INSTITUTIONAL BARRIERS TO SUSTAINABILITY
A Case Study of Transportation Planning in Vancouver, British Columbia

by

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ABSTRACT

Significant changes must occur in human interaction with the natural environment if the world is to move towards a state of sustainability. While the need for such change is widely recognized, planning in many sectors continues to lead to development that is unsustainable. Urban transportation planning is one such sector.

Little attention has been given by sustainability-oriented researchers to the problem of resistance to change. Conversely, little attention has been given by organizational change theorists to local government planning organizations' indifference to the sustainability imperative. As a consequence, while a great deal of research has examined the need to control the automobile in urban areas, little has been written about why such control still does not happen -- even when policies call for it.

Vancouver, British Columbia is recognized for its progressive attempts to move towards sustainability. This progressive situation creates an environment in which barriers impeding change towards sustainability can be studied. While Vancouver's municipal and regional policies explicitly call for a reversal in priorities which have traditionally favoured automobiles over transit, bicycles and pedestrians, operational decisions still favour the automobile. Most significantly, roads continue to be widened and new expressways are built to accommodate more automobile traffic.

A qualitative case study approach was used to inquire into transportation planning in Vancouver. An analysis of documents and of interviews with key informants suggests
that a system of institutional barriers exists which has structural, cultural, and human resource dimensions. Unsustainability is a function of organizational inertia which is not only supported by, but also takes advantage of and fosters, the wider political individualistic culture.

Specifically, there are several reasons for the disjunction between Vancouver's transportation policies and the decisions which are being made in transportation infrastructure development: an institutional structure which separates land-use and transportation planning, impedes comprehensive decision-making, and lacks mechanisms to publicize and assess cumulative environmental impacts; the existence of an organizational culture which seems to condone the use of subversive tactics to promote an informal transportation plan which perpetuates traditional, automobile-oriented values, beliefs and assumptions; and the lack of conceptual knowledge and skills necessary for organizational change to occur.

The practical implications of these findings are that, in cases like Vancouver's, sustainability can be fostered by three categories of mutually reinforcing actions: education, structural change, and planning practice. The actions in each category can build momentum towards second-order change using a social learning process to overcome societal values, beliefs and assumptions which promote an automobile-dominated transportation system.
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CHAPTER ONE - INTRODUCTION

"If you look at the current growth patterns, what we're seeing is becoming a more and more auto-dependent region and that's totally contrary to our stated goals which [are] to preserve our green space, to improve our air quality, to utilize transit more as a tool and to become more transit-dependent. Certainly the way we're going right now is just the opposite of that. With the dependence on the automobile there comes more demand for bigger roads, more freeways, bridges ..." (15-100-110)

Case Study Participant, 1994

1.1 - Overview

Industrialism and the accompanying process of change have caused two critical problems: the explosion of human population in poor nations and the high level of consumption of resources by rich nations. The systemic worldwide environmental degradation which both problems are contributing to has been documented since Rachel Carson's call for action in 1962 (Carson 1962). Over this same time period, there have been numerous forecasts of impending environmental collapse.¹ Yet, judging from the action taken, the vast majority of humans, including our influential leaders, still pay only cursory attention to this information and continue to promote unsustainable practices.

The majority of humans appear to be ignoring the vital signs of impending destruction of the natural life support systems upon which we depend for survival. This may be due to the unprecedented growth in economic prosperity in the developed world (particularly during

the past half century) brought about by technological innovation and capital investment.² Residents of the wealthy nations simply do not want to change their lifestyle.

1.2 - Purpose of Research

The purpose of this research is to contribute to knowledge which examines why, despite signs of severe ecological degradation, humankind is not taking strong actions towards sustainability.

There is a large body of research which documents ecological degradation and which describes both the concepts of sustainability and elements of a sustainable society. In addition, a great deal of research has examined the change process and barriers to that process within organizations and institutions.³ When this study was initiated, the researcher could not find any studies which examined barriers to change impeding a movement towards sustainability. It was felt that such a study would assist in understanding the process of moving from the current resource consumptive worldview to a sustainable worldview.

² For example, Canada has experienced substantial economic growth in this century -- particularly in the three decades which followed the beginning of the Second World War. The percent economic growth experienced during the decades spanning 1920-1990 are as follows: 1920-30 -- 12 percent, 1930-40 -- 10 percent, 1940-50 -- 34 percent, 1950-60 -- 43 percent, 1960-70 -- 37 percent, 1970-80 -- 9 percent, and 1980-90 -- 2 percent (Canada. 1993b. Canadian Economic Observer). Since 1970, economic growth has slowed dramatically. This may mean that the upper limits of natural resource exploitation have been reached.

³ A much smaller body of research examines change processes and barriers to change at a community level. Refer, for example, to Kettner et al. 1985 and Netting et al. 1993.
To focus the research effort, it was decided to study the case of transportation planning in Vancouver. Of the various components of community planning, transportation planning was selected because, in terms of potential change towards sustainability, transportation is arguably the most significant unsustainable component of our present cities.

In their study of the carrying capacity of communities, Wackernagel et al. (1993) divided the consumption of resources into five categories: food, housing, transportation, consumer goods, and embodied resources in services received. Although food consumption was the largest component of a community's ecological footprint, these researchers concluded that transportation is the one component where the greatest gains (measured in net resource consumption reduction) towards sustainability can be achieved. Other studies have stressed the importance of transportation as the major sustainability issue. The least efficient mode of transportation, but the greatest consumer of resources, was identified as the automobile (refer to Chapter Two, Section 2.3).

Moving towards an urban transportation system which is less dominated by the automobile is perceived as one method to assist human settlements to shift from an anthropocentric form of development (human-centred) to a biocentric form of development (nature-centred). For the purposes of this dissertation, biocentricism can be defined as development (excluding significant future growth) which focuses on the maintenance and

---

rehabilitation of natural systems and the extension of our moral obligation for the pursuit of
equity from humans to all species.

There is a substantial amount of literature on methods to reduce reliance on the
automobile with minimal personal costs and great social benefits, but, in order to implement
these methods, commitment is needed. For those wishing to contribute to such change, it is
important to discover the reasons why there is not yet a strong movement towards more
sustainable modes of people transportation in North American urban regions. The Vancouver
area was selected because the City and region of Vancouver have made clear statements
regarding its desire to move towards a more sustainable transportation system. For example,
at a meeting on April 4, 1991, City Council passed a motion endorsing the regional Creating
Our Future program. Contained within the program report is Action 16 which calls on
decision-makers to "Reverse transportation priorities so decisions are made to favour walking,
cycling, public transit, goods movement and then the automobile" (City of Vancouver 1991,
32).

Despite these municipal and regional directives, increasing automobile traffic and high
pollution readings indicate that the city and the region are moving away from this goal of a

---

5 Refer to Chapter Two, Section 2.3.4 and see, for example, Duany 1991, Kitchen

6 For other municipal and regional commitments to move towards transportation
sustainability, see also Clouds of Change: Final Report of the City of Vancouver Task Force
on Atmospheric Change (City of Vancouver 1990), Creating Our Future (Greater Vancouver
Regional District 1990), Liveable Region Strategy (GVRD 1993b), CityPlan documents of
the current official community planning process in Vancouver, and the minutes of Vancouver
City Council which appear in the bibliography.
decreased emphasis on the automobile in the region's transportation system (Greater
Vancouver Regional District [GVRD] 1994b). Furthermore, current planning is directed to
accommodate ever more automobile traffic. This is true for both official explicit plans, such
as the Long-Range Transportation Plan for Greater Vancouver (Greater Vancouver Regional
District & Province of British Columbia 1993a), which project a significant increase in both
automobile use and air pollution by the year 2021, and unpublished plans which suggest
potential sites for street widening and new overpasses.

This research inquiry investigates why Vancouver's transportation planners continue
to develop more automobile infrastructure (thus encouraging greater automobile dependency)
when the stated planning goals call for the preservation of green space, the improvement of
air quality, and the expansion of the public transit system. Institutions seem collectively to
state that they have goals of transportation sustainability, but, in practice, they seem to pursue
other goals. There appear to be institutional barriers which impede effective planning for
transportation sustainability. This study will try to determine what these barriers are.

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A potential solution advocated to overcome the negative impacts of the automobile
is the utilization of alternative fuels. These fuels are perceived to contribute significantly
less air pollution. For example, electric cars are championed as non-polluting. Unfortunately,
the efficiency of converting fossil or nuclear fuel to electrical energy (in North America,
only a small portion of electrical energy is derived from hydro-electric sources) is less than
ten percent. Vast amounts of heat energy and other pollutants are created at thermal power
generating plants. Hydro electric power depends on the destruction of river ecosystems.

Chapter Two examines other forms of automobile pollution (for example, noise, congestion,
vibration) which degrade the quality of urban life.

---

For the purposes of this study, institutions can be defined as public structures and
procedures relevant to transportation planning.
The general research is based on the following primary research question:

"What barriers within Vancouver's planning systems impede change towards a significantly less automobile-dependent transportation system?"

To ascertain what these barriers might be, in-depth, semi-structured interviews were conducted with key informants involved in Vancouver's transportation planning system. Evolving from these interviews were a number of issues which required further investigation. A number of illustrative case studies of transportation planning in Vancouver (embedded in the general Vancouver case) were therefore undertaken to check the validity of the interviewees' claims and to further explore the nature of institutional barriers.

Although the focus of this research inquiry is on the City of Vancouver, the impacts of transportation planning by the Greater Vancouver Regional District (GVRD) and the provincial government on Vancouver are also considered because transportation planning is a multi-level, multi-jurisdictional process.

1.3 - Dissertation Outline

This dissertation is divided into six chapters.

Chapter One has introduced the research topic, purpose, approach, and methodology.

Chapter Two summarizes the argument for why residents of the rich nations of the world should be concerned with global ecological degradation and examines the role of the automobile in the rich nations. Theories and models of community planning, community development, sustainable development, and organizational/community change and transformation processes are reviewed. Finally, a possible transformation process towards sustainability is discussed.
Chapter Three presents the concepts used to frame the research, the rationale for using a case study methodology, and the data collection and analysis methods.

Chapter Four describes the City of Vancouver and its surrounding region, the attitudes of the local citizenry towards the natural environment, how the system for the movement of people is organized, and the level of financial investment in different components of Vancouver's transportation system.

