



Whenuapai Airbase social and economic impact study

Report to Enterprise Waitakere

July 2003

Preface

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Executive Summary

NZIER and Corydon Consultants Ltd. have been commissioned by Enterprise Waitakere, in association with Waitakere City Council, to provide an assessment of the potential economic impact the decision of the Crown to vacate Whenuapai Airbase ('the Base') will have on the Waitakere and North West Auckland (NW) regional economies. Our impact study analyses the downstream effects of the withdrawal of the Base's expenditure on output and employment in the two economies. It also looks at the degree to which the Base population contributes to local service infrastructure. Our findings can be summarised as follows:

- With total gross output of \$102.7 million, the Base currently accounts for 2.3% of total industry output in Waitakere City. The output multiplier of 2.3 implies that the loss of this output will result in a further \$132.2 million decline in output in the rest of the Waitakere economy. Therefore, the total impact of the removal of the base is \$234.9 million in output terms.
- The output multiplier for the defence industry in the NW sector is 2.5, higher than that for Waitakere alone. This suggests that the loss of the Base will result in an additional loss in output of \$153.5 million from the NW economy. Thus, the impact of the loss of the Base on the NW districts excluding Waitakere (ie. Rodney District and North Shore City) in output terms will be around \$21.3 million.
- The employment multiplier for the Base in Waitakere is 1.6, suggesting that the loss of the Base's 1,061 (full-time equivalent) jobs would result in the loss of an additional 586 jobs in Waitakere. The two principal contractors employed by the Base expect to make 90 staff (75 full-time equivalents) redundant following the closure of the Base. Other local businesses are likely to experience a short-term decline in sales, until the accommodation currently occupied by Base staff is reoccupied.
- With the closure of the Base, up to a possible 355 privately-owned homes could be released onto the market in a short space of time. This may depress local property prices, though approximately 120 of those houses are owned by civilians who are not as likely to vacate once the Base closes down. The release of a further 421 houses associated with the Base could exacerbate this effect.
- Local schools would lose pupils (in the short-term) and experience some social disruption. Both schools and local recreation groups would lose a range of assistance provided by the Base, including security, equipment, fundraising and facilities, as well as the capacity to respond to emergencies. We estimate the maximum number of families that could be lost to the region to be 826.
- However, the Base's contribution to the local economies has been declining over the last 20 years. This gradual wind-down, together with the amount on notice of the closure, is likely to reduce the impact of the closure, both on Base staff and the local economies, from that which would otherwise have been the case.

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1. Introduction

NZIER, in association with Corydon Consultants Ltd., has been commissioned by Enterprise Waitakere (EW) and Waitakere City Council to provide an assessment of the potential economic impact that the Crown's decision to vacate Whenuapai Airbase will have on the Waitakere and North West Auckland regional economies. This assessment is required to assist EW in evaluating the need for action to avoid the long term negative impact that the loss of this activity may have. EW wants to gain an understanding of the impact on the local economy in terms of the activities provided and the services, product purchased, and the number of people employed both directly and indirectly.

These considerations form the basis of this impact study, which analyses the downstream effects of the withdrawal of expenditure on output and employment in the two economies. In addition, we examine the degree to which the base population contributes to local service infrastructure.

2. Historical analysis

2.1 Introduction

This section looks at the history of Whenuapai Airbase ('the Base') and its relationship with the local community across time. The reference point is predominantly Waitakere City; however, some comparisons are made with the North West (NW) sector of Auckland (i.e. the area covered by the combined Rodney District, North Shore City and Waitakere City Territorial Authorities). There is somewhat of a dearth of information available on Base operations. Information was most scarce in relation to the period when Whenuapai operated as an international airport. As a result, there are some inevitable gaps in the data and analysis. As time series data on the Base population were not readily available we have largely restricted our coverage to history, personnel (employment) and incomes.

2.2 Background¹

Located near the upper reaches of the Waitemata harbour, around twenty minutes' drive from central Auckland, Whenuapai airfield is one part of what is known as Base Auckland.² Grassed areas surround the base, although urban sprawl has seen residential housing gradually encroach on the largely rural backdrop.

Construction of Whenuapai as a base for Wellington bomber aircraft began in the late 1930s, at the behest of Sir Ralph Cochrane, the RNZAF's first Chief of Air Staff. This followed the purchase by the Air Force of 600 acres, which took effect on 5 September 1938. Turning the land from swamp and kauri forests into a useable airfield was a difficult task, undertaken in great secrecy and urgency due to the imminence of WWII. The construction of the hangars to house the Wellington bombers and the airmen was obviously not an insignificant undertaking and indicates the substantial impact Whenuapai had on the local area even in its infancy. The cost of building the hangars alone was estimated to be about £100,000.

2.3 Wartime activity and beyond

One of the reasons for establishing the base was to provide American reserves in the Philippines a place to land in New Zealand. Such a landing place was considered necessary in light of the impending battles, especially

¹ Most of the material presented here is drawn from Ingersoll (undated). Rather than reference separately, this footnote serves as a general reference.

² The other part of Base Auckland is Hobsonville, whose operations are winding down in 2002/03.

the Battle of the Coral Sea. Following the Japanese bombing of Pearl Harbour in 1941, activity on the base picked up substantially. Indeed, Whenuapai became the main entry and exit point for aircraft that were to serve in the Pacific. The heavy aircraft placed pressure on its hitherto grass runways, such that in 1942 the Government authorised the immediate construction of a concrete runway at Whenuapai. This meant an additional 500 men were required for a period of about six months, just to do the work. Housing for the men was also required. While no precise figures for Whenuapai are available, the cost of the concrete runways at Whenuapai and Ohakea was estimated at £1.4 million.

Following the war, activities at Whenuapai were scaled back drastically. Aircraft on loan were either returned or scrapped, most of the new bases set up both in New Zealand and overseas were closed down and an air of uncertainty hung over the future of the Air Force. Whenuapai was kept operational and in late 1945 it opened to civilian air traffic, with the intention of turning it into an international airport. In 1947 National Airways Corporation (NAC) took over the passenger and freight carrying service, and regular services between Whenuapai, Paraparaumu and Harewood ensued. A regular international flight from Whenuapai to London, via Sydney, Darwin, Singapore, Bombay, Basra, Athens and Rome started in April 1963, and continued until November 1965. It was in 1965 that the international airport opened on the site of Auckland Aero Club's original airfield at Mangere, and civilian operations moved there after around twenty years operating out of Whenuapai.

According to a *Metro* magazine article in 1983, the mid-1960s saw tremendous change in the local RNZAF scene. The departure of civilian operations allowed a return of focus to military activities and radical aircraft re-equipment also took place, with significant leaps in technology. The piston-engined Handley-Page Hastings gave way to the pressurised, turbo-prop Lockheed Hercules; while the Sunderland flying boats were replaced by the latest in Lockheed Orion maritime patrol aircraft, containing highly sophisticated electronic surveillance gear. This was also the time that the previously separate stations of Hobsonville and Whenuapai were merged into one and became RNZAF Base Auckland.

More recent data has been difficult to obtain, but what has been made available suggests a declining role for the Base over the last 20 years.

2.4 Personnel

Perhaps the greatest contribution of Whenuapai to the local economy has been in terms of the large numbers of people associated with the Base. As described above, these numbers were not restricted to those military personnel and civilians who actually worked on the base. They also included tradespeople, general labourers and associated service providers.

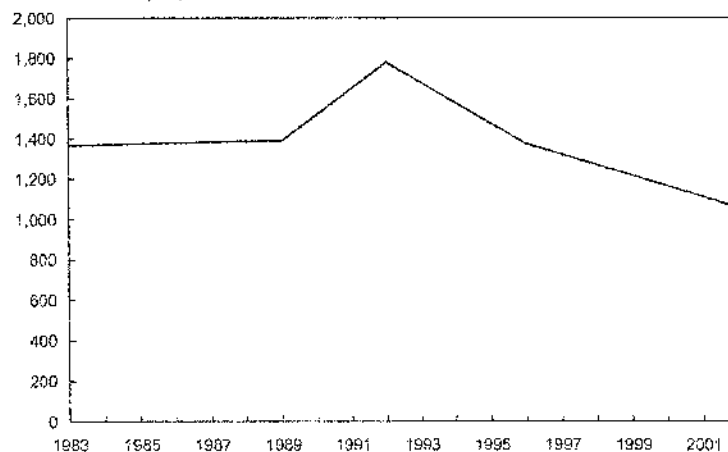
Useful information on the numbers of these ancillary people is not readily available so the focus of our analysis will be on Base employees.

The number of Base staff in 1940 was estimated at approximately 300 people. Within a few years, this had grown to about 2,000. Obviously the war effort required large numbers, but such a rapid increase in such a short space of time is remarkable.

