# DEVELOPMENT COST LEVIES: AN ANALYSIS OF PARK LEVIES ON COMMERCIAL FLOORSPACE (IN THE CITY OF VANCOUVER)

by

Barbara Tully

B.A., University of British Columbia, 1991

A THESIS SUBMITTED IN PARTIAL FULFILMENT OF

THE REQUIREMENTS FOR THE DEGREE OF

Master of Arts in Planning

in

THE FACULTY OF GRADUATE STUDIES

School of Community and Regional Planning

We accept this thesis as conforming
to the required standard

THE UNIVERSITY OF BRITISH COLUMBIA

May 1996

In presenting this thesis in partial fulfilment of the requirements for an advanced degree at the University of British Columbia, I agree that the Library shall make it freely available for reference and study. I further agree that permission for extensive copying of this thesis for scholarly purposes may be granted by the head of my department or by his or her representatives. It is understood that copying or publication of this thesis for financial gain shall not be allowed without my written permission.

School
~~Department~~ of Community and Regional Planning

The University of British Columbia
Vancouver, Canada

Date May 30, 1996

DE-6 (2/88)

## ABSTRACT

The use of Development Cost Levies is a relatively new mechanism by which municipalities may charge development a share of costly new infrastructure. Their use is an improvement upon the previous ad-hoc system of land use contracts. The equity of Development Cost Levies is widely disputed, but this thesis finds that their use is fair and justifiable when judged in the context of the unprecedented growth of the Lower Mainland. The paper finds that Development Cost Levies are generally passed back to the landowners, unless the market is inelastic, in which case they are passed forward to the purchaser.

The thesis specifically examines Development Cost Levies for parkland acquisition in mixed-use neighbourhoods. Park acquisition levies in mixed-use neighbourhoods are currently charged only to residential development in B.C. municipalities. This thesis examines whether the usage of parks by employees warrants commercial development paying a share of the parkland acquisition levies in mixed use neighbourhoods.

In order to determine if commercial development should pay a portion of the cost of park acquisition, a park survey was conducted in an existing mixed-use area to determine employee usage of parkspace. A literature search revealed no other park surveys which examined employee and resident usage of parkspace in mixed-use neighbourhoods. The survey found that employees generated 83% of the usage of parkspace in two mixed-use area neighbourhood parks. The findings of the survey indicate that commercial development should be paying a proportional share of development cost charges for parkland acquisition in mixed-use neighbourhoods. This information was then applied to a recently upzoned area of the City of Vancouver to illustrate a sample calculation of Development Cost Levies.

# TABLE OF CONTENTS

## LIST OF FIGURES

## LIST OF TABLES

## ACKNOWLEDGEMENT

I would like to thank all of my friends and families who supported me over the years: Pamela, Susie, Catherine and Alison gave me their friendship; Rosalie and Bernie guided me along; and the Pez provided unselfish support and encouragement. Thank you all.

# INTRODUCTION

## 1.1 PROBLEM IDENTIFICATION

Greater Vancouver is experiencing rapid and sustained population growth. From 1976 - 1986 the Greater Vancouver Regional District area experienced growth rates of 1.7% per year (Baxter, 1993, p.5). From 1986 - 1991 the G.V.R.D. has had an annual population growth of 2.9% per year (Baxter, 1993, p.5). Over the period of 1986-1991 an additional 206,135 (net) residents moved into the region. This influx of newcomers has fuelled new residential and commercial development. The need for new services and the shrinking revenues of municipalities in relation to costs has made the financing of costly capital infrastructure improvements difficult for municipalities. These improvements include large projects such as sewer upgrades and treatment plants, as well as park land acquisition for the growing population.

In addition to the demands for upgraded and new services, municipalities have limited means of increasing revenues. Revenues are generated from transfers from other governments, property taxes and a variety of licence and user fees. Currently municipalities have the ability to negotiate for some form of community amenity contribution with developers of large projects, but only if rezoning is required. This is negotiated on the basis that the funds are needed to provide amenities in a neighbourhood as a result of the increased population. In other areas, when the required zoning is already in place, these contributions cannot be demanded. Thus municipalities are seeking new ways to generate revenue to

finance the costly capital improvements which are needed for the growing population.

In 1990, the Provincial Government gave municipalities the authority to charge new development for certain infrastructure costs with the aim of making developers financially responsible for a greater part of the provision of new infrastructure. The charge is placed upon new construction and is leviable when zoning changes are not required. This levy is a development cost levy (DCL) or a development cost charge.

Development cost levies have been used in suburban areas in British Columbia to ensure that residential development pays a share of the costs which are generated by the new population. Placing a levy solely on residential property may be fair in "bedroom communities"--where the majority of development is residential--but it may not be equitable in a community which has a mix of residential and commercial development. Inner suburb areas such as Richmond and Burnaby have a fair amount of commercial development compared to their outer suburb counterparts. In these inner suburbs while only new residential development may be paying for the infrastructure costs through a development levy, new owners and employees of commercial businesses may also be using the infrastructure amenities.

In most municipalities, the purchase of park land has been paid by development cost levies from new residential development. In an area where a mix of residential and commercial use exists, it is arguable that an inequity may be present if only one group is paying the full cost of the infrastructure and amenities such as park land. This thesis seeks to explore commercial usage of infrastructure, specifically park facilities, to determine if the

current practices of levying development cost charges are fair.

## 1.2 GOAL OF THE THESIS

As governments find their resources being stretched, it is necessary for planners to explore and evaluate different financing mechanisms for urban infrastructure. The goal of the thesis is to examine development cost levies and determine if commercial development should pay a portion of the development cost charges which are levied solely on residential development in mixed-use inner suburb areas.

Although development cost levies are increasingly being used by municipalities, they are controversial in the planning and architecture professions. Some argue that development cost levies are a means of inequitable taxation (UDI, 1990). Others contend that they are a fair and equitable means of ensuring new development pays its own way (PIBC, 1991). The end effect of cost levies is also highly disputed. Amborski cites that municipal officials assume that the charge reduces developers profits while the development industry argues that they are simply added to the price of housing (Amborski, 1988, p.3-4). The cost of the levy is not always passed on to the home buyer or absorbed by developers, and other actors need to be considered when determining the end effect of development levies. This paper will explore who, ultimately, ends up paying development cost charges, using different market scenarios. This thesis, therefore, is of value to the profession as it will discuss the conflicting opinions surrounding the use of development cost levies and seek to come to conclusions about the validity of the arguments for and against development levies.

In the past, residential development levies have paid the cost of amenities such as

neighbourhood park land. The fairness of the current practice of residential development paying all park levies will also be examined in depth. A field study of users of parks in mixed-use locations will be designed and carried out to determine how much both commercial employees and residents use parks, and if the usage of commercial employees warrants development cost levies for park acquisition being levied on commercial uses. From the survey, conclusions will be drawn about the residential and commercial share of park levies and applied to the recently rezoned Burrard Slopes area of the City of Vancouver.

## 1.3 DEFINITIONS OF KEY CONCEPTS

Table 1 : Key concepts

| |
|---|
| The "ability to pay principle" is based upon the principle that those with higher incomes should contribute more to public service financing than those with lower incomes. |
| The "benefit received" principle is based upon the belief that individuals who receive the benefit of a service should pay its cost. |
| "Capital projects" are large scale infrastructure projects. They are funded out of the capital budget as opposed to the operating budget and are one time costs. |
| "Development cost levy" (DCL) or "development cost charge" (DCC) is a levy placed on new development to finance infrastructure costs which are seen to be generated by the new development. |

"Elastic demand" is demand for a commodity which expands and contracts depending upon the price of the commodity.

"Floor space ratio" (f.s.r.) is the floor area allowed to be built on a site, based on the site's zoning, divided by the property's site area.

"Intergenerational equity" or "horizontal equity" is the principle of equal treatment for people in equal circumstances.

"Inelastic demand" is demand for a commodity which does not charge based upon market conditions.

A "land use contract" is a contract between the municipality and the developer, who, by the terms of the contract agrees to provide or finance the services agreed upon.

A "parkette" is a small park which is less that 0.5 acre in size

A "sub-neighbourhood park" varies from 0.5 acre. to 2 acres and is designed to be as flexible and adaptable as possible for activities such as walking, jogging, throwing a frisbee. Sub-neighbourhood parks generally draw people from within a radius of 100 yards up to a 1/4 mile.

## 1.4 OVERVIEW AND METHODOLOGY OF THE THESIS

Chapter 2, "History of Development Cost Levies," will explore the literature surrounding development cost levies. Chapter 2 first seeks to explore the current financing problems facing municipalities. Greater Vancouver has experienced rapid population growth and local governments are faced with shrinking revenues and increasing expenditures. They are seeking alternative funding mechanisms to finance the costly infrastructure improvements needed for the growing populations. Past attempts to locate finance mechanisms for development to pay a share of the infrastructure costs will be outlined. In addition, the historical background leading to the placement of development cost levies will also be discussed.

The legislation governing the placement of development cost levies will be presented. The equity of development cost levies is controversial. There are divergent points of view about the fairness of placing levies on new development including the intergenerational inequity involved in switching to a new financing system. As well as fairness issues, the debate about the impact of development cost charges will be outlined. One side argues that levies are just another tax that is ultimately passed on to the home purchasers, while the others state that the levies are absorbed by other parties in the chain of development (UDI, 1990; Snyder & Stegman, 1986). Observations from other cities will be explored in an attempt to assess who actually pays the development cost charge.

Chapter 2 also explores the use of park development cost levies in other cities. Many

cities using development levies require commercial uses to pay a park levy only in downtown locations. Other studies which examined the proportion of employee use versus resident use of parks in mixed-use neighbourhoods will be sought.

In order to determine if commercial uses should be charged a park levy in a mixed-use neighbourhood, it is necessary to discover which uses are creating the demand for the parks. Chapter 3, "Survey Methodology," first introduces the Burrard Slopes area of Vancouver, then examines the study methodology which will be used for the survey of employee and resident park usage. The different types of survey methods are assessed in order to obtain the best possible survey design. Criteria are developed in order to assess suitable parks for the study. Burrard Slopes does not yet have a park or residential component to the area so parks in similar areas must be used in order to examine employee and park use.

Chapter 4, "Survey Results," reports the findings of the employee\resident park survey. The raw data results from the survey are presented and the differences between the two park sites are explored. The data is then used to achieve a ratio of employee to resident park use which will provide direction regarding the placement of development cost levies on new commercial development.

Chapter 5, "Burrard Slopes" will applies the survey results to the Burrard Slopes area. The effects of a development cost levy are also be discussed in the context of the Burrard Slopes area. Once it is determined if commercial space should be charged park development cost levies in certain mixed use areas, then the dollar amount of the commercial and

residential park levy is calculated.

Chapter 6, "Conclusion," reiterates the findings of the thesis and suggests areas of further research which could be pursued as a result of the findings of this thesis. Chapter 6 also discusses policy implications and implications for the planning profession in Canada.

# HISTORY OF DEVELOPMENT COST LEVIES

## 2.1 A GROWING VANCOUVER

The population of Greater Vancouver is currently growing rapidly. Baxter reports that the region grew by 260,000 from 1986 to 1991 (Baxter, 1993). Over the next 30 years the Greater Vancouver Regional District predicts an increase of 1.24 million people to the Lower Mainland region or about 1.9% per year (GVRD Strategic Planning Department, 1993, p.62). The City of Vancouver's share of the population increase is anticipated to be 173,000 people over the next 30 years (GVRD Strategic Planning Department, 1993, p.62). This growth is due to three sources: international migration, natural increase and internal migration. Over the 1981 - 1989 period, 33% of the growth was due to international migration, 35% from net natural increase (surplus of births over deaths) and 32% from net internal migration (surplus of people moving to the region than moving from the region) (Baxter, 1993). Even without immigration, growth would continue due to natural increase and internal migration (67% of current growth) would continue as neither of these methods of growth can be controlled. Thus the population can be expected to rise by a significant amount in the next thirty years. Along with this increase, the profile of the population will also change due to factors such as aging and ethnic pluralism.

This population growth generates positive effects for many sectors of the economy. In Vancouver, it provides not only construction jobs and benefits to the economy during the building stage, but also increases revenues to businesses, arts and entertainment. But while

providing benefits including lowering demands on suburban and rural growth and its accompanying costs, this increase in population will also place a strain on the existing City infrastructure. The City will need to upgrade and add additional infrastructure such as sewer systems, sewage treatment plants, new streets and larger water reservoirs. The increased population will also require additional community services such as park land, community centres, daycares, libraries and schools.

## 2.2 THE FINANCE PROBLEMS OF MUNICIPAL GOVERNMENTS

Enid Slack (1990) has researched the history of municipal financing. Her research indicates that sources of capital funding for B.C. municipalities has been decreasing, due to several factors. First, since the 1970s, transfer payments from provincial governments to local governments municipalities has been steadily declining. As senior levels of governments struggle with increasing costs and deficit reduction, they are decreasing transfer payments to municipalities and "downloading" responsibilities. In order to meet the shortfall, municipalities in B.C. have increasingly been forced to rely on borrowed funds to finance capital costs. Over the period of 1962-77, the revenue derived from provincial assistance decreased from 17.2% of total revenue to 9.9% (Kuroyama, 1979, p.30). This trend has continued. From 1977-86 the reliance on long term debt has increased significantly in British Columbia, with the decrease in transfers from other governments (Slack, 1990, p.7).

In addition, municipalities are severely restricted in their revenue generating sources. The Municipal Act of B.C. allows funds to be collected only through levy charges for such things as property taxes (Section 427), licences (Section 440), user fees (Section 564) and

development cost charges (Section 702C). In British Columbia, property taxes make up the bulk of municipal revenue at 62% of the total (Slack, 1988, p.6).

Along with all the regular municipal expenditures, such as street maintenance, fire, police, etc., Kuroyama identified rapid urban population growth as being one of the main contributors to the increased financial strain (Kuroyama, 1979, p.33). Population growth in urban centres creates the need for additional water, sewer, transportation systems, police, fire, and parks and recreation facilities.

Another cost is the increased service delivery such as better roads, traffic control, snow removal, demanded by the new population and once an additional service is added, it often becomes perpetual as residents expect it (Kuroyama, 1979, p.37). Skaburskis concurs and finds that service levels are also related to income levels. As income levels rise residents demand more and improved services. Pollution and environmental concerns become more prevalent as the population becomes more affluent (Skaburskis, 1993, p.10). All of these service demands increase the financial pressure on local governments.

Large capital projects have traditionally have been paid for in British Columbia by municipal bonds which are paid off over time by general revenues. The 1970s and 1980s saw a large increase in property taxes and utility bills as land prices increased and mil rates increased in order to keep pace with inflation. Property taxes also increased in order to fund the new capital projects (Snyder and Stegman, 1986, p.6). But now residents are becoming vocally opposed to higher taxes and are voting against some capital plebiscites (Snyder and Stegman, 1986, p.6). Although, some cities, such as Vancouver, have been successful when

seeking funds on plebiscites, the general opposition of the voting public to higher taxes is another contributing factor to the financial difficulties which municipalities currently face. As a result, while cites are growing and the need for additional service delivery is expanding, the revenue sources are shrinking, leading to a growing financial crisis.

## 2.3 USE OF LAND USE CONTRACTS

Due to the difficultly municipalities have encountered in paying for expanding capital costs, they have increasingly tried to ensure that development pays for a fair share of these costs. Generally developers provide only those on-site services which are required for their site, such as sewer, roads, water etc. As Skaburskis puts it: "the competitive market will not allocate goods and services in a manner that yield a socially desirable environment" (Skaburskis, 1993, p.5). In the Municipal Act, the mechanism for ensuring payment was a land use contract between the municipality and the developer. The municipality determined the level of servicing needed for the development and negotiated these needs with the developer. Land use contracts were used to ensure that services would be installed (Mackenzie,1978, p.20).

In 1976 the B. C. Minister of Municipal Affairs and Housing, the Honourable Hugh Curtis, established the Joint Committee on Housing to examine housing affordability in British Columbia. The Committee advocated a change in legislation to abandon the use of land use contracts and move to a development cost levy system. It was noted that the previous system of contracts was easily abused and perceived as unfair as the contracts were

negotiated on a site-by site basis and municipalities did not legally have to prescribe the same requirements for similar properties, thus leading to charges of discrimination or favouritism (MacKenzie,1978, p.20).