Chapter Five presents findings from the interviews with key informants and the illustrative cases. Interviewees' understandings of the barriers which are hindering change towards sustainability are analyzed. Three illustrative cases, a study examining Vancouver's capital and operating budgets, a study of a perceived informal transportation plan, and a study of the Lion's Gate Bridge public participation process, are presented to illuminate how unsustainability continues. In addition a number of embedded cases, which reinforce the illustrative cases, appear as footnotes within this section.

Chapter Six relates study findings, from the interviews with key informants and the illustrative cases, to the theoretical planning process model discussed in Chapter Three and provides a succinct overview of the barriers to change which were identified through the empirical research.

Chapter Seven discusses the following implications of the case study: implications for organizational change theory, implications for action, and implications for future research.

Appendices A to K provide detailed information which supports the discussion in the main body of the text.
CHAPTER TWO - THE SUSTAINABILITY CHALLENGE

2.1 - Introduction

This review of literature concentrates on four areas which need to be understood in order to study the transportation planning process. First, concepts of sustainability are examined to develop a better understanding of this worldview and to provide context for the focus on the automobile. Second, the impact of the automobile on the liveability of urban regions is examined. Third, organizational/community change and transformation literature is reviewed in order to develop an understanding of institutional and community change processes. It is assumed that an understanding of change processes is necessary in order to achieve any sort of change within an organization and/or community. Fourth, a conceptualization of the process towards, and the elements of, a sustainable transportation system is presented.

2.2 - Sustainability Put on the Agenda

In 1987, the World Commission on Environment and Development (WCED) stated that to achieve global equity in living standards, a five to ten fold increase in economic output must take place over the next 50 years (WCED 1987, 213). Unfortunately, humankind is already appropriating approximately forty percent of the net energy¹ available from the natural process of photosynthesis (Vitousek et al. 1986, 372). With an expected doubling of the world

¹ Vitousek et al. (1986, 368) use the term "Net Primary Production" (net energy) to describe the amount of energy left after subtracting the respiration of primary producers (mostly plants) from the total amount of energy (mostly solar) that is fixed biologically. The authors conclude that developing biological realities will force decision-makers to face the "limits to growth" debate.
population over the next 60 years, an equitable distribution of resources at First World levels, or the maintenance of present levels of material consumption, will be difficult to maintain.

Not only is humankind living off the planet's energy "income" (plant photosynthesis from solar radiation), but we are also consuming the planet's "capital" (the stored energy of fossil fuels) (Rees 1992a, 14). This "capital" took millions of years to accumulate, but in less than a century fossil fuel consumption has allowed the population to increase to a level of over five billion people.

Humankind is not "walking softly" on this planet. Goodland and Daly (1992, 37) note that the traditional view of environmental limitations to growth which focused on "source limits" (depletion of resources such as fossil fuels and other minerals), is now being replaced by a new view of limitations to growth based on "sink constraints" (accumulation of ozone gases, global warming and local/regional air and water pollution). Using a simple input-output model, humankind has transformed the shape of the world's natural capital from fossil fuels into people and pollution.

Why have these problems arisen, and what amount of disruption to the orderly functioning of the ecosphere must be overcome to return nature to an optimum functioning life support system? The next section will examine a number of elements which address these questions.

2.2.1 - Unidimensional Definition of Development

A review of the evolution of economic development theory is important to understand the present "state of the world." The modern paradigm of global economic development made its first appearance in the late 1940s. This economic development paradigm operates under the
assumption that resources and human ingenuity are boundless. Consequently, infinite growth is seen as possible.

Friedmann and Weaver (1979, 108) traced the globalization of this modern paradigm of economic development to the "Expert Report," Measures for the Economic Development of Underdeveloped Nations prepared for the United Nations in 1951. Prior to this period, only segments of Europe and North America pursued economic goals based on the economic growth paradigm. The experts envisioned "the emergence of a universal, cosmopolitan civilization in which autonomous individuals would freely enter into contractual relationships with one another on the basis of enlightened self-interest" (United Nations 1951). Factors during this period which reinforced this new paradigm included the beginning of decolonization, the development of a science of economics based on western concepts and theory, the invention of national income accounts, and the appearance of a western educated elite in countries worldwide.

Friedmann and Weaver identified the following characteristics of society which emerged from the global economic development paradigm:

* Economics is seen as the only significant value in national development.
* Development has a unidimensional form defined by the market value of production.
* Economic order focuses on the efficient allocation of resources.

Source: Friedmann & Weaver 1979, 108

Equity is virtually ignored. Development initiatives focus on growth, efficiency in resource allocation, rapid capital accumulation, and technological change. The United Nations report concluded that:

"... rapid economic progress is impossible without painful readjustments. Ancient philosophies have to be scrapped; old social institutions have to
This economic worldview marked the beginning of a global economy and was also the beginning of cultural disharmony for many of the so-called underdeveloped countries.

Effects of the new economic order include the rapid expansion of cash crop agricultural practices to supply rich nations with specialized foodstuffs; rural to urban migration spurred on by landowners who desire land for cash cropping; and burgeoning urban populations fueled, in part, by economic uncertainty\(^2\). Population growth and resource consumption by rich nations may be considered the most significant factors threatening the continuation of the world as we know it today.

### 2.2.2 - Population Growth

The world's population is expected to increase from a present level of 5.3 billion to a projected level of ten to eleven billion around the year 2050 (United Nations 1991). Table 2.1 summarizes the absolute growth in population between the year 1950 and 1990 with projections to the year 2025 (United Nations 1991, 5). World population is increasing at a rate of 93 million people per year. This rate will continue to increase before it peaks at a high of 98 million people per year between 1995 and 2000.

Table 2.2 summarizes world per capita production and consumption of grain on a regional and worldwide basis. The table also presents trends in productive capacities. Per capita

\(^2\) Refer to the "The Coming Anarchy" for a very sobering analysis of the destruction of traditional values, beliefs and assumptions of African cultures and the evolution of a new form of tribalism based on survival (Kaplan 1994, 44).
production and consumption of grain can be used to analyze long term environmental sustainability. In the rich regions of the world, grain is either consumed directly or is fed to livestock and consumed indirectly as meat. In the remainder of the world, grain is mainly consumed directly for food. Humans cannot survive if per capita annual grain consumption drops below 180 kilograms (about 1 pound per person per day) for an extended period of time.

### TABLE 2.1

<table>
<thead>
<tr>
<th>Year</th>
<th>Population</th>
</tr>
</thead>
<tbody>
<tr>
<td>1950</td>
<td>2.5</td>
</tr>
<tr>
<td>1990</td>
<td>5.3</td>
</tr>
<tr>
<td>2000</td>
<td>6.3</td>
</tr>
<tr>
<td>2025</td>
<td>8.5</td>
</tr>
</tbody>
</table>


The application of new agricultural technologies (based mainly on the utilization of fossil fuels in various forms) resulted in the "Green Revolution" (a rapid expansion in the production of foodstuffs around the world). These trends in rapid growth of per capita food production began in the sixties, lasting for a short period of time in Africa (until 1967) and up

---

3 Analyzing annual per capita grain production rather than total grain production is important as it takes population increases into consideration. Total annual grain production may be increasing, but, if at the same time, population is also increasing, the actual food available to each human may be static or even declining. Increased food production leads to the degradation of agricultural lands and, when more lands are brought into production, reduces the biodiversity of a region. After a certain critical threshold level, the resulting stress on the natural environment leads to ecological collapse.
to 1984 in Western Europe and Asia.

TABLE 2.2
Regional and World Grain Production per Person, Peak Year and 1990

<table>
<thead>
<tr>
<th>Region</th>
<th>Peak Product. (Year)</th>
<th>Peak Product. (kg)</th>
<th>1990 Product. (kg)</th>
<th>Change since peak year (percent)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Africa</td>
<td>1967</td>
<td>169</td>
<td>121</td>
<td>-28</td>
</tr>
<tr>
<td>E. Europe &amp; USSR</td>
<td>1978</td>
<td>826</td>
<td>763</td>
<td>-8</td>
</tr>
<tr>
<td>Latin America</td>
<td>1981</td>
<td>250</td>
<td>210</td>
<td>-16</td>
</tr>
<tr>
<td>North America</td>
<td>1981</td>
<td>1,509</td>
<td>1,324</td>
<td>-12</td>
</tr>
<tr>
<td>Western Europe</td>
<td>1984</td>
<td>538</td>
<td>496</td>
<td>-8</td>
</tr>
<tr>
<td>Asia</td>
<td>1984</td>
<td>227</td>
<td>217</td>
<td>-4</td>
</tr>
<tr>
<td>World</td>
<td>1984</td>
<td>343</td>
<td>329</td>
<td>-4</td>
</tr>
</tbody>
</table>


According to the State of the World 1991 report (Worldwatch Institute 1991), in all regions of the world, per capita grain production has peaked and a steady decline is now taking place. Further expansion of the agricultural land base and yield increases are being suppressed due to the cost of fossil fuel and environmental degradation. The repercussion of countries falling below the threshold of survival (180 kilograms of grain consumed per person per year), as Africa has, is described by Kaplan (1994, 44) who predicts anarchy and new tribalism in the poorest countries of the world. The number and size of degraded areas will continue to expand as population growth places added demands on finite natural resources. Numerous authors...
(Brown, Flavin & Wolf 1988, Kaplan 1994, Rahman 1991, Rees 1992b, Westlake 1990) suggest that other regions, including Asia and Latin America, will fall below the threshold of survival during the next twenty years and that regional environmental collapse will ensue. Other authors (Berreby 1990, Skinner 1988) see continuing population expansion as the main factor which will fuel the continued expansion of growth economics.

2.2.3 - Resource Consumption

Based on western consumption patterns, a child born into the first world will, within their lifetime, consume approximately 75 times the resources of a child born into the third world (based on current consumption). A resident of the rich nations "uses 15 times as much paper, 10 times as much steel and twelve times as much fuel as a Third World resident" (Durning 1991, 15). As the United Nations Development Programme notes, "the richest twenty percent of the world's people are at least 150 times richer than the poorest twenty percent" (1992, 3). This ratio has doubled over the past thirty years (during a time when the people of the rich nations of the world espoused an attitude of sharing). Resource consumption in the third world centres on obtaining materials to ensure basic human survival. Resource consumption in the first world is driven by attempts to satisfy social, psychological and spiritual needs through material possessions.²

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⁴ Consumption rates based on World Bank statistics for Gross National Product per capita. Low, middle, and high income economies were examined (World Bank 1993, 238).

