

**ECONOMIC IMPACT OF THE  
SMALES FARM TECHNOLOGY OFFICE PARK  
ON THE NORTH SHORE AND NEW ZEALAND ECONOMY**

**AN ANALYSIS OF OUTPUT, EXPENDITURE, JOBS,  
AND FISCAL IMPACT**

A Report Prepared for Smales Farm Technology Office Park

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## **Executive Summary**

The fully developed Smales Farm Technology Office Park (SFTOP) aims to become the leading centre in New Zealand for technology-based industries and knowledge-based economic development. With the park expecting an eventual population of 6-7000 people and containing companies producing an estimated \$NZD 700 million, anticipated facilities on the park will include childcare centres, restaurants, gymnasium, service shops, satellite offices and hotel and conference facilities.

This report highlights the economic impact of the completed SFTOP on North Shore City and the New Zealand economy.<sup>1</sup> Economic impact arises in four key areas: Output, employment, additional expenditure and fiscal. The assessment is predominantly quantitative in nature.

### **Annual Output Impact of a Fully Completed Park**

- SFTOP is expected to produce \$NZD 700 million in direct output (like goods and services produced by companies located in SFTOP) per annum.
- An additional \$NZD 75.6 million is generated annually due to the multiplier effect. Furthermore, a total of over \$NZD 775 million in output may be generated annually when the park is fully developed.
- For every one dollar of output, 11 cents additional output may be generated in the regional economy.

### **Annual Employment Impact of a Fully Completed Park**

- Tenant companies in SFTOP could create a total of approximately 7,000 direct jobs per year.
- An additional 15,645 jobs may be created in the regional economy due to the multiplier effect.
- A total of 22,645 jobs may be attributed either directly or indirectly to SFTOP.
- For every job in the park, an additional 2.24 jobs may be generated in the wider regional economy.

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<sup>1</sup> For an expanded analysis see Schumacher et al., 2004/1

### **Expenditure Impact of a Fully Completed Park**

- The anticipated total annual wage income generated by SFTOP is \$NZD 259 million.
- Employees of tenants in the park are expected to spend \$NZD 197 million of their income in the regional economy annually.
- Taking the impact on jobs outside the park into account, this figure may rise to \$NZD 600 million.
- Construction of the park will generate an estimated \$NZD 300 million for the building sector.
- Operating expenses of SFTOP are expected to be \$NZD 5 million per year.
- Of the operating expenses, approximately \$NZD 3-3.5 million are spent in the North Shore economy per year.

### **Annual Fiscal Impact of a Fully Completed Park**

- SFTOP is expected to pay rates to the North Shore City Council of around \$NZD 650,000 per year.

# 1. Introduction

## *Objective*

This study examines the potential economic impact of the completed Smales Farm Technology Office Park (SFTOP) to North Shore City and the New Zealand economy (see Appendix 1 for some facts about North Shore City and Appendix 2 for an overview of technology parks and their contribution to regional economic development).

The completed SFTOP will impact on the North Shore and New Zealand economy in several ways. First, technology-based companies generally use local resources to provide a product or service that caters predominantly to an export market. Such industries are considered to be the main driver of economic growth due to a multiplier effect associated with the industry sector. In other words, every output of and every job in SFTOP will impact on other industries within the regional economy.

Furthermore, direct and indirect expenditure made by employees of tenant companies and management can be assessed. A significant portion of salary and wages paid to the expected 7,000 employees of SFTOP can be assumed to be spent in the region. Most of the services and expenses related to the management of SFTOP are expected to be provided locally as well. In addition, substantial expenditure on construction projects will impact significantly on the local building industry. The completed park will host a total of 13 buildings including multi-tenant buildings, hotel, conference facilities, restaurants, gymnasium, and service shops. The total value of the park buildings is estimated at \$NZD 300 million.

Finally, SFTOP will create a net fiscal gain to North Shore City in form of rate payments.

## ***1.2 Approach***

Economic impact arises in four key areas: Output, employment, additional expenditure and fiscal. In order to evaluate the impact on output and employment, a multiplier analysis is used. The details of the multiplier analysis are discussed in the following section. To evaluate the expenditure effects, we first estimate the average income generated by SFTOP. We then calculate the expenditure effect by finding the proportion of income that is expected to be spent in the North Shore City region. For this we will utilise the index of the average marginal propensity to consume of New Zealand. Fiscal impact is the estimate of the North Shore City council rates that the completed park will be subject to.