In 1990, the Provincial Government amended the Vancouver Charter and the Municipal Act to allow for the placement of development cost levies, as a source of revenue to offset the increasing cost of infrastructure needs created by the population growth from new development.

## 2.4 DEVELOPMENT COST CHARGE LEGISLATION

Under the Municipal Act and the Vancouver Charter, municipalities have been given various powers by the Provincial Government. Municipalities have been granted the right to regulate activities within their boundaries. They have the power to zone land, and to place regulations on building and subdivision.

Section 983 of the Municipal Act and Section 523D of the Vancouver Charter provide the legislative authority for British Columbia municipalities to charge development cost levies. The Municipal Act and the Vancouver Charter differ slightly as to which items are eligible for funding with development cost levies. The Municipal Act (Section 983, subsection 2) states that a local government may, by bylaw, for the purpose of providing funds to assist the local government to pay the capital costs of:

1) providing, constructing, altering or expanding sewage, water, drainage and highway facilities, other than off-street parking facilities; and

2) providing park land and improvements to park land.

The Vancouver Charter, Section 523D allows for the collecting of funds to assist in the two above areas and also for the capital cost of providing, altering or expanding:

3) day care facilities in premises leased or owned, and acquiring property for such facilities; and

4) the provision of replacement housing,

in order to directly or indirectly serve the development. Replacement housing is defined in the City of Vancouver Zoning and Development By-law as being housing necessary to house persons displaced and unable to afford comparable accommodation as a result of development in the area (City of Vancouver, 1991a, Appendix A, p.3).

The legislation is quite clear that the charges imposed are only to provide funds "to assist" with capital costs. Thus development cost levies are not allowed to be used to pay for the entire infrastructure cost which will be incurred by a municipality as a result of new development.

Development cost charges can be levied under Section 983 (2) of the Municipal Act on subdivision approvals or a building permit on everything except:

(1) a building permit authorizing construction, alteration or extension that is exempt from taxation by the Lieutenant Governor (e.g. churches, social housing owned by the Federal or Provincial Government);

(2) building permit authorizing construction of three or less self-contained dwelling units; and

(3) a building permit authorizing construction, alteration, or extension of a building or structure for residential purposes, where the value of the work exceeds $50,000.

The money which is collected must be placed in a separate account and may be used only to finance items within the boundary area outlined in the development cost levy by-law for that area. Replacement housing is the only item for which levy funds may be used outside the development cost levy district.

Since development cost charges were put in place to promote a uniform system, there are restrictions about varying the levying rates. When a new development cost levy by-law is passed, projects already with a building permit are exempt. Municipalities need to notify property owners in advance of any proposed changes, to allow them to inform City Council about their opinions and views.

The Municipal Act, Section 984 (1) notes levies are only allowed to vary with respect to:

1) different zones or different defined areas;
2) different uses;
3) different capital costs related to different classes of development; and
4) different sizes or number of units or lots created by or as a result of development.

The Vancouver Charter, Section 523D (12) states that the levy may also vary with respect to different occupancies but does not include variations for different classes of development or different sizes or number of units or lots created by or as a result of

development.

The placement of development cost levies attempts to give equity to the system by providing guidelines for the financing of off-site infrastructure. They are meant to replace land use contracts and bring order and consistency to the development process.

Development cost levies are increasingly being used by municipalities. A survey carried out by Slack from December 1989 - February 1990 found that of the 114 municipalities in B.C. who responded to the survey, 52 were using development cost levies and 6 were in the process of charging development levies. Thus only a short period after the legislation was enacted, at least 52 of a total of 148 municipalities (39%) in B.C. levy development cost charges (Slack, 1990, p.22).

## 2.5 COLLECTION OF DEVELOPMENT COST LEVIES

There are two points in the development process where development cost charges may be levied. They can be levied either when a building permit is issued or an occupancy permit is issued. Municipalities wishing to secure the funds as soon as possible may opt for levying the cost charges at the building permit stage. This results in a longer period of financing for the developer than if the monies are collected at the occupancy stage, which is when the developer is more likely to have some of the units sold. Vancouver's current practice is that levies must be paid when the occupancy permit is issued, with a minimal amount due at the building permit stage. However, interest is charged since most land purchases have to be undertaken ahead of time.

## 2.6 DETERMINING THE DEVELOPMENT COST LEVY CHARGE RATE

Prior to determining the development cost levy rate, a study of the area where development cost levies are being considered should be undertaken. Legislation states that municipalities must make available the considerations, information and calculations used to determine the basis of a development cost levy (Municipal Act 984 (3)). In the City of Vancouver development cost levies have been considered only in the context of community planning studies, which are available for public review. It is also beneficial to have information illustrating that the future population cannot be sustained by the current infrastructure in order to successfully defend a legal challenge. In a 1979 survey of Ontario municipalities Amborski (1979) found that only eight of 28 jurisdictions in Ontario had publicly available studies to support their development cost policy and charge rate (Amborski in Nelson ed., 1988, p.59).

Once research has been completed to show that the new development will result in strains to the existing infrastructure system, the calculation of the charge must be undertaken. In order to determine a levy rate, an inventory of the existing infrastructure needs to be undertaken. The next step is to determine the estimated population increase over the selected time period. The increase of population is then multiplied by the adopted standards relating to infrastructure for daycares, parks, etc. The additional infrastructure needs generated by the new development are calculated with a monetary estimated cost determined for each infrastructure item. The purchase price of the entire package is then calculated and divided by the estimated buildable floorspace in order to determine the development cost charge cost per square foot based upon the new development paying the cost of the entire infrastructure

package. Because the legislation states that development cost levies are to assist in the cost of infrastructure, developments cannot be charged the entire cost of providing the infrastructure, general tax revenues must also "assist". Municipalities must therefore ensure that the estimated total revenue from development levies are less than the full cost of the infrastructure costs. In order to assist in determining an adequate charge, municipalities find it useful to complete a survey of development cost levy rates in neighbouring areas in order to ensure the proposed rate is not excessive.

## 2.7 THE EQUITY OF DEVELOPMENT COST CHARGES

### 2.7.1 Ability To Pay Versus Benefit Received

The aim of development cost charges is to ensure that new development pays its own way. But the question remains: are development cost levies equitable in theory? Two authors discuss equity in the development levy context using two economic principles: 1) the ability to pay principle and 2) the benefits received principle. It is upon these two principles which the current system of financing and the development cost levy system are based (Snyder & Stegman, 1986; Slack, 1986).

The ability to pay principle advocates that those with higher incomes should contribute more to public financing than those with lower incomes. The principle is based upon the reasoning that the greater one's income and assets, the greater one's ability to pay. This principle is employed for the financing of goods that are viewed as the responsibility of society as a whole (e.g. education). The ability to pay principle is the basis for the current

property taxation system as those with higher property values pay more, based upon property tax assessment (Snyder and Stegman, 1986, p.28). Facilities such as community centres, ice rinks, libraries, police/fire station, and swimming pools will continue to be funded under the ability to pay system, as it is clear that these facilities are to the betterment of society as a whole rather than a geographic area.

Under the "benefits received" principle only an individual who receives the benefit of a service are responsible for the cost of the service (Slack, 1986). This principle is based upon the rationale that if the benefits are only accruing to one group then it is equitable to charge only that group the cost of the service. The development cost charge system is partially based upon this principle. Under this principle, the levies are fair if the capital improvements benefit the new development.

It can be difficult to assess exactly who benefits from certain infrastructure improvements. Using the benefit received principal, the levies would be unfair if the benefit of the service applied to all individuals but only the new residents were paying the cost. Section 2.4 above discussed the four types of infrastructure costs which development levies may be charged. Infrastructure costs such as sewage, water, drainage, and daycare land and development are items whose benefit can generally be attributed to a specific area. The provision of replacement housing is tenuous as only those who reside in the housing will be the beneficiaries. Thus using a benefit-received system of financing for these items, aside from replacement housing, is equitable.

### 2.7.2 Neighbourhood Park Financing

For the other fundable item for development cost levies, park acquisition, it is less clear as to whether the benefit of parks accrues to only the new community or to the surrounding community at large. If the benefit of parks, such as neighbourhood parks, can be attributed to a geographic area then they should be financed using the "benefits received" principle. If the parks are of general benefit to society by being regional or city-wide facilities then their funding should be based on the "ability to pay" principle.

The literature is conflicting regarding park use and who benefits from parks. The Planning Institute of British Columbia (PIBC) advocates that parks are a benefit received type of good. The paper, published in 1990, argues that both the park acquisition and development should be funded by development cost levies. The PIBC rationale is that "these basic services are provided as needed and are paid for by those who will benefit directly from them" (PIBC, 1990, p.3). The opposite view is presented by the Urban Development Institute which completed a paper in 1988 analyzing the City of Scarborough's development charge policy. This paper states that libraries, parks and recreation facilities which are proposed as leviable items are not legitimate items as they were "not capital projects which relate to land development and related specifically to the geographic area of benefit" (UDI, 1988, p.15).

Between the two extremes of the ability to pay or benefit financing, Snyder and Stegman identify a grey area where either type of financing could be applied (Snyder and Stegman, 1986, p.28). They perceive park land purchase is in this grey area, as it does not clearly fit under either principle. It is, therefore, necessary to assess whether the benefit of

parks accrues mainly to the adjacent community or to society as a whole.

The proposed park usage study will aid in the understanding about who obtains benefits from parks, by examining park usage. Parks have both a visual and a functional utility among different user groups. Parks benefit society as a whole as there is visual benefit from seeing a park in the otherwise built environment. Unfortunately, the visual value of green space to society is impossible to measure. The study will enable some conclusions to be drawn about which funding mechanism is most appropriate for park space. The "ability to pay principle" is appropriate if park users are from both inside and outside the neighbourhood. The "benefit received" principle can be employed if the users are primarily from within the neighbourhood.

### 2.7.3 Intergenerational Equity

Although development cost charges are defendable for infrastructure such as replacement housing and daycare under the benefit received principle, authors also discuss development cost charges in the context of intergenerational or horizonal equity. Horizontal equity is equal treatment of people in equal circumstances. In the past, in British Columbia, existing residents financed the cost of future residents' infrastructure. An infrastructure project would be paid off in five years, yet actually have a life-span of 30 years or more. The cost of paying for future infrastructure is more expensive today than in previous decades due to higher land costs and higher financing costs. Thus the current system is that the existing residents are paying for the infrastructure of future residents (Snyder & Stegman, 1986, Slack, 1993). However, often the new residents have had to "do without" until enough money was

saved to provide the amenity. This is not a problem in a new area where everyone does without amenities. It is a problem in an existing area where new residents "borrow" existing residents facilities. These facilities become overburdened with the influx of the new residents and the community wants the expanded facilities.

A development cost levy system represents a change to a new system where future generations now must pay for themselves. Under the horizontal equity principle future generations should have access to the same facilities as current residents and not have to pay additional levies as traditionally it has been local governments' responsibility to provide infrastructure through general revenue (Snyder & Stegman, 1986, p.28).

Although development cost levies appear inequitable when examined in the context of the horizontal equity principle, they are defendable on the basis that the horizontal equity principle does not apply as the generations are not "in equal circumstances." The previous funding system had existing generations paying the infrastructure costs of future generations. Due to the rapid growth experienced in regions such as Vancouver, continuing with the existing system could result in established residents being overburdened by the infrastructure costs created by the large incoming population. Today's taxpayers are faced with huge expenditures due to the rapid population growth. During the period of 1971 - 1981 the Greater Vancouver Regional Districts' average annual growth rate was 1.55% per year (Baxter, 1993, p.5) In the decade of 1981 - 1991 the average annual growth rate was 2.3% (Baxter, 1993, p.5). As this growth is unprecedented, it is arguable that the generations are not in equal circumstances thus the horizontal equity principle should not apply. Although abandonment of the current system would create somewhat of a windfall for established

residents who would no longer be paying for future residents, the implementation of a system of development charges is more equitable than overburdening the present population. As previously mentioned, the infrastructure improvements are partially funded through general revenues, so existing residents are paying towards the upgrades. The level of service is not improved for existing residents as they are provided with the same per capita levels they previously enjoyed. Present taxpayers may benefit by not paying the full cost of future generations infrastructure which is attributable to a specific geographic area, but, as Slack points out, the "transition from one system to the other is not without gains and losses" (Slack, 1990, p.17).

### 2.7.4 Argument of Double Taxation

It is argued by the Urban Development Industry that especially in redevelopment areas, development cost levies are a method of double taxation because the services are already in place and over the years the property taxes have already been paid for them (UDI, 1990, p.3). Legally development fees cannot be collected unless there is evidence that new infrastructure is needed for the area. Thus the Urban Development Institute argument is flawed because if all the services already were in place, then a development cost levy would neither be needed nor would it be justifiable under the terms of the Municipal Act or the Vancouver Charter. Levies can only be placed where it can be shown that new development is creating a demand for new, expanded, or replaced infrastructure.

## 2.8 RESULT OF DEVELOPMENT COST LEVIES

### 2.8.1 Outcomes of Development Cost Levies

Prior to examining development cost levies using neo-classical economics it is useful to examine which components in the development industry a cost levy can influence. Depending upon market circumstances, which are discussed below, the cost levies influence the following four factors:

1) a development cost charge may decrease the amount which a developer is willing to pay for a piece of land;
2) a levy may result in the a developer accepting less profit. Developers generally achieve a 20% rate of return. Huffman, Nelson, Smith, and Stegman (1988) discuss that it is unlikely that developers would absorb the development cost charges themselves. Developers do occasionally pay some of the levy but this situation generally does not continue for long periods. They will choose not to develop rather than accept a lower profit because land development is generally a risky investment and the profit margin expected is the benefit of making such investment risks (Huffman, Nelson, Smith and Stegman in Nelson ed., 1988, p.318);
3) developers could decrease the quality of the product thus ensuring that it did not cost more to built in the post levy stage. They could also decrease the size of the product which may enable them to sell more units than anticipated in the pre-levy stage; and
4) development cost levies may increase the price or rent to the purchaser and thus the levy is passed on to the buyer.

Generally the beneficiaries of cost levies are the owners of existing properties. Eventually the price of housing or the rents will increase over time due to the new infrastructure and amenities of the area. Their property values will rise if the price of housing increases due to the addition of the development cost levy and its associated benefits.

The development industry argues that if development cost charges are passed on to the consumer it has other ramifications beyond an increase in housing prices. Due to the increased the price of housing, home purchasers would face increases in the amount of money needed for a down payment as well as a mortgage. This increase in down payment and mortgage may result in some individuals being excluded from the market because they do not meet minimum income qualifications (UDI, 1990, p.3-5). Although it may seem unfair if the development cost levies are passed on to purchasers, this is ultimately the original intent of the levies. They are designed to ensure that new development and therefore the new residents pay a share of the infrastructure needs they are creating by moving to that community. Although the intent is for new development to "pay its own way" market conditions determine who ultimately pays the levies. As mentioned previously, if developers believe that potential purchasers will no longer be able to afford the product due to the additional cost of the levies, they may chose to produce a lower end product - either smaller or of a slightly inferior quality. Thus a levy that is passed on to purchasers does not necessarily result in individuals being excluded from the market.

Skaburskis points out that if housing prices can increase this implies that the prices were not already at their maximum. He argues that developers would not be so generous as to not have prices at their maximum. He points out that the burden of development cost

levies must be shared by landowners and purchasers since there is a strong lobby in the development industry against the use of levies (Skaburskis, 1993, p.29). Thus, the four ways discussed above are likely used in various combinations in order to share the cost of development cost levy.

### 2.8.2 Supply and Demand as Related to Development Levies

In order to assess the impact of development cost levies most authors use a neo-classical economic model. Within a fixed time period there is a supply of housing stock and a demand for that housing. (See Figure 1). The equilibrium point is where quantity = price or supply = demand. When development fees are levied the cost of supplying new development generally increases if the product size and type stays constant. The effects of cost levies have is dependent upon the type of market which exists. The housing market may be at equilibrium and therefore have elastic demand, may be falling and have elastic demand or the market may be rising or a "hot" market and have inelastic demand.