⁵ This overconsumption is driven by a number of factors, including advertising, which fuels desire rather than addressing needs; the loss of traditional values such as patience, honesty and integrity, which have been replaced by desire for material wealth; the substitution of shopping for more satisfying and diversified cultural activities; government subsidization of selected sectors of the economy, such as the beef, tobacco, and private automobile industries; and the expansion
Even with this massive quality of life imbalance, there is an enormous net transfer of wealth from the poor nations to the rich nations (totalling fifty-two billion dollars in 1989) (World Bank 1989, 8). Table 2.3 documents the deteriorating monetary situation in recent years for the poor countries of the world.

| Table 2.3 |
The Deteriorating Financial Position of Developing Countries  
1980-89 (U.S. $ Billions) |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Total debt stocks (yr. end)</td>
<td>572</td>
<td>753</td>
<td>819</td>
<td>855</td>
<td>1047</td>
<td>1156</td>
<td>1165</td>
</tr>
<tr>
<td>Total debt Flows</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Disbursements</td>
<td>112</td>
<td>124</td>
<td>108</td>
<td>97</td>
<td>103</td>
<td>108</td>
<td>111</td>
</tr>
<tr>
<td>2. Principal repayments</td>
<td>46</td>
<td>49</td>
<td>46</td>
<td>50</td>
<td>76</td>
<td>88</td>
<td>86</td>
</tr>
<tr>
<td>3. Net Flows (1-2=3)</td>
<td>66</td>
<td>75</td>
<td>62</td>
<td>47</td>
<td>27</td>
<td>20</td>
<td>26</td>
</tr>
<tr>
<td>4. Interest payments</td>
<td>47</td>
<td>68</td>
<td>65</td>
<td>69</td>
<td>65</td>
<td>72</td>
<td>77</td>
</tr>
<tr>
<td>5. Net Transfers (1-2-4=5)</td>
<td>+19</td>
<td>+6</td>
<td>-2</td>
<td>-22</td>
<td>-38</td>
<td>-52</td>
<td>-52</td>
</tr>
</tbody>
</table>

* Projected

Twenty percent of the world's population (approximately one billion) live in unprecedented wealth while at least twenty percent live in poverty. The ecosphere is finite and, in order to maintain the natural life support system on which humankind depends, other plant and animal species are forced into households, changing their function from productive units to consumptive units. Communities no longer function as social units and places of permanence, but rather as units of commercial enterprise.

6 The net transfer of wealth is calculated by subtracting the interest and principle payments on the foreign debt (owed by the poor nations to the rich nations of the world) from foreign aid payments received from the rich nations.
species must have available a portion of the energy from photosynthesis. Thus, expanding population increases aggregate resource consumption which leads to environmental degradation.

2.2.4 - Environmental Degradation

Bug-eyed bunnies are symbolic of one of a number of serious ecosphere modification problems facing humankind today: the hole in the ozone lying over Antarctica (Larmer 1991, 43). The United States National Aeronautics and Space Administration has recently discovered that the ozone hole over the south pole has expanded faster than originally predicted (to a size which is, today, two times the size of Canada). Carcinogenic radiation levels increase to more than ten times normal levels during the fall season. Humans, who have experienced skin irritations and swollen, clouded-over eyes, have been encouraged to wear hats, sunglasses and sunscreen. Humans can adapt more readily than blind salmon, myopic rabbits and blind sheep (blinded by cataracts). One of the many challenges of science is to find methods whereby the flora and fauna can adapt to the new realities of an human-altered environment.

Other vital signs of growing ecological damage are documented in the work of Brown, Flavin & Wolf (1988, 76), Rees (1991, 8) and the Worldwatch Institute. Key indicators of the continuing degradation of the ecosphere are summarized in Table 2.4.

---

It is interesting to note that at the present time approximately four percent of the earth's land area is set aside for non-consumptive purposes in parks and nature reserves. This statement is not entirely true as resource extraction is still allowed in some park systems. The United Nations would like to increase this to a level of 12 percent. This is creating a furore, as the business community, unions and special interest groups in resource communities view a tripling of the land base removed from exploitive production as a catastrophe for business. Yet, even at a level of 12 percent, humankind is still appropriating 88 percent of the earth's surface for human purposes. A more appropriate level of approximately 50 percent has been proposed by the Wildlands Project (Noss 1992, 10).
### TABLE 2.4
Key Indicators of Ecosphere Degradation

1) **Forest Loss.** World forests are shrinking at an estimated rate of 17 million hectares per year (Worldwatch Institute 1992, 3) - a land mass which is equivalent to three times the area of Nova Scotia. Some countries, such as Ethiopia, have lost nearly all their forest cover.

2) **Soil Degradation.** Approximately 6 million hectares of land per year (an area equivalent to the size of Sri Lanka) are degraded so critically that their productive capacity is lost (Worldwatch Institute 1991, 8). Soil oxidation and erosion totals 26 billion tons per year in excess of natural ecological formation processes (Rees 1991, 462).

3) **Climate Change.** World temperatures may increase by an estimated 1.5 to 4.5 degrees C. by the year 2040 (Rees 1991, 462). This temperature change will result in increased volumes of water and will melt polar ice caps, with a consequent rise in sea levels from 1.2 to 2.2 meters by the year 2100 (Rees 1991, 463).

4) **Water.** Groundwater tables are falling in many parts of Africa, Asia and North America as withdrawal rates exceed aquifer recharge rates. Over 1.2 billion people in the poor nations do not have access to safe and reliable water (Postel 1992). Thousands of lakes in the industrial north are biologically dead and thousands more are in the process of dying (Brown, Flavin & Wolf 1988, 76).

---

### 2.2.5 - Concluding Comments

As we move towards the second millennium, humankind is beginning to realize that we have degraded the natural global ecosystem which sustains life. The present debate focuses on the degree of degradation which has occurred and the amount of further degradation the world's ecosystems can sustain. Supporters of the dominant Industrial Development Paradigm (i.e. Growth Economics, refer to Appendix A) criticize people and ideas which examine alternative development paradigms. They view pollution and environmental degradation as a management...
problem which can be resolved within the existing parameters of growth economics, and they claim that continued growth will eventually create equity for all nations -- rich and poor alike.

Proponents of change away from "business as usual," support their views by citing global trends of environmental degradation and inequalities in the distribution of wealth between rich and poor nations of the world. They recognize that the pursuit of economic growth has resulted in poor countries striving for the same prosperity (or appearance of prosperity) found in the rich nations.

Trends in population growth and resource consumption indicate that the rich nations must, if we are to survive, significantly reduce our standards of consumption. Environmentalists are calling for radical social change through the reorientation of basic social values and rapid movement towards a sustainable lifestyle. They feel ten, possibly twenty, years are left in which to redefine how humankind interacts with its life support systems (the ecosphere).

Humankind has three development paths to choose from: continued domination of the ecosphere, attempting to use science and technological innovation to resolve environmental problems; evolving fundamental changes in values, beliefs and attitudes which recognize that humankind is one of many species which must share the life support systems of the planet; or some sort of compromise between these two development paradigms.

In the coming decades the issue of continued economic growth versus ecological preservation/balance will be the focus of a great deal of intellectual discourse. This is not a new debate⁸; it is simply discourse which has been put to one side over the past one hundred years.

⁸ For example, Ebenezer Howard in his book "Garden Cities of Tomorrow" (1902, 43), introduces a thesis for new ways of constructing and operating communities. The book includes
while humankind consumed the shadow carrying capacities\(^9\) of frontier lands and the stored benefits of photosynthesis.\(^{10}\)

For humankind to move towards a development pattern which incorporates long-term survivability, a new development paradigm must evolve which recognizes limitations on both the growth of human activities and the accompanying impacts on the natural environment. A state of ecological balance must be re-established between humankind and nature. Discussion surrounding this new development paradigm falls within the area of study referred to as "sustainable development."\(^{11}\) Numerous authors (Daly & Cobb 1989, Rees 1992a, United Nations 1992) have called for a change towards a sustainable society. The components and characteristics which would comprise an ecological worldview have been identified (refer to appendix A). What is lacking is a desire by society to move towards this new ecological worldview.

The United Nations (1992) has documented this resistance to change. They conclude that, in the twenty years since the creation of the United Nations Environment Programme, world

\(^9\) The concept of carrying capacity can be defined as "an ecosystem's capability to continue supporting life for an indefinite period. If this carrying capacity is exceeded, the quality of life will decline. If a carrying capacity surplus (a shadow carrying capacity) is encountered, rapid population growth and/or quality of life improvements will take place" (Catton and Dunlap 1980, 43). Australia, North and South America and most of Africa and Asia represented carrying capacity surplus regions during the colonial era.

\(^{10}\) Fossil fuels really represent the accumulated or stored benefits of millions of years of the photosynthesis process.

\(^{11}\) Recently many authors have modified the term from "sustainable development" to "sustainability" to disassociate from authors advocating "sustainable growth."
governments have taken superficial steps (for example, setting up environmental ministries and signing international agreements) which have not led to concrete commitments to action. Overall, environmental conditions have deteriorated (dramatically in some regions of the world). The concept of "overshoot" now looms as a realistic future for humankind.

2.3 - The Role of the Automobile in Post-industrial Society

A community's shift from an automobile-centred transportation system to a transportation system which is not centred around the automobile represents a movement from anthropocentricism to soft biocentricism. This section will review the impact of the automobile on urban regions and will present a number of innovative solutions which demonstrate successful urban transportation systems which are not dominated by the automobile.

"Knights in chromium armour. We never admitted it, but that's how my friends and I saw ourselves in the fifties as we roamed midwestern highways on many a balmy evening. In muscular, deep-throated steeds we sped from town to town, the wind hurricaning in through open windows and corn rows whipping by like picket fences" (Grove 1983, 2).

