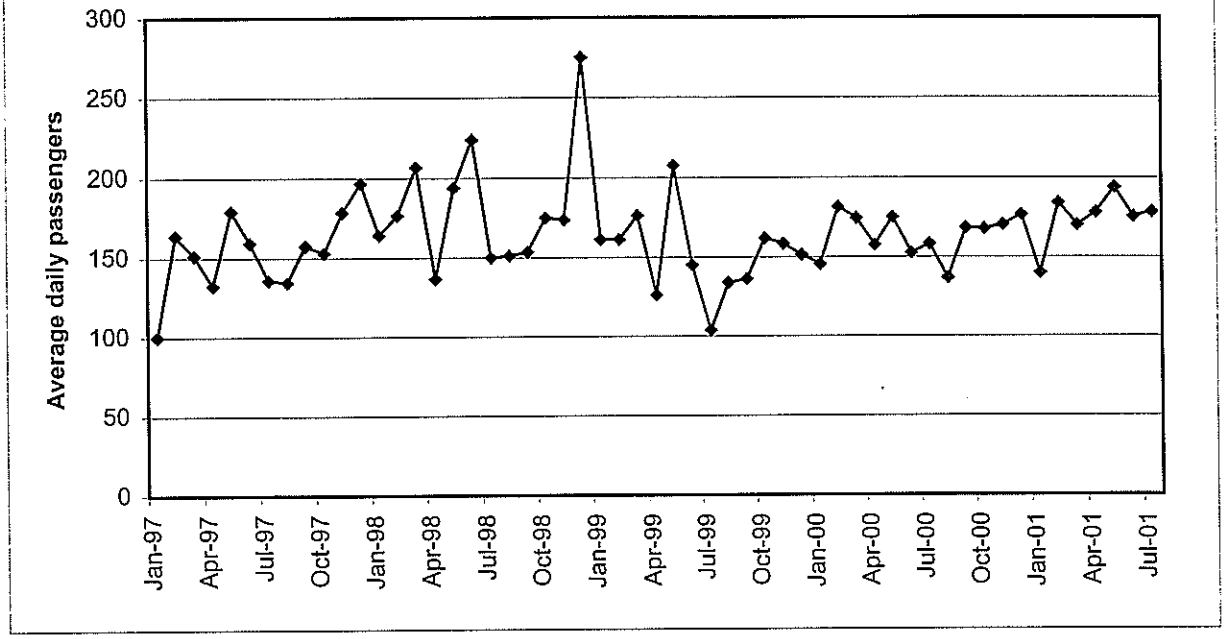


Figure H4 Lyttelton Patronage - Saturday
(12 Months average)