In a competitive or elastic market, attempting to pass the levy on to purchasers will result in a demand decrease as some purchasers due to the increase in price may consider smaller units or a less-finished product. Other buyers will seek housing in other locations or postpone buying. Due to this decrease in demand, builders may be forced to accept less profit or some may leave the market and less housing will be produced. In the short run both the developers and the buyers will share the cost of the development levy. In the longer run, property owners will share the cost of the levy as demand for their property will be less, having the effect of decreasing land prices somewhat. If the market continues with inelastic

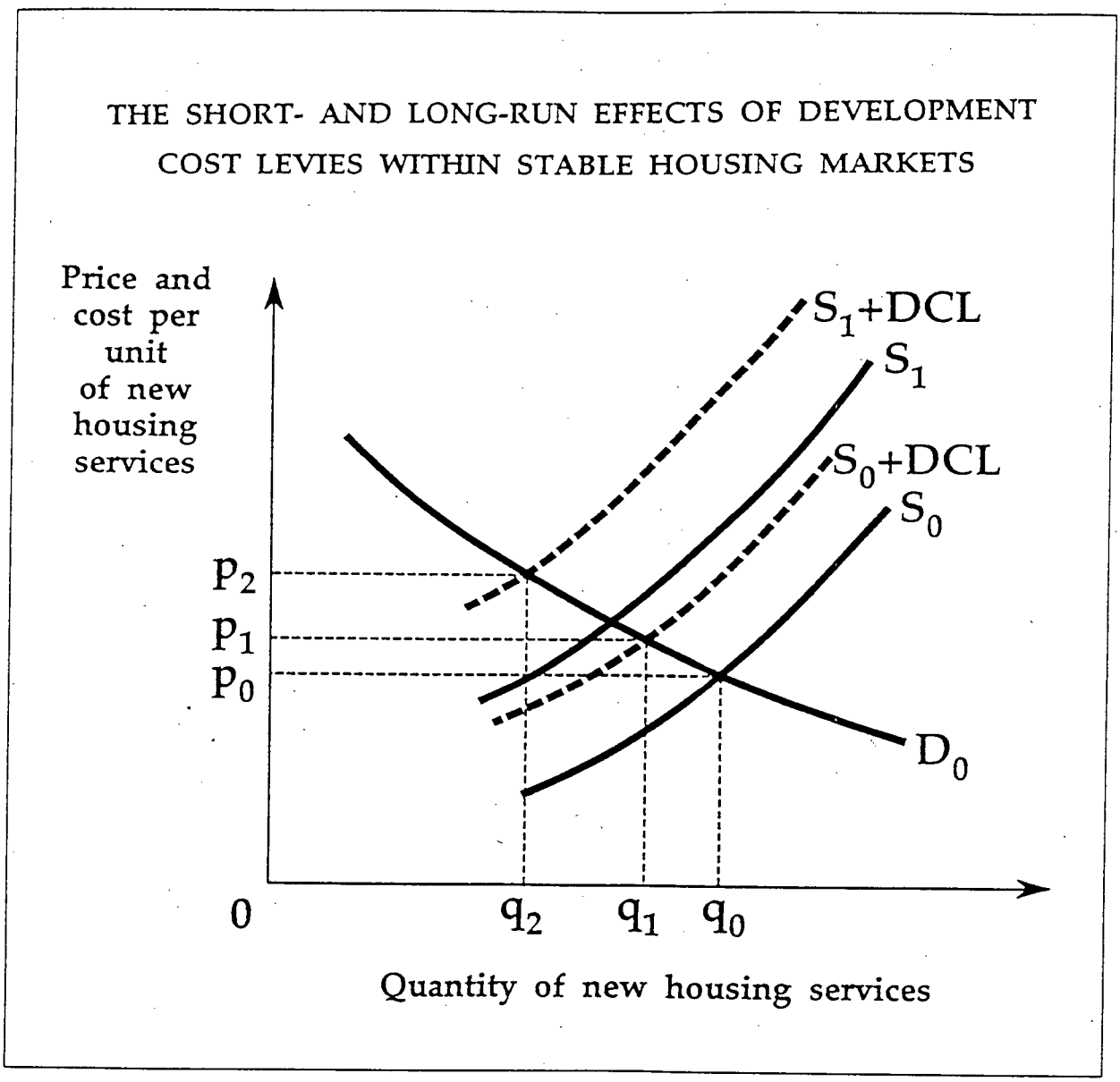



Figure 1 Effects of Development Cost Levies in Stable Housing Markets

*Source: Skaburskis, 1993, page 30*

demand, along with less housing being produced, the existing stock will begin to deteriorate, further reducing supply.

In the future demand may be greater than supply, and the price of housing will rise. If this occurs then the cost of the levy can be passed on to the new home buyers. The increase in price enables developers to reenter the market as prices will have risen to incorporate the development fees. If the demand remains at equilibrium with supply then the developers and homeowners will continue to share in the cost, the landowner may attempt to pass the cost back or the quality or size of housing may be reduced.

In a falling market, attempts by the developers to pass on the cost of development levies are not possible as the demand for housing is elastic. In this scenario the supply of housing is greater than the demand. Developers are willing to absorb some or most of the cost of development levy as the competition for purchasers is great. In this scenario, the developer generally absorbs most if not all of the development cost levy.

In a market with inelastic demand, development cost charges will likely be passed on to home purchasers. The supply curve will shift upwards. In this situation the demand curve will shift outwards to meet the new supply curve as buyers are willing to pay more for housing. In this scenario the development cost levies will be passed on to home purchasers. Due to the inelastic demand, the demand curve will also shift outwards as consumers are willing to pay more for the product. The price and quantity will both increase. Skaburskis illustrates this situation by a vertical supply curve which illustrates the only factor that can determine housing prices in this scenario is an alteration of demand (see Figure 2). A

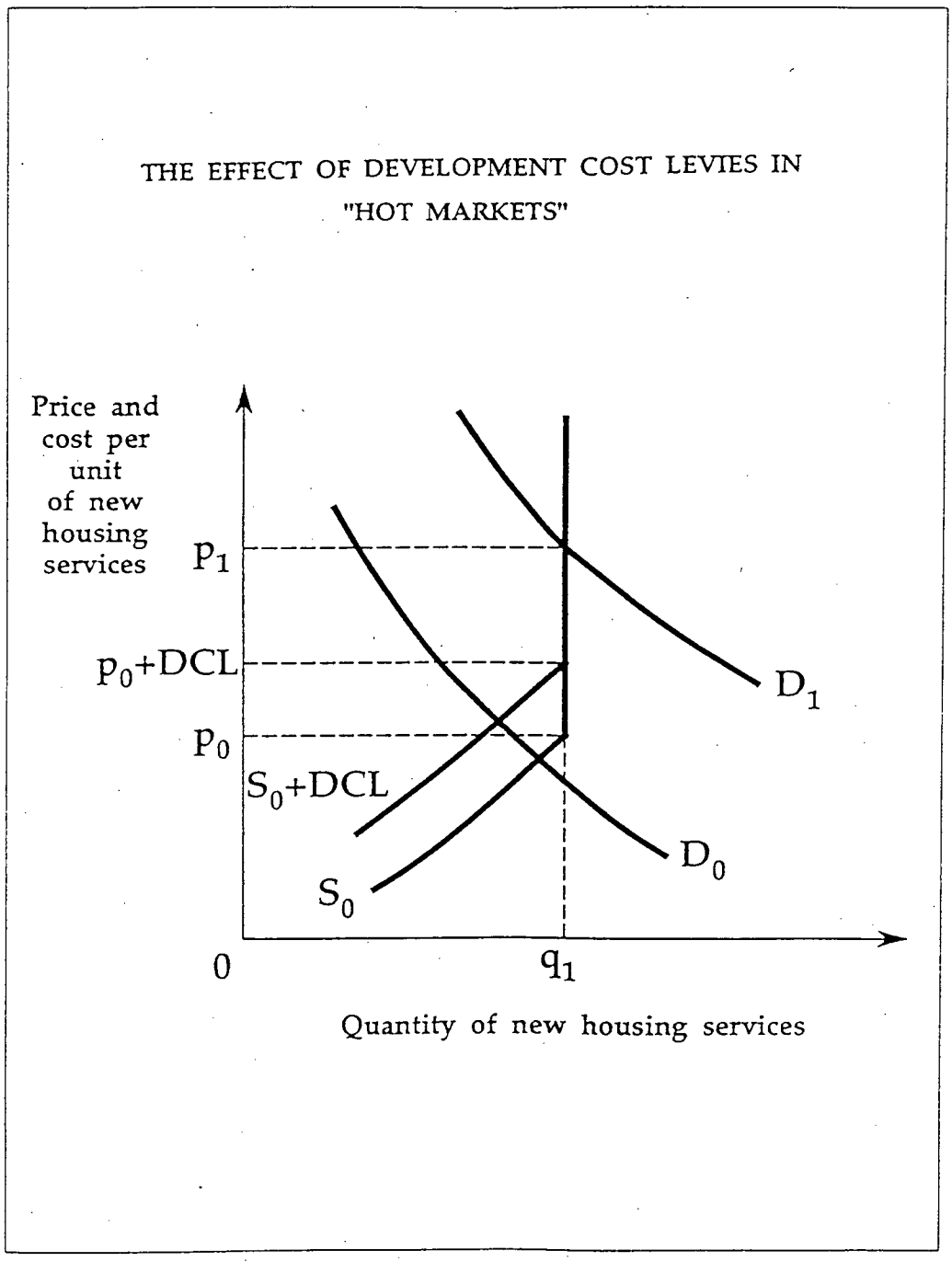



Figure 2 Effects of Development Cost Levies in "Hot Markets"

*Source: Skaburskis, 1993, page 38*

decrease in demand will decrease housing prices (Skaburskis, 1993, p.39).

### 2.8.3 Uniformity of Charge

The location of a development cost charge affects the impact which the fee will have on the market. If the development charge occurs across a whole region, then prices will undoubtedly rise over time as discussed in section 2.8.1. The supply curve will shift upwards thus altering the equilibrium to a new price.

The result of cost charges is different when the levies are only placed in one location. In this situation the price of housing would increase only in that location where the development fee is levied. The result of a cost charge in this situation is dependent upon the demand for housing in that specific area where the charge is levied. Again, if the area has high demand the levies will be passed forward to the new purchasers. Since there are purchasers who are attracted to that area, they will likely be willing to pay more for that location with funding for amenities in place, and an increase in price will not deter all of them from purchasing. In an area without great demand, developers will be unable to raise the price because housing in nearby locations that do not have a levy charge will not have increased in price. In this instance, the developer may choose not to develop until prices rise in the surrounding locations, or reduce the quality and/or size of the product.

The other option which is available would be to attempt to pass the charge back to the initial landowner by purchasing the land for less money. Developers will be unable to pass the cost on to the new home buyers, who could buy a commodity cheaper outside of the

development cost levy boundary.

### 2.8.4 Land Purchase in Relation to Knowledge of a Development Cost Levy

As discussed previously, developers may attempt to pass the development cost charge back to the landowner. The ability of developers to pass a cost levy back on to the landowner is dependent on the timing of the levy. If developers purchase land and the development cost levy is put in place following the purchase, or they were uninformed about the upcoming development levy, then the outcome is again dependent on market conditions. Obviously, in this scenario the developer has no opportunity to pass the cost levy on to the landowner. If the demand is high but supply is low then the levy will be passed on to purchasers. If demand is low and supply is high then the developer will likely be forced to absorb the development cost levy.

If a developer has knowledge of a levy set at a current fixed rate, then the developer would likely include this as one of the costs of development and be willing to pay less for the land than if there was no cost levy in place. If the developers expected profit is not achievable due to a levy cost then the developer can decrease the amount they are willing to pay for the land. Economic analysis of a project in the development industry is often carried out using the residual mechanism. This involves estimating revenues and subtracting expenditures and the expected rate of return for the project. The amount remaining or the residual amount is the amount the developer is able to pay for the land. If the cost of producing a development have increased due to a cost levy, then the money available for the land purchase decreases, thus development cost levies are passed backward to the landowners.

In a survey of Toronto developers and buildings Amborski found that 69.7% of respondents considered land residual technique in their decisions. They used either a pro-forma or residual method as the most important determination for the price they would be willing to pay for land (Amborski, 1988. p. 18-19). Thus the existence of a development cost levy can influence the price a developer is willing to pay for the land. Obviously if owners feel that demand will increase they may reject the offer to purchase their land and wait for the market conditions improve to where the development industry will give the owners asking price for the land.

Is it fair if levies are often absorbed by the pre-development owners? Generally development cost levies occur in areas where there is substantial population growth. In the City of Vancouver levies have only been placed in areas in which upzoning has occurred. Currently levies have been placed in the Downtown South Area and Burrard Slopes. These areas underwent significant "upvaluing" in terms of zoning, which were a result of planning studies prior to the levying of the development cost charge. Although the levy may be passed back to the pre-development landowners, it is these landowners who have made a substantial financial gain through the increase in value of their zoning.. The attempt of the City to take back some of the unearned value is known internationally as the recapture of betterment. This is defined as "the unearned increment that accrues to developers not through their own efforts, but through public decisions to upgrade the development value of particular plots of land" (Alterman, 1989, p.58). If development cost levies are passed back to the pre-development landowners then the City is recapturing some of the increased land value created through the upzoning process.

### 2.8.5 Development Cost Levies and their Effect on Rate of Development

Critics of development cost levies such as the Urban Development Institute, argue that levies have the adverse effect of slowing development until prices or rents have risen to the appropriate amount or land costs have decreased to the point of making development feasible.

Examples from other cities do not support the belief that development cost levies have the effect of slowing development. Barnebey, MacRostie, Nelson, Simpson and Winterset (1988) report that the San Diego growth rate has not been hampered by impact fees. The article reports that "Developers accept the program as necessary for growth." The article further argues that the development community benefits from the levies as they now have some say in both the quality and the timing of the facilities for which their contributions are paying (Barnebey, MacRostie, Nelson, Simpson and Winterset in Nelson ed., 1988, p.44). Skaburskis argues that the insertion of a development cost charge may delay development while housing prices increase, but a moderate development levy may quicken development if it is perceived that the charge will be increased in the future (Skaburskis, 1993, p.42). However, this may not affect long held properties in a rising market who have a cushion to sell at a lower price.

A Planning Institute of British Columbia paper also differs with the Urban Development Institute thinking and cites studies in Californian cities which indicated that development cost levies did not deter development. The article also notes that levies may, in fact, benefit landowners by giving some certainty and consistency. Boston is another city that the Planning Institute of British Columbia points to in which development has continued at a steady pace even with development cost levies on office and commercial projects. There

developers are required to commit money to affordable housing (PIBC, 1991, p.3).

### 2.8.6 Development Cost Levies and their Affect on Growth Sentiments

Although the development industry opposes development cost levies, they may actually aid development in areas where "no growth" sentiments exist. Increasing citizens such as those in Californian desert communities are speaking out against development. Often the argument for opposing new development is based upon the argument that the community possess inadequate infrastructure such as roads, sewers and park land. Having development cost charges ensures that necessary infrastructure will be put in place prior to the construction of new development thus deflecting some of the opposition. Snyder and Stegman, (1986) point out that development (especially in U.S. cities) favour cost levies as they fear moratoriums on development. Developers would likely accept development fees over the alternative to stopping all development or carrying out site by site negotiations. Growth is more accepted if the current taxpayers feel they are not paying for this growth, and development levies may, in fact, facilitate development and help overcome political constraints in some areas (Snyder and Stegman, 1986). By facilitating development, housing costs will likely be lower than in a development moratorium environment.

### 2.8.7 Office Sector

When considering the effect of a cost levy on the office sector it is similar to the housing sector. Huffman and Smith in Development Impact Fees (Nelson ed., 1988) explore the effects of development levies in the context of the office market. They argue that if

levies substantially decrease the rate of return for a project, then the developer will no longer proceed with the project. Similarly, in the housing sector, there is an opportunity to pass the fees along to the tenants if the demand for office space is inelastic. Office space demand is inelastic with certain industries and users who need to locate in specific areas to maintain agglomeration economies. Development levies will be passed on in these areas to businesses in the form of higher rents.