This analogy to medieval knights describes our love affair with the automobile. In little over a century the transportation of most people in the rich nations of the world has moved from foot and animal mobility to propulsion provided through the internal combustion engine. The automobile has offered people unsurpassed mobility and individual freedom at a cost which,

12 The concept of "overshoot" denotes a condition where a system degrades dependent resources to a point whereby recovery of the resources and the system is impossible. For additional information see the book review of "Beyond the Limits," 1992, by Donella Meadows, Dennis Meadows and Jorgen Randers, Post Mills, Vermont: Chelsea Green Publishers, which appears in the Rocky Mountain Institute Newsletter, Vol.8 No.3, Fall/Winter 1992, p.8.
until recently, has represented a minor portion of personal disposable income (Ward 1990, 169).

In the United States, one job in six depends on the manufacturing, maintaining, operating or disposing of the automobile (Engwicht 1993, 5).

Our dependence on the automobile has reached a level of addiction, as the recent Los Angeles earthquake illustrated. Ridership on certain routes of the Los Angeles Metrolink transit system increased twenty-fold immediately following the earthquake due to the collapse of heavily-used elevated freeways. But once the initial shock was over, alternate routes were discovered, and commuters turned their backs on transit to resume driving their automobiles -- in spite of having to endure two hour one-way trips. While urban planners mourn the loss of a golden opportunity to move toward a rail transit system as the dominant mode of urban transportation, city decision-makers prepare to invest approximately $800 million in reconstructing eleven freeways (Reed 1994, A-14).

Even at a time when the automobile continues to dominate our lives, greater numbers of people are recognizing that this vision of mobility and freedom, coupled with a sense of speed and power, is illusionary. The automobile is being associated with the degradation of social and environmental quality within and beyond community boundaries. Ward labels automobiles as anti-social objects which turn drivers "into enemies of society" (1990, 169).

Cities have been reconstructed to accommodate peak rush hours (Duany 1991). In the process, the freedom of the non-auto-using public -- the poor, the elderly and the young -- has been severely restricted. A quote from a Los Angeles planning report illustrates the subservient position humans hold to the automobile: "The pedestrian remains the largest single obstacle to free traffic movement" (Engwicht 1993, 41).
The automobile has claimed more lives through accidents in this century than all wars during the same time period (Ward 1990, 169). It has degraded the lives of humans and other species through air, water, and sound pollution; urban congestion; and resource depletion (for the construction, maintenance, and disposal of the automobile and its various accessories) (Renner 1989, 97).

The next five subsections will explore two important questions: "What is the impact of continued reliance on the automobile as the dominant form of urban transportation," and "How can this reliance on the automobile be overcome?" The first subsection will review the relationship between transportation and land use. Recent worldwide trends in the use of the automobile, and the automobile's impact on urban landscapes and human lifestyles will be presented. Automobile-derived pollution, and land consumption patterns will be examined. New ideas and innovations in the management of automobiles, and alternatives to the automobile will be discussed. Finally, plans for ecologically sustainable urban transportation will be presented, and a process to move towards transportation sustainability will be introduced.

2.3.1 - Relationship Between Land Use and Transportation

The right to travel, as embodied in the concept of the "right-of-way," has been a long established tradition (TEST 1991, 15). In Great Britain, the right-of-way was an extension of the commons and provided a corridor of mobility to move sheep and other livestock. Today, rights-of-way are more commonly used for the movement of motorized vehicles within and between urban regions.

In modern society, the relationship between land use and transportation continues to exist
and substantially shapes our urban landscape. Hart (1992, 483) claims that the last four decades of urban development have been dominated by the desire to accommodate the automobile. This process of accommodating one dominant form of transportation has resulted in various human activities becoming "more widely spread, with greater distances separating homes, jobs, and services" (Hall 1993, 9). Because this urban spread further perpetuates the growth in automobile usage, a continuing demand for the supply of additional infrastructure to support the automobile is insured.

In recent years, the intractable problem of the automobile infrastructure supply-demand dilemma has been revealed. The supply of automobile infrastructure increases the demand for this infrastructure to a point of congestion (Association of County Councils 1991, 19). Additional supply of infrastructure to relieve congestion tends to create more demand and, in turn, more congestion. This drama of constructing new supply (infrastructure), only to be overwhelmed by new demand (more automobiles) has been played out in cities around the world. In the process, vast amounts of resources have been invested in a vain effort to overcome the dilemma.

2.3.2 - Trends in Automobile Usage

The world's passenger car fleet is increasing at a faster rate than population growth, with the number of vehicles projected to surpass one billion by 2030 (United Nations Environment Programme 1992, 410). The annual global growth rate is estimated at ten million cars and five million buses and trucks. Approximately eighty percent of vehicles are located in the rich nations of the world. Automobile density has reached a level of 1.8, 2.2 and 2.8 persons per
vehicle in the United States, Canada and Western Europe respectively. Market saturation is slowing down the increase in vehicle ownership in the rich nations. This will result in the majority of future growth taking place in the poorer nations.

In comparing the types of urban transportation used in North America and Europe, European countries display a healthier modal split between cars, public transit, bicycles, walking, and motorcycles. In Canada and the United States, there is a heavy reliance on the automobile (refer to Table 2.5). Table 2.6 illustrates the relationship between urban densities and commuting choices for a number of industrialized cities.

| TABLE 2.5 |
| Urban Passenger Transport by Mode in Selected Countries - circa 1980 |
| (Percentage of Total Trips) |

<table>
<thead>
<tr>
<th>Country</th>
<th>Car</th>
<th>Transit</th>
<th>Bicycle</th>
<th>Walking</th>
<th>Motorcycle</th>
</tr>
</thead>
<tbody>
<tr>
<td>United States</td>
<td>82</td>
<td>3</td>
<td>1</td>
<td>11</td>
<td>1</td>
</tr>
<tr>
<td>Canada</td>
<td>74</td>
<td>15</td>
<td>(--------</td>
<td>11</td>
<td>1</td>
</tr>
<tr>
<td>West Germany</td>
<td>48</td>
<td>11</td>
<td>10</td>
<td>30</td>
<td>1</td>
</tr>
<tr>
<td>Great Britain</td>
<td>45</td>
<td>19</td>
<td>4</td>
<td>29</td>
<td>2</td>
</tr>
<tr>
<td>Netherlands</td>
<td>45</td>
<td>25</td>
<td>9</td>
<td>19</td>
<td>1</td>
</tr>
<tr>
<td>Austria</td>
<td>39</td>
<td>13</td>
<td>8</td>
<td>31</td>
<td>4</td>
</tr>
<tr>
<td>Sweden</td>
<td>36</td>
<td>11</td>
<td>10</td>
<td>39</td>
<td>2</td>
</tr>
</tbody>
</table>


As a result of a heavy reliance on the automobile, a significant percentage of urban space is appropriated for automobile infrastructure, including roads, freeways, parking, and service
stations. Los Angeles is the world leader in urban land appropriated for automobile use. Seventy percent of its land area is used for automobile-related purposes (Engwicht 1993, 5).

Table 2.6 denotes Vancouver holding a lead position in the consumption of land and the heavy reliance on the automobile for urban transportation.

**TABLE 2.6**

*Urban Densities and Commuting Choices, Selected Cities, 1980.*

<table>
<thead>
<tr>
<th>City</th>
<th>Land Use Intensity (pop+jobs /ha)</th>
<th>Private Car (% of Workers)</th>
<th>Public Transport</th>
<th>Walking &amp; Cycling</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phoenix</td>
<td>13</td>
<td>93</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Vancouver</td>
<td>15</td>
<td>83</td>
<td>9</td>
<td>8</td>
</tr>
<tr>
<td>Washington</td>
<td>21</td>
<td>81</td>
<td>14</td>
<td>5</td>
</tr>
<tr>
<td>Sydney</td>
<td>25</td>
<td>65</td>
<td>30</td>
<td>5</td>
</tr>
<tr>
<td>Toronto</td>
<td>59</td>
<td>63</td>
<td>31</td>
<td>6</td>
</tr>
<tr>
<td>Amsterdam</td>
<td>74</td>
<td>58</td>
<td>14</td>
<td>28</td>
</tr>
<tr>
<td>Stockholm</td>
<td>85</td>
<td>34</td>
<td>46</td>
<td>20</td>
</tr>
<tr>
<td>Munich</td>
<td>91</td>
<td>38</td>
<td>42</td>
<td>20</td>
</tr>
<tr>
<td>Vienna</td>
<td>111</td>
<td>40</td>
<td>45</td>
<td>15</td>
</tr>
<tr>
<td>Tokyo</td>
<td>171</td>
<td>16</td>
<td>59</td>
<td>25</td>
</tr>
<tr>
<td>Hong Kong</td>
<td>403</td>
<td>3</td>
<td>62</td>
<td>35</td>
</tr>
</tbody>
</table>

Note: This table defines land use intensity as population and jobs per hectare. This concept acknowledges the multifunctionality of urban space.

In limited numbers, automobiles offer unsurpassed freedom, but as numbers increase congestion dramatically reduces automobile efficiency and degrades the liveability of the urban environment. Degradation takes place in two forms: environmental and social.

Within the environmental realm, a large amount of research documents the ill affects of the automobile on human health and the natural environment. There is a direct link between energy use and various forms of pollution. The first step in understanding this link comes through examining energy use by urban transportation mode (Lowe 1990, 13). Table 2.7 illustrates this relationship.

TABLE 2.7
Energy Intensity of Urban Transport Modes, United States

<table>
<thead>
<tr>
<th>Mode</th>
<th>Number of Passengers per Vehicle</th>
<th>Energy Intensity (Btu per passenger-km)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercity Rail Car</td>
<td>80</td>
<td>442</td>
</tr>
<tr>
<td>Intercity Bus</td>
<td>40</td>
<td>477</td>
</tr>
<tr>
<td>Light Rail Car</td>
<td>55</td>
<td>639</td>
</tr>
<tr>
<td>City Bus</td>
<td>45</td>
<td>691</td>
</tr>
<tr>
<td>Rapid Rail Car</td>
<td>60</td>
<td>752</td>
</tr>
<tr>
<td>Car Pool</td>
<td>4</td>
<td>1144</td>
</tr>
<tr>
<td>Automobile</td>
<td>1</td>
<td>4576</td>
</tr>
</tbody>
</table>


A city bus containing forty-five passengers is 6.6 times more energy efficient than an automobile containing a single occupant. Extrapolating this ratio relationship, one can conclude that a city bus requires less than seven passengers, at any time, to match the energy consumption levels of an automobile.
Table 2.8 (Lowe 1990, 14) offers information which links pollution levels to different modes of transportation used for commuting to work. The table clearly documents the high levels of pollution emitted by the automobile. According to Lowe's calculation, a single occupant car produces eleven times the hydrocarbons, five times the carbon monoxide, and a third more nitrogen oxides per passenger kilometer than a transit bus.