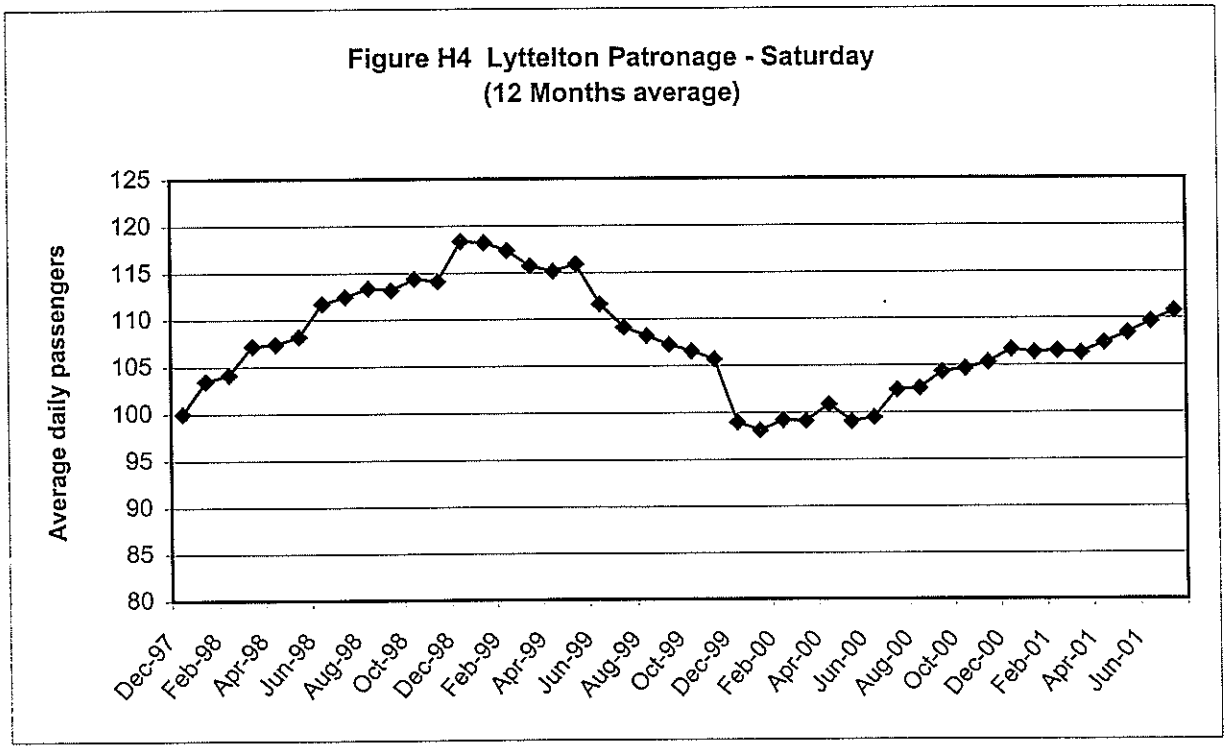


Figure H5 Lyttelton Patronage -Sunday

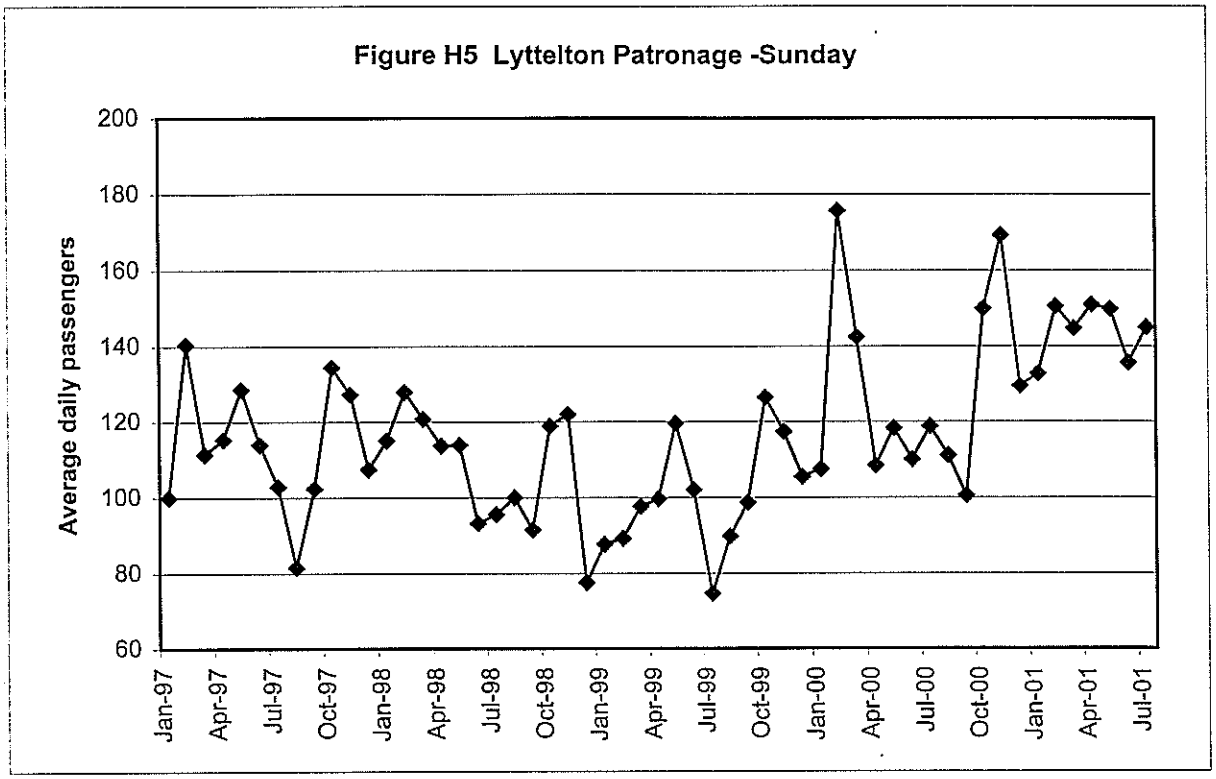