## 2. Economic Impact Analysis

### 2.1 *Method*

In order to evaluate the economic impact of the completed SFTOP on the regional economy, we used national Input-Output tables, based on Statistics New Zealand's 1994-1995 inter-industry study, the latest available. These tables are also used to calculate the output, expenditure and employment multipliers which will help us to quantify the indirect effects, as well as direct effects associated with the establishment of SFTOP. Unfortunately, no specific regionalised Input-Output tables are computed by Statistics New Zealand. This means that it will be difficult at times to determine the factual impact on the North Shore City economy. However, the analysis will highlight the impact of SFTOP on the New Zealand economy.

An Input-Output Table shows the sales and purchases between sectors, including those between industries, households and overseas. The Input-Output tables used in this study are provided by Statistics New Zealand and cover 126 separate industries. In a first step, we determined the industry headings that best describe the companies that are likely to be situated at the technology park. We calculate separate expenditure and employment multipliers for the following sectors:

- Non-residential Building/Construction
- Communication Services
- Technical Services
- Computer Services
- Management Services

The inter-industry nature of the input-output tables 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 of SFTOP on the regional and national economy. Note that the sector 'Non-residential

Building/Construction' has been included as only 2 of the 11 buildings have been completed.

## **2.2 *What is a Multiplier?***

A multiplier measures the magnitude of a role that a particular sector plays in the overall economy. Therefore, it enables us to compare and contrast the economic impact of each and every sector associated with the proposed project on the overall economy. In this study, we calculated multipliers which measure the direct and indirect effects of a change in a particular sector. The direct effect on the economy is the predicted level of expenditure by SFTOP. The indirect effects are the flow-on effects on industry sectors linked to the park such as suppliers or service providers.

For a derivation of the multipliers see Appendix 1. We have used the output multipliers estimated for the Springfield Technology Park (Massachusetts, USA) as a proxy. Although it is smaller, the Springfield Technology Park closely resembles the developing SFTOP because it is located in a culturally similar environment, the buildings are of a comparable quality, they host the same technology-based tenants and the study was conducted by a reputable University, the University of Massachusetts.

### **3. Assumptions**

#### ***3.1 Assumptions used in estimating the Output Impacts***

While estimating the output impacts of SFTOP, we used the Input-Output tables for the New Zealand economy as a whole as no regional tables exist. We estimate that the developed SFTOP will generate a total output of \$NZD 700 million. This figure is derived from company output of New Zealand firms in the technology sector to a total of 7,000 employees. The figure does not take into account output generated by the same company elsewhere in New Zealand or offshore.

#### ***3.2 Assumptions used in estimating the employment impacts***

As we mentioned above, it is assumed that the total employment in the technology park will be around 7,000 employees on completion of the park. This figure was derived from an accepted staff density ratio of 1 employee per 14 square metres office space. This is consistent with the density ratio of the Telstra Clear building. We also use the output multipliers estimated for Springfield Technology Park (Massachusetts, USA) as a proxy.

#### ***3.3 Assumptions used in estimating the expenditure impact***

In order to calculate the expenditure impacts, we utilize the average marginal propensity to consume of the New Zealand economy. Marginal propensity to consume indicates the percentage of an additional dollar earned that is spent on goods or services. Currently this figure is 76 percent.

In order to estimate the total income generated by the park, the number of employees is multiplied by the per capita real GDP of the New Zealand economy, which is \$37,000 \$NZD.

### ***3.4 Assumptions used in estimating the fiscal impact***

City council rates are determined by land value, staff density and number of sanitary facilities. We assumed that future buildings in the park will be similar in regards to the above discussed influencing factors of those by Telstra Clear and Tranz Rail. Therefore, the current city council rates paid by the Telstra Clear and Tranz Rail are used to approximate the anticipated rates for the completed park. After further discussion with the North Shore City Council Rates Officers, we concluded that the park will pay around \$NZD 6.50 per square metre of ground floor area.

## 4. Results

### 4.1 Output Impact

As we do not know how much each industry will contribute to SFTOP, it was not possible to compute an overall output multiplier. According to our calculations, different sectors have different output multipliers. The largest output multiplier is found for the communication services sector. If we assume that all of the sectors will contribute equally to the park then a \$NZD 1 increase in output by the park will induce a further \$NZD 0.11 increase in output for the regional economy. Therefore, with the assumption of a \$NZD 700 million future output, the completed park will generate approximately \$NZD 75.6 million of additional income each year for the New Zealand economy. However, if we assume that half of the park will be communication sector oriented, the additional income generated by the park will increase to \$NZD 270 million annually. It should be noted that the building sector will only contribute to the output during the construction stage of the Technology Park.