**TABLE 2.8**

*Pollution Emitted from Typical Work Commutes, United States*

*(grams per 100 passenger-kilometres)*

<table>
<thead>
<tr>
<th>Mode</th>
<th>Hydrocarbons</th>
<th>Carbon Monoxide</th>
<th>Nitrogen Oxides</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rapid Rail</td>
<td>0.2</td>
<td>1</td>
<td>30</td>
</tr>
<tr>
<td>Light Rail</td>
<td>0.2</td>
<td>2</td>
<td>43</td>
</tr>
<tr>
<td>Transit Bus</td>
<td>12</td>
<td>189</td>
<td>95</td>
</tr>
<tr>
<td>Van Pool</td>
<td>22</td>
<td>150</td>
<td>24</td>
</tr>
<tr>
<td>Car Pool</td>
<td>43</td>
<td>311</td>
<td>43</td>
</tr>
<tr>
<td>Single Occupant</td>
<td>130</td>
<td>934</td>
<td>128</td>
</tr>
</tbody>
</table>


Although energy efficiencies and reduction of pollution using non-automobile modes of transportation have been clearly documented, the popularity of automobile transportation continues to grow. Between 1973 and 1988, countries of the European Economic Community have made some progress towards energy conservation in non-automobile sectors, with a slight increase in overall energy consumption of 3.5 percent. However, the road transport sector (automobile and truck) increased its level of total energy consumption by 49.1 percent during
this time period. Focusing on oil use only, oil consumption for all other non-automobile sectors actually declined by ten percent from 1973 to 1988, while the transportation sector (all modes) increased its use of oil by 28.6 percent. The transportation sector now consumes over one half the oil used in the European Economic Community (Whitelegg 1991, 90).

2.3.3 - Transportation and Urban Liveability

According to Quidort (1991, 101), continued high levels of oil consumption and the accompanying high levels of pollution, coupled with congestion, stress, damage to cultural heritage, and safety problems, are slowly eroding the liveability of our urban regions. These problems have evolved incrementally since the Second World War, as urban planners (predominantly in North America, and with a lag, in other regions of the world) have perfected the art of automobile-focused urban and regional planning. As Lowe (1992, 120) relates,

"Among industrial regions, North America and Australia have the weakest planning traditions. Governments on these continents have done relatively little to guide development beyond separating industrial areas from those zoned for commerce and housing."

Calthorpe (1991, 84) and Duany (1991) severely chastise North American planners for allowing the automobile to become the defining technology of the built environment. According to Duany, American cities have been highly planned for the past twenty years, but the

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13 The planning profession cannot be held solely responsible. The passing of urban trolley systems was due to more than consumer preference. A United States federal court, in 1949, found a number of corporations and corporate officials guilty of a conspiracy which involved purchasing urban trolley companies and ultimately closing them down. Corporations included General Motors, Mack Trucks, Firestone, and Standard Oil of California. Ultimately Americans had little choice but to purchase automobiles (Hanson 1986, 395).
suburbanization process has taken the four elements of community (places to live, work, shop and gather), isolated them in distinct packages (residential suburbs, business parks, shopping malls, and recreational complexes), and used the automobile to connect them (highway, arterial, collector and local street system). The automobile has also encouraged the "segregation of our culture: old from young, home from job and store, rich from poor and owner from renter" (Calthorpe 1991, 84).

Sections of our cities constructed prior to this "Age of Segregation Urbanism" suffered the same fate as peripheral suburban zones. The traditional, predominately gridiron, segments of our cities have been remodelled for the automobile. At one time, urban streets performed two functions: allowing both human movement and human exchange. Appleyard (1981) documented the inverse relationship between movement and exchange functions. As speed and volume increase, and automobiles appropriate increasing space (referred to as the Zone-of-Influence), the human exchange function begins to decline. Interaction between friends and acquaintances across streets and even on the same side of streets declines. Families with children move away, and new families do not move in. Alienation increases to a point where heavily travelled streets become hostile environments for humans and become the domain of the automobile.

Goodland et al. (1993, 9) claim that congestion in Los Angeles has reached a level where commuters spend more time in their cars than any other single activity except office work. A report published by the London-based Transportation and Environmental Studies group (TEST) concludes that the parking spatial demand per car in London is three times the space demand for the average home. Worldwide, cars command twenty percent of urban space. This demand for
space increases to 50% for the average US city and 67% for Los Angeles.¹⁴

Increasing numbers of vehicles in urban areas also lead to safety problems, disruptions to community life, and deteriorating health. Goodland, Guitink and Phillips (1993, 2) note that "the impact of today's annual output of 48 million cars vastly exceeds the impact of the [annual] human population growth of 90 million." They claim that one automobile consumes many times more energy and other natural resources, and creates greater pollution (including disposal) problems than the average human.

An exhaustive study, entitled Wrong Side of the Tracks: Impacts of Road and Rail Transport on the Environment (Transportation & Environmental Studies 1991) was undertaken in England and examined the social, environmental, and economic impacts of continued automobile infrastructure expansion. The study arrived at the following conclusions:

**Safety**

Vehicle traffic may be relatively safe for their occupants, but they are relatively unsafe for other road users -- particularly pedestrians and cyclists. As a result, over a quarter of a million people worldwide die each year from vehicle accidents and an estimated twenty to forty million receive personal injuries. The risk of death for cyclists in a collision with an automobile is at least three times greater than for pedestrians or automobile occupants.

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¹⁴ In Section 2.3.2, Engwicht (1993) provided a figure of 70% of Los Angeles' area used for the automobile, while Goodland et al. (1993) use a figure of 67%. The discrepancy between figures relates to different definitions of land used for the automobile.
Community Disruption

The introduction or expansion of road infrastructure into a community can inhibit the movement of people and contribute to social alienation. The most affected are the young and elderly. Approximately one half of school children living in Outer London are now driven to school due to increasing traffic danger. Also because of this danger, the elderly must be accompanied by someone in their travels. The situation becomes self perpetuating: more school children and elderly being driven results in more traffic danger, resulting in even more children and elderly being driven. The only people who cannot join this self perpetuating cycle are the poor: those people who cannot afford a vehicle.

The other major disruption to community life is the involuntary curtailment of street life as the automobile becomes the dominant element of the streetscape. As street life declines, people's lives are increasingly conducted within their homes and their automobiles (which ultimately becomes an extension of the home).

Health

The automobile contributes to a number of forms of physical and mental illness. Lack of exercise related to car use impacts on human physical health. Noise contributes to the deterioration of mental health. In urban regions, noise nuisance from road traffic is most often the dominant form of noise pollution. Between seven and 31 percent of residents living in OECD countries are exposed to road traffic noise which exceed 65 dB. Noise exceeding these levels, and continuous low-level noise leads to hearing damage, auditory fatigue, and a range of physiological reactions including stress and changes in
blood pressure.

Although proponents of the automobile still call for the expansion of infrastructure to relieve congestion, a growing segment of society is calling for processes which will reduce the impact of the automobile on the urban landscape.

2.3.4 - Improved Automobile Management

Some cities around the world are beginning to introduce demand management techniques to reduce the negative impact of the automobile in urban regions. Table 2.9 provides a summary of some of these management techniques.

Possibly the greatest gains in automobile management would be in redesigning the car to take the ecological realities of the 1990s, and beyond, into consideration. This process has started; there are innovative experiments underway which will radically reshape the image of the automobile. Concepts include light electric vehicles and new hybrids which combine the best features of electric and internal combustion engine technology (Flavin 1993, 27).

The Rocky Mountain Institute (1993, 7) has conceived of a hypothetical four passenger car which combines existing technology into a "Supercar," with fuel efficiency levels of 150 miles per gallon (US City/Hwy). The car is based on the Ultralite auto prototype developed by General Motors. Advances beyond the Ultralite prototype include using carbon-fiber and other composite materials to reduce body weight to approximately 1300 pounds (a typical 1990 U.S. production car weighs 3180 pounds), using aerodynamic design techniques not only on the top but also on the bottom of the vehicle, and incorporating a hybrid-electric-battery drive system which would require only a 10 to 20 horsepower internal combustion engine (current engines
must be in the range of 100-200 horsepower to provide the same performance).

<table>
<thead>
<tr>
<th>Measures Taken</th>
<th>City</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Encouragement of vehicle fleet renewal.</td>
<td>Los Angeles</td>
<td>Up to 95% of emissions reduction.</td>
</tr>
<tr>
<td>Gasoline recovery devices in service stations.</td>
<td>Los Angeles</td>
<td>Reduction of emissions equivalent to 19% of total HC emitted in California in 1980.</td>
</tr>
<tr>
<td>Inspection and maintenance programs for cars.</td>
<td>New York</td>
<td>Reduction of 39% in NO\textsubscript{x} and 34% in CO emissions between 1980 and 1987.</td>
</tr>
<tr>
<td>Parking permits, access permits and taxes on vehicles.</td>
<td>Singapore</td>
<td>The share of private cars in total vehicle traffic at peak hours in the town centre decreased from 50-60% to 23%. Commuting journeys towards the town centre have shifted from cars to bus services from a 56%/33% share to 46%/46%. Accidents in the town centre have fallen by 25%.</td>
</tr>
<tr>
<td>Road pricing (tolls) for urban motorways (three projects).</td>
<td>Hong Kong</td>
<td>Bottle-necks have diminished by 14, 16, and 17 percent representing time gains of 98,000, 113,000 and 124,000 hours respectively.</td>
</tr>
<tr>
<td>Traffic restrictions to given districts in central areas.</td>
<td>Göteborg</td>
<td>Victims of accidents decreased by 40-45%. Net noise reductions of about 4 dB(A) for 1/3 of inhabitants. 7% increase in the average length of journeys outside the areas compensated in part by the increased average speed within the areas.</td>
</tr>
</tbody>
</table>


Technological and urban design innovations will not resolve the ultimate problem which makes cities unliveable: the sheer volume of vehicles which leads to traffic congestion and the
use of a significant proportion of urban land for vehicle-related purposes.