It was estimated that, in 1983, Base Auckland employed a total of around 1,300 service personnel and 76 civilians (*Metro*, 1983). This represented around a third of the RNZAF total for that time. In 1989, estimates placed the total numbers at around 1,400, while in 1992 there were some 1,700 military and 90 civilian personnel in total (RNZAF, 1992). Figure 1 below presents estimates of the numbers of employees on the base over time. Despite a brief increase in the early 1990s, overall numbers have been in general decline over the period. While the average annual percentage change in full-time equivalent (FTE) personnel³ for the period 1983-2002 was -1.3%, the corresponding figure for the period 1991-2002 was -5.0%, indicating quite a rapid decline in Base employee numbers in the last ten years.

Figure 1 Base personnel

Number of employees



Source: RNZAF, *Metro Magazine*

Figure 2 (below) shows total employment of those usually resident in Waitakere City (on an FTE basis) and the proportion of that employment the Base represented during 1986-2001.⁴ As we would expect given the reduction in numbers of Base staff, the proportion of employment of those

³ FTE numbers are calculated as all full-time staff plus half of part-time staff (we used the number of employees defined as casual as a measure of part-time employees). For the historical data points, we assumed that the same proportion of overall staff were part-time as was the case in 2002.

⁴ Note that we have assumed that all of the personnel employed by the Base reside in Waitakere City.

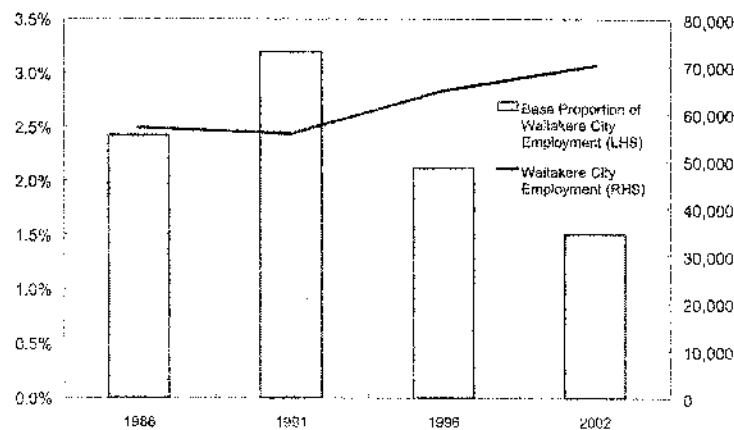
usually resident in Waitakere City accounted for by the Base shows a declining trend (except for the significant rise in the second period). Conversely, total employment of those usually resident in Waitakere City shows an increasing trend, with annual average percentage growth of 1.3% over the period 1986-2001, compared with an annual average decline for Base numbers of -1.7%. These trends serve to exacerbate the decline in the proportion of Waitakere City employment accounted for by the Base.

In essence, since 1986 the contribution of the base has declined both in absolute terms and relative to total employment for those usually in Waitakere City. The latest data available indicate that the Base accounted for around 1.5% of total employment of those usually resident in Waitakere City in 2002,⁵ which is slightly less than half of what it was in 1991.

In 1986, the Base accounted for around 1.0% of employment of those usually resident in the NW sector, while in 2002, that figure was 0.6%. During the temporary rise in employment in 1991, the base accounted for around 1.2% of FTE employment in the NW sector. While not shown in the chart below, the annual average percentage change in employment of those usually resident in the NW sector as a whole was 1.6% from 1986-2002, meaning the contribution of the Base to this sector was declining at an even faster rate than for Waitakere City.

Figure 2 Waitakere City usually resident total employment and Base share

Percent of Waitakere usually resident employment (LHS), number of FTEs (RHS)



Source: Statistics NZ, Various

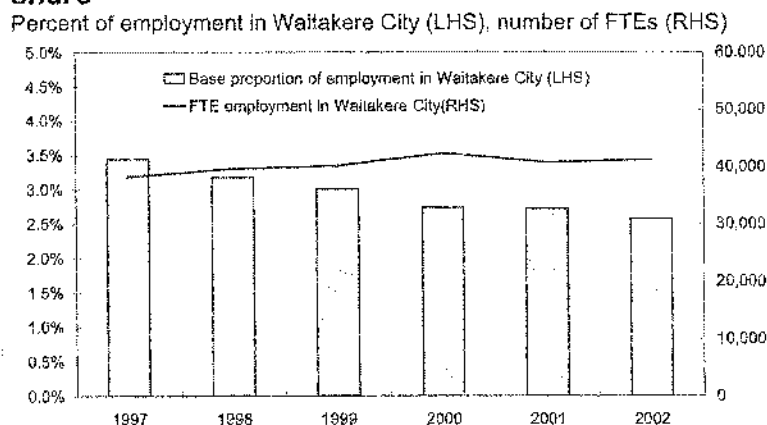
The figures above are census data, which were used to try to show the trends over time. While useful for this purpose, they tend to underestimate the

⁵ We have inferred total FTE employment for Waitakere City in 2002 from the 2001 data using the annual average percentage change for 1986-2001, and the FTE formulation mentioned in footnote 4 above.

contribution of the base to Waitakere City because they measure employment of the population usually resident in Waitakere City. This includes those who live in Waitakere City, but actually work outside the authority boundaries.⁶ When we consider employment within Waitakere City itself, the contribution of the base is made even more clear. Figure 3 (below) tells a similar story to the figure above. What is interesting is the same general relationship as Figure 2 but a difference in magnitude.

While FTE employment within Waitakere City has been growing at a slower rate than employment of the usually resident population, a divergence is emerging between the proportion of the employment provided by the Base in Waitakere City and FTE employment in Waitakere City. The reason this divergence is less marked is that the Base actually accounts for a larger proportion of employment within Waitakere City than it does in terms of employment of the usually resident population (on average there is about a one percentage point difference for the years that we have data). While we do not have a long time series of data to work with, this is an issue that should be borne in mind when considering the effect of the Base on Waitakere City.

Figure 3 Employment in Waitakere City and Base share



Source: Statistics NZ, Various

⁶ Anecdotal evidence suggests that Waitakere City exports around 40% of labour, while importing only around 19%, so there is in effect, a net outflow of people who live in Waitakere City but travel outside the area to work.

To get a better idea of the relative significance of the Base, we have compared the 2002 count of personnel in terms of FTEs with other industries in Waitakere City and the NW sector in Table 1 below.⁷ While tiny in comparison with the manufacturing and retail trade industries, the base itself employs more people than either of the agriculture, forestry and fishing, mining and utilities industries in Waitakere City. It employs roughly the equivalent of 41% of the total number of FTEs employed in the accommodation, cafés and restaurants sector in Waitakere. As we will explain in the section on multipliers below, the Base may actually be responsible for some of the employment in this (and other) sectors.

Table 1 Composition of usually resident employment by industry 2002

Industry	Share of FTEs (%)	
	Waitakere	NW sector
Agriculture, forestry and fishing	1.33	2.23
Mining	0.02	0.06
Manufacturing	15.84	12.94
Utilities (electricity, gas and water supply)	0.24	0.23
Construction	7.33	7.64
Wholesale trade	7.75	8.17
Retail trade	12.67	12.50
Accomm. Cafes and restaurants	3.38	3.54
Transport and storage	4.05	3.81
Communication services	1.83	1.81
Finance and insurance	3.63	4.35
Property and business services	11.96	14.05
BASE STAFF	1.36	0.51
Other govt. admin. and defence	2.30	2.93
Education	6.92	6.77
Health and community services	7.03	6.92
Cultural and recreational services	2.49	2.74
Personal and other services	4.12	4.09
Not elsewhere included	5.34	4.72

Source: Statistics New Zealand, Various

To get a measure of whether the Base was an exceptional case among industries in terms of the reduction in staff numbers, we compared employment in 1986 with the corresponding figure in 2002 for a range of industries in Waitakere City.⁸ The results are shown in Figure 4.

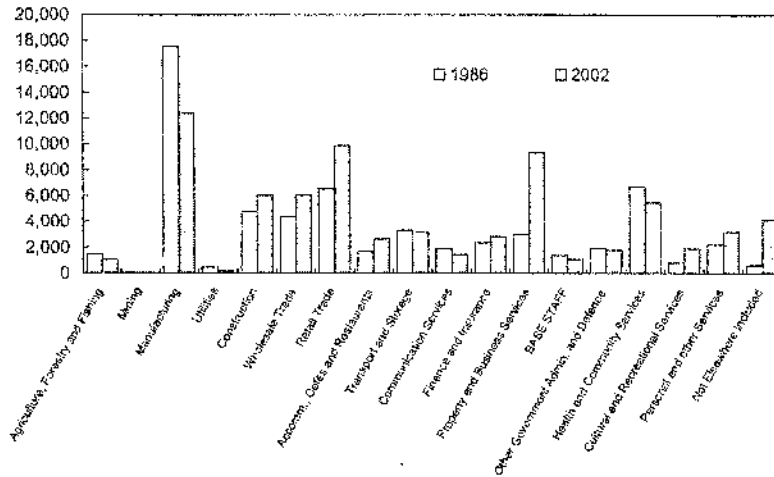
⁷ We have applied the average annual percentage change figure to 2001 industry employment to derive the 2002 figures.