The output multipliers for all the sectors included in our study are presented at table 1:

**Table 1: Output Multipliers for SFTOP:**

Industry	Output Multiplier
Communication Services	0.77633
Non-residential Building	0.466925
Computer Services	0.159054
Management Services	0.075105
Technical Services	0.057388

#### **4.2 Annual Employment Impacts of a Fully Completed Park**

The employment multipliers for all sectors included in our analysis are presented in Table 2. If we assume that the jobs in the park will be equally allocated between the sectors, the 7,000 jobs created when the park is completed will generate an additional 15,645 jobs in the regional economy. Once again, these estimations show that SFTOP will create more additional jobs if it is communication services oriented. If half of the jobs are allocated to the communications sector, the SFTOP will create an additional 15,970 jobs. A total of at least 22,645 jobs may thus be attributed either directly or indirectly to SFTOP. Note that this figure implies that tenant companies are start-up ventures, re-locate from off-shore locations to SFTOP or will not leave for an off-shore location due to the existence of the park. The number may be significantly reduced if companies simply re-locate from within New Zealand.

**Table 2: Employment Multipliers for SFTOP**

Industry	Employment Multiplier
Communication Services	3.104
Computer Services	1.690
Management Services	2.163
Technical Services	1.983

#### **4.3 Expenditure Impacts of a Completed Park**

The anticipated total wage income generated by the completed park is \$NZD 259 million per year. If we assume that 76 percent of this wage income will be spent on goods and services, SFTOP will contribute approximately \$NZD 197 million annually to the North Shore City region. Furthermore, if we take into account the 15,000 additional jobs created by SFTOP, the total contribution may be as large as \$NZD 600 million. Note that it is not possible to determine exactly how much of income is spent in North Shore City or in the wider Auckland region.

Currently, 2 of the proposed 13 buildings have been completed. The total value of all buildings in the park is estimated to be around \$NZD 300 million. In the construction process of the Telstra Clear and Tranz Rail building, local builders and suppliers have been used whenever possible. The completion of the park will therefore have a positive impact on the building sector on the North Shore and New Zealand. The factual impact will depend on the level of locally/nationally sourced components. Note that the spill-over effects of the construction phase have been included in the multiplier analysis.

Assuming that future companies in the park have a similar cost structure to Telstra Clear and Tranz Rail, the total annual operating expenses of the completed park are estimated to be around \$NZD 5 million. Currently 60 – 70 percent of the operating expenses are spent locally on the North Shore. This suggests that the completed park may lead to further annual expenditure of \$NZD 3–3.5 million on the North Shore.

#### ***4.4 Annual Fiscal Impacts of a Completed Park***

The ground floor area of the completed park is expected to be 100,000 square metres. With an anticipated average North Shore City Council rate of \$NZD 6.50 per square metre the total amount of rates paid to North Shore City will be approximately \$NZD 650,000 per year.

## 5. Conclusion

This report demonstrates the significant impact of SFTOP on the North Shore City Region and the New Zealand economy. The completed park is expected to produce \$NZD 700 million in direct output (like goods and services produced by companies located in SFTOP) per annum. An additional \$NZD 75.6 million may be generated due to the multiplier effect. This means that SFTOP may contribute as much as \$NZD 775 million annually to the regional economy.

Furthermore, on completion, tenant companies in SFTOP could create a total of approximately 7,000 direct jobs. An additional 15,645 jobs may be created due to the multiplier effect. In total SFTOP may influence as many as 22,645 jobs in the regional economy.

The expenditure impact of SFTOP will be significant. The anticipated total wage income generated by SFTOP will be \$NZD 259 million per year. Annually, employees of the park are expected to spend \$NZD 197 million of their income in the regional economy. Taking the impact on jobs outside the park into account, this figure may rise to \$NZD 600 million. Furthermore, construction of the park will generate an estimated \$NZD 300 million for the building sector. Operating expenses of SFTOP are expected to be \$NZD 5 million per year. Of these operating expenses, approximately \$NZD 3-3.5 million are likely to be spent in the North Shore economy. Fiscally, SFTOP is a significant income generator for NSC. On completion, the park is expected to pay rates to the North Shore City Council of around \$NZD 650,000 per year.

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# Appendix 1

## *Some Facts About North Shore City<sup>2</sup>*

North Shore City (NSC) is the fourth largest city in New Zealand and in the year to March 2002, NSC's economy grew 4.7 percent - the fastest growing economy within the Auckland region, which generates one third of New Zealand's income. This has been recognised by the North Shore City Council (NSCC) and in its economic development strategy plan, the Council's proposed approach is to make NSC a 'world-class business location for knowledge and creative industries recognising these industries make comparatively few demands on the environment'. The objective is to balance social, cultural, environmental and economic priorities on a sustainable basis to create economic wealth. Given that NSC's projected population growth between 2001 and 2021 is 38 percent (as opposed to 20.6 percent in the whole of New Zealand), a well-planned strategy of economic development is essential.