**2.3.5 - Alternatives to the Auto**

Table 2.10 summarizes a number of initiatives which are both replacing urban automobile usage (or insuring usage does not increase) and improving urban liveability.

**TABLE 2.10**  
**Examples of Alternatives to the Automobile**

<table>
<thead>
<tr>
<th>Measures Taken</th>
<th>Town</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Generalized improvement of public transport towards an integrated public transport system.</td>
<td>Munich</td>
<td>A 30% increase in public transport users. The ratio of public transportation/cars has changed from 37/63 distribution to 46/54 between 1970 and 1980.</td>
</tr>
<tr>
<td>Simplified and integrated transit fares ('travel card').</td>
<td>London</td>
<td>A 16% increase in public transport users. Cars arriving at central London in peak hours have diminished by 10-15% with similar improvements in air quality.</td>
</tr>
<tr>
<td>Simplified and integrated transit fares ('travel card')</td>
<td>Paris</td>
<td>A 1/3 increase in public transport users and 2-3% reduction in car utilization during the whole day.</td>
</tr>
</tbody>
</table>


Communities of particular note, due to the integrated nature of their transportation planning and implementation strategies are Curitiba, Brazil and Freiburg, Germany. Curitiba, a city of 1.6 million people, has received international acclaim for its urban transportation system. A master plan for the city (completed in 1965) defined linear growth corridors with
limits on the outward expansion of the central area. According to Rabinovitch (1993, 18), the key to Curitiba's success is the thoughtful integration of land use and transport policies. High density new development and redevelopment projects are encouraged along public transport corridors. A mix of homes, jobs, services, and recreation are promoted in close proximity to each other. Transit infrastructure is designed so that, as ridership increases, express bus reserve lanes can be converted to light rail and ultimately to high-capacity rapid rail systems.

The Curitiba Integrated Transport Network has grown from 25,000 passengers per day in 1974 to the current level of 1.3 million passengers per day. This innovative direct route bus system costs approximately $200,000 (US) per kilometre to construct compared with $20 million per kilometre for a light rail system, and $90-100 million per kilometre for an underground metro system. The system moves passengers faster, and for less money, than any other system in Brazil. An estimated twenty-five percent city-wide fuel saving has been attributed to the transit system.

Innovation and creativity are cornerstones to the planning and management of Curitiba. Boarding tubes (mini bus stations) speed up the loading and unloading of passengers. The City has also developed an extensive cycleway system which links parks and protected river valley areas. Open leisure space per inhabitant has increased from 0.5 square meters in 1970 to the current level of 50 square meters. Pedestrians are given priority in the downtown core. Curitiba's ecologically sensitive transportation system has spurred an environmental consciousness in the city. Similar initiatives can be replicated elsewhere.

The City of Freiburg (population 180,000) serves as an administrative centre to the Black Forest region of southwest Germany. Here, city officials have used three techniques to control
the use of the automobile: severely restrict use; provide affordable, convenient alternatives; and rigorously encourage compact land use to permit the viable use of transit, bicycling and walking (Pucher & Clorer 1992, 386). Freiburg's initiatives are very similar to the activities undertaken in Curitiba. Pucher and Clorer note that the important ingredient for change was community elected officials who realized that sooner or later a decision had to be made on "how many cars would be permitted in their cities."

2.3.6 - Concluding Comments

Automobiles, and their infrastructure, are having detrimental effects on communities including problems of land consumption, pollution, safety, health and social alienation. But the experiences of communities such as Curitiba and Freiburg demonstrate that it is possible to design transportation systems to become more sustainable.

2.4 - Concepts of Sustainable Development

The search for a set of values, beliefs and attitudes, different from industrialism, to shape human development has been underway for many decades. In 1987, the Brundtland Commission brought a fringe debate, surrounding alternative development ideologies, to public attention through the publishing of Our Common Future. The publication of this report resulted in the popularization of the term Sustainable Development, which the Commission defined as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (WCED 1987, 43).

A action-deflecting debate surrounds the appropriate meaning of sustainable develop-
ment. Some advocate sustainable growth, which is simply an adaptation of neo-classical economics to include environmental protection, while others insist that humankind must develop new ways of interacting with nature because they believe that the natural carrying capacity of the planet earth has been surpassed (Pimentel 1994, 37).

Within the context of this dissertation, the term growth is not considered to be synonymous with the term development. Growth implies the continuing expansion and consumption of material goods on a per capita, as well as an aggregate, level and the conversion of renewable and non-renewable resources from a natural state to a state which can be used by humans. Development implies a per capita decline in material consumption accompanied by an increased focus on knowledge, spirituality and relationships. A number of conceptual frameworks will be reviewed to develop a sense of the parameters of this elusive concept of sustainable development.

Robinson et al. (1990, 41) identify two factors which comprise the foundations of sustainability: the natural environment and the socio-political system. The natural environment must be maintained in order to provide for the needs of present and future generations. In order to maintain the natural environment, human enterprise must coalesce around a set of values and principles which encompasses concepts of sustainability, and the political system must support these values and principles. Sustainable development requires a state of ecological balance between humankind and nature and a process to move towards and maintain this balance.

Rees (1989, 3) defines sustainable development as "positive socioeconomic change that does not undermine the ecological and social systems upon which communities and society are dependent. Its successful implementation requires integrated policy, planning, and social
learning processes; its political viability depends on the full support of the people it affects through their governments, their social institutions, and their private activities." The following points are appended to this definition.

Sustainable development

1) is oriented towards achieving ecological, social, and economic objectives;
2) may impose ecological limits to material consumption, while fostering qualitative development at the community and individual levels;
3) requires government intervention, but also the leadership and cooperation of the private sector;
4) demands policy integration and coordination at all spatial scales and among relevant political jurisdictions; and
5) depends on education, planning, and political processes that are informed, open, and fair.

Non-depletion of the stock of environmental capital is becoming a central element of models of sustainability. Ekins (1992, 412) has developed a set of conditions which he claims will lead to sustainability:

1) Destabilization of global environment features such as climate patterns or the ozone layer must be prevented.
2) Important ecosystems and ecological features must be absolutely protected to maintain biological diversity.
3) Renewable resources must be renewed through the maintenance of soil fertility, hydrobiological cycles and necessary vegetative cover. Sustainable harvesting must be rigorously enforced.
4) Depletion of non-renewable resources should proceed on the basis of maintaining a minimum life-expectancy of the resource, at which level consumption would have to be matched by new discoveries of the resources. Use of non-renewable resources must be minimized through the development of durable products and by practising the "four Rs" (repair, reconditioning, re-use and recycling). Furthermore, all depletion of these resources should involve contribution to a capital fund to help finance research for alternatives and the eventual transition to renewable substitutes.
5) Emissions into air, soil and water must not exceed the capability of the earth to absorb, neutralize and recycle them, nor must emissions lead to life-damaging concentrations of toxins.
6) Risks of life-damaging events from human activity must be kept at very low levels. Technologies, such as nuclear power, which threaten long-lasting ecosystem damage at whatever level of risk, should be forgone.


In the urban realm, the concept of sustainability is often in contradiction to prevailing development patterns which emphasize separation of land uses and transportation dominated by the automobile. These planning practices are now increasingly considered to be a wasteful use of land and other resources. A sustainable urban community, as defined by Rees and Roseland (1991), emphasizes efficient use of urban space, a reduction in the consumption of material and energy resources, community liveability, and the organization of administrative and planning processes which can deal sensitively and comprehensively with socio-economic and ecological complexities. Achieving this vision of a sustainable community would involve a massive change in the way we live in and plan our communities. This type of change cannot occur without an in-depth understanding of the change process and particularly how change is brought about and how it is impeded.

2.5 - Theories of Organizational Change

Organizational literature helps us develop an understanding of how organizations construct themselves, how they function, and why some organizations change and adapt while others decline and disappear. The purpose of examining organizational literature was to develop insights into how institutional planning systems function and how they have adapted to or resisted change. Other theoretical perspectives, such as cultural and political theories, were not used in framing this analysis of barriers because the focus of the research is on planning.
institutions and their reasons for not pursuing (or indeed, their reasons for blocking) sustainability.

In modern societies, communities can be viewed as encompassing a number of organizations. Public organizations have taken over many community functions which, at one time, were performed by community volunteers. As Amitai Etzioni explained in his definitive book *Modern Organizations*,

"Ours is an organizational society. We are born in organizations, educated by organizations, and most of us spend much of our lives working for organizations. We spend much of our leisure time paying, playing and praying in organizations" (Etzioni 1964, 1).

In modern First World societies, to understand communities one must also understand organizations.

The business world has undergone dramatic change over the past decade as processes of centralization and globalization have redefined the principles governing the economic marketplace. Once pillars of business expertise, companies such as IBM, General Motors and Northern TelCom have been shaken into the realization that the traditional way of doing business through incremental change is insufficient in today's marketplace. The explosion of the Space Shuttle Challenger in January 1986 helped galvanize the public's attention on the incompetence of aging organizational structures (McCurdy 1989, 301). Moore and Gergen (1988) forecast a five to twenty-five year period during which aging organizations will undergo transformational change processes which will result in either business failure or significant modification to organizational philosophy.
2.5.1 - Organizational Literature

The field of organizational behaviour is immense. Processes of change are most extensively researched in the fields of business administration, education and the medical sciences. On March 12, 1994, the University of British Columbia Library system contained 4664 items listed under the subject heading "organization." On the same date, the computerized index Uncover, which contains 12,000 journal titles, included 10,331 articles under the subject heading of "organization" and 594 articles under the subject heading of "organizational development." Titles such as Teaching the Elephant to Dance: Empowering Change in Your Organization (Belasco 1990), Managing the Unknowable: Strategic Boundaries Between Order and Chaos in Organizations (Stacey 1992), The Postmodern Organization: Mastering the Art of Irreversible Change (Bergquist 1993), and Breakpoints (Strabel 1992) define a cluster of literature which ranges from in-depth inquiry to cookbook how-to discourse.