Businesses that are "footloose", able to locate outside a development cost levy zone if alternative locations meet the transportation, communication and accessibility needs of the business, have elastic demand for office space (Huffman and Smith in Nelson ed., 1988, p.271). The ability of the developer to pass the fees along to these tenants is decreasing. In the long run, if little new development occurs, then the existing stock will deteriorate and supply will decrease. This decrease in the supply will cause rents to rise again until supply and demand are at equilibrium. Alternatively, developers of office space may attempt to pass some of the development fees on to landowners.

Huffman and Smith's (1988) research indicates that in the long run tenants usually bear the additional costs and landowners may pay a portion, but developers are unlikely to pay the fees in the long run. They also found that the owners of existing properties are the ultimate winners as the added costs will deter construction (thereby reducing supply) and due to demand being greater then supply, rents will eventually rise to a point where development is again feasible. In addition, the new community facilities built through cost levies will make the community more attractive (Huffman, Nelson, Smith, and Stegman in Nelson ed., 1988, p. 321)

## 2.9 PARK STUDIES IN OTHER CITIES

Residential standards for park space have long been utilized by planning departments but research in the employees' use of parks is minimal. As mentioned previously in Section 2.7.2, parks are a grey area, not easily distinguishable as falling under the ability to pay principle or the benefit received principle. This is why is it necessary to determine if parks generally benefit all of society or just the surrounding residents. This is explored by examining studies in other cities which explore employee use of park space in mixed-use areas.

The findings of a study of five inner city parks in Toronto offer some insights into the current study. The study was carried out using user observation, ecological mapping, a park use questionnaire and photographs from August - September 1995. A total of forty users in the five parks were randomly interviewed. The findings at Grange Park, which is located in a mixed-use area of residential, institutional and commercial use, were particularly useful. The questionnaire identified that Grange Park had a problem with marginals which may have affected people's use of the park. At Grange Park it was found that "local residents kept park use relatively high in the morning and evening, while employees from adjacent work places pushed the site population to its peak at lunch hour" (Toronto Department of Parks and Recreation, 1986, p.30). These findings indicate that park use differs during different times in day. During the lunch hour period the park is filled with employees. Resident use is outside of these times, with the majority of resident use in the morning and the evenings.

A search of the literature revealed no studies which focused on quantifying employee

and resident use of parks located in mixed-use areas. Thus, the focus of the survey of this paper is to conduct a survey to gather data to quantify employee and resident use of parks in mixed-use neighbourhoods.

## 2.10 USE OF COST LEVIES IN OTHER NORTH AMERICAN CITIES

Literature on the incidence of development cost levies being charged for park land on non-residential use in other North American cities is also limited. In 1992, C.N. Watson and Associates, a firm specializing in research and economic analysis for municipalities, carried out a survey of development charges in over 300 Ontario municipalities. The survey recorded no municipalities in that province where a park levy was placed on commercial property.

Although the C.N. Watson & Associates (1992) survey found no instances where non-residential uses where being charged a park levy, they are being considered in some Ontario cities. In 1991, C.N. Watson and Associates completed a report for the City of North York, entitled Development Charge Policy Report. It recommends a development cost charge for parks, recreation, libraries and cultural activities of $2.29 m2 (gross) be levied on commercial, industrial and institution development (C.N. Watson, 1991 p.2-14). The report stated that 10% of the need for community and neighbourhood parks was attributed to non-residential development (C.N. Watson, 1991 p.B18). In the same report, 30% of the demand for parkette (less that 0.5 acre in size) was attributed to non-residential demand (C.N. Watson, 1991, p.B19). The larger non-residential cost share for parkettes reflects greater proximity to and usage of parkettes by employees in North York.

In 1991, The City of Etobicoke, in co-operation with C.N. Watson, produced a report which also examined development cost charges for this Metropolitan Toronto municipality. One of the observations of the report was "that non-residential development charges have been increasing in growth areas in Ontario in part to assume a more equitable cost share relative to residential development" (City of Etobicoke, 1991, p.S11). The report recommended a park, recreation and library charge of $1.26 per m2 charge for non-residential development. For parkland acquisition across the City, it was estimated that non-residential use of parkland made up 10% with the remaining 90% being the residential share (City of Etobicoke, 1991, Chart 4.3).

There are examples in North American cities where park standards are set in areas which are primarily office oriented, primarily in downtown cores. In Santa Monica, a study was carried out to assess office workers use of parks in the downtown area. It found that parks were the public service most often used by office workers as 40% of workers were regularly using city park facilities. Because the commercial space was generating park demand in the downtown area, it is now responsible to provide park land. The standard set was 1/4 acre per 1,000 employees (University of Illinois Centre for Urban Economic Development, 1988, p.29).

The various different levies being proposed by other North American cities indicates that there is no clear understanding of the amount of park demand which is generated by non-residential development. The figures generated by North York and Etobicoke are not based upon actual usership of parkland. Thus it is necessary to carry out a study of who actually uses parkland in order to assess the cost share which residential and non-residential use

should be charged.

## 2.11 SYNOPSIS OF LITERATURE ON DEVELOPMENT COST LEVIES

Municipalities are seeking alternative funding sources as the traditional sources of property taxes and transfers from higher levels of governments can no longer provide the funds needed. Furthermore, cities with growing populations are in need of costly infrastructure expansions. At the same time, taxpayers are seeking a higher level of service delivery and are not willing to wait several years as was the case in previous generations. A development cost levy system allows municipalities to generate the needed funds for capital projects up front.

Although development cost levies are not without controversy, and represent a change from the current funding structure in which past residents paid for current residents' infrastructure, they appear to be one solution which is generally equitable in nature. They are a good solution for politicians who are in favour of development but also do not want their voting populations overburdened by large tax increases. New residents are forced to pay a larger share for themselves. While this might be viewed as unfair under the horizontal equity principle, as the two generations are not being treated equally, the horizontal equity principle is only applied to people in equal circumstances. In this case, because of the unprecedented growth in the Lower Mainland, paying for new services places an unfair burden on the existing residents. In addition, residents of fully serviced and supplied areas pay higher housing prices that reflect the level of amenities available, and in effect "purchase" these assets from the previous owners who funded them over time through taxes. Therefore, the

existing and future residents are not in equal circumstances and, thus, the principle is not applicable.

The effect of development levies depends primarily on the market conditions at the time of sale. Development cost levies are generally passed on either to the purchaser or to the previous landowner. Developers do occasionally pay some of the levy, but this situation generally does not continue for long periods. In the City of Vancouver, where levies have occurred in specific areas where significant upzoning has occurred, the result is that the developer and/or the landowner share in the cost of the levy unless demand to live in that area is inelastic.

Regardless of who ends up paying the cost of development levies, it appear to be one way that a number of North American municipalities have moved in order to help them acquire the needed funds for adding infrastructure to areas that are undergoing development. While it is true that existing residents benefit in areas where development cost levies are placed, in Vancouver, the levies have been placed only in areas with little or no current residential population.

While it is easily argued that new development should pay for infrastructure such as replacement housing, sewage, water, drainage, highway facilities, and daycare, the case of parkland and parkettes is not so straightforward. The question arises: should commercial development have an amount for park acquisition and development added to their development cost levies? Do employees of parkland use it enough that it warrants charging them for its use?

The literature regarding non-residential use of park space is very sparse. A literature search revealed no other studies which explored both resident and employee use of parks. The park use studies which were discovered, focused upon either resident use, or office workers use of park space in the downtown core.

C.N. Watson's report (1991) estimates that 10% of the need for community and neighbourhood parks and 30% of demand for parkettes results from non-residential development. The City of Etobicoke estimates non-residential use of parks to be 10% . What if the employees actually use parks more than that amount? If so, should the commercial developer not be charged a higher amount in order to pay a more equitable share in lieu of employee use? Are these figures transferable to Vancouver where the climate is more temperate and parks can be utilized for a longer period of time?

These are some of the unanswered questions which need to be addressed using a field study. Since no surveys has been carried out regarding the employee use of park space it is necessary to carry out field work to determine how much of park space in mixed use neighbourhoods is attributable to commercial employees.

# SURVEY METHODOLOGY

## 3.1 BURRARD SLOPES CASE STUDY

The Burrard Slopes area of Vancouver will be used as a sample area in which the charging of park levies will be applied. The area was historically a light-industrial area. In 1993, City Council adopted policies that in effect upzoned the Burrard Slopes area to allow for mixed-use development. This area is made up of three different zoning districts. The area from First Avenue to Third Avenue between Burrard Street and Fir Street is zoned IC (Industrial/Commercial) - which allows mixed use developments which maintain an industrial/commercial feel to the area. The IC zoning allows a total of 2.5 f.s.r (1.0 residential + 1.0 commercial and 0.5 industrial). The Fourth Avenue frontage between Burrard and Fir Street and the two pockets at the Base of the Granville Bridge are zoned C-2B. This zoning allows a mix of commercial and residential (1.0 residential and 1.0 commercial). The area from Sixth Avenue to Eighth Avenue between Burrard and Hemlock is zoned C-3A and the guidelines encourage residential uses, while seeking cohesion with commercial uses. This zone allows a maximum of 3.0 f.s.r (2.75 residential + 0.25 commercial), but only 1.0 f.s.r. outright. Figure 3 illustrates the boundaries for Burrard Slopes area and shows the zoning.

Since the area was previously zoned light industrial in use, it contains few amenities. The adopted policies will result in a large residential population increase in this area. This population will require amenities as the area is currently amenity deficient area. In particular, the Burrard Slopes area is seriously deficient in park space (see Figure 4). The acquisition

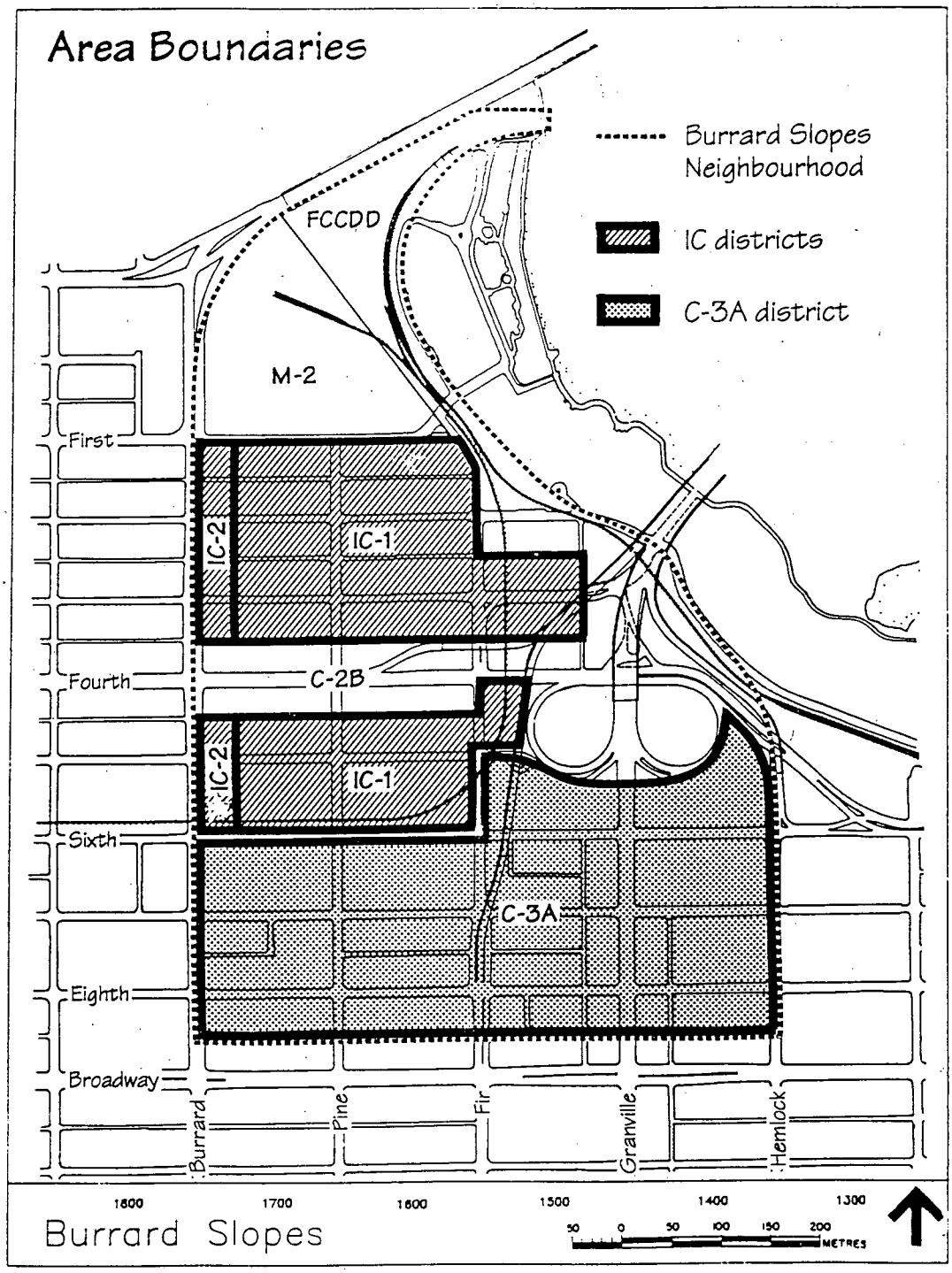



Figure 3 Burrard Slopes Area Boundaries

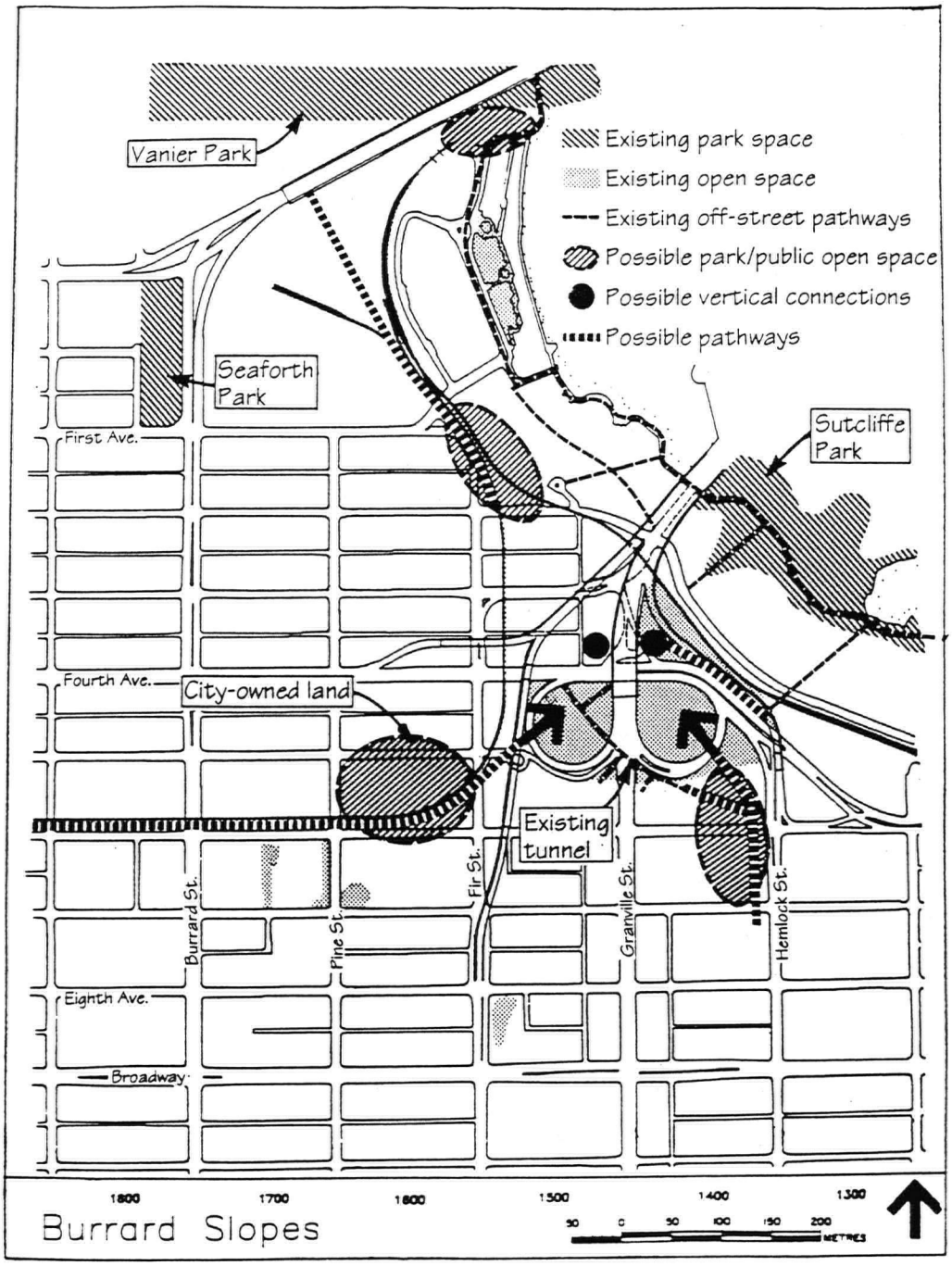



Figure 4 Burrard Slopes Open Space

of land for park space and the construction of the amenities for new residents and also for employees who will work in the area is necessary. As previously mentioned, Community Amenity Contributions (CAC's) are another means of charging development for infrastructure. However, the C-3A zoned portion of Burrard Slopes these cannot be charged CAC's as the zoning is already in place and community amenity contributions are leviable only at the time of rezoning. Due to the large need for infrastructure, the City of Vancouver has chosen to apply development cost levies in order to have development throughout the entire area pay a portion of the share in the infrastructure improvements.