⁸ While there were differences in the number of industry classifications in 1986 and 2001, we conducted a concordance exercise to be able to make valid comparisons. In addition we applied the average annual percentage change figure to the 2001 data to derive the 2002 figures. We did not

The number of industries that shed staff between 1986 and 2002 was about the same as those whose numbers increased. Table 2 (below) presents the percentage changes in industry employment in Waitakere City between 1986 and 2002. It shows that the average change in employment across all industries was an increase of around 52%, while Base staff numbers declined by around 23%. Excluding those who were not adequately defined, the big movers during this time were services related – particularly cultural and recreational services and property and business services. Retail trade also saw just above average growth, but is particularly noteworthy because of its already high base in 1986.

Figure 4 Employment by industry of those usually resident in Waitakere City

Full time equivalent employees



Source: Statistics NZ, Various

have time series data for employment within Waitakere City on a comparable industry basis, so these figures will tend to underestimate the relative size of the Base.

Table 2 Change in usually resident employment 1986-2002 – Waitakere City

Industry	Percentage change in employment
Agriculture, forestry and fishing	-29.6
Mining	-49.3
Manufacturing	-29.4
Utilities (electricity, gas and water supply)	-58.4
Construction	26.4
Wholesale trade	38.7
Retail trade	51.7
Accomm. Cafes and restaurants	58.0
Transport and storage	-4.6
Communication services	-23.7
Finance and insurance	20.9
Property and business services	209.9
BASE STAFF	-23.1
Other govt. admin. and defence	-7.5
Health and community services	-18.3
Cultural and recreational services	137.2
Personal and other services	44.7
Not elsewhere included	590.6

Source: Statistics New Zealand, Various

2.5 Incomes

The original purpose of this section was to look at the incomes of Base personnel with a view to seeing if, and how these changed over time. It was considered useful to ascertain levels and changes in the incomes of Base staff relative to other industries in the local area. If those on the Base have higher than average income levels, then the impact of the relocation will be felt more acutely in the local economy than if their income levels were lower than average. That is, assuming that Base employees have roughly the same consumption patterns as non-Base employees, the effect of the relocation on the local economy will be more pronounced than is suggested by the employment figures alone.

However, we were unable to obtain sufficiently robust data to make valid comparisons over time. Thus, we have only two data points to work from:

- total wages and salaries of Base employees in 1992,⁹ and

⁹ See NZDF Land Management Planning Study, 1992.

- average salaries of Base employees by arm in 2002.

Therefore, our ability to compare and analyse incomes over time was severely constrained. We were able to compare the information we had with Census data on *total incomes* by industry for Waitakere City and the NW sector, but it should be borne in mind that, as a general rule, salaries and wages only form part of an individual's total income, and would therefore tend to underestimate such a measure.

Our limited comparison provides some evidence in support of the hypothesis that jobs data alone may underestimate the economic impact of the Base. In 2002, the average salary of Base staff of around \$38,700 was greater than the average total income of FTE employees in Waitakere City of around \$37,300.¹⁰ Once other sources of income are considered, Base employees' total incomes are likely to be even greater than non-Base employees on average. This confirms that measuring the loss to the local economy only in terms of FTE jobs from the relocation decision would tend to underestimate the actual impact across the community.

In 2002, Base employees accounted for around 1.5% of total FTE employment in Waitakere City, while the total salaries alone (i.e. excluding other potential income sources such as interest or dividends) of those employees was equivalent to around 1.7% of the total incomes of employees in Waitakere City. So, while we have limited data to work from, there is some evidence that those Base jobs that would be lost to Waitakere City as a result of the relocation are remunerated at a higher level than average. In addition, the Base data we worked from did not include the salaries of the 23 foreign personnel on exchange, as they are not paid by the RNZAF. Obviously, these people would expend some of their income in the local economy, which is not counted here as we do not have information on their remuneration levels.

2.6 Expenditure

Table 3 (below) sets out total Base expenditure in 1992 and 2002. The 2002 figure for salaries and wages was provided by NZDF. Other figures for 2002 are based on the 1992 figures, and assume that the proportion of total expenditure on these items has remained the same over the decade. When considered against a backdrop of a drop in overall numbers, the similarity between the wages and salaries bill in the two years suggests Base employees have enjoyed increases in remuneration over that period.

¹⁰ In order to enable comparison, two steps were taken. First we took the midpoint averages of income bands from the 2001 census bands, multiplied by the number of FTE for each band (with an imputed amount of \$150,000 for those registered as having a total income over \$100,000). Second, we calculated the percentage change in Public Sector weekly earnings and applied that to the 2001 numbers to derive the 2002 figures. This is imperfect, but useful for exposition purposes.

Table 3 Base expenditure

	Expenditure 1992 (\$ million)	Expenditure 2002 (\$ million)
Salaries and wages	40.3	41.3
Goods and services	9.0	9.2
Works and services	4.0	4.1
Rates	0.3	0.3
Fuel	11.0	11.3
TOTAL	64.6	66.2

Notes: (1) Data on wages and salaries provided by NZDF, all others estimated assuming identical shares of total expenditure in 2002 as in 1992.

Source: NZDF, NZIER

2.7 Summary

Analysis in this section has been hampered by the lack of availability of key data. The data supplied by NZDF covered only a relatively short time period, and came with caveats around its accuracy. Notwithstanding this, we have been able to place the impact of the Base in an historical context and look at some high level comparisons across time. It is clear that the Base today is not as significant as it was in the past, when it was first a key part of wartime operations, and later operated as Auckland's international commercial airport.

While employment at the Base has been declining, employment of those usually resident in Waitakere City has been increasing. This has accentuated the decline in the Base's proportion of FTE employment of those usually resident in Waitakere City. However, these figures tend to underestimate the Base's presence in Waitakere City when we look at employment within Waitakere City itself. The difference in magnitude between these two measures is around one percentage point in the years for which we have data. While we were not able to make a strict concordance with the time series data on an industry basis we do have, the general point about the relative size of the Base should not be overlooked.

Despite this, there is some suggestion that the Base's contribution to the local economy is not so large today as it was in the past and therefore the economic consequences of the closure will not be as significant as they would have been in the past. It is likely that the impact of the closure will be further reduced by the amount of warning provided, which means that all those affected have time to adjust their behaviour.

In saying this however, the Base could not be considered insignificant to the Waitakere City economy. Given that the average income levels of Base staff are higher than those of average non-Base employees, the impact in terms of jobs lost will be magnified, assuming similar consumption patterns. Finally, the Base has contributed more to the community than jobs and incomes, and that loss will also be felt in the 'hearts and minds' of local residents. A discussion of social impacts follows.

3. Social impacts

3.1 Analytical framework

A review of literature about the effects of major company closures in New Zealand over the past 20 years or so shows a pattern in the types of impacts experienced by the towns and districts in which these closures took place.¹¹ Commonly the following impacts were experienced:

- A drop in the value of house sales as relatively large numbers of houses are put on the market over a short period.
- A drop in house rent prices as a surplus of rental housing becomes available.
- Loss of key skills from the wider community (e.g. health workers and teachers) as spouses leave town with those made redundant.
- Loss of volunteers from community organisations.
- Closure of businesses that had been reliant on sales to the company and its employees (leading to further redundancies).
- Increased household debt, defaults on mortgages and rents, and increased incidence of service disconnections.
- Disruption to community structures resulting from the influx of newcomers, loss of friends and family members, as well as workers losing the sense of camaraderie gained through being part of the organisation's workforce.
- Symptoms of stress among school pupils due to anxiety and uncertainty in the homes of those affected by redundancy and the loss of friends when families move away.
- A high turnover in school rolls, with associated disruption to school programmes as those made redundant leave and new people move in.

It should be noted however that there are at least four significant areas of difference between the situations described in the literature on industrial closures and that of the Whenuapai Base closure.

¹¹ Clutha Valley Hydro-development, closure of Mosgiel woollen mill and Patca and Southdown freezing works. See also *Closedown: A review of New Zealand literature pertaining to industrial closings and mass redundancies, 1980-1984* (Ministry of Works and Development, May 1985).

1. With the exception of Southdown in South Auckland, most of the documented closures happened in provincial areas, away from major cities. Whenuapai is part of the Auckland region, the biggest population centre in the country and as such is in an area where housing is in demand, house prices are disproportionately high, and employment opportunities are relatively plentiful.
2. Most of the employees affected by the documented closures were made redundant, whereas when the Base is closed, most of the employees will have the choice of transferring to Ohakea or some other part of RNZAF operations. They will not be made redundant although it is expected that some will choose to resign or retire early rather than be relocated.
3. Most of the documented closures were relatively sudden with little time to implement mitigation strategies to reduce the effects on workers and the community.
4. According to the Base Commander at Whenuapai, the Base operates to a large extent as a community within a community -- largely self sufficient in terms of many services as well as social networks. Employees are well-conditioned to transfers and tend not to 'put their roots down' because of this. Permission to survey the base employees was not forthcoming and so we were not able to verify this perception to any great extent. However, information gained through interviews with a variety of agencies indicate that the Base is seen, at least by some, as part of the Whenuapai community and that a number of people employed at the Base have a reasonably high level of interaction with the wider community.