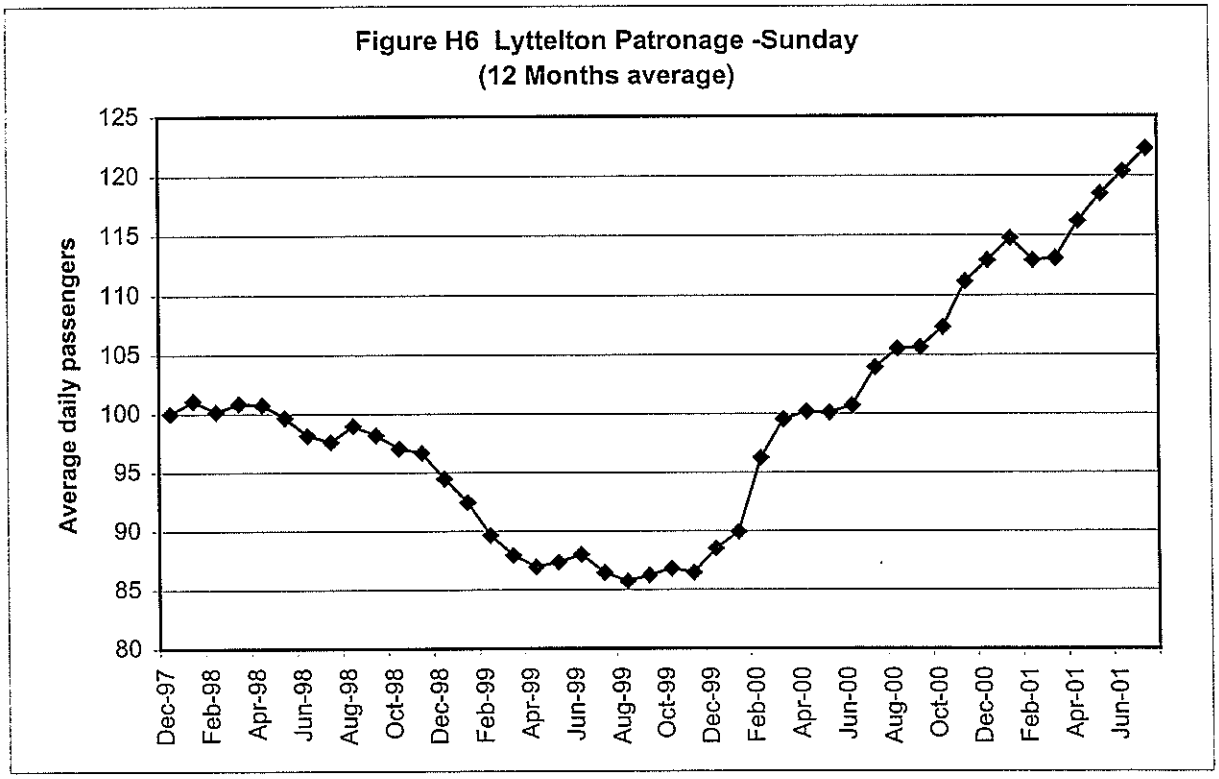
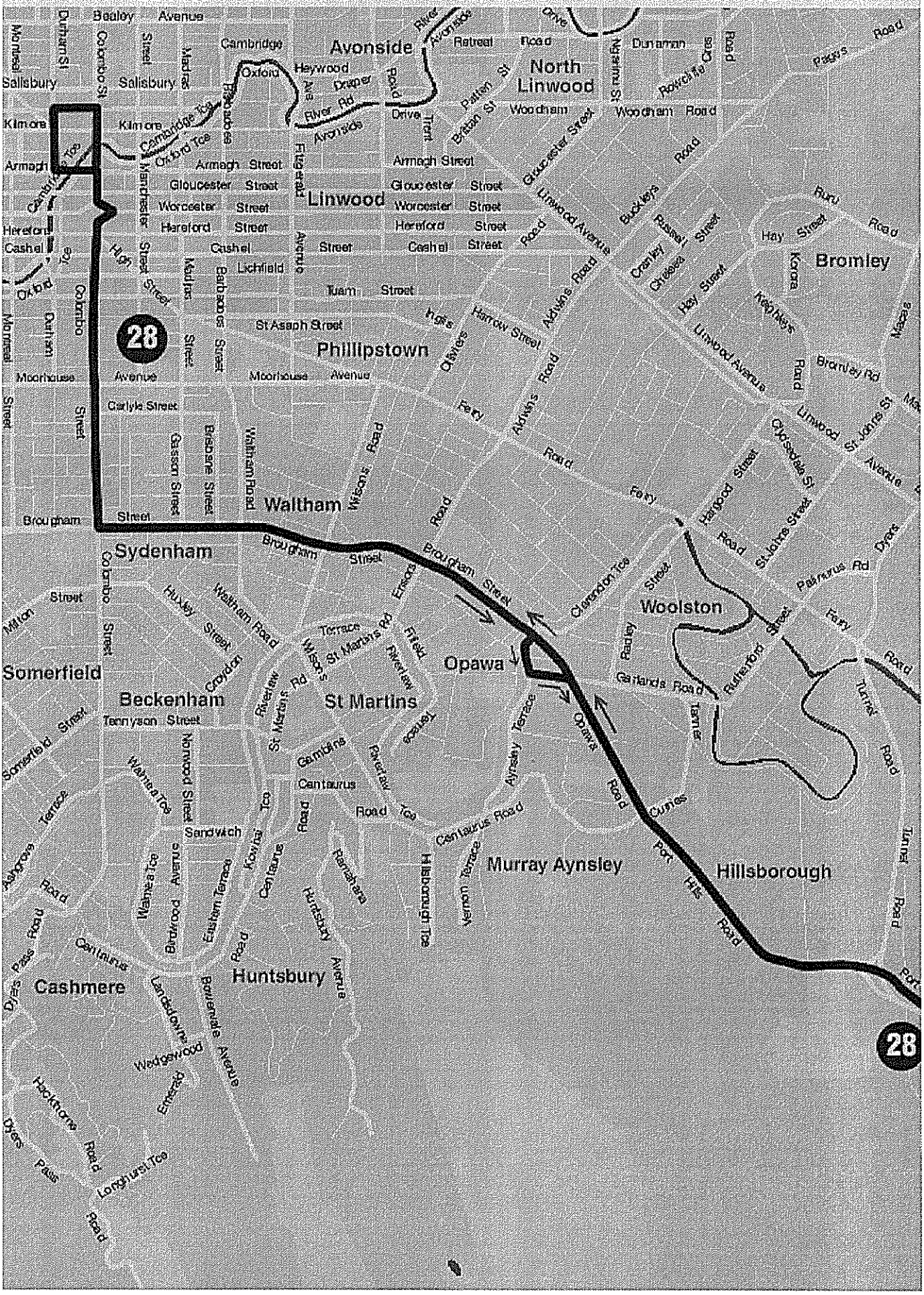