Development cost levies will be utilized primarily to purchase park space in the Burrard Slopes neighbourhood. Since the area has currently has no neighbourhood park space and does not yet have a large population of residents it is necessary to obtain data regarding park usership from other areas in the City. The study to explore resident and employee park use will be carried out in park sites which are located in neighbourhoods similar to the future Burrard Slopes neighbourhood. The findings of the employee and resident park usage survey will be used to determine the placement of a development cost levy for park acquisition in the Burrard Slopes area.

## 3.2 USER SURVEY

The aim of the park survey is to ascertain the amount that residents and employees use parks. In order to gather information regarding employee and resident park use a survey of park users is most appropriate. In order to contact park users, the survey is most easily carried out directly at the parks. On-site surveys have the benefit of allowing inquiry about

behaviour at the time of the action, and thus may have a higher accuracy rate than surveys which inquire about past or future behaviour.

The type of survey mechanism must also be decided at the outset. The choices available for the user survey in the parks were: a self-survey whereby participants would be given a survey to complete, or a personal interview method in which a staff member asks users about their recreation behaviour. The latter method of surveying has a number of advantages. The personal contact with the respondents increases the response rate (usually about 90-95%) and reduces the problem of non-respondents. Personal interviews allow for in-depth questions and allow for probing and explaining questions to respondents, therefore decreasing inadequate replies or blanks. They are an excellent means of collecting information from a large number of people quickly and accurately. The disadvantage is that questionnaires need to be kept short and the cost of this method is high, both in terms of money and personnel (Tourism and Recreation Research Unit, 1983, p.98). Interviews are the most time consuming and expensive to administer but the results are usually more meaningful than other survey types such as written questionnaires (Harris and Hepner, 1983, p.11). For the current study it was felt that the benefit of the personal interview method outweighs the costs for this study.

Although personal interviews generally are more successful, the success of the personal interview method is dependent upon the skills of the interviewers (Hudson, 1988, p.31). The validity of the information is dependant upon the ability of the interviewers to ensure that their own biases do not affect their questioning. Interviews were carried out by Planning Assistants of the Vancouver Planning Department under the supervision of the

Planner in charge of Burrard Slopes. The author as well as three other members of the Community Planning Division were the staff members designated to carry out the personal interviews. The procedure followed by the interviewers was to identify themselves as members of the staff of the Vancouver Planning Department. Following this, staff informed people that a study of park usership was being carried out and inquired if they would be willing to participate in the survey. If a positive response was given, the interviewers proceeded to ask the questions. The importance of asking the questions exactly as worded in the questionnaire, was stressed to the interviewing staff, as changes in the wording can significantly affect the responses. If probed as to the nature of the study, staff were instructed to say that the results would be utilized in the planning of new parks in other mixed-use areas. It was felt that any mention of cost levies to the development industry could bias the responses of the park users.

### 3.3 SURVEY TIMES

The survey days and times then had to be determined. In order to ensure that the sample data are not skewed due to patterns of use, it is necessary to ensure that the survey times take into account seasonal, weekly and daily variations. Thus the surveying took place over a one month period from August 18 to September 17, 1993. The survey period chosen is consistent with The Recreation Site Survey Manual which suggests that at least eight days of surveying is needed. The Manual also recommends that surveying should be carried out over weekdays, weekend days, days within and outside school holiday periods (Tourism and Recreation Research Unit, 1983, p.13). This was accomplished by surveying a total of seven days at each of the two park sites, 14 days in total. Surveying was carried out at each park

location for two weekend days and five weekdays with approximately half undertaken during summer holidays.

The park survey is meant to record levels of parks use. For this reason, surveying was carried out on non-rainy days as there would be few park users on rainy days. In order to record variations of use throughout the day surveying was undertaken in the following one hours blocks:

| | |
|---|---|
| 10:00 a.m. - 11:00 a.m. | Morning use |
| 12:00 p.m. - 1:00 p.m. | Lunch use |
| 3:00 p.m. - 4:00 p.m. | Afternoon use |
| 5:00 p.m. - 6:00 p.m. | Evening use |

## 3.4 LOCATION OF THE INTERVIEWERS IN THE PARKS

As mentioned previously, the interviews were carried out at the park sites. In order to record true levels of use, the goal was to speak to every park user during the survey times. Although the parks did become crowded at times, there were four surveyors that were able to ensure that each user was surveyed. The survey barrels were set up on the major paths of the park, and as people came to the park surveyors approached them to participate. As the parks did not have clear entrances and exits it would have been difficult to interviewing visitors as they leave. Instead interviewing occurred at the park sites, with interviewers attempting to ask every passerby. When groups of people came to the park sites individual responses were recorded. This method of interviewing all individuals minimizes interviewer bias so that there is no choice of whom to interview.

## 3.5 SURVEY SITES

In order to ensure that the results were as representative as possible, two park sites were chosen. Gathering data on only one park site may skew the data if the site chosen is unusual. Also by choosing two neighbourhoods with slight dissimilarities, a larger application can be made of the resulting data to a broader range of neighbourhoods. In order for the survey to provide information about employee and resident use of parks, the park survey sites needed to meet a criteria. Because the data will be used to assess the equity of development cost levies on commercial uses for sub-neighbourhood parks in mixed use mid to high density neighbourhood it was necessary that sample parks be: 1) sub-neighbourhood parks and 2) located in a mid to high density mixed use area.

### 3.5.1 Neighbourhood Parks

Any park development levies collected in the Burrard Slopes Case Study area will be used to purchase sub-neighbourhood park space. The Ontario Ministry of Culture and Recreation defines these spaces as 0.5 acre to 2 acres. They need to be flexible and adaptable to allow a variety of uses (Ontario Ministry of Culture, 1976, p.32). These are small parks, with open grass for users to create their own uses such as ball throwing, frisbee as well as sitting areas for reading and talking, aimed at local users. No surface parking lots are provided in these parks. Gold defines sub-neighbourhood parks as small in size, parks which are generally walked to, and provide informal leisure and recreation opportunities (Gold, 1980, p.132). In order for the survey results to be applicable to the Burrard Slopes area the survey parks need to be sub-neighbourhood parks.

### 3.5.2. Mixed-Use Area Location

Another criterion for a survey park is that is has to be located in a mixed-use area. Traditionally the literature appears to categorize parks as serving either a commercial or a resident population. The Maryland National Park Planning Commission defines urban parks as small parks serving the CBD, a highly urban area, or commercial areas. In contrast, residential neighbourhood parks are small in size, walked to, and provide informal leisure and recreation opportunities (Gold, 1980, p.132). This study is seeking a mix of these two concepts: neighbourhood parks in "urban" areas.

In order for the study to provide data about mixed-use neighbourhoods, the selected sites need to be in areas with an even representation of commercial and residential development thus making them mixed-use neighbourhoods, similar to the Burrard Slopes case area. The parks must also be located in a mid to high density area. Burrard Slopes, when fully developed under the current zoning and approved rezoning policies will potentially have an overall floorspace ratio (f.s.r.) of 2.5. It is now approximately 1.4 f.s.r overall. Nelson Park is located in a mid to high density mixed use area. The 1/4 mile catchment area, shown in Figure 5 has a predominance of residential floorspace of 2.56 f.s.r. over commercial floorspace (2.41) with an overall density of 2.5 f.s.r. (calculations in Appendix A). The V.G.H. parks are also located in a mid density mixed use area. The 1/4 mile catchment area shown in Figure 5 has a greater amount of commercial floorspace (1.91) than residential floorspace (1.38) with an overall density of 1.60 f.s.r. (calculations in Appendix A). The 1/4 mile catchment area, shown in Figure 5, has an overall F.S.R. of 1.6. The f.s.r

calculations were determined by obtaining data from City Hall permit files, information from large institutions such as Robson Square and V.G.H. The Nelson Park area data was also taken from the Central Area Database and confirmed through file research and field work. The data calculations are presented in Appendix A.

### 3.5.3 Selected Parks

Two parks were selected which meet the above criteria. Nelson Park and the Vancouver General Hospital park sites were chosen. Nelson park is located at Thurlow and Nelson (see Figure 5). It is one and one-half acres, excluding Lord Roberts Elementary School and playground. The park has several benches, a water fountain, and both sunny and shaded green space.

The Vancouver General Hospital park sites located at 12th Ave. and Heather and 12th and Oak were also selected (see Figure 5). Each typifies a sub-neighbourhood park and are approximately one acre in size. Both offer neighbourhood activities with picnic benches, open spaces and tennis courts. The VGH parks are located in a mid density (overall f.s.r. 1.60) mixed use area.

## 3.6 SURVEY DESIGN

The surveys aims to determine if park users are employee or residents in the area, and the amount of time they spend in the parks. Current recreation activity enables predictions to be made regarding potential future attitudes and behaviour (Hudson, 1988). The survey

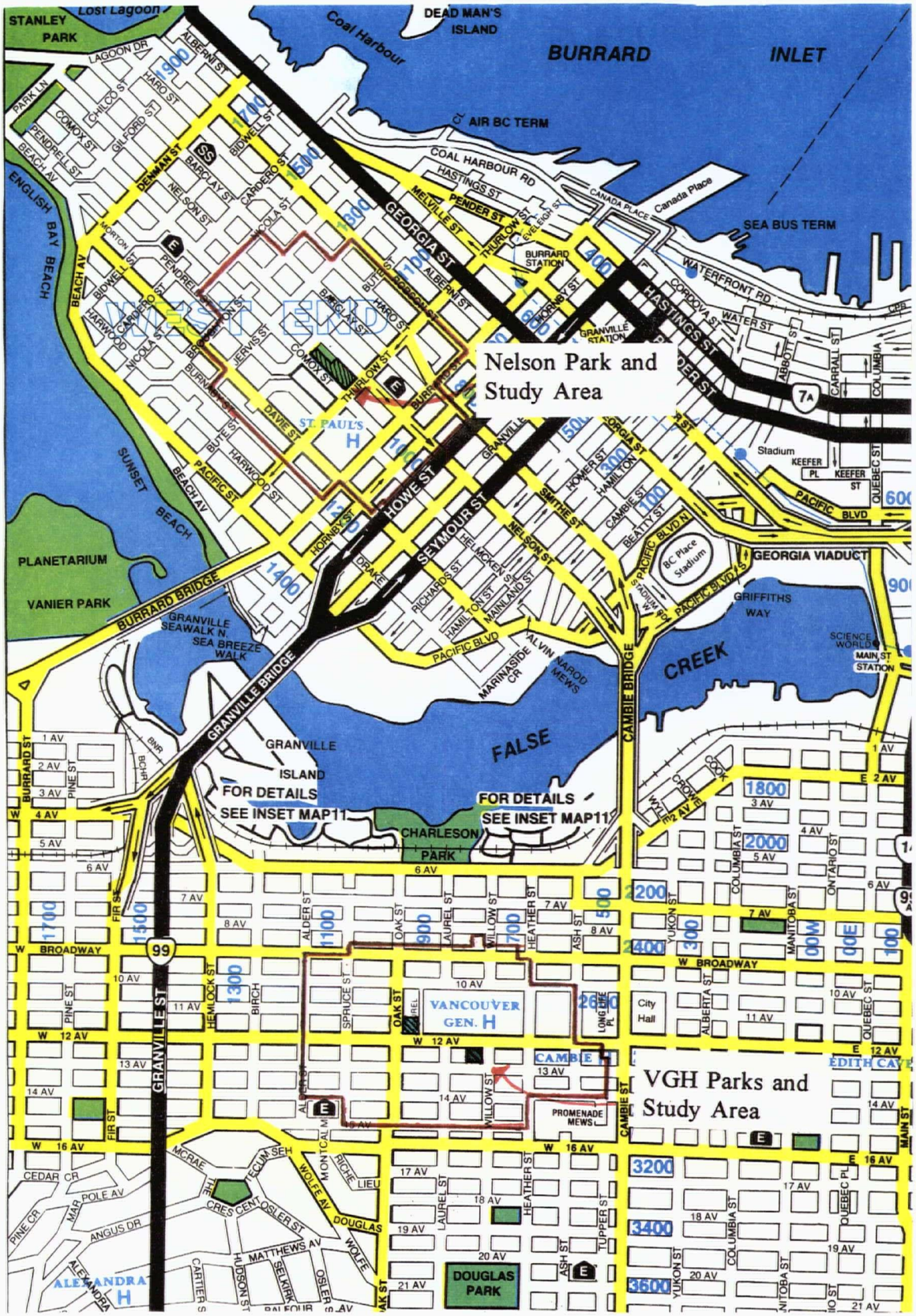



Figure 5 Nelson Park and VGH Parks Study Areas

seeks to discover if users are residents or employees in the neighbourhood, what activity they are doing and the approximate length of time they expect to spend.

In order to assess whether users are residents or employees in the neighbourhood it is necessary to define a boundary for the "neighbourhood" for the purposes of the study. Traditionally a sub-neighbourhood park serves people from a 100 yard to 1.4 mile radius. Studies have shown that if a park is more than a two to three block walk or more than three minutes walking time, it will not receive significant use (Toronto Department of Parks and Recreation, 1986, p.9). Thus a two to three block radius is the approximate threshold level beyond which the desire to use a park is thwarted by distance. Hence being a resident or employee in the "neighbourhood" will be defined as park users who live or work within three blocks of the park site. The closed-ended Question 1A: "Do you live or work within three blocks of this park?" was asked in order to categorize users. Question 1B: "Are you a resident, an employee or both" was asked if users answered "Yes" to Question 1A. Question 2: "What activity are you using the park for?" inquired into the type of activity respondents were doing in the park. This open-ended question was asked of all park users, regardless of their response to Question 1A as the question is also useful to park planners as it gives an idea of programming ideas and uses for parks. Question 3 inquired as to the expected length of park usage: "Approximately how long will you spend in the park?" Although the estimated time may not be the correct amount of time users actually spent in the park, it was too difficult to attempt to ask users as they left the amount of time they had spent in the park. The questionnaire was purposefully kept brief in order to ensure a high participation rate. A sample survey is included as Appendix B.

# SURVEY RESULTS

## 4.1 DATA MANAGEMENT

Following the completion of the survey, the data were coded into WordPerfect using a numerical coding system for all questions. Due to the nature of the questions asked, it was possible to use a numerical coding system for Question 1. For Question 2, "What activity are you using the park for?", which is an open-ended question, a coding list was drawn up. The coding list enabled consolidation of similar responses but was not overly general. The categories developed were: work/lunch break; sit/relax; read; suntan; walking through; playing tennis; playing football; picnicking; strolling; exercising dog; cycling through; drinking beer; bringing children to play; playing hackey-sac; and doing tai-chi. Although drinking beer is not a traditional nor a legal park use, Nelson Park is used for that purpose by members of the homeless community. The accurate recording of this use is of value to the Park Board.