The following section summarizes the historical development of the field of organizational behaviour. Major sources used to form this discussion include Planning in the Public Domain: From Knowledge to Action (Friedmann 1987), Philosophic and Pragmatic Influences on the Practice of Organization Development, 1950-2000 (Sanzgiri & Gottlieb 1992), Encyclopedia of Organizational Change Methods (Huczynski 1987), Managing Organizational Behavior (Schermerson et al. 1991), Social Work Macro Practice (Netting et al. 1993), and Initiating Change in Organizations and Communities (Kettner 1985).

2.5.2 - Historical Overview of Organizational Behaviour Literature

Organizations can be defined as "collectivities of individuals gathered together to serve
a particular purpose" (Netting et al. 1993, 122). Generally, groups of people working together to accomplish a specific task have been found to be more productive than the same number of people working individually. Organizational structures evolved as society became more complex, requiring the resolution of more complicated problems.

The evolution of the field of organization behaviour resulted from humankind's desire to find more effective and efficient ways of accomplishing work and of providing for people's needs and wants. The literature on organization behaviour can be traced back to the work of macrosociologist Max Weber who, in the early part of the twentieth century, studied social rationality and institutional planning. Weber's descriptive bureaucracy model introduced the concepts of hierarchical structure within a closed system in which power and responsibility were controlled and concentrated. The concept of rational/legal authority was formalized in an organization structure which encouraged the specialization of knowledge, definitive rules of conduct, and the separation of work and social activities (Weber 1924). The strong focus on the accomplishment of tasks and the pursuit of economic efficiency resulted in bureaucratic organizations playing a major role in the advancement of the industrial revolution.

Frederick Taylor (1911), an American engineer, industrialist and educator further refined the bureaucratic model by focusing on management techniques which would increase productivity. Taylor introduced the concept of scientific analysis to the workplace and stimulated the field of "Universalistic Management." The result of this scientific emphasis was management techniques which instituted concepts of stability, predictability, and maximization of individual productivity into the workplace.

Traditionally, the evolution of new theories and models of organization have been due
to weakness of the dominant paradigm of organization. The universalistic management models tended to treat workers as machines; the workplace becoming a highly efficient, but dehumanizing environment. In reaction to the shortcomings of the universalistic management models, a new group of theories, called Human Relations, came into prominence. This new way of thinking about organizations received legitimacy from the now famous Hawthorne Experiments (Schermerhorn et al. 1991, 554), conducted by the Harvard Graduate School of Business between 1927 and 1932.

The Hawthorne experiments involved modifying the work environment and observing changes in worker productivity. As Friedmann (1987, 204) notes with apparent irony, "Harvard scientists made the epochal discovery that workers are human beings who respond favourably when they are treated with consideration and respect." The researchers concluded that work organizations were, in fact, social systems and that productivity could be increased by modifying social factors. New concepts were introduced into the field including benefits derived from leadership, cooperation, teamwork and management concern for the welfare of workers.

Theories continued to focus on methods (in this case social rewards) to increase worker productivity. Critics of these administrative models viewed them as manipulative, paternalistic, and a continuation of the hierarchical relationship of top-down decision-making and concentrated power. The organization continued to be viewed as a closed system.

Within the context of understanding organizational change and transformation, these theories contribute an important insight. Even in top-down hierarchical organizations, workers continue to hold a "core of free choice" (Friedmann 1987, 204) over how they undertake their work. In other words, workers can undermine or facilitate change. Therefore, creating change
in organizations using rules and formal organizational structures based on the bureaucratic universalistic management models may not be as effective as approaching workers as social beings who can think for themselves. This concept will be discussed in more detail in Section 2.5.7.

In 1960, Douglas McGregor (1960, 47) introduced the idea that organizational members not only are social beings but are also self-actualizing beings. Drawing on Maslow's hierarchy of needs (Maslow 1970, 97), McGregor advanced Theory X and Theory Y to contrast two distinct methods of management. Theory X assumes that organizational members (a) have an inherent dislike for work, (b) must be coerced to maintain desired levels of productivity, (c) prefer to be told what to do, and (d) could be motivated significantly by monetary rewards. Up until the time of McGregor's research, much of the theory and practice in organizational behaviour relied on these basic assumptions.

Theory Y substantially differs from theory X through the recognition that humankind's higher-order needs should be incorporated into the management of organizations. Theory Y assumes that organizational members (a) perceive work as a natural self-fulfilling activity, (b) do not require coercion for work to be accomplished, (c) can more readily focus on the accomplishment of organizational goals if their personal needs are being addressed in the process, and (d) work better in an environment which allows for the expression of individual creativity and imagination.

Theory X/Theory Y's contribution to organizational behaviour theory centres around the recognition that creativity and imagination exist at all levels of organizations. Thus decision-making power, rather than being concentrated at the top, can be dissipated throughout the
structure of organizations. These theories introduced basic concepts which acknowledged that the self-image of the individual has a great impact on how that individual functions in an organization. If basic and higher-order needs are not met, individual workers (and groups of workers) can undermine the efforts of an organization to adapt to its changing external environment. Subsequent theories and models expanded the understanding of organizational behaviour, but resulted in a theory base which focused on methods and techniques to maintain systems and markets. The dynamic nature of organizations and the external environment and markets served by organizations were not recognized.

2.5.3 - Historical Overview of Theories of Organizational Change and Transformation

Peter Drucker made the first important contribution to organizational change and transformation literature in 1954 when he introduced the concept of "Management by Objectives" (MBO). This management method adjusts organizational resources to achieve defined objectives. The shortcoming of Drucker's MBO theory was its focus on particular organizational components. Small-scale tactical interventions could result in significant, unanticipated, negative impacts on other organizational components and ultimately on the organization's overall performance.

Philip Selznick's research on the operational dynamics of the Tennessee Valley Authority resulted in the concept of "institutionalization" (1957, 16). Selznick observed that without appropriate internal direction and external feedback, organizations can take on a "life of their own," performing to meet the needs and desires of the employees rather than of the market or constituents the organization was set up to serve.
Selznick's concept of institutionalization (also referred to as goal displacement and cooptation) dispelled the belief that organizations are rational systems. Through the resulting discourse, organizations came to be seen as natural systems which encompass the characteristics of biological organisms -- most notably the obsession for survival. Amitai Etzioni (1964, 7) added the concept of "stated goals" versus "real goals" to assist in the prediction of organizational behaviour in organizations under stress or undergoing change. Stated goals are the rational strategies for the achievement of task goals, while real goals are perceived as strategies which will insure individual survival within the organization. When both types of goals cannot be served at the same time, the real goals (e.g. survival) most often define individual and organizational behaviour.

Herbert Simon's (1957) decision-making theory suggested that the key to understanding organizations could lie in understanding constraints to decision-making. March and Simon (1958) defined this process as "bounded rationality" and described three clusters of constraints:

(a) habits, abilities, and other personal characteristics that individuals bring with them into the decision-making process and that influence their actions in certain ways irrespective of the circumstances surrounding a specific decision;

(b) "motivations, values, and loyalties... whereby an individual's strong identification with a certain group whose values diverge from organizational values might limit the individual's rational behavior" (Mouzelis 1967, 124); and

(c) the inability of the decision-maker to know either all the variables that might influence the decision or all the possible consequences.

As decisions are bounded by the aforementioned constraint clusters, March and Simon postulated that decision-making was a process of risk management or risk reduction. Without "perfect" knowledge, the decision-maker relies on a labyrinth of formal informational inputs and

47
informal social inputs to arrive at a decision.

Etzioni, March, Selznick, Simon and others exploded the rational model myth of organizations. Certainly, within the context of organizational change and transformation, the importance of past experience, present social networks and allegiances, and the nature and quality of information significantly influence the outcome of decision-making processes. How to influence these factors became an important consideration in directing organizational change and transformation.

While March, Simon and others developed theories and models of decision-making within organizations, Katz and Kahn (1966, 314) examined how organizations interact with their external environment. This research represents another watershed in understanding organizations. Up to this point, theories and models developed to modify the behaviour of organizations focused on changing resource allocations within organizations. Spurred on by General Systems Theory, Katz and Kahn postulated that organizations operate as open systems, constantly responding to inputs from the surrounding environment and impacting the surrounding environment through outputs from the organizational system. Another important characteristic of the open-system model is the feedback loop whereby organizations utilize experience to learn how to adapt and change.

The importance of systems theory to understanding organizational change and

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15 General Systems Theory (GST), was developed by the Austrian biologist, Ludwig von Bertalanffy (1968), who introduced the concepts of closed and open systems which were quickly absorbed by organizational behaviour theorists.

16 Please refer to Netting et al. (1993, 140) for examples of open system models.
transformation lies in the concept of organizations interacting with a larger environment. This apparent interaction between organizations and communities suggests that organizations play an important role in shaping the dynamic evolution of communities and that organizations must be understood to understand this evolution.

2.5.4 - Contemporary Theories and Models of Organizational Change and Transformation

Contemporary theories and models of organizational behaviour focus on understanding how organizations must change and adapt to the new realities of markets and constituents. These theories came into prominence in the 1980s, as the economies of North America and Western Europe began experiencing the negative impacts of global economic competition. A 1993 Gallup poll, which surveyed the attitudes of 400 executives selected from Fortune 1000 companies (Yellin 1993), concluded that many of the leaders of American business are "change incompetent." The poll noted that 56 percent of the executives surveyed had no formal planning group to assess the impact of change in their organization. When asked why organizations resist change, 82 percent of the executives replied that management had to protect the status quo, 79 percent noted that they didn't like to lose control, and 77 percent reported that they simply didn't know what to do about change. As many early organization theorists had discovered, social factors play a dominant role in how organizations function.

In his model of organizational "political power," Pfeffer (1981, 3) acknowledged the important impact that individual interests play in shaping organizations. These individual interests have a profound influence on shaping power structures in organizations and ultimately
on how resources are allocated within organizations. Pfeffer concluded that rationality plays a relatively minor role in the functioning of organizations; organizational leaders are more concerned with control and maintenance of the status quo, and this is achieved through the maintenance of social networks of power.


"a pattern of basic assumptions -- invented, discovered, or developed by a given group as it learns to cope with its problems of external adaptation and internal integration -- that has worked well enough to be considered valid and therefore, to be taught to new members as the correct way to perceive, think, and feel in relation to those problems."