We cannot verify the extent to which Base employees have established local social networks. This would be a major determinant of the degree to which they are likely to be affected by the closure and relocation. However, we have been able to interview a range of agencies and organisations in the local community that interact with the Base in some way. The differences between this closure and that of most major industrial closures as outlined above, will inevitably reduce the relative severity and scale of the social effects experienced by the Whenuapai community and by the Base employees. Nevertheless, some social effects can be expected. This report focuses on the effects of the closure on the community, not on RNZAF employees. The scale of the impact on the community will depend largely on the number of Base employees who decide to leave the area.

3.2 Method

We had intended to carry out a random survey of 25% of those currently employed at the Base, primarily to obtain information on such things as:

- The extent to which Base personnel engage with the local community and the types of community activities they engage in.
- Employment status of spouses.
- The extent of home ownership and private renting among staff.
- The length of time staff had been employed at the Whenuapai Base.
- The decisions that personnel are most likely to make when the Base closes, i.e. whether to stay with RNZAF and re-locate or stay in Auckland and either retire or look for alternative employment.

It was intended that this information would be supplemented by information gained through interviews with schools and other agency representatives in the local community. However, permission to carry out a staff survey was not forthcoming from the RNZAF and so the interviews with schools and agencies became the primary source of information. This has been supplemented by data provided by RNZAF on organisational structure, employees' age groups, family status and home ownership.

3.3 Key findings

3.3.1 How many are leaving?

Currently the Base employs 1,067 personnel (1,061 FTEs). According to the Base Commander (Stu Mackenzie), up to 100 of these people could still be required in Auckland as Naval Support staff. If that is so, on current staff levels, as many as 967 people and their immediate families could potentially leave the area in 3-5 years, depending on the timing of the closure. We place at 826, the maximum number of families that would leave as a result of the Base's closure.

Information provided by RNZAF shows that the majority (70%) of the current workforce is aged between 21 and 40 years. The regular force (RF) is by far the largest group of employees and the majority of these (75%) are 35 years or younger. By the time the Base closes at least 37 employees will be close to or over the usual retirement age of 65 years.

Table 4 Whenuapai Base employees by age and service arm

As at 1/12/02

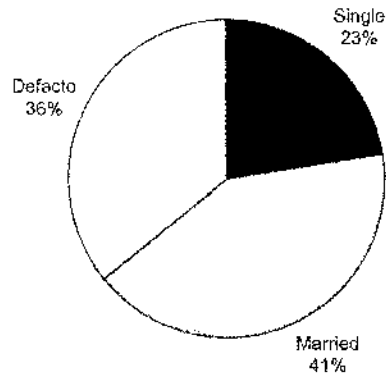
Age Group	Arm					Total
	Civilian	Casual	Foreign	Non-Reg	Regular	
20 and under	1	2	0	2	68	73
21 to 25	5	1	0	4	221	231
26 to 30	4	1	3	0	174	182
31 to 35	21	1	4	0	170	196
36 to 40	19	0	9	0	116	144
41 to 45	24	1	5	0	61	91
46 to 50	16	0	2	0	23	41
51 to 55	23	0	0	3	6	32
56 to 60	30	1	0	5	4	40
61 and over	20	5	0	12	0	37
Total	163	12	23	26	843	1,067
Average Age	47	45	38	52	30	34

Source: NZDF

Of the 1,067 employees, the majority (826 or 77%) are married or living in de-facto relationships and 240 (22%) are single (Figure 5). The majority of the workforce has been employed in the Airforce for less than 9 years. The vast majority of those who have served more than 9 years are married or in de-facto relationships while the majority of single employees have served 5 years or less.

Figure 5 Whenuapai Base personnel by marital status

As at 1/12/02, all arms



Source: NZDF

According to the Base Commander, Air Force personnel are used to being posted to a variety of locations and it is common for people to be moved every 2-5 years. This organisational culture is likely to substantially mitigate the impacts of the closure on Base employees, their families and the decisions they make regarding their future, relative to that normally experienced with a major closure. A number of factors are likely to reduce the impacts on Base employees.

1. A widespread acceptance of a transitory lifestyle among the Base personnel.
2. The sense of 'community' usually derived from one's neighbourhood or town is likely to be derived from the social and professional networks within the Base itself. This is enhanced by the self-sufficiency of the Base in terms of recreation and other facilities (e.g. the after-school programme).
3. Consequently, many of the Base personnel, especially single people with no children, can be expected to have relatively weak links with the wider community.
4. Because of the frequency of postings, the Base population is reasonably fluid and, according to the Base Commander, it can be expected there will be a 25% turnover of current personnel by the time the Base actually closes. Those that take their place will have no expectation of a long-term stay.
5. The 'Return of Service' rule for those who have been put through training courses by the RNZAF means that employees to whom it

applies are bound to the Force for a number of years, during which time they may be posted to wherever the Force chooses. According to the Base Commander, people in this category are generally younger employees, especially air crew. Those who do not fit into this category will be able to choose to leave the Force when the Base closes. No information was available on the numbers of personnel in each category.

The Base recently conducted a series of focus group consultations among employees to ascertain their willingness to transfer to Ohakea. They found there was a significant degree of reluctance among some sections of the workforce to move. This reluctance was based on a range of factors including:

- Not wanting to disrupt their children's schooling (particularly in the case of those with high school aged dependants).
- Their spouses or partners had a good job which they did not wish to give up.
- They had put down roots in the area – owned their own home and/or a boat and liked the Auckland lifestyle.

Although the proportion of those who said they were not willing to move was initially high, according to the Base Commander this proportion is declining as people become accustomed to the idea. He expected that by the time the Base is finally closed, most staff would have decided to transfer to Ohakea rather than leave the Air Force.

We were unable to verify this. From comments made by Base staff and others it seems likely that a significant proportion may decide to leave the Air Force and stay in Auckland. The Principal of one of the schools interviewed stated:

"I know that not all the families are planning to move to Ohakea when the [closure] occurs. Some have told me that they intend to resign and stay in the local area because of spouse's employment or because they have older children settled into local high schools."

One of the few Base personnel we were able to interview said that, based on discussions with others employed on the Base, he estimated that, at this stage, at least 25% intend to resign rather than go to Ohakea. The reasons he cited were the same as those reported from the focus group process (see above).

The uncertainty regarding the numbers of personnel who will have a choice and what choices they are likely to make mean it is impossible to estimate the number and family status of people likely to stay and their family status.

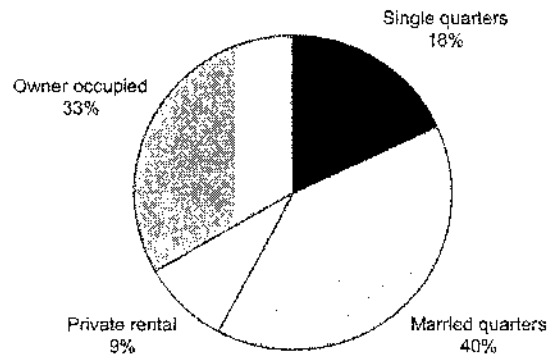
This precludes an accurate assessment of the effects of the closure on some areas such as the private housing market and schools. However there are a number of other areas where effects can be assessed with some certainty.

3.3.2 Effects of house sales

Information provided by the RNZAF shows that 355 (33%) of the current workforce live in their own homes (Figure 6). Of these, 262 are married.

Figure 6 Whenuapai Base personnel by accommodation type

As at 1/12/02, figures refer to people rather than households



Source: NZDF

The results of the staff focus group consultation process recently conducted by the RNZAF show that married staff who own their own homes are the least likely to be prepared to relocate to Ohakea. A concern expressed by staff in the focus groups was over the need for sufficient notice of the closure to enable those living in their own houses to organise the sale of their homes. The release of 355 houses onto the property market within a short period could have a significant effect on house prices in the area. However, this figure can be considered as an upper bound, as around 120 houses are owned by civilians, who would be less likely to vacate with the closure of the Base. Without any information on the location and geographical spread of these houses it is not possible to calculate the likely severity of this effect. Also, as indicated above, an unknown proportion of these homeowners may choose not to leave.

3.3.3 Disposal of RNZAF accommodation

There are 421 houses associated with the Base (on the Whenuapai Base, near the Base and at Hobsonville) as well as single quarters that can accommodate over 190 people. At this stage, Housing New Zealand Corporation (HNZC) has not declared an interest in acquiring the vacated

Base accommodation although there seems to be a general perception in the area that this will happen. Another option would be to sell the houses for removal. HNZC staff currently involved in discussions over the future of land and accommodation associated with the Base consider it highly unlikely that many, if any, of the houses will be sold for removal; they will more likely be reoccupied in situ. The urban design work currently being undertaken by the Waitakere City Council and HNZC is based on this assumption.