The data was segregated by park site in order to see differences and similarities between the two sites. The data were coded into WordPerfect and saved as an ASCII file to be read in the Statistical Package for the Social Sciences (SPSS-PC) package. The program written and employed to analyze the data is located in Appendix C.

## 4.2 DATA FINDINGS

The raw data consists of responses for each question. These responses were then cross tabulated to illustrate the associations between "Who used the park" / "How long they stayed" and "Who used the park" / "What activity did they participate in". The raw data result tables are located in Appendix D.

These findings indicate that neighbourhood parks are primarily used by people living or working in close proximity to them. The results show that approximately 70% of the users at both the parks sites live or work within three blocks of the park. 30% of the users lived or worked outside the three block radius.

The employee/resident breakdown of the two parks is strikingly different. Nelson Park users are predominately residents (70%) while the VGH parks users are employees (70%). Survey respondents who said they were both residents and employees (7%) will not be analyzed as the survey did not reveal which 'role' the both respondents were in at the time of survey. Table 2 illustrates the usage of employees and residents at the two parks sites.

Table 2 Raw Findings of Employee and Resident Use at the Two Park Sites

| | Nelson Park | V.G.H. Parks |
|---|---|---|
| Employees | 456 (21%) | 983 (75%) |
| Residents | 1735 (79%) | 318 (25%) |

For both residents and employees in the Nelson Park area, the park was most used as a path to reach another destination. Residents used Nelson Park to sit and relax (15%), and suntan (8%). The park was also used by residents to walk and exercise their dogs (8%). Employees at Nelson Park had very different use patterns than the residents. Employees who were not walking through the park (45%) went there predominantly to eat their lunch (38%).

In the VGH parks similar results for residents and employees were noted. Residents use the park for walking through (38%) playing tennis (30%) or relaxing (13%). Employees were walking through (65%) or eating lunch (25%).

## 4.3 FACTORS AFFECTING PARK USE

The results gathered for the two park sites are very different. This may be due to a number of factors such as housing characterises, demographics and perceived safety.

### 4.3.1 Housing Characteristics

The differing results for the two parks suggest that the characteristics of the housing located within the two areas may affect usage. Nelson Park is located in the West End neighbourhood which is located directed west of the downtown area. 75% of the population in the West End resides in five-storey (or more) apartment buildings. 25% reside in other multiple dwellings that are four storeys or less (City of Vancouver, 1994a, p.4;). Because of the abundance of people living in apartments five storeys and greater, the majority of the population would not have large accessible greenspace available to them in their dwelling unit.

In contrast, the Fairview Slopes area where the Vancouver General Hospital parks are located has a very different housing characteristic. Only 20% of Fairview's population live in apartment buildings five storeys and higher. The majority of residents, 77%, live in multiple dwellings four storeys and less (City of Vancouver, 1994b, p.4). These are generally townhouse units which have some greenspace or private open space available to them. The ground floor units have a patio available and many of the upper units have a rooftop patios available (City of Vancouver, 1993a, p.2). Thus it appears that since residents of Fairview are likelier to have some private open space available to them, they may frequent the parks in the area less often.

### 4.3.2 Perceived Safety

It appears that perceived safety may be an issue for some at Nelson Park. There were a total of 80 individuals in Nelson Park who stated their main activity was to drink beer or

alcohol in the park. These individuals were primarily homeless people who came to the park to consume alcohol under the shade of the trees and away from more visible locations. There were generally a few groups of three or four people each day undertaking this behaviour. Although they generally left people alone, the observers witnessed the occasional person ask for money or request a used pop can to return for refund. The presence of this group likely inhibited some employees and a few residents from coming to the park. For instance, St. Paul's Hospital, located across Thurlow Street from Nelson Park, has a large staff, yet few of these people came to the park. Another explanation is that working downtown may offer a wider range of activities than the Vancouver General Hospital area.

Many respondents offered general suggestions about Nelson Park. The most frequent comment was that the lighting needed to be improved, as they did not feel safe crossing the park in the evening and would walk along the periphery. Lack of perceived safety at Nelson Park appears to be a factor in the findings.

## 4.4 ANALYSIS OF TIME SPENT IN THE PARK

The amount of time residents and employees spent in the parks effects each groups' usage of the parks. It is likely that residents who go to the parks will stay longer, as employees may be restricted by coffee breaks or lunch break time constraints. In order to determine the amount of park usage hours for employees and residents, the number of users for each time period was multiplied by the mid-point of that time frame (see calculations are in Appendix E).

Nelson Park area employee use was 170 hours or 21% of total park use while resident use was 637 hours or 79% of total park use. The employee use at the VGH Parks was 262 hours or 60% of total park use and resident use was 174 hours or 40% of total park use. The average amount of time spent in Nelson Park was 22.33 minutes for employees and 22.02 minutes for residents. Employees at the VGH parks had an average stay of 15.99 minutes use per workday, while residents stayed an average of 32.88 minutes. Table 3 presents a summary of the time each group spent in the parks.

Table 3 Usage for Employees and Residents at the Two Park Sites

| | Nelson Park | | VGH Parks | |
|---|---|---|---|---|
| | Employees | Residents | Employees | Residents |
| Number of survey responses | 456 | 1735 | 983 | 318 |
| % of total | 21% | 79% | 75% | 25% |
| Avg. time spent in park per person (minutes) | 22.33 | 22.02 | 15.99 | 32.88 |
| Total hours of park use | 170 | 637 | 262 | 174 |
| Percentage breakdown for each park | 21% | 79% | 60% | 40% |

The temporal adjustments to the data did not affect the original results for Nelson Park as there were similar amount of time spent in the park by employees and residents. The time

spent in the park did affect the raw data for the VGH Parks as residents, on average, stayed in the park longer than did employees. The park usage for the VGH Parks considering the time factor is 60% employee use and 40% resident use.

### 4.5 DATA WEIGHTING

The aim of this study is to determine the amount of park usage generated per square foot of commercial and residential space in order to calculate an equitable per square footage development cost levy. It is, therefore, necessary to determine the amount of commercial and residential floorspace within the three block radius of each park site. The floorarea data, were collected from large employers and taken from the Vancouver Planning Department Central Area Database.

Within the Nelson Park three block area there is a total of 10,422,244 sq. ft. of commercial and residential floorspace (see Appendix A). 3,823,358 sq.ft. (37%) is commercial floorarea and 6,598,886 sq.ft. (63%) is residential floorarea (City of Vancouver, Central Area Database).

Within the Vancouver General Hospital three block area there is a total of 6,661,351 sq ft of commercial and residential floorspace (see Appendix A). 3,355,351 sq ft (50%) is commercial floorarea and 3,306,000 (50%) is residential floorarea (City of Vancouver, Central Area Database) .

In order to determine park usage generated by one residential and commercial square

foot, the percentage of time spent in the park by employees and residents needs to be multiplied by the percentage of existing floorspace within the three block radius. For Nelson Park 21% of the park usage was generated by employees and 79% was generated by residents. The floor area within the three block radius of Nelson Park, as discussed in Section 4.3, is 37% commercial floorspace and is 63% residential floorspace. Table 4 illustrates the steps were used to obtain the relative park use generated by commercial and residential floorspace:

Table 4 Data Weighting

Nelson Park:

| | Employees | Residents |
|---|---|---|
| Find factor to obtain base 100 | 37 x 2.703 = 100 | 63 x 1.588 = 100 |
| Multiply usage by factor | 21 x 2.703 = 57 | 79 x 1.558 = 125 |
| Divide use by total use for relative share | 57/182 = 0.31 | 125/182 = 0.69 |
| Divide commercial generated use by resident generated use for comparative % | 31/69=0.45 | |

Thus at Nelson Park for every one minute of use generated by a residential square foot there is 27 seconds of use (0.45 minute) generated by a commercial square foot. Since there are equal amounts of residential and commercial floorspace within three blocks of the Vancouver General Hospital parks, the comparative percentage is 60/40 = 1.50. Or in the

VGH area, for 1 minute of use generated by a residential square foot there is a corresponding 1.5 minutes generated by commercial floorarea.

## 4.6 OVERALL PARK USAGE

Since Nelson Park is used by a greater number of people than the V.G.H. parks, in order to obtain an overall park use figure both parks must be weighted equally. When the two park sites are combined, a ratio of 91:109 or 83% results. This indicates that over the two park sites, for every one minute of park usage generated by one residential square foot, there was a corresponding 50 seconds of park usage generated by one commercial square foot. Commercial floorspace in the two areas generates an average of 83% as much park usage as residential floorarea. This figure indicates that commercial floorarea does generate park usage and that a commercial floorarea should be paying a development cost levy for park purchase and development.

## 4.7 FUNDING PRINCIPLE FOR PARKS

The findings of the park survey also provide insight into the appropriate funding mechanism for the financing of neighbourhood park space. The "ability to pay principle", introduced in Section 2.7.2, can be applied appropriately if neighbourhood parks are a social good which benefits both people located in and outside the neighbourhood. The "benefit received" principle can be employed if the benefit can be attributed primarily to a geographic area. This is measured by the amount of users which are located within close proximity to the parks.

At Nelson Park, 71% of the users were working or living within three blocks of the park. At V.G.H. a similar percentage of neighbourhood users, 68%, was recorded. The results for the two parks combined are that 70% of the park users live or work within three blocks of the park. The margin of error for the study is ± 2%. This high usage from neighbourhood employees and residents indicates that parks are used significantly more by those in close proximity to the park. This high usage rate by nearby employees and residents supports the application of the benefit received principle on neighbourhood parks as the benefit of parks is attributable to a specific geographic area.

Since the benefit received principle is the most appropriate principle for the funding of neighbourhood parks, this study shows that the use of Development Cost Levies, which are based upon this principle, are equitable as the benefit of neighbourhood parks accrue mainly to those located within close proximity to them. Thus it is fair to have those individuals who are receiving the benefit of the service, pay a portion of its cost.

# BURRARD SLOPES

Chapter 4 established that charging development cost levies for neighbourhood park space is equitable. Using the Burrard Slopes neighbourhood, the effects of a levy will be examined along with the calculation of an appropriate development cost levy.

## 5.1 EFFECT OF A DCL ON THE BURRARD SLOPES AREA

Section 2.8 discussed the various effects of a development cost levy. In order to assess the result of a levy on the Burrard Slopes area, it is necessary to observe existing market considerations.

### 5.1.1 Effect of Levies on Residential Units

In levy areas such as Burrard Slopes, which are surrounded by non development cost levy districts, it is unlikely that a development cost charge would be passed on to purchasers. Burrard Slopes is in close proximity to the Kitsilano area which currently has no development levy. If developers attempted to pass the levy on to new homebuyers in Burrard Slopes, buyers would likely choose the neighbouring Kitsilano where prices would likely be lower due to no development cost levies that they would be if Kitsilano had a levy. Although the absolute price of units in Kitsilano may still be higher, purchasers may still be willing to pay slightly more to be in an established area with a high level of current amenities. Thus, due to the location of Burrard Slopes and market competition, it is unlikely that a development cost charge would be passed on to purchasers.

It is likely that the development cost charge would either be absorbed by the developer, would be passed back to the landowner, even more likely, or would be a combination of both. In order to pass some of the cost to the landowner, the developer would want to pay less for land located within the levy boundary. But, is this fair to the landowner? As discussed in Section 2.7.2, it is arguable that the development cost levy is merely an attempt by the City to take back some of the value accrued on the area when City Council chose to rezone it.

If market conditions were to change, and the levy was passed on to purchasers either in whole or in part, it would be fair as these new homeowners will be the main beneficiaries of the new infrastructure and the increased asset value. In areas with a large number of existing residents and few amenities, inequities may be created as the existing residents would not be paying cost charges, yet would receive the benefit of improvements to infrastructure in the area. This is not the case with Burrard Slopes as there are few existing residents prior to the development cost levy adoption to benefit from the new infrastructure. In areas where amenities already exist, existing residents "stay even" if they are not charged but maintain their pre-development per capita level of amenities.

### 5.1.2 Effect of Levies on Commercial Space

The effect of a development cost charge on the commercial space in Burrard Slopes must also be examined. The addition of a development cost charge may increase the rental price of the commercial space. As the area is encompassed by non-levy areas, landlords will only obtain rents higher than non-levy rent areas if there is inelastic demand for the area. If

the demand for commercial space varies with the price of rent, then rents for the area will be similar to rents in the neighbouring areas in order to keep them competitive. However, new parkspace and daycare facilities will benefit commercial employees and could produce some additional demand for commercial space in Burrard Slopes.

## 5.2 DETERMINING THE AMENITY NEEDS FOR BURRARD SLOPES

As previously discussed in Section 3.1, the recent upzoning of the Burrard slopes area has produced allowable densities from 2.0 - 3.0 f.s.r allowing a mix of residential, commercial and some industry. This increase in residential population will generate increased infrastructure needs. The steps discussed in Section 2.6 to determine the infrastructure needs generated by the new population are outlined below.

### 5.2.1 Inventory of Existing Infrastructure

Since there are currently few residents in the Burrard Slopes area, the existing amenities are sparse. The four infrastructure items which are payable with development cost levies are daycares; engineering facilities such as sewage, water, drainage, highway facilities; parks and replacement housing. There are currently no daycares in operation in the area. The City of Vancouver Engineering Department has opted not to use development levies for the provision of engineering infrastructure, as most of that infrastructure is already in place. They have opted to remain with the system of general revenues for any necessary improvements, thus the engineering fundable items will be excluded from this calculation. The existing park land consists of 4.5 acres of publicly owned land around the loops of the

Granville Bridge. The area currently contains no replacement housing units since no new significant development has occurred.

### 5.2.2. Estimated Population Increase

The new policies for the Burrard Slopes area translate into approximately 5,000 residents. Approximately 450 of these residents will be in the age range of 0-18 years old, assuming that the Planning Department's estimate of 15% of the units suitable for families is accurate (City of Vancouver, 1994b, Appendix B, p.1). It is estimated that the existing 8,000 employees will likely remain stable as older industrial jobs are replaced by more residentially compatible ones. The estimated area mix is 62% employees and 38% residents (City of Vancouver, 1994b, Appendix B, p.1).

### 5.2.3 Daycare Requirements for the New Population

The City of Vancouver Social Planning has standard formulas to determine daycare need based upon studies conducted in Vancouver and other cities. Of the 450 children, one third (or 150 children) would be in the 0 - 5 year old range. Social Planning uses 0.68 labour participation and a 0.5 daycare participation to determine that 51 daycare spaces are needed. In addition 150 children in the 6-12 year old age group require 25 out-of-school care spaces. The total facility would need 8,025 sq. ft. of space to house a daycare, out-of-school care, and family place. The cost for this item is 15,000 sq. ft. site x $90 sq ft = $1,350,000 plus a construction cost of $1,605,000. Social Planning estimates the total cost of the facility to be $2,955,000 (City of Vancouver, 1994b, Appendix B, p.1,2).

### 5.2.4 Park Space Requirement for the New Population

This new population is estimated at 5,000 residents. The current Vancouver Park Board standard for park and public open space is 2.75 acres per 1,000 residents ( (City of Vancouver, 1994b, Appendix B, p.1,2). The Park Board has no standards for park space for employees as it is satisfied through the 2.75 acres/1000 standard.

Using the 2.75 acres per 1,000 residents, the area requires (5,000 residents x 2.75 acres / 1,000 residents) 13.75 acres of park land. The City presently owns 4.5 acres of park space, so 9.25 acres of additional park land is required for the new residents. There would likely be park land requirements which the City would receive upon the rezonings of the Molson Brewery and the CPR "Y" lands. The City would probably still need to purchase approximately 5.5 acres The land purchase price is estimated at $4 million / acre. Thus the purchase of park land is approximately $22,000,000 (City of Vancouver, 1994b, Appendix B, p.1,2).

### 5.2.5 Replacement Housing Requirement

The City's Housing and Properties Department estimates that 75 units of replacement housing will be necessary in the area to house individuals who will be displaced as a result of the redevelopment. The City's share of this non-market housing cost is estimated by Housing & Properties to be $13,600 / unit. The remainder of the funds would be augmented by Federal and/or Provincial non-market housing programs however, this could have changed due to recent cutbacks of federal programs. The total cost of 75 units of replacement housing to the City is $1,020,000 (City of Vancouver, 1994b, Appendix B, p.1,2).