Figure H6 Lyttelton Patronage -Sunday
(12 Months average)



28 Lyttelton / Rapaki



Appendix 2 Regional Databases for Public Transport Patronage & Demographic/Economic Data

Before the project commenced, it had been considered that assembling a database of public transport patronage trends and the main patronage 'drivers' (demographic, economic, private transport costs, etc.) for each region may assist to "account for any external region wide influences on patronage .....", as discussed in the Study Brief. However, this approach was not as useful as initially envisaged given that:

1. The Data Required was Not Readily Available

We were only able to gather relatively full patronage trend and demographic/ economic trend data for the Auckland Region, and this data series has limitations in that data for most demographic/economic variables is not available from 1996 (last Census for which data is currently available). No accurate patronage trend data is available for the Wellington Region, and we had difficulty in obtaining demographic/ economic data for Christchurch.

2. Unable to Perform Statistical Analysis

Given that the change in variables do not tend to correspond in a simple manner with changes in patronage, it is not possible to draw conclusions as to the relative impact of different factors on patronage. To draw meaningful conclusions with this type of data set would have required multi-regression analysis, which was not included in the Study Brief. Also the small number of data points would have meant that multi-regression analysis would not have produced accurate results for this data set in any case, as a minimum of 30 data points for each variable is required to produce useful results.

3. Control Route/Total Analysis Produced Good Results

We were able to identify control routes/totals for all the case study services, which enabled the underlying patronage trend to be measured. There was therefore no need to also allow for external factors affecting patronage as these were incorporated in the control route/total trends.

The data gathered for each of the three regions is attached.

Auckland Patronage & Demographic/Economic Data

Auckland Urban Area PT Service

	1989/90	1990/91	1991/92	1992/93	1993/94	1994/95	1995/96	1996/97	1997/98	1998/99	1999/00	2000/01
Patronage (passenger boardings)												
	1989/90	1990/91	1991/92	1992/93	1993/94	1994/95	1995/96	1996/97	1997/98	1998/99	1999/00	2000/01
Bus	41,241	36,997	34,097	30,393	30,970	31,246	31,127	31,986	32,327	34,071	35,405	38,052
Rail	1,500	1,276	1,052	1,019	1,181	1,606	2,089	2,146	2,065	2,072	2,289	2,235
Ferry *	714	822	889	1,022	1,150	1,187	1,360	1,382	1,406	1,558	1,890	2,341
Total	43,455	39,095	36,038	32,434	33,300	34,039	34,576	35,514	35,799	37,701	39,585	42,628
Revenue ($)												
Bus			$34,864	$40,605	$40,633	$38,995	$38,525	$39,300	$42,812	$43,655	$44,504	
Rail			$1,768	$1,958	$2,326	$3,125	$4,059	$4,129	$3,968	$3,969	$4,470	
Ferry			$2,281	$2,743	$3,269	$3,418	$3,801	$3,486	$3,833	$4,436	$6,170	
Total			$38,912	$45,305	$46,228	$45,539	$46,385	$46,915	$50,613	$52,060	$55,144	
Average Fare ($)												
Bus			$1.02	$1.34	$1.31	$1.25	$1.24	$1.23	$1.32	$1.28	$1.26	
Rail			$1.68	$1.92	$1.97	$1.95	$1.94	$1.92	$1.92	$1.92	$1.95	
Ferry			$2.57	$2.68	$2.84	$2.88	$2.79	$2.52	$2.73	$2.85	$3.26	
Total			$1.08	$1.40	$1.39	$1.34	$1.34	$1.32	$1.41	$1.38	$1.39	
Vehicle Kms												
Bus			23019	23641	23641	24465	25362	26258	26388	26534	26738	
Rail			497	500	525	973	1002	991	1001	997	999	
Ferry			67	62	74	74	74	74	88	112	178	
Total			23583	24203	24240	25511	26437	27323	27476	27644	27915	

* Ferry excludes Waiheke

Note:

(i) year is July to June

(ii) vehicle kms should be revenue kms if possible

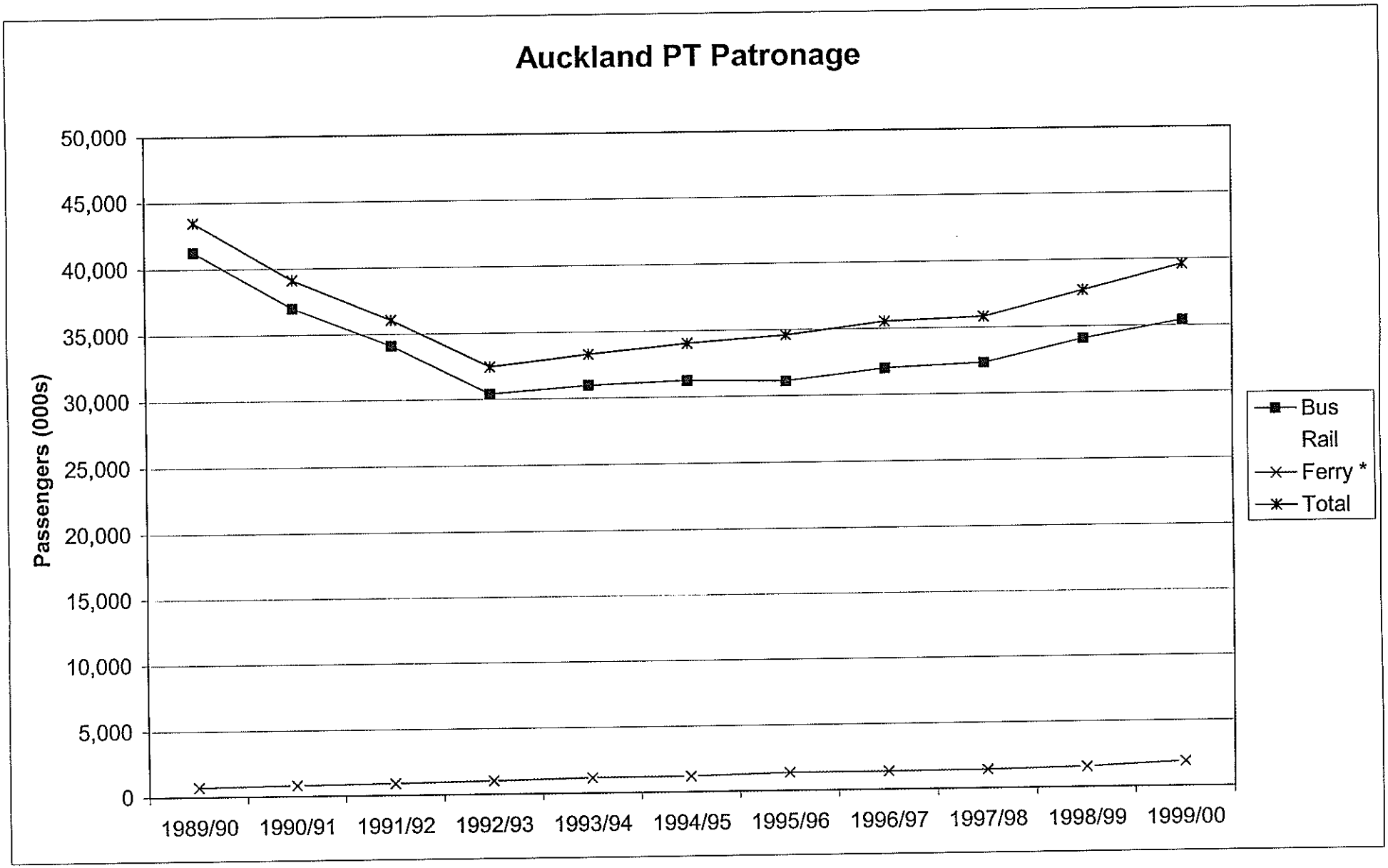
Auckland Urban Area Demographics & Economics