Negotiations are currently underway with HNZC regarding the future of 136 ha of RNZAF land in the Hobsonville area. This includes the Hobsonville village area, 90 ha of bare land and 30 ha of land occupied by Defence-related infrastructure. Some of this land is of interest to the Ministry of Education for two future schools; much of the remaining land could be developed by the Corporation for residential use.

Housing New Zealand Corporation advised that under its policy of 'pepper-potting' state housing, only about 25% – 30% of the sections will be used for state rental accommodation. The rest will be sold either to owner-occupants or for private rental accommodation.

The development of the surplus land for residential use means that there will be a significant increase in the residential population of the Hobsonville and Whenuapai area over the medium term. Whatever the future ownership status of the surplus Base houses, given the demand for housing in the Auckland region they are likely to be reoccupied within a short time. Some of the occupants will be state tenants, although most can be expected to be private home owners.

3.3.4 Impacts on contractors and local retailers

There are two principal contracting companies employed on the Base – Eurest and Serco. Eurest runs all the hospitality and accommodation services on the Base including the cafeteria and the cleaning of the accommodation blocks and officers' mess. Altogether they employ 60 people at the Base, 35 of whom are employed full time. All of these jobs will become redundant with the closure of the Base.

Serco is responsible for the cleaning of all the non-accommodation buildings as well as building maintenance and grounds maintenance. This company employs 30 people on the Base, about 25 of whom are employed full-time. The part-time workers are cleaners; the majority of the other employees are trades people. All 30 jobs will become redundant when the Base closes.

There will be a number of other businesses in the Whenuapai/Hobsonville area for whom a high percentage of clientele are associated with the Base. Some of the small-scale retailers in the Whenuapai and Hobsonville

shopping centres may fall in this category. These businesses are likely to experience a decline in sales and a loss of employment capacity, at least in the short-term until the Base accommodation is reoccupied and the HNZC subdivision becomes a reality.

3.3.5 Impacts on the community

a) Impacts on Schools

Information provided by RNZAF shows that there are approximately 548 children with one or more parents employed at the Base. Of these, 139 are pre-school, 263 primary or intermediate, and 146 secondary. The Base Commander advised that the majority of younger pupils attended Hobsonville and Whenuapai Primary Schools while most of those of secondary school age were split between Massey High School (which has the Base within its zone) and Westlake Boys and Girls. Because of the size of the school rolls, and the fact that most RNZAF families do not live on the Base itself, information on the numbers of these children attending each secondary school was difficult to obtain.

The numbers attending each school (as reported by each school) show a large number of pupils unaccounted for when compared with the figures supplied by RNZAF. The figures for the two primary schools can be assumed to be reasonably accurate because the relevant pupils in each class were actually counted. However this was not possible at the secondary school level because of the number of classes involved. When the discrepancy was discussed with Massey High they confirmed that it could be assumed that the majority of the 146 secondary pupils referred to in RNZAF figures (i.e. in excess of 100) attended their school. The figures reported by the schools together with the numbers of staff and Board of Trustee members with connections the Base are shown in Table 5.

Table 5 Schools attended by pupils whose parents work at Whenuapai Base

School	Total pupils	No. of pupils with parents at the Base	% of total school roll	No. of teachers whose partners work at the Base	No. of BOT members* from the Base
Hobsonville Primary	613	58	9.5%	2	0
Whenuapai Primary	385	52	13.5%	1	2
Massey High	2,300	Likely to be in the order of 100	4%	4	0
Westlake Boys High	1,960	18	0.9%	1	0
Westlake Girls High	2,050	unknown	unknown	0	0
Totals	7,308	135		8	2

- Boards of Trustees

Primary schools

Judging from the above figures, the two primary schools are likely to experience significant impacts. Not only do they have a significant proportion of pupils with parents employed at the Base, but they also rely on the Base for a wide variety of resources and staff support.

Whenuapai Primary has the highest level of interaction with the Base. This school uses the Base's heated indoor pool for all its swimming classes and for its sports day, and uses the Base grounds for its cross-country events. The Base assists the school in a variety of ways including:

- Providing large tents and outdoor lighting facilities for gala days.
- Making staff available and providing visual aids (slides and maps) for talks on specialist topics.
- Donating surplus equipment such as computers and printers.
- Providing access to the Base's weather station for science projects.
- Providing equipment for Health and Safety fire extinguisher training at the school.
- Help with networking of the school's equipment by technicians from the Base.

Further, the school principal attributes the absence of vandalism at the school to the 24 hour presence of the Base security staff.

Unlike Hobsonville Primary, Whenuapai is a zoned school. This restricts the pool of potential students and as a consequence the school roll is very stable. If the Base houses are not re-occupied quickly or are relocated, this school could experience a significant drop in its roll. To address this, the school would need to drop its zoned status and actively recruit pupils from outside the area.

Hobsonville Primary regards the Base as very much part of their school's identity – their logo even incorporates helicopters. Hobsonville's roll is expanding as more families choose this school for their children. The school is not concerned about the loss of pupils from the Base, which they anticipate will relieve a potential overcrowding situation. However, there is concern about the potential loss of associated facilities and parental support. Hobsonville uses the Base swimming pool for training and borrows tents from the Base for outdoor education activities and gala days. According to the Principal, parents associated with the Base play a big role in fund raising and sports events and also accompany school field trips.

Experience from other major closures indicates that for the two primary schools, a high turnover in school rolls and associated disruption to school programmes can be anticipated as Base employees leave and new people move in. According to the school principals, the majority of the pupils in both schools come from settled, supportive families with 'rural' values. A number have parents or even grandparents who attended the same school. Both schools place high value on fostering a culture of respect and responsibility among pupils, and have a policy of zero-tolerance of aggressive behaviour. The principals of both primary schools are very concerned about the potential impact of the Base's closure on the culture of their schools, the way their school operates and the quality of the relationships between pupils. The nature of the socio-economic impacts will depend very much on decisions related to the future location and occupancy of the Base houses. Large numbers of newcomers with contrasting values and backgrounds will provide a challenge for integration, especially if the transition happens over a short time period.

Because of the high number of students potentially involved, school morale could be detrimentally affected by children from families under stress as a result of the closure. If large numbers of families move away, those left behind will experience the loss of friends and social networks.

Secondary schools

Information on the number of pupils with parents employed at the Base was not available from Westlake Girls High and data from Westlake Boys cannot be relied on for the reasons noted above. Given the overall size of

their rolls and the fact that the Base is not within the zone for Westlake Girls or Boys, these schools are not likely to be affected to any significant degree by the loss of pupils from the Base. Neither school has Trustees from the Base and Westlake Boys has only one teacher associated with someone employed at the Base. Massey High will be more affected. Although the number of pupils with parents working at the Base is estimated to be in the order of 4%, this school will potentially face the need to replace four teachers whose spouses/partners work at the Base.

b) Impacts on recreation groups

There are four sets of recreation facilities at the Base that are regularly used by outsiders: the swimming pool, the golf course, and the rowing and yachting facilities. As noted above, two schools rely on the Base's swimming pool. Others in the surrounding community also use the pool. The nearest alternative facility is in Henderson.

The golf course has considerable patronage from the community around the Base as well as from wider Waitakere. Membership is open to anyone. There are a number of alternative golf courses in Waitakere with West Massey, a 10-15 minute drive from Whenuapai, being the closest. However, the Whenuapai course is less expensive than other courses and for this reason some golfers are prepared to bypass other facilities to use the one at the Base.

Westlake Boys High and Westlake Girls High both use the Defence Department's boating facilities at Hobsonville. The Boys High has 60 rowers enrolled which makes it one of the largest public rowing schools in the country. The Girls High has about 35 rowers. In addition, 5-6 rowers from the Waitemata area access the facilities under the umbrella of Westlake Boys. Westlake Boys has a fleet of 22 15m rowing boats which are stored on the Hobsonville site in an old hanger and a storage shed belonging to the Airforce. The Girls High has about 15 boats which are also stored on the Base's Hobsonville site.

If these schools lose access to such storage capacity within close proximity to the places where they row, their ability to continue with the sport would be seriously impeded. Alternative sites such as Lake Pupuke are unsuitable for serious training, and the boats are too fragile and cumbersome to be transported long distances to and from storage.