## 5.3 TOTAL COST OF THE BURRARD SLOPES DCL FUNDABLE ITEMS

In order to set the development cost levy rate, the total cost of the public amenities needs to be calculated. Following this, the potential floorspace needs to be divided into the total public cost to determine the amount of the development cost levy if new development was paying the total costs of the needed infrastructure.

The total cost of the public amenities to be funded in the Burrard Slopes area with development cost levy funds is:

| | |
|---|---|
| Daycare | $ 2,955,000 |
| Parkland acquisition | 22,000,000 |
| Replacement Housing | 1,020,000 |
| | $ 25,975,000 |

The potential developable floorarea in the entire Burrard Slopes neighbourhood is:

| | |
|---|---|
| Residential | 2,600,000 sq. ft. |
| Commercial | 960,000 sq. ft. |
| Industrial | 300,000 sq. ft. |
| TOTAL | 3,860,000 sq. ft. |

If development was paying the entire cost of the amenity package the cost would be:

$ 25,775,000 ÷ 3,860,000 sq ft = $6.67 sq ft

Since charter authority and the Municipal Act allow DCL funds to only "assist" in the provision of infrastructure, an amount less that $6.67 must be charged.

## 5.4 CALCULATION OF DEVELOPMENT COST LEVIES FOR BURRARD SLOPES

The Development Cost Levies for the Burrard Slopes can now be calculated based upon the cost of the amenity package discussed in Section 5.3

### 5.4.1 Levies on Industrial Floorspace

The Vancouver Charter allows development cost levies to vary by use. The City of Vancouver Planning Department reports that industrial floorspace has on average approximately half the number of employees as office or retail floor space (City of Vancouver, 1993b, p.5). Thus based upon the City's calculations, industrial floorspace generates half the demand for amenities as commercial floorspace.

### 5.4.2 Park Levies on Commercial and Residential Floorspace

Section 2.6 notes that the collection of cost levies has not been approved by the Province of British Columbia beyond 75% of the amount of the total infrastructure package. The City of Vancouver Planning Department proposes a development cost levy of $5.00 per sq. ft. for commercial and residential uses and $2.00 for industrial uses in the Burrard Slopes area (City of Vancouver, 1994b, Appendix A, p.1). This would generate $18,400,000 which

is 71% of the total cost of the items. The City's calculations do not fully reflect the findings of the park survey which found that commercial floorspace generates 83% of the park usage as compared to residential floorspace. Based on the usage findings in the study, it is erroneous to charge commercial floorspace and residential floorspace the same park levy, as residential floorspace produces more park users.

Using the 71% figure, as discussed in Section 5.4.2, figure the City hopes to collect approximately $15,620,000 in park levies from Burrard Slopes. The survey results indicate that residential floorspace generates 1.2 times as much park usage as commercial floorspace. In addition, industrial floorarea generates half the demand for parks as does commercial floorspace. In order to determine the rates for each use we solve for x:

$$\$15{,}620{,}000 = 1.20 \times 2{,}600{,}000x \text{ (resi)} + 960{,}000x \text{ (comm)} + \tfrac{1}{2}\, 300{,}000x \text{ (ind)}$$

$$\$15{,}620{,}000 = 3{,}120{,}000x + 960{,}000x + 150{,}000\, x$$

$$\$15{,}620{,}000 = 4{,}230{,}000\, x$$

$$x = 3.69$$

Therefore, the park levy component of the development cost levy for the Burrard Slopes area is: $4.43 per sq. ft. of residential floorspace; $3.69 per sq. ft. for commercial floorspace and $1.85 per sq. ft. for industrial floorspace.

### 5.4.3 Levies for Replacement Housing

The City hopes to collect $724,200 for replacement housing from all uses in Burrard Slopes (City of Vancouver, 1994b, Appendix B, p.1,2). There is 2,600,000 sq ft of residential floorspace, 960,000 sq ft of commercial floorspace and 300,000 sq ft of industrial

floorarea. Since all development is equally likely to case the loss of existing housing, all should be charged equally. Thus the replacement housing levy for commercial, residential and industrial square footage is $0.19 per square foot.

### 5.4.4 Levies for Daycare

The City hopes to collect $2,098,050 for daycare from all uses in Burrard Slopes (City of Vancouver, 1994b, Appendix B, p.1,2). There is 2,600,000 sq ft of residential floorspace, 960,000 sq ft of commercial floorspace and 300,000 sq ft of industrial floorarea. City and other studies indicate that commercial floorspace produces approximately 300% more demand on average for daycare than residential does (City of Vancouver, 1991a, Appendix III, p.4) . Thus the daycare for residential square footage is 1/3 x. The daycare levy for commercial and industrial square footage is x per square foot and 1/2 x per square foot, respectively.

$2,098,050 = 2,600,000x (resi) + 3.0 x 960,000x (comm) + ½ 300,000x (ind)

$2,098,050 = 2,600,000x + 2,880,000x +150,000 x

$2,098,050 = 5,9300,000 x

x = 0.35

Therefore, the daycare levy component of the development cost levy for the Burrard Slopes area is: $0.35 per sq. ft. of residential floorspace; $1.06 per sq. ft. for commercial floorspace and $0.53 per sq. ft. for industrial floorspace.

## 5.5 TOTAL DEVELOPMENT LEVY

Thus in the Burrard Slopes area the appropriate DCL rates are:

($4.43 + 0.19 + 0.35) = $4.97 per square foot of residential use

($3.69 + 0.19 + 1.06) = $4.92 per square foot of commercial use

(1.85 + 0.19 + 0.53) = $ 2.57 per square foot of industrial use

These levies will generate ($4.97 sq ft × 2,600,000 sq ft) + ($4.92 sq ft × 960,000 sq ft) + ($2.57 sq ft × 300,000 sq ft) = $18,416,200 which is 71% of the total amenity cost of $25,975,000.

# CONCLUSIONS

## 6.1 THESIS FINDINGS

The Lower Mainland area has been growing at an unprecedented rate. The large increase in population in the area has forced municipalities to seek new mechanisms for the funding of capital infrastructure as the traditional means are no longer sufficient. The infrastructure is costly to construct. Limited ability by municipalities to increase revenue and shrinking transfer payments from higher levels of government are leading to a financial crisis for many municipalities in B.C., and especially in the lower mainland. In 1990 the Provincial Government introduced the ability for municipalities to charge development cost levies in order to generate the funds for capital infrastructure projects. This mechanism is intended to bring fairness to the system and ensure that development paid its share of new infrastructure costs.

The equity of development cost charges has been called into question by their opponents. They do result in a change from the current funding structure in which past residents paid for current residents' infrastructure. Now the new residents must pay for themselves. This can be viewed as unfair under the horizontal equity principle as the two generations are not being treated equally. If new residents pay the same taxes, then they should have access to the same facilities. But, the horizontal equity principle is only applied to people in equal circumstances. Because of the unprecedented growth in the Lower Mainland, paying for new services places a huge burden on the existing residents. Therefore, the existing and future residents are not in equal circumstances and the principle is not applicable.

It is also true that areas with few amenities are often less costly to purchase housing, then the areas with a built up infrastructure and public amenities. Thus new residents purchasing units in these limited amenity areas are paying for the upgrade in amenities through the development cost charge. In the Vancouver context, development cost levies have only occurred in areas with little or no current residential population at the time of the levy. Thus there are few existing residents who are not paying a share of the future infrastructure benefits which will accrue to that community through the development cost levies.

Opponents of development cost levies often cite that the levies are passed onto the homebuyer, thus further decreasing the affordability of housing. The effect of the levies depends more so on the market conditions at the time of sale. They are generally passed either onto the purchaser, passed back to the landowner, or some combination of the above. Occasionally they are paid by the developer, although that situation does not continue for long periods of time. In the Vancouver context, development cost levies are placed only in specific areas of the city. Thus unless demand to live in these specific areas is inelastic, the levies will not be passed onto the purchaser.

Development cost charges are seen by some as a means of taking back value which Council granted during an upzoning. They should not be viewed as a tool to take back revenue given through an upzoning. Development cost levies do not achieve this, as zoned property is forced to pay levies as well as recently rezoned property.

Once it was established that development cost charges are an equitable mechanism of

ensuring new development pays a share of infrastructure costs, the practice of levying a portion of levies for parkland and development solely on residential development was examined. The literature review found no studies which specifically examined park usage generated by commercial floorspace in mixed-use areas. In order to assess the fairness of residential development paying the sole portion of development cost charges relating to parks, a user survey was designed and conducted to determine how much of park space in mixed use neighbourhoods is attributable to commercial floorspace.

The survey found that 21% of the usage at Nelson Park, located in the West End and 60% of the usage of the Vancouver General Hospital Parks was attributable to commercial floorspace. Over the two parks, commercial floorspace generated 83% of the usage of parkland as residential floorspace. Employees do use parks in substantial numbers and therefore, commercial floorspace should also be levied a portion for parks in their development cost charges.

## 6.2 IMPLICATIONS OF FINDINGS FOR URBAN POLICY

This thesis attempted to provide a comprehensive look at development cost changes. Many in the planning profession use these tools without a full understanding of their history, limitations and the regulations governing them. It is hoped that this paper has been enable to provide general information about development cost charges to planners in both the public and private sectors.

The levying of park levies on commercial space is done in some Ontario

municipalities, but the literature revealed no in-depth studies that analyzed or justified the park usage attributed to commercial floorspace. This thesis sought to provided needed information about the parkspace usage generated by commercial floorspace. The findings should have an impact on general policy relating to the levying of park development cost charges. The current levying structure, used by most municipalities, of placing the parkland portion of the levy solely on residential use when located in mixed use areas, is erroneous and inequitable.

The survey might have been improved by an "evening" assessment of park use that extended beyond 6:00 p.m. Since many residents are employed during the day, a later 8:00 - 9:00 p.m. observation period may have increased the resident park usages.

## 6.3 AREAS FOR FURTHER STUDY

Although the thesis answered the questions as set out, it also raises other questions. The levying of daycare development cost charges needs to be further explored. A finer grain analysis needs to be developed for demand of daycare between the different uses. This could be accomplished by examining the differences of demand for daycare by employees in the different commercial uses (industrial, office and retail).

Although the thesis found that development cost charges, the existing mechanisms for ensuring development pays for itself, are equitable, the thesis is in no way advocating that they are the only, or the best, way of achieving this aim. They are merely an improvement from the previous system. Some municipalities may be charging development levies that are

actually prohibiting development. In Ottawa, development cost charges have been removed as it was felt that their elimination would provide a jump start for a sagging housing market. Recently, other ideas such as public/private partnerships are being discussed. These involve private firms putting forward a proposal for a per usage fee to be paid by the government body. The private firm takes the risk associated with the building and operating of the facility and is assured an income stream from the government body. These initiatives have been done for roads, sewage and water systems in England. The government is paying at least 15% less for a private water service than that run under the previous public system. As infrastructure costs are rising and the public's ability and desire to pay higher taxes is decreasing, it is new ideas such as these which need to be explored in the future.

## BIBLIOGRAPHY

Alterman, Rachelle. (1989) Evaluating Linkage, and Beyond. Cambridge: Lincoln Institute of Land Policy.

Amborski, David P. (1988) Impact fees Canadian Style: the Use of Development Charges in Ontario. Development Impact Fees. Ed. Arthur Nelson. Chicago: APA. p.52-63.

Amborski, David P. (1988) "The Incidence of Development Charges: Theory and Early Evidence." Toronto: Ryerson Polytechnical Institute.

Barnebey, Mark, Tom MacRostie, Arthur Nelson, Fary Simpson & Jan Winters. (1988) Paying for Growth: Community Approaches to Development Impact Fees. Development Impact Fees. Ed. Arthur Nelson. Chicago: APA. p.37-51.

Baxter, David. (1993) "The Age Structure of the Population in the Metropolitan Vancouver Region in 1991". In Livable Region Strategic Plan: Population Working Papers. Burnaby: Greater Vancouver Regional District Strategic Planning Department.

Baxter, David. (1989) Population and Housing in Vancouver, Changing Patterns of Demographics & Demand. Vancouver: The Laurier Institute.

City of Etobicoke and C.N. Watson & Associates, Ltd. (1991) Development Charges Policy Report (Draft). Etobicoke: City of Etobicoke and C.N. Watson.

City of North York. (1991) City of North York Development Charge Policy Report (Draft). North York: City of North York.

City of Ottawa, Department of Recreation and Culture. (1990) 2% and 5% Parkland Bylaws. Ottawa: City of Ottawa.

City of Vancouver, Planning Department. (1993) Central Area Database. Vancouver: City of Vancouver.

City of Vancouver, Planning Department. (1991a) Development Levies in Dwontown. Vancouver: City of Vancouver.

City of Vancouver, Planning Department. (1991b) Zoning and Development By-law. Vancouver: City of Vancouver.

City of Vancouver, Planning Department. (1993a) Fairview: A Community Profile. Vancouver: City of Vancouver.

City of Vancouver, Planning Department. (1993b) Potential for a Development Cost Levy By-law in the Burrard Slopes Neighbourhood. Vancouver: City of Vancouver.

City of Vancouver, Planning Department. (1993) West End: A Community Profile. Vancouver: City of Vancouver.

City of Vancouver, Planning Department. (1994a) Vancouver Local Areas 1981 - 1991, 100% and 20% data from the Canada Census. Vancouver: City of Vancouver.

City of Vancouver Planning Department (1994b). Spending of Proceeds in the Burrard Slopes Neighbourhood. Vancouver: City of Vancouver.

C.N. Watson and Associates Ltd. (1992) 1992 Survey of Ontario Municipal, Utility and School Board Development Charges. Toronto: C.N. Watson and Associates Ltd.

C.N. Watson and Associates Ltd. (1991) City of North York Development Charge Policy Report. Toronto: C.N. Watson & Associates.

Coquitlam Planning Department. (1985) Updating of Development Cost Charges for Open Space. Coquitlam: Coquitlam Planning Department.

Greater Vancouver Regional District Strategic Planning Department. (1993) Managing Vancouver's Growth: The Livable Region Strategic Plan. Burnaby: Greater Vancouver Regional District.

Harris, Larry and George F. Hepner (1983) Open Space and Land Development: A Basic Guide to Management and Preservation of Open Space, Parks and Recreation Areas in Urban Communities. Kalamazoo: Western Michigan University.

Hudson, Susan. (1988) How to Conduct Community Needs Assessment Surveys. Columbus: Publishing Horizons, Inc.

Huffman Jr., Forrest E. and Arthur C. Nelson, Marc T. Smith and Michael Stegman. (1988) Who Bears the Burden of Development Impact Fees? Development Impact Fees. Ed. Arthur Nelson. Chicago: APA. p.313-323.

Huffman Jr., Forrest E. and Mark Smith. (1988) Market Effects of Office Development Linkage Fees. Development Impact Fees. Ed. Arthur Nelson. Chicago: APA. p.267-277.

Kuroyama, Kazumi Alan. (1979) The impost fee and development cost charge in B.C. Vancouver: University of B.C. Master's Thesis, 1979.

Lancaster, Roger, ed. (1983) Recreation, Park and Open Space Standards and Guidelines. Alexandria: National Recreation & Park Association.

MacKenzie, Roderick. (1978) Land Use and Development Control in B.C.: Development Permits, Development Charges & The Municipal Act. Vancouver: University of British Columbia.

Nelson, Arthur, ed. (1988) Development Impact Fees. Chicago: American Planning Association.

Planning Institute of B.C. (1991) PIBC Position Paper on Development Cost Charges. Vancouver: PIBC.

Slack, Enid. (1990) An Economic Analysis of Development Charges in British Columbia and Ontario. Toronto: Enid Slack Consulting Inc.

Slack, Enid. (1994) Development Charges in Canadian Municipalities: An Analysis. Toronto: ICURR Publications.

Skaburskis, Andrejs. (1993) Assessment of development cost levies. Victoria: B.C. Ministry of Municipal Affairs, Recreation & Housing.

Snyder, Thomas & Michael Stegman (1986) Paying for Growth: Using development fees to finance infrastructure. Washington: Urban Land Institute.