	1986	1989/90	1990/91	1991/92	1992/93	1993/94	1994/95	1995/96	1996/97	1997/98	1998/99	1999/00
Total Population	777,549	808,499	820,812	830,781	844,073	861,799	883,344	919,561	934,763	951,589	963,959	
Total Popn under 30 years	390,372	400,043	403,267	406,491	413,147	419,803	426,458	433,114	439,770			
Total Full-time Employed	337,266	333,389	332,096	330,804	332,008	333,212	334,417	335,621	336,825			
Total Part-time Employed	62,682	65,540	66,493	67,446	71,515	75,583	79,652	83,720	87,789			
No of households own 0 cars				37,497	37,010	36,523	36,035	35,548	35,061			
No of households own 1 car				119,328	118,357	117,386	116,416	115,445	114,474			
No of households own 2 car				88,668	91,354	94,039	96,725	99,410	102,096			
No of households own 3+ car				30,717	32,588	34,459	36,329	38,200	40,071			
Total Households				276,210	279,308	282,407	285,505	288,604	291,702			
Retail sales ($ Mar2000)			$10,588	$10,166	$10,673	$11,585	$12,513	$13,176	$13,158	$12,906	$12,887	$13,667

Notes:
(i) Auckland urban area is that area served by the PT service
(ii) It is recognised that data will only be available for the majority of these categories from the census, meaning entries only available for 1991 and 1996

	1986	1989/90	1990/91	1991/92	1992/93	1993/94	1994/95	1995/96	1996/97	1997/98	1998/99	1999/00
% Popn under 30 years	50.2%	49.5%	49.1%	48.9%	48.9%	48.7%	48.3%	47.1%	47.0%			
Labour Force Participation	0.47	0.45	0.45	0.44	0.44	0.43	0.42	0.41	0.41			
% 0 car owning hhds				13.6%	13.3%	12.9%	12.6%	12.3%	12.0%			
% Changes Year on Year												
Total Population		4.0%	1.5%	1.2%	1.6%	2.1%	2.5%	4.1%	1.7%	1.8%	1.3%	
% Popn under 30 years		-1.4%	-0.7%	-0.4%	0.0%	-0.5%	-0.9%	-2.4%	-0.1%			
Labour Force Participation		-4.5%	-1.7%	-1.4%	-0.7%	-1.2%	-1.6%	-3.1%	-0.8%			
% 0 car owning hhds					-2.4%	-2.4%	-2.4%	-2.4%	-2.4%			

Population growth over 1986 - 1998/99	23.97%
Annual popn growth rate (%)	0.89


Auckland PT Patronage
Passengers (000s)
50,000
45,000
40,000
35,000
30,000
25,000
20,000
15,000
10,000
5,000
0
1989/90
1990/91
1991/92
1992/93
1993/94
1994/95
1995/96
1996/97
1997/98
1998/99
1999/00
Bus
Rail
Ferry *
Total

	1989/90	1990/91	1991/92	1992/93	1993/94	1994/95	1995/96	1996/97	1997/98	1998/99	1999/00	2000/01
PT Bgs/Capita	53.7	47.6	43.4	38.4	38.6	38.5	37.6	38.0	37.6	39.1		
Bus Bdgs/Capita	51.0	45.1	41.0	36.0	35.9	35.4	33.8	34.2	34.0	35.3		
PT Veh Kms/Capita			28.4	28.7	28.1	28.9	28.7	29.2	28.9	28.7		
Bus Veh Kms/Capita			27.7	28.0	27.4	27.7	27.6	28.1	27.7	27.5		
PT Ave Fare			$1.08	$1.40	$1.39	$1.34	$1.34	$1.32	$1.41	$1.38	$1.39	
Bus Ave Fare			$1.02	$1.34	$1.31	$1.25	$1.24	$1.23	$1.32	$1.28	$1.26	

% Change Year on Year

	1989/90	1990/91	1991/92	1992/93	1993/94	1994/95	1995/96	1996/97	1997/98	1998/99	1999/00	2000/01
PT Bgs/Capita		-11.4%	-8.9%	-11.4%	0.6%	-0.3%	-2.4%	1.0%	-1.0%	4.0%		
Bus Bdgs/Capita		-11.6%	-8.9%	-12.3%	-0.2%	-1.6%	-4.3%	1.1%	-0.7%	4.0%		
PT Veh Kms/Capita				1.0%	-1.9%	2.7%	-0.5%	1.7%	-1.2%	-0.7%		
Bus Veh Kms/Capita				1.1%	-2.1%	1.0%	-0.4%	1.9%	-1.3%	-0.7%		
PT Ave Fare				29.4%	-0.6%	-3.6%	0.3%	-1.5%	7.0%	-2.3%	0.9%	
Bus Ave Fare				30.7%	-1.8%	-4.9%	-0.8%	-0.7%	7.8%	-3.2%	-1.9%	