The population is ethnically diverse and Asian people now comprise NSC's second largest population group with people from China being the largest group followed by Koreans. NSC is an attractive destination for international immigrants and those from elsewhere in New Zealand. One of the growing concerns, however, is the loss of 25-29 year olds which represents a significant human capital loss.

## **Education**

One of the most significant contributors to economic growth is the educated and skilled workforce in NSC. Almost three-quarters of NSC students attend decile 9 and 10 schools (72 percent) compared with 33.8 percent of the total 8 New Zealand cities<sup>3</sup> recently surveyed in relation to the quality of life in those cities. Furthermore, NSC had the lowest proportion of school leavers without qualifications between 1998 and 2001 in the Auckland region. Almost 15 percent of the residents have degrees compared with 10 percent nationally.

In the Auckland region, NSC has the highest median household income of \$53,355 and the lowest number of beneficiaries. House ownership too was highest in 2002 - 66.2 percent - compared to the national average of 63.9 percent.

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<sup>2</sup> This material has been drawn from the following sources: Quality of Life '03 in New Zealand's eight largest cities; North Shore Quarterly Review; Developing the North Shore, Strategic Considerations; North Shore City Economic Development E-news; North Shore City Council Economic Development Strategy and North Shore City's Business and Economy 2003.

<sup>3</sup> New Zealand's 8 largest cities are North Shore, Waitakere, Auckland, Manukau, Hamilton, Wellington, Christchurch and Dunedin.

## **Business and Employment**

Of the eight cities, NSC saw the greatest economic growth between 1998 and 2002 with an average growth of almost 6 percent per year although the bulk of this occurred between 1998 and 2000. Over the same period, the growth in the Auckland region was 3.4 percent per annum. Moreover, NSC recorded the highest growth rate in numbers of businesses between 1998 and 2002 (29.3 percent) as opposed to 21.4 percent in New Zealand. In February 2003, there were 19,477 businesses in NSC, an increase of 990 businesses over the previous year. Moreover, the percentage growth in the number of economically viable businesses (1998 to 2002) was 29.3 percent for NSC compared with 20.6 percent nationally. Information technology is becoming an important component of this economic growth. As a contrast to New Zealand as a whole (4.7 percent), employment growth in NSC has been most significant at 12.8 percent over two years between 2000 and 2002.

NSC tends to have a service-based economy and one-third of all jobs are in the distribution and hospitality industry. Because of the presence of a skilled and educated workforce, NSC is one of the best-educated and skilled communities in New Zealand and an attractive destination for companies looking to locate (or relocate) their businesses. It is important to provide the job opportunities for this skilled labour force in high technology fields.

In January 2004, NSC's office vacancy rate was 6.8 percent which compared favourably with that of the Auckland CBD (11.95 percent), the city fringe (9.7 percent) and the southern corridor (6.9 percent)<sup>4</sup>. Takapuna's overall office vacancy rate was 3.15 percent.

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<sup>4</sup> Personal communication with Cameron Melhuish (Bayleys Research, 25<sup>th</sup> February 2004)

## Appendix 2

### *TECHNOLOGY PARKS: AN OVERVIEW*

There are many theories about what makes regional development and growth successful and what might stimulate this in a regional economy. Two of the most popular, namely creativity and technology, will be examined here. Firstly, attracting creativity in all its dimensions is seen to be an important factor for sustained economic growth. The concentration of creative communities does not happen by accident and Florida (2002) outlines three principal forms of creativity that attract creative capital in its many manifestations:

- Technological creativity which includes innovation, new products and new ideas;
- Economic creativity which includes entrepreneurship and the creation of new businesses and industries; and
- Cultural creativity which is the ability to invent new ways of thinking, new art forms, designs and concepts.

Florida suggests that those areas which are attractive to creative people are also the centres of innovation and high-technology developments. Given the demographic characteristics of the North Shore, the key ingredients are all present as a basis for promoting a creative sector and enhancing economic development. High technology industries are an essential component in this.