Sport & Fitness Division, Ontario Ministry of Culture and Recreation. (1976) Guidelines for Developing Public Recreation Facility Guidelines. Toronto: Ministry of Culture and Recreation.

Toronto Department of Parks and Recreation. (1986) A Comparison of Five Inner City Parks. Toronto: City of Toronto.

Tourism & Recreation Research Unit. (1983) Recreation Site Survey Manual. London: E& F.N. Spon, 1983.

Union of B.C. Municipalities. (1987) Survey of Fees and Charges as at September 1987. Richmond: Union of B.C. Municipalities.

University of Illinois at Chicago, Centre for Urban Economic Development. (1988) Linked Development in U.s. Cities: Description of Policy Efforts with a Brief Discussion of Critical Issues. Chicago: University of Illinois at Chicago.

Urban Development Institute. (1988) Analysis of the City of Scarborough's Development Charge Policy. Toronto: Urban Development Institute.

Urban Development Institute, Pacific Region. (1990) Discussion Paper on Development Cost Charges and Levies: Alternative Financing mechanisms for Infrastructure. Vancouver: Urban Development Institute.

## APPENDIX A FLOOR AREA STATISTICS - NELSON PARK & VGH PARKS

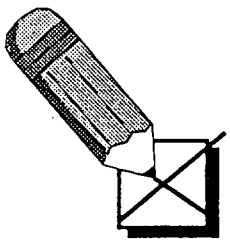
I.) NELSON PARK FLOORAREA & F.S.R.:

| | |
|---|---|
| Commercial | 3,823,358 sq.ft. commercial = 2.41 FSR<br>1,586,000 sq.ft. site area |
| Residential | 6,598,886 sq.ft. residential = 2.56 FSR<br>2,575,000 sq.ft. site area |
| TOTAL | 10,422,244 sq.ft. floorspace = 2.5 FSR<br>4,161,000 sq.ft. site area |

II.) VGH PARKS FLOORAREA & F.S.R.:

| | |
|---|---|
| Broadway | 1,004,000 sq.ft. commercial = 1.93 FSR<br>520,000 sq.ft. site area |
| VGH | 2,351,351 sq.ft. institutional = 1.90 FSR<br>1,236,747 sq.ft. site area |
| Total comm/inst Areas | 3,355,351 sq ft comm/inst = 1.91 FSR<br>1,756,747 sq.ft. site area |
| Total Residential | 3,306,000 sq.ft. dwellings = 1.38 FSR<br>2,400,000 sq.ft. site area |
| TOTAL | 6,661,351 sq.ft. floorspace = 1.6 FSR<br>4,156,747 sq.ft. site area |

## APPENDIX B: SAMPLE SURVEY



City of Vancouver

# People at Play Survey

The City of Vancouver Planning Department and Park Board want to find out how employees working in this mixed commercial/residential neighbourhood use nearby parks. The results will help the City plan for recreation in these types of neighbourhoods. We thank you for your involvement.

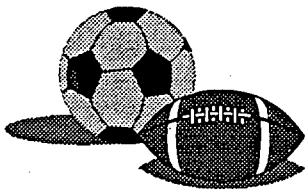
1. Do you live or work within 3 blocks of this park?

☐ Yes ⇨ ☐ Resident ☐ Employee ☐ Both

☐ No

2. What activity are you using the park for?

3. Approximately how long will you spend in this park?



**After completing the questionnaire, please deposit in the "People at Play Survey Barrel"**

# APPENDIX C: SPSS PROGRAM TO ANAYLYZE THE DATA

```
SPSS/PC+ The Statistical Package for IBM PC

SET LENGTH=59 / EJECT=ON.

DATA LIST FILE 'A:VGHTEST'
/USER 5 TYPE 6 ACTIVITY 7-8 SPEND 9-10.

VARIABLE LABELS USER 'Live or work in 3 blocks'/
TYPE 'Res/Emp/Both'/ ACTIVITY 'Activity type'/
SPEND 'Time spent'.
VALUE LABELS USER 1 'Yes' 2 'No'/
TYPE 1 'Resident' 2 'Employee' 3 'Both' 4 'Neither' 5 ' Patient'/
ACTIVITY 01 'Eat lunch, work break' 02 'Sitting/relaxing' 03 'Reading'
04 'Suntanning' 05 'Walk through' 06 'tennis' 07 'Football'
08 'Picnic' 09 'Walk-leisure pace' 10 'Exercise Dog' 11 'Ride through'
12 'Drink Beer' 13 'Play with kids' 14 'Hackey-sac'
15 'Tai-chi' 16 'Walk to work'
17 'Frisbee'/
SPEND 01 'under 5 min' 02 '5-9.9 min' 03 '10-14.9 min' 04 '15-19.9 min'
05 '20-29.9 min' 06 '30 min' 07 '45 min' 08 '1 hour' 09 '90 min'
10 '2 hours' 11 '3 hours' 12 '4 hours' 13 '5 hours'.



RECODE USER TO SPEND (SYSMIS=99).
MISSING VALUE=99.

FREQUENCIES VARIABLES=USER TYPE ACTIVITY SPEND.
The raw data or transformation pass is proceeding
   2085 cases are written to the compressed active file.
```

## APPENDIX D RAW DATA TABLES

Question 1: Do you live or work within three blocks of this park?

NELSON PARK

| Response | Frequency | Percentage |
|---|---|---|
| Yes | 2470 | 71% |
| No | 999 | 29% |
| Missing data | 6 | 0% |
| | | |
| TOTAL | 3475 | 100% |

VANCOUVER GENERAL HOSPITAL PARKS

| Response | Frequency | Percentage |
|---|---|---|
| Yes | 1408 | 68% |
| No | 677 | 32% |
| Missing data | 0 | 0% |
| | | |
| TOTAL | 2085 | 100% |

Question 2: Are you an employee, resident, both or neither (within three blocks of the park)?

NELSON PARK

| Response | Frequency | Percentage |
|---|---|---|
| Resident | 1735 | 70% |
| Employee | 456 | 18% |
| Both res & emp. | 279 | 11% |
| TOTAL | 2470 | 100% |

VANCOUVER GENERAL HOSPITAL PARKS

| Response | Frequency | Percentage |
|---|---|---|
| Resident | 318 | 23% |
| Employee | 983 | 70% |
| Both res & emp. | 107 | 7% |
| TOTAL | 1408 | 100% |

Question 3: What activity are you doing in the park today?

NELSON PARK

| Response | Frequency | Percentage |
|---|---|---|
| Eating lunch/work break | 209 | 6% |
| Sitting/relaxing | 510 | 15% |
| Reading | 43 | 1% |
| Suntanning | 170 | 5% |
| Walking through | 2121 | 61% |
| Tennis | 0 | 0% |
| Playing Football | 42 | 1% |
| Picnic | 1 | 0% |
| Strolling through | 27 | 1% |
| Exercise dog | 162 | 5% |
| Riding through | 28 | 1% |
| Drinking beer | 80 | 2% |
| Playing with children | 51 | 2% |
| Hackey-sac | 15 | 0% |
| Tai-chi | 2 | 0% |
| Frisbee | 10 | 0% |
| Missing data | 4 | 0% |
| TOTAL | 3475 | 100% |

Question 3: What activity are you doing in the park today?

VANCOUVER GENERAL HOSPITAL PARKS

| Response | Frequency | Percentage |
|---|---|---|
| Eating lunch/work break | 282 | 14% |
| Sitting/relaxing | 221 | 11% |
| Reading | 19 | 1% |
| Suntanning | 25 | 1% |
| Walking through | 1204 | 58% |
| Tennis | 282 | 14% |
| Playing Football | 3 | 0% |
| Picnic | 5 | 0% |
| Strolling through | 7 | 0% |
| Exercise dog | 27 | 1% |
| Riding through | 2 | 0% |
| Drinking beer | 0 | 0% |
| Playing with children | 7 | 0% |
| Hackey-sac | 0 | 0% |
| Tai-chi | 1 | 0% |
| Frisbee | 0 | 0% |
| Missing data | 0 | 0% |
| TOTAL | 2085 | 100% |

Question 4: How long will you spend in the park today?

NELSON PARK

| Response | Frequency | Percentage |
|---|---|---|
| under 5 minutes | 2155 | 62% |
| 5.0 - 14.9 min. | 109 | 3% |
| 15.0 - 29.9 min | 153 | 5% |
| 30 min | 381 | 11% |
| 45 min - 60 min | 424 | 12% |
| 90 min - 2 hours | 196 | 6% |
| 2 hours + | 50 | 1% |
| Missing data | 7 | 0% |
| TOTAL | 3475 | 100% |

VANCOUVER GENERAL HOSPITAL PARKS

| Response | Frequency | Percentage |
|---|---|---|
| under 5 minutes | 1210 | 58% |
| 5.0 - 14.9 min. | 68 | 3% |
| 15.0 - 29.9 min | 129 | 6% |
| 30 min | 221 | 11% |
| 45 min - 60 min | 341 | 16% |
| 90 min - 2 hours | 111 | 5% |
| 2 hours + | 5 | 0% |
| Missing data | 0 | 0% |
| TOTAL | 2085 | 100% |

CROSS-tabulation of type versus time will spend

VANCOUVER GENERAL HOSPITAL PARKS

| | >5 min | 5-14.9 min | 15-29.9 min | 30 min | 45 - 60 min | 90 min-2 hours | 2 hrs+ | Missing data | TOTAL |
|---|---|---|---|---|---|---|---|---|---|
| Resident | 125 | 21 | 18 | 21 | 90 | 38 | 5 | 0 | 318 |
| Employee | 638 | 14 | 68 | 141 | 106 | 16 | 0 | 0 | 983 |
| Both | 54 | 5 | 4 | 9 | 28 | 7 | 0 | 0 | 107 |
| Neither | 393 | 28 | 39 | 50 | 114 | 50 | 0 | 0 | 677 |
| Miss. data | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| TOTAL | 1210 | 68 | 129 | 221 | 341 | 111 | 5 | 0 | 2085 |

CROSS-tabulation of type versus time will spend

NELSON PARK

| | >5 min | 5-14.9 min | 15-29.9 min | 30 min | 45 - 60 min | 90 min-2 hours | 2 hrs+ | Missing data | TOTAL |
|---|---|---|---|---|---|---|---|---|---|
| Resident | 1053 | 65 | 79 | 158 | 211 | 135 | 31 | 0 | 1736 |
| Employee | 223 | 11 | 26 | 121 | 63 | 12 | 0 | 4 | 456 |
| Both | 184 | 9 | 5 | 27 | 40 | 12 | 2 | 0 | 279 |
| Neither | 693 | 24 | 43 | 75 | 110 | 37 | 17 | 0 | 999 |
| Miss. data | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 5 |
| TOTAL | 2155 | 109 | 153 | 381 | 424 | 196 | 50 | 7 | 3475 |

APPENDIX D: RAW DATA TABLES

CROSS-tabulation of type versus activity

VANCOUVER GENERAL HOSPITAL PARKS

| | eat lunch/ work break | sit/ relax | read | suntan | walk through | tennis | football | picnic | walk - leisure pace | exercise dog | ride through | drink beer | bring children | hackey-sac | tai-chi | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Resident | 5 | 42 | 6 | 19 | 122 | 96 | 0 | 2 | 4 | 15 | 0 | 0 | 6 | 0 | 1 | 318 |
| Employee | 248 | 35 | 5 | 3 | 636 | 45 | 3 | 3 | 1 | 3 | 1 | 0 | 0 | 0 | 0 | 983 |
| Both | 15 | 5 | 1 | 0 | 55 | 29 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 107 |
| Neither | 14 | 139 | 7 | 3 | 391 | 112 | 0 | 0 | 2 | 7 | 1 | 0 | 1 | 0 | 0 | 677 |
| Miss. data | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| TOTAL | 282 | 221 | 19 | 25 | 1204 | 282 | 3 | 5 | 7 | 27 | 2 | 0 | 7 | 0 | 1 | 2085 |

APPENDIX D: RAW DATA TABLES.

CROSS-tabulation of type versus activity

NELSON PARK

| | eat lunch/ work break | sit/ relax | read | suntan | walk through | tennis | football | picnic | walk - leisure pace | exercise dog | ride through | drink beer | bring children | hackey-sac | tai-chi | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Resident | 5 | 261 | 26 | 132 | 1038 | 0 | 32 | 1 | 16 | 133 | 13 | 21 | 42 | 13 | 2 | 1735 |
| Employee | 173 | 36 | 1 | 5 | 219 | 0 | 13 | 0 | 3 | 3 | 0 | 1 | 2 | 0 | 0 | 456 |
| Both | 15 | 37 | 7 | 14 | 183 | 0 | 0 | 0 | 2 | 15 | 1 | 0 | 4 | 1 | 0 | 279 |
| Neither | 16 | 176 | 9 | 19 | 679 | 0 | 7 | 0 | 6 | 11 | 14 | 58 | 3 | 1 | 0 | 999 |
| Miss. data | 0 | 0 | 0 | 0 | 6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 |
| TOTAL | 209 | 510 | 43 | 170 | 2125 | 0 | 52 | 1 | 27 | 162 | 28 | 80 | 51 | 15 | 2 | 3475 |

## APPENDIX E CALCULATIONS FOR PARK USAGE BY HOURS

NELSON PARK

| EMPLOYEES: (respondents x mid-point of time frame) | | RESIDENTS: (percentage x mid-point of time frame) | |
|---|---|---|---|
| < 5 min | 223 x 3 min = 669 | < 5 min | 1053 x 3 min = 3159 |
| 5 - 14. 9 min | 11 x 10 min = 110 | 5 - 14. 9 min | 65 x 10 min = 650 |
| 15-29.9 min | 26 x 22 min = 572 | 15-29.9 min | 79 x 22 min = 1738 |
| 30-44.9 min | 121 x 37 min = 4477 | 30-44.9 min | 158 x 37 min = 5846 |
| 45-59.9 min | 63 x 52 min = 3276 | 45-59.9 min | 211 x 52 min = 10972 |
| 1-2 hours | 12 x 90 min = 1080 | 1-2 hours | 135 x 90 min = 12150 |
| >2 hours | 0% | >2 hours | 31 x 120 min= 3720 |
| TOTAL - 10184 min ÷ 456 employees = 22.33 minutes per employee | | TOTAL - 38235 min ÷ 1736 residents = 22.02 minutes per resident | |
| 10,184 min ÷ 60 min/hr = 169.73 hours | | 38,235 min ÷ 60 min/hr = 637.25 hours | |
| **170 hours of employee use** | | **637 hours of resident use** | |

Thus for Nelson Park, of the 807 hours spent in the park there were 170 hours (21% ) spent by employees and 637 hours (79%) spent by residents.

APPENDIX E CALCULATIONS FOR PARK USAGE BY HOURS

VANCOUVER GENERAL HOSPITAL PARKS

| EMPLOYEES: (percentage x mid-point of time frame) | RESIDENTS: (percentage x mid-point of time frame) |
|---|---|
| < 5 min 638 x 3 min = 1914 | < 5 min 125 x 3 min = 375 |
| 5 - 14. 9 min 14 x 10 min = 140 | 5 - 14. 9 min 21 x 10 min = 210 |
| 15-29.9 min 68 x 22 min = 1496 | 15-29.9 min 18 x 22 min = 396 |
| 30-44.9 min 141 x 37 min = 5217 | 30-44.9 min 21 x 37 min = 777 |
| 45-59.9 min 106 x 52 min = 5512 | 45-59.9 min 90 x 52 min = 4680 |
| 1-2 hours 16 x 90 min = 1440 | 1-2 hours 38 x 90 min = 3420 |
| >2 hours 0% | >2 hours 5 x 120 min= 600 |
| TOTAL - 15,719 min ÷ 983 employees = 15.99 minutes per employee | TOTAL - 10,458 min ÷ 318 employees = 32.88 minutes per resident |
| 15,719 min ÷ 60 min/hr = 261.98 hours | 10,458 min ÷ 60 min/ hr = 174.3 hours |
| **262 hours of employee use** | **174 hours of residents use** |

Thus for the VGH parks, of the 436 hours spent in the park, there were 262 hours (60% ) spent by employees and 174 hours (40%) spent by residents.