The RNZAF Base Auckland Yacht Club at Catalina Bay has 122 members, 60% of whom are civilians. The RNZAF restricts the numbers of civilians who can join the club. Once the Base closes, the club expects the number of members to double. The club runs organised races for every class of boat each weekend in the summer and every second Sunday during the winter, as well as year-round races on Wednesday evenings. In addition, the club hosts a regatta every two years for clubs west of the Harbour Bridge. It is the high

quality of the facilities that makes this possible. The club uses the boating facilities on the Hobsonville site which include a jetty, workshop, tractor shed, shed and dinghies for the rescue boat, toilets, a concrete ramp, a pontoon and a club house. The club is well patronised for a number of reasons:

- There is a strong sense of camaraderie among the members, many of whom have been with the club long-term.
- It is the only club on the western harbour with a club house.
- It is not constrained by the tide as is the case for the nearest alternative facilities at Clearwater Cove, West Park, Marua and Herald Island. Te Atatu is restricted by the Harbour Bridge.

The club hopes that the Waitakere City Council will acquire the yacht club site (which, according to the Commodore, is on reclaimed land with no previous owner) and then enter into a lease with the yacht club for the facilities.

c) Impacts on the local fire brigade

According to the Principal Rural Fire Officer for Waitakere, there is a great deal of formal and informal interaction between the Urban and Rural Fire Brigades and the Whenuapai Base. This includes shared training courses, assistance with fire fighting, attendance at accidents and civil defence and emergency support.

The Base provides specialists for particular fire-fighting courses (such as in the use of foam). The Civil Defence Regional Urban Search and Rescue Teams are trained at the Base (2-3 day courses). During these courses the Base provides catering and accommodation. According to the Principal Rural Fire officer, it will be very hard to find an alternative to this facility and any alternative is likely to be much more expensive. He thought it inevitable that this would lead to a reduction in the number of training courses run.

Base personnel also assist with the control of nearby fires and with car accidents. The NZ Fire Service trucks have a water carrying capacity of 1,200-1,800 litres whereas those from the Base can carry 3,000-4,000 litres. The extra capacity comes in very handy for rural fire-fighting. The nearest Fire Service truck is at Waitemata but if that is unavailable a truck has to be brought from Henderson or Avondale. Traffic on the highways can cause severe delays for trucks coming from these areas. The Principal Fire Officer believes the closure of the Base will result in delayed response rates in some cases. The cost of allocating a truck to the Whenuapai area to replace those currently available from the Base could not be justified.

According to the Principal Fire Officer, the closure of the Base will also have a detrimental effect on the local capacity to respond to civil emergencies. The Base has a rostered fire crew of at least ten at all times as well as a ready-response force of about fifty that can be called on in the event of a civil emergency. The Base is also able to provide hospital and cooking facilities and shelter for large numbers of civilians in the event of a civil emergency.

“What we are going to miss is the day-to-day unofficial assistance and co-operation that make things easier for us and for ratepayers”.

4. Economic impacts

4.1 Method

National input-output (IO) tables are produced reasonably regularly by Statistics New Zealand. The most recent of these is for the year ending March 1996, and this forms the basis of the Auckland/Waitakere regional IO tables. Regionalisation is done using a mix of Statistics New Zealand business demographic and population census data. Effectively, we use employment and business location data as a proxy for regional economic activity, and use this to split national business sales and purchase transactions, as recorded in the national input-output table, into regional allocations. Similarly, regional population distribution is used as a proxy to allocate household spending across regions.

An IO table shows the sales and purchases between sectors, including those between industries, households, and overseas (i.e. imports and exports). The IO table provided by Statistics New Zealand, which forms the basis for our analysis, comprises 126 separate industries, one of which – ‘defence’ -- includes the activity of the Whenuapai airbase. Thus, we can use a Waitakere City regional IO table to depict the flows specific to the local defence sector.

The inter-industry nature of the IO table provides the basis for valuing the flow-on effects through the local economy of a change in one sector. That is, by manipulating the input-output table, we can derive the impact on Waitakere City of the withdrawal of the Whenuapai airbase. This estimation is typically known as *input-output* or *multiplier* analysis. The remainder of this section explains what multipliers are and how they are derived. Section 4.2 presents the results of our IO analysis of the contribution of the Base to the economies of Waitakere City and the NW sector.

4.1.1 What is a multiplier?

A multiplier is a means of measuring the magnitude of the role that a particular sector plays in the overall economy. This measure takes account not just of a sector's direct economic contribution, but also its degree of inter-relatedness with other sectors and households. For example, a sector with a relatively small number of employees may draw heavily from other sectors, and thus have a much larger economy-wide impact than its employment share would suggest.

In simple terms, derivation of industry multipliers rests on the notion that in order for a particular sector to produce goods or services, it must purchase inputs from other sectors. These sectors in turn rely on the provision of

inputs from yet more sectors, and so on. Whenuapai airbase, for example, is a user of electricity, which is provided by businesses in the electricity generation sector. Electricity generators in turn depend on inputs from the oil, gas and coal sectors, amongst others. These sectors in turn purchase materials from a range of other sectors.

Furthermore, a sector has the potential to affect the level of household spending via its role as an employer. Employment provided by the airbase, for example, provides income to the households of its employees, which is in turn used to purchase goods and services. These goods and services require additional production by their respective supplying sectors, which as we have seen above, gives rise to a chain of flow-on effects through other industries.

These simple illustrations show that the potential economic impact of Whenuapai airbase extends well beyond the immediate provision of defence services. The purpose of multipliers is to fully capture this impact.

Multipliers are essentially ratios that relate the size of the economy-wide impact resulting from an initial change in a particular sector, to the size of that initial change. Thus, an output multiplier of 2.9 for a particular sector indicates that if that sector were to increase output, economy-wide output would increase by 2.9 times that amount. Importantly, this economy-wide change includes the initial change.

There are three broad effects of an change in production activity associated with the withdrawal of Whenuapai Airbase:

- The *direct effect* is the initial decrease in the current level of expenditure by the Base.
- *Indirect effects* are the flow-on effects on supplying sectors – that is, former suppliers to Whenuapai will in turn be required to lower their production (i.e. purchases of inputs) once the Base orders cease; suppliers' reduction in production will lead to falls in their suppliers, and so on.
- *Induced effects* record the additional change in activity in the economy that is induced by a change in the income accruing to households. Each of the subsequent falls in production activity arising from the Whenuapai closure, for instance, will lead to some decline in the value of wage and salary income paid to employees (because, potentially, staff are either required to work fewer hours, or fewer staff are required). This fall in wage and salary income will depress household consumption, which in turn will put further downward pressure on production activity.

The magnitude of these effects, within given boundaries, will depend not only on the size of the initial decline (in this case taken to be the current level of expenditure of the airbase) but also on the level of 'leakages' of expenditure from the Waitakere and North West Auckland regional

economies¹². This depends partly on the location of industries providing goods and services to Whenuapai (within or outside the region) and in turn where these supplier industries source their inputs from. It also depends on the propensity to consume or save of the industries or households concerned.

4.1.2 Caveats

For a host of reasons, multipliers must be interpreted with caution. In particular, three key points should be noted:

- (i) Multipliers assume that sectors combine inputs, and produce outputs, in fixed proportions.
- (ii) Multipliers take no account of induced changes in relative prices.
- (iii) Multipliers assume that labour and capital are available in unlimited quantities.

As an illustration of the effect these assumptions can have on economic impact analysis, consider the closing of the Whenuapai airbase in general terms. This will have the potential to generate unemployment. In the real world the labour force is not unlimited in size, and basic economics tells us that additional supply of a limited resource will have a tendency to lower the price of that resource. In turn, changes in input prices will tend to lead (to some degree) to substitution toward the relatively less expensive inputs (from the relatively more expensive alternatives); however, the assumptions underlying multipliers preclude this.

These effects, alone or combined, will tend to lead to a multiplier which is greater than the true economic impact on a region of a change in one industry. That is, multipliers have a tendency to overstate economic impacts.

A detailed description of multiplier methodology is set out in Appendix A.

4.2 Results

Our IO analysis allows us to analyse the contribution of the Base to the regional economies of Waitakere City and the NW sector.

Because practically all defence employment in the Waitakere Territorial Authority is by the Whenuapai Base (with only a very small number of employees remaining at Hobsonville), we can reasonably assume that it accounts for almost the entire industry in our Waitakere-level regional analysis. The NW sector includes other defence activities (e.g. Devonport

¹² The North West Auckland sub-region includes Rodney, Waitakere City and North Shore Territorial Authorities.

Naval Base). However, by looking at this wider region, we also capture more of the flow-on effects of Whenuapai itself.

4.2.1 Output¹³

Waitakere City

Total gross output from the Base totals \$102.7 million. This accounts for 2.3% of total gross output in Waitakere. Table 8 sets out gross output by industry, and contribution to total gross output for Waitakere.

The output multiplier of the Base for Waitakere is 2.3¹⁴, implying that an initial \$1 increase in activity (output) by the Base generates a further \$1.30 of output elsewhere in the Waitakere economy.¹⁵

NW sector

Total gross output of the defence industry in the NW sector amounts to \$295.3 million, or 2.2% of total gross output in the region (see Table 9).

The output multiplier for defence in the NW sector is 2.5, higher than that for Waitakere alone. This suggests that the loss of the Base will result in an additional loss in output of \$153.5 million from the remainder of the NW economy. Thus, the impact of the loss of the Base on the NW districts excluding Waitakere (ie. Rodney District and North Shore City) in output terms will be around \$21.3 million.