A review of the large body of literature indicates that there is a growing consensus that the long-term economic development prospects in most developed countries lie in a concentration of innovation and technologically orientated business enterprises in a region (Luger and Goldstein, 1991) and that these industries are often located in specific areas like SFTOP. Several terms are used to describe 'local initiatives to stimulate investment in high-technology activities' (Komninos, 2002: 55), including 'Research', 'Science' and 'Technology' Parks or 'Business' incubators and Komninos (2002) differentiates these as follows:

- A research park is usually located close to a university<sup>5</sup> or similar research organisation and the emphasis is on research rather than development with the key being the liaison between academia and research at the leading edge of science and technology;
- A technology park is a development to accommodate companies engaged in the commercial application of high technology, with activities including R&D, production, sales and servicing. Academic involvement is also essential; and
- Business incubators, such as the Massey University e-centre, are places where newly created firms are located in one space with the aim of enhancing the chances of growth and the rate of survival of these businesses by providing them with facilities and managerial support.

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<sup>5</sup> See also [www.aurp.com](http://www.aurp.com) which is the website for the Association of University Research Parks

Komninos (2002) continues that science and technology parks include the following four components:

- A property-based initiative;
- Formal links with a university, higher education institution or research centre;
- Is designed to encourage the formation and growth of knowledge-based businesses; and
- Has a management function that is actively engaged in fostering the transfer of technology and business skills to the organisations on site.

Our focus in this report is on the role of a technology park, usually designed to accommodate firms in the commercial application of advanced technologies (Grayson, 1993). These technology parks form part of what Komninos (2002:11) describes as an 'intelligent city' which is a spatial entity that offers an environment for technical innovation based on clusters or technology parks and a digital capacity to manage and diffuse that knowledge and technology.

The success of technology parks, therefore, is dependent on a myriad of factors such as:

- A sufficient population to support economic activity;
- Organisational characteristics of organisations in the park;
- The tenant mix in the park;
- Incubator facilities;
- Leadership and long-term commitment of the host institution; and
- Strong external linkages that develop between the technology park and organisations and, education and training providers which enhance skill development and job opportunities.

Furthermore, several locational factors are important for the optimum benefit of the parks for the community and according to Badarulzaman (1998) these are:

- Good transportation;
- Good telecommunication system;
- Availability of skilled labour;
- Good political climate. Local government is particularly important in this regard.

## Appendix 3

### *Derivation of the Multipliers*

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

$$Z = \begin{bmatrix} z_{11} & z_{12} & \dots & \dots & z_{1n} \\ z_{21} & \dots & \dots & \dots & z_{2n} \\ \dots & \dots & \dots & \dots & \dots \\ \dots & \dots & \dots & \dots & \dots \\ z_{n1} & \dots & \dots & \dots & z_{nn} \end{bmatrix} \quad f = \begin{pmatrix} f_1 \\ f_2 \\ \dots \\ f_n \end{pmatrix} \quad x = \begin{pmatrix} x_1 \\ x_2 \\ x_3 \\ x_4 \end{pmatrix}$$

where:

$z_{ij}$  = sector  $i$  sales to sector  $j$

$f_j$  = sector  $j$  sales to final demand

$x_j$  = total sector  $j$  sales

The relationship between the elements of these matrices is:

$$x_i = z_{i1} + z_{i2} + \dots + z_{in} + f_i$$

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

$$a_{ij} = \frac{z_{ij}}{x_j}$$

which in matrix form is:

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

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:

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

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

$$x = Zi + f$$

$$x = Ax + f$$

where  $i$  is an  $n$ -element column vector of 1 s.

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:

$$Ix - Ax = f$$

$$\Rightarrow (I - A)x = f$$

From this we can derive the change in output,  $x^*$ , arising from a change in final demand,  $r^*$ :

$$x^* = (I - A)^{-1} f^*$$

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

$$x^* = Bf^*$$

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

$$x^* = \begin{bmatrix} b_{11} & b_{12} & \dots & b_{1n} \\ b_{21} & b_{22} & \dots & b_{2n} \\ \dots & \dots & \dots & \dots \\ b_{n1} & b_{n2} & \dots & b_{nn} \end{bmatrix} \begin{pmatrix} f_1^* \\ \dots \\ \dots \\ f_n^* \end{pmatrix}$$

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

$$x^* = \sum_{i=1}^n b_{ij} f_j^*$$

For  $f_j^*=1$ ,  $x^*$  reduces to:

$$x^* = \sum_{i=1}^n b_{ij}$$

$x^*$  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  $j$ .

Employment multipliers are calculated in a similar way, but this time the inverse Leontief matrix is multiplied with the ratio of full-time equivalent jobs to output by sector. Unfortunately, this matrix is not provided by Statistics New Zealand. We therefore use the output multipliers estimated for the Springfield Technology Park (Massachusetts, USA) as a proxy. Although it is smaller, the Springfield Technology Park closely resembles the developing SFTOP because it is located in a culturally similar environment, the buildings are of a comparable quality, they host the same type of technology-based tenants and the study was conducted by a reputable University, the University of Massachusetts.