Wellington Patronage & Demographic/Economic Data

Wellington Urban Area Demographics & Economics

	1986	1988	1991	1996	2001	Source	1998/99	1999/00
Total Population	392103		400275	424717	434009	MERA		
Total Popn under 30 years	198,282		193,680	187,782		MERA		
Total Full-time Employed	159012		146946	143187		MERA		
Total Part-time Employed	24423		27768	39084		MERA		
No of households own 0 cars		22297		21347	19546	BA&H		
No of households own 1 car		60697		67942	72244	BA&H		
No of households own 2+ car		38121		42796	45887	BA&H		
No of households		121115		132086	137678	BA&H		
Total Cars		182685		204889	219083	BA&H		
Retail sales	No Idea							

Notes:

(i) Wellington urban area is that area served by the PT service

(ii) It is recognised that data will only be available for the majority of these categories from the census, meaning entries only available for 1991 and 1996

Wellington Regional Council Patronage Funding Data

Baseline Returns

	Peak		Off Peak	
	Passenger Numbers	Passenger Kilometers	Passenger Numbers	Passenger Kilometers
July-99	1,155,423	18,711,213	1,050,745	10,801,976
August-99	1,546,271	19,886,111	1,113,535	10,257,680
September-99	1,255,968	18,448,904	1,085,377	11,006,749
October-99	1,242,706	17,704,671	1,021,126	10,415,012
November-99	1,359,880	19,397,037	1,048,621	10,914,434
December-99	969,961	14,781,651	1,101,492	11,917,767
January-00	772,750	12,379,445	950,645	10,506,272
February-00	1,401,652	19,712,059	1,089,981	11,331,611
March-00	1,611,143	22,679,963	1,264,462	13,044,636
April-00	1,013,652	15,112,928	1,017,991	10,519,420
May-00	1,558,632	22,070,270	1,105,485	10,873,429
June-00	1,378,338	19,794,151	1,031,740	10,127,458

Christchurch Patronage & Demographic/Economic Data

Greater Christchurch

Includes Chch urban and school services, plus Ferry, Burnham, Rangiora, and Airport services

Year	Jul	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Total	% Change
92-93	687 792	564 076	597 181	602 505	559 047	555 556	477 856	603 824	681 203	621 642	605 329	622 985	7 178 996	
93-94	632 377	647 072	607 522	588 598	587 357	579 568	505 247	634 897	750 837	623 314	673 232	671 112	7 501 133	4%
94-95	651 296	695 787	659 199	630 209	666 197	620 041	556 433	674 657	792 297	623 051	740 262	693 609	8 003 039	7%
95-96	708 625	744 013	697 970	708 854	722 159	621 578	591 355	713 409	787 083	667 543	782 900	641 115	8 386 604	5%
96-97	699 731	766 035	713 442	767 921	731 399	643 194	619 329	751 447	789 898	766 161	821 107	747 042	8 816 706	5%
97-98	803 135	774 445	780 767	788 424	715 120	679 733	601 644	738 460	852 846	715 137	763 031	784 536	8 997 279	2%
98-99	759 388	764 435	765 511	750 887	728 052	671 334	570 504	743 831	879 598	716 895	811 807	786 024	8 948 266	-1%
99-00	752 397	836 130	810 918	792 658	763 248	714 423	610 658	858 398	972 295	730 999	915 335	821 903	9 579 362	7%
00-01	833 766	903 113	848 455	837 782	847 851	777 355	717 273	887 690	1042 727	838 696	1021 015	935 653	10 491 376	10%
01-02	975 019													