4.2.2 Employment

Waitakere City

The employment multiplier for the Base is 1.6 in Waitakere. This means that, for every additional job created on the Base itself, an additional 0.6 (FTE) positions are created elsewhere in Waitakere.¹⁶

NW sector

The employment multiplier for defence in the NW sector is 1.6, the same as for Waitakere.

¹³ Note that these output figures differ from our expenditure estimates in 2.6. Our analysis was hampered by lack of timeseries data from NZDF.

¹⁴ Note that we have rounded the multipliers in the text to one decimal place. The calculations in the tables are derived from multipliers to four decimal places.

¹⁵ To put this multiplier in perspective, the industry output multipliers for Waitakere City range in value between 1.9 and 2.9.

¹⁶ The underlying assumption is that an increase in employment will cause (or is driven by) a proportionate increase in each of the other inputs, which in turn leads to additional activity and employment in other sectors. That is, it is not the increase in the Base's employment *per se*, that generates further employment elsewhere; rather it is the general increase at the Base, of which increased employment is a part.

Table 6 Multiplier effect - Waitakere

	Direct impact	Multiplier	Indirect effect
Employment (FTEs)	1,061 ¹⁷	1.6	586
Total gross output (\$ million)	102.7	2.3	132.2

Source: NZDF, NZIER

Table 7 Multiplier effect – NW sector

	Direct impact	Multiplier	Indirect effect
Employment (FTEs)	1,061	1.6	681
Total gross output (\$ million)	295.3	2.5	441.3

Source: NZDF, NZIER

¹⁷ Recall that this figure represents FTE employees. While overall Base employment is 1067, this includes 12 staff defined as casual. In keeping with the standard definition of FTE, we have included half of the part-time/casual staff and all of the full-time staff in our FTE calculations.

Table 8 Industry contribution to total gross output - Waitakere

Industry	Gross output (\$ millions)	% total gross output
Construction	632.4	13.9
Retail Trade	409.6	9.0
Wood and Paper Product Manufacturing	392.5	8.6
Wholesale Trade	354.9	7.8
Food, Beverage and Tobacco Manufacturing	266.6	5.9
Business Services	223.6	4.9
Petroleum, Chemical, Plastic and Rubber	214.9	4.7
Property Services	213.4	4.7
Machinery and Equipment Manufacturing	194.5	4.3
Textiles and Apparel Manufacturing	178.2	3.9
Metal Product Manufacturing	140.6	3.1
Transport and Storage	135.1	3.0
Finance and Insurance	133.9	2.9
Health and Community Services	125.8	2.8
Education	121.9	2.7
Communication Services	105.0	2.3
Defence	102.7	2.3
Furniture and Other Manufacturing	79.8	1.8
Local Government Administration	79.6	1.7
Personal and Other Community Services	68.2	1.5
Electricity, Gas and Water Supply	66.6	1.5
Non-metallic Mineral Product Manufacturing	55.1	1.2
Central Government Administration	54.6	1.2
Printing, Publishing and Recorded Media	51.4	1.1
Cultural and Recreational Services	51.0	1.1
Accommodation, Restaurants and Bars	49.7	1.1
Agriculture	45.7	1.0
Fishing	3.7	0.1
Forestry and Logging	3.5	0.1
Mining	2.6	0.1
Ownership of Owner-occupied Dwellings	0.0	0.0
TOTAL	4558.9	100

Table 9 Industry contribution to total gross output – NW sector

Industry	Gross output (\$ millions)	% total gross output
Construction	1728.5	12.6
Wholesale Trade	1584.2	11.6
Retail Trade	1124.5	8.2
Business Services	974.4	7.1
Property Services	682.1	5.0
Finance and Insurance	560.8	4.1
Wood and Paper Product Manufacturing	557.0	4.1
Petroleum, Chemical, Plastic and Rubber	556.8	4.1
Machinery and Equipment Manufacturing	547.2	4.0
Food, Beverage and Tobacco Manufacturing	500.8	3.7
Transport and Storage	428.9	3.1
Health and Community Services	428.5	3.1
Metal Product Manufacturing	397.0	2.9
Communication Services	343.2	2.5
Textiles and Apparel Manufacturing	332.5	2.4
Printing, Publishing and Recorded Media	324.3	2.4
Education	319.6	2.3
Defence	295.3	2.2
Electricity, Gas and Water Supply	285.2	2.1
Agriculture	278.5	2.0
Furniture and Other Manufacturing	211.1	1.5
Personal and Other Community Services	193.4	1.4
Cultural and Recreational Services	193.1	1.4
Accommodation, Restaurants and Bars	191.4	1.4
Local Government Administration	187.2	1.4
Central Government Administration	171.2	1.3
Non-metallic Mineral Product Manufacturing	140.0	1.0
Forestry and Logging	66.3	0.5
Fishing	34.6	0.3
Mining	29.8	0.2
Ownership of Owner-occupied Dwellings	0.0	0.0
TOTAL	13667.4	100.0

5. Summary of findings

- With total gross output of \$102.7 million, the Base currently accounts for 2.3% of total industry output in Waitakere City. The output multiplier of 2.3 implies that the loss of this output will result in a further \$132.2 million decline in output in the rest of the Waitakere economy.
- The defence industry output multiplier for NW sector is 2.5, suggesting that the loss of the Base will result in an additional loss in output of \$153.5 million from the remainder of the NW economy. Thus, the impact of the loss of the Base on the NW districts excluding Waitakere (ie. Rodney District and North Shore City) in output terms will be around \$21.3 million.
- The employment multiplier for the Base in Waitakere is 1.6, suggesting that the loss of the Base's 1,061 (FTE) jobs would result in the loss of an additional 586 jobs in Waitakere. The two principal contractors employed by the Base expect to make 90 staff (75 FTEs) redundant following the closure of the Base. Other local businesses are likely to experience a short-term decline in sales, until the accommodation currently occupied by Base staff is reoccupied.
- With the closure of the Base, up to 355 privately-owned homes could be released onto the market in a short space of time. This may depress local property prices. The release of a further 421 houses associated with the Base could exacerbate this effect.
- Local schools would lose pupils (in the short-term), and are likely to experience some disruption as pupils from new families move in to the area settle in. The schools would also lose a range of assistance provided by the Base, such as security, fundraising, facilities and equipment.
- Local recreation groups would lose assistance such as storage capacity for equipment, and boating facilities, as well as volunteer time and training. The withdrawal of the Base would also reduce the local capacity to respond to civil emergencies, accidents, search and rescue operations and fires.
- These impacts are likely to be mitigated by the fact that the Base's contribution to the local economies has been generally declining over the last 20 years. This gradual wind-down, together with the amount of notice of the closure, is likely to reduce the impact of the closure, on both Base staff and the local economies, from that which would otherwise have been the case.

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Appendix A Multiplier methodology

A.1 Type I and Type II multipliers

Type I and Type II multipliers differ in the extent to which they fully capture economy-wide impacts of a sectoral change. In this study we will report Type II multipliers since they provide a more comprehensive measure of economic change. The derivation of Type II multipliers is essentially an extension of the Type I algebra; hence both Type I and Type II derivations are presented here.

The distinction between Type I and Type II multipliers is as follows:

- *Type I multipliers* measure the direct and indirect effects of a change. In the instance of an output multiplier, the direct effect is the initial change in output in the industry which is experiencing a reduction in demand. The indirect effects result from the need to produce less inputs for that industry.
- *Type II multipliers* include the direct and indirect effects, as well as the induced effect of a change. The initial direct and indirect effects result in lower employment, which in turn affects household income, which lowers demand, which lessens output, which then lowers employment further, and so on.

A.2 Derivation of Type I multipliers¹⁸

Given an n -sector economy, the transactions matrix and the vectors of final demands and outputs can be represented as:¹⁹

$$Z = \begin{pmatrix} z_{11} & z_{12} & \cdots & z_{1n} & z_{1c} \\ z_{21} & z_{22} & \cdots & z_{2n} & z_{2c} \\ \vdots & \vdots & & \vdots & \vdots \\ z_{n1} & z_{n2} & \cdots & z_{nn} & z_{nc} \\ z_{c1} & z_{c2} & \cdots & z_{cn} & \end{pmatrix} \quad \mathbf{f} = \begin{pmatrix} f_1 \\ f_2 \\ \vdots \\ f_n \end{pmatrix} \quad \mathbf{x} = \begin{pmatrix} x_1 \\ x_2 \\ \vdots \\ x_n \end{pmatrix}$$

where:

¹⁸ Note that the following exposition tends to use an increase in activity to illustrate. However, the logic applies equally to a decrease in activity.

¹⁹ In the Inter-industry Study 1996, which forms the basis of the multiplier analysis contained in this report, $n = 126$.

z_{ij} = sector i sales to sector j

f_j = sector j sales to final demand

x_j = total sector j sales

The c -th row represents compensation of employees (ie. payments for labour), and the c -th column is household consumption.

The relationship between the elements of these matrices is:

$$x_i = z_{i1} + z_{i2} + \dots + z_{in} + f_i \quad (1)$$

The technical coefficients (or direct input coefficients) of sector j are written:

$$a_{ij} = z_{ij} / x_j \quad (2)$$

which in matrix form is:

$$\mathbf{A} = \begin{pmatrix} a_{11} & a_{12} & \dots & a_{1n} \\ a_{21} & a_{22} & \dots & a_{2n} \\ \vdots & \vdots & & \vdots \\ a_{n1} & a_{n2} & \dots & a_{nn} \end{pmatrix}$$

Thus a_{ij} is the proportion of sector j 's total output (the value of which is equivalent to the value of sector j 's total input) and is made up of inputs from other sectors (i).

Given equation (1), sector i 's sales can be rewritten and expressed in terms of technical coefficients as:

$$x_i = a_{i1}x_1 + a_{i2}x_2 + \dots + a_{in}x_n + f_i \quad (3)$$

Equations (1) and (3) respectively can be written in matrix form as:

$$\mathbf{x} = \mathbf{Z}\mathbf{i} + \mathbf{f} \quad (4)$$

$$\mathbf{x} = \mathbf{A}\mathbf{x} + \mathbf{f} \quad (5)$$

where \mathbf{i} is an n -element column vector of 1s.

Recall that equations (1) and (3), and hence (6) and (7), are equivalent.

Using an $n \times n$ identity matrix and rearranging equations (5) yields:

$$\begin{aligned} \mathbf{I}\mathbf{x} - \mathbf{A}\mathbf{x} &= \mathbf{f} \\ \Rightarrow (\mathbf{I} - \mathbf{A})\mathbf{x} &= \mathbf{f} \end{aligned} \quad (8)$$

From this we can derive the change in output, \mathbf{x}^* , arising from a change in final demand, \mathbf{f}^* :

$$\mathbf{x}^* = (\mathbf{I} - \mathbf{A})^{-1}\mathbf{f}^* \quad (9)$$

$(\mathbf{I} - \mathbf{A})^{-1}$ is the Leontief Inverse, or the total (initial, direct and indirect) requirements matrix. This can be represented by \mathbf{B} so that:

$$\mathbf{x}^* = \mathbf{B}\mathbf{f}^* \quad (10)$$

A.2.1 Output multipliers

Re-expressing equation (10) in expanded format gives:

$$\mathbf{x}^* = \begin{pmatrix} b_{11} & b_{12} & \cdots & b_{1n} \\ b_{21} & b_{22} & \cdots & b_{2n} \\ \vdots & \vdots & \ddots & \vdots \\ b_{n1} & b_{n2} & \cdots & b_{nn} \end{pmatrix} \begin{pmatrix} f_1^* \\ f_2^* \\ \vdots \\ f_n^* \end{pmatrix}$$

From this it can be seen that the economy-wide impact of f_j^* is:

$$\mathbf{x}^* = \sum_{i=1}^n b_{ij} f_j^* \quad (11)$$

For $f_j^* = 1$, \mathbf{x}^* reduces to:

$$\mathbf{x}^* = \sum_{i=1}^n b_{ij} \quad (12)$$

\mathbf{x}^* is the (Type I) *output multiplier*: that is, how much does economy-wide output have to increase to meet a \$1 increase in final demand for the output of sector j .

A.2.2 Value added multipliers

In principle these are calculated in the same way as for output multipliers; the distinction is that changes in sectoral output arising from a change in final demand are scaled by each sector's value added input coefficient (ie the ratio of value added to total inputs).

The value added input coefficients are calculated using the sum of the compensation of employees, the operating surplus and net indirect tax rows of the input-output table. We shall denote this sum as z_{vaj} . In a manner similar to that used to derive the direct input coefficients in equation (2), the value added input coefficients are:

$$a_{vaj} = z_{vaj} / x_j \quad (13)$$

By using this to scale the impact of changes in output we have:

$$v_j^* = \sum_{i=1}^n a_{vai} b_{ij} / a_{vaj} \quad (14)$$

This is the (Type I) *value added multiplier*. Its interpretation is: how much will economy-wide value added increase, above the initial increase in sector j 's value added payments, given an increase in final demand of sector j 's output of \$1.

A.2.3 Employment multipliers

These are calculated as for the value added multipliers, but rather than use value added to scale the output effects we have used the ratio of full time equivalent (FTE) jobs to output by sector. This employment ratio is:

$$e_j = FTE_j / x_j \quad (15)$$

Using this in our multiplier calculation gives:

$$e_j = \sum_{i=1}^n e_i b_{ij} / e_j \quad (16)$$

A.3 Derivation of Type II multipliers

In the calculations above, the matrix elements are restricted to those within the $n \times n$ confines of the transactions matrix of the 1996 Inter-industry tables. However, this effectively excludes the impact of changes in household income arising from additional final demand, since household income and consumption is outside of the $n \times n$ matrix. Type II multipliers address this issue by expanding the $n \times n$ matrix to include household consumption and compensation of employees. Households are effectively treated as another

production sector in Type II multiplier analysis, producing labour services and demanding consumption goods and services.

The technical coefficients for the household row and column are:

$$a_{cj} = z_{cj} / x_j \quad (17)$$

$$a_{ic} = z_{ic} / x_c \quad (18)$$

where:

a_{cj} = the labour coefficient for sector j

a_{ic} = the 'household consumption' coefficient.

In equation (18), x_c represents household disposable income. For the analysis contained in this report we calculated household disposable income as the sum of:

- compensation of employees (from the input-output tables)
- self-employed earnings (derived from SNZ's *Institutional Sector Accounts*)
- dividend earnings (derived from SNZ's *Institutional Sector Accounts*)

and then subtracted tax from that sum using an average personal income tax rate derived from the *Institutional Sector Accounts*.

Appendix B List of interviewees

The following people and organisations were interviewed as part of our social impact analysis:

- Mack Allen: Wellbeing Collaboration Project Manager, Waitakere City Council
- Peter Barber: Principal Rural Fire Officer and ex Chief Fire Officer, Urban Fire, Waitakere City
- Judy Brown: Principal, Whenuapai Primary School, Whenuapai
- Graham Deacon: Chair of Waitakere Boys High Rowing Club
- Margaret Doherty: Principal, Hobsonville Primary School, Hobsonville
- Neil Gray: Housing New Zealand Corporation, Wellington
- George Higgins: Commodore RNZAF Base Auckland Hobsonville Yacht Club
- Stu Mackenzie: Wing Commander and Base Commander, RNZAF, Whenuapai
- Manager: Serco Defence, Waitakere
- Robyn Mihaere: Principal's Secretary, Massey High School, Masey, Auckland
- Danny O'Donnell: Leisure Services Manager, Waitakere City Council
- Peter Reid: Squadron Leader, Facilities Manager, RNZAF Base Auckland
- Russell Richardson: Chief Executive, Eurest, Head Office
- Nathan Villars; Westlake Boys High
- Lesley ?: Administration, Westlake Girls High.

Appendix C Information sources

We tried a number of sources in an attempt to gather the data we needed on the Base's employment and expenditure patterns over time. All these methods failed to provide us with the information we needed. Below we document the sources tried.

- A request in writing was sent to Peter Reid, the Facilities Manager at the Base.
- We met with Stu Mackenzie, the Base Commander. We also put our information request in an email to him. Stu ruled out the possibility of doing a survey of employee intentions on the closure of the Base, but offered information on numbers employed, etc. He later declined to provide us with this information, and directed us to Gp. Cpt. Randerson for all further data requests.
- On Stu's direction, we put a request in writing to Gp. Cpt. Randerson. Gp. Cpt. Randerson provided some statistical information after a second request and confirmed that a survey of Base employees was out of the question.
- We approached Mark Unsworth of Saunders Unsworth Ltd.
- We sent a request in writing to Peter Bollmann at RZNDF.
- Our librarian contacted the librarian at NZDF. Their librarian was advised by Ric Cullianane (Public Relations) that they would not provide us with the data we were seeking.
- We sent an Official Information Act request to the Minister of Defence and the NZDF. We received a response from this on 7 July. We received data on personnel numbers and costs from 1997, and on expenditure and income from 1998/99. However, the nature of the data provided meant that it was of little use to our analysis. It was inadequate in places, and was accompanied by the disclaimer that 'it is possible that some data were missed. I therefore cannot confirm that the data provided are complete or accurate'. Despite these inadequacies, we did run some cross-checks against our historical and input-output analysis. We found no cause to alter any of our assumptions or results.
- We also searched through NZDF Annual Reports (which didn't have data disaggregated by Base), and related websites.
- We also approached Auckland International Airport, Air New Zealand and the Auckland City Council in an attempt to get some information on the Base when it operated as an international airport.

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