According to Schein, the culture of an organization is very visible (Schein 1985, 24); observers can quickly sense the norms of operation and the level of production which management expects of the staff. An organizational culture creates an atmosphere of security and continuity; employees feel comfortable and confident within a social system which supports their actions. As long as they conform to the norms of the organizational culture, their peers will continue to include them within this social structure. The positive aspects of organizational culture have a tendency to insulate employees from constant changes in the external environment.

An organization's culture is determined by the behaviour of its social system which is shaped by a unique combination of components, including climate, communication network, status/role structure, management pattern, decision-making methods, and types of individuals (Dyer & Dyer 1986, 14). The culture encompasses the belief system which defines the
appropriate behaviour of individuals and the collective of individuals which makes up the organization.

The following elements define the culture within an organization: artifacts, perspectives, values and assumptions (Dyer & Dyer, 16). Artifacts can be categorized into physical (office, logo, etc.), behavioral (rituals, ceremonies) and verbal (expression, stories, myths). Artifacts are the perceptible expressions of the shared perspectives, values and assumptions of an organization's belief system. Perspectives are shared ideas and rules which define appropriate action. Appropriate action is most often encouraged through a reward system. Rokeach (1979, 2) defines values as core conceptions of the desirable used as evaluative criteria for the selection of action or desirable ends. Statements of management philosophy normally articulate an organization's values. Finally, basic assumptions are assumed beliefs which are considered as given and are rarely, if ever, questioned. Included in the organizational culture is what Jesaitis and Day (1992 63) term the individual's self concept (the central beliefs and feelings the individual has about her or himself).

According to Goodstein and Burke (1991, 7), organizational change or transformation literature is concerned with survival, not the socially wrenching process of outright destruction nor the building of new organizations utilizing new human and other resource combinations. This dissertation assumes that it is most socially and economically productive to change the relationships of existing organizational resources, simplify resources, or incrementally add new resources rather than discard and start anew. The significance of this assumption will become more evident when discussing change and transformation at a community level. Although communities may become bankrupt, it is very difficult to destroy them.
Carnall (1989, 128) describes change as encompassing the creation of a new synthesis of people, resources, ideas, opportunities and demands. The catalyst to change is most often in the form of either an outside stimulus or a leader who initiates and guides a change process of "creative destruction" (Schumpeter [1943] 1987, 132). Schumpeter was the first author to discuss entrepreneurial activities as necessary components of change (or what will be referred to in this discussion as transformation or regeneration). Although he is most identified with the economic aspects of the "entrepreneur," Schumpeter was concerned with the creative process of developing new combinations of resources which would throw aside the "status quo' and allow for social innovation, change and evolution. To achieve change or organizational transformation, a significant portion of the change strategy must address both the potential motivations of the individual and the culture of the organization. To achieve change, the facilitator, or change agent, must also be aware of the type or level of change required by the organization.

2.5.5 - Levels of Organizational Change

Many authors (Dyer & Dyer 1986, Fletcher 1990, Levy & Merry 1986, Tushman et al. 1988) advocate a two-level change model. Figures 2.1 and 2.2 delineate system change and cultural change processes (also described, in the literature as first- and second-order change processes). System improvement, or first-order change is problem-oriented, focusing on incremental improvements in the output of organizations. Diagnostic processes are used to determine what is wrong with sub-systems, and then these problems are corrected. Leadership is not perceived to be a barrier to implementing the change event and therefore the process of change is easily controlled.
Cultural change (also referred to as second-order or transformational change) is a far more wrenching experience. Levy and Merry (1986, 5) describe this level of change as a "multidimensional, multi-level, qualitative, discontinuous, radical organizational change involving a paradigmatic shift." Values, beliefs and assumptions are questioned. Cultural change concentrates on diagnostic processes which examine dysfunctional effects of core assumptions. Often, because leaders cannot adapt to new internal or external environmental factors, change in how leaders lead is a critical component of the cultural change process. The questioning of all components of the organization (including leadership) results in a change process which is largely uncontrollable. Reality is redefined.

As noted earlier in this chapter, a Gallup poll (Yellin 1993) concluded that the vast majority of executives do not want to lose control of their organizations. They therefore deny reality and attempt to find magic answers to their organization's problems by taking action at the
system level rather than at the cultural level. The dynamics of this problem is discussed in more detail in Section 2.5.7 where Chris Argyris' research into why smart people (in this case executives and consultants) find it difficult to learn is examined. As an introduction to this subject, denial will be explored as one of the stages in the change process.

2.5.6 - Stages in the Organizational Change Process

A number of models, describing the different stages of change which individuals and organizations proceed through, have been developed by Buckley and Perkins (1984), Carnall (1989 1990), Ley and Merry (1986), Moore and Gergen (1988) Nord and Tucker (1987). The most elementary model, put forward by Levy and Merry (1986, 273), identifies four distinct
change stages: 1) Crisis, 2) Transformation, 3) Transition, and 4) Stabilization and Development.

Moore and Gergen (1988, 376) provide very similar stages, but attach different names to each stage: 1) Shock, 2) Defensive Retreat, 3) Acknowledgement, and 4) Adaptation and Change.

Nord and Tucker (1987, 9), who describe change within the context of an innovation process, list stages of 1) Diagnosis, 2) Design, 3) Implementation, and 4) Stabilization.

The most complex model in the literature is presented by Buckley and Perkins (1984, 48). Their organizational transformation model is reproduced below:

1. **Unconsciousness Stage**: Organization transition begins gradually, with a period of organization unconsciousness that builds a readiness for change.

2. **Awakening Stage**: The developing awareness and surfacing symptoms form a message to all involved of needed change.

3. **Reordering Stage**: Reordering is a probing process integrating the new catalyst with the existing situation and beginning to challenge underlying assumptions of the past.

4. **Translation Stage**: Translation is the process of integrating information, metaphorical images and personal visions of the unconsciousness, awakening and reordering stages.

5. **Commitment Stage**: Commitment is when the organization takes responsibility for implementation of the new vision.

6. **Embodiment Stage**: In embodiment, leadership and employees work together to bring the transformed vision into day-to-day operations.

7. **Integration Stage**: As the embodiment of the desired change becomes widespread, the organization reaches a stage of integration.

Carnall's model of organization transformation (1989, 133; 1990, 138) is the most comprehensive, within the context of this discussion, as it acknowledges the negative individual
motivational aspects of change and makes positive suggestions for overcoming these barriers.\textsuperscript{17} Carnall assumes that the individual affected by the proposed change "must be the prime mover if change is to be assimilated and if adaptation is to occur" (1990, 138). Change creates stress and apprehension. Transformation creates higher levels of stress and leads to the loss of self-esteem for all members of the organization. Carnall, in Figure 2.3, demonstrates the relationship between stages of the transformation process and performance levels which are affected by the loss or the regaining of self-esteem. He has termed this relationship the "Coping Cycle."

The coping cycle acknowledges that people respond differently under conditions of rapid change. Performance will be affected in three ways (Carnall 1990, 40):

1. When new systems, processes and methods must be learned, performance can temporarily decline (the learning curve effect);

2. Individuals must adapt the new systems, processes and methods to function in an appropriate manner (the process effect). Although planned to operate effectively, in reality new systems do not work perfectly the first time around;

3. During change, some people are motivated or challenged while others can become completely overwhelmed and demoralized (the self-esteem effect). In many cases, the accumulated knowledge of individuals, represented by artifacts, perspectives, values, and assumptions, become suspect or are outrightly rejected. The feeling of comfort with familiar norms and mores is replaced by the fear of the unknown. Reality is redefined, sometimes many times, and individuals lose their context with reality. All people possess a certain level or threshold of comfort when dealing with uncertainty which, if surpassed, results in complete performance collapse.

As Figure 2.3 illustrates, performance and self-esteem are closely linked. According to

\textsuperscript{17} Colin Carnall has studied organization change in a large number of public institutions and private sectors organizations. Sectors of the economy examined include manufacturing, banking, health care and education (Carnall 1989, 127).
Camall, the most important factor in re-building performance is the restoration of individual and organizational self-esteem.

**FIGURE 2.3**
The Coping Cycle During Change/Transformation

Source: Camall. 1990.

Levels of self-esteem, and therefore performance, fluctuates as one progresses through the various stages of the change process. Within an organization, individuals may be at different stages at any particular time. Some may be moving forward, some may be moving backwards, and some may be remaining static. Again, change facilitators must recognize the uniqueness of each change process and the uniqueness of each individual within the change process. Carnall subdivides the transformation process into five distinct stages: Denial, Defence, Discarding, Adaptation and Internalization.

*Stage One - Denial* - Individuals focus on what is working rather than what is not.
Responses to suggested change may include "Don't change a winning team" or "We tried that before but it did not work" (Carnall 1990, 141). Tradition and ritual are elevated in importance. There may be a strong association with old ways -- even with activities people disliked in the past. The attitude of "We have always done it this way; Why change?" is very strong. Paralysis may set in during major change with the suppression or denial of new ideas and concepts. Self-esteem may increase during this stage due to increased group cohesion and camaraderie. Performance may also increase as individuals, to insure organizational continuity, attempt to demonstrate that the old ways are still effective.

**Stage Two - Defence** - This is a time when attempts to undermine the change process take place. These attempts of subversion may focus on the new ideas, on the person (people) who are facilitating the change process, or both. Feelings of depression and frustration (loss of self-esteem) develop in individuals who have difficulty dealing with change. Group support may disappear as individuals are lost in an internal process of attempting to find or rediscover their self-image. Individuals focus on self and therefore organizational performance plummets.

**Stage Three - Discarding** - Individuals commence the process of change, finally recognizing the futility of holding on to the past. As Carnall (1989, 143) notes, why and how this transition occurs is not understood. Discarding involves a perception of acceptance of the inevitability and necessity of change. Discarding requires time, and change facilitators must recognize the need for an atmosphere which allows for experimentation and risk-taking. Through experimentation and risk-taking, individuals can reconstruct a new self-image, thus stimulating optimistic feelings towards self and the organization.

**Stage Four - Adaptation** - This stage encompasses a process of mutual adaptation.
Individuals begin to adapt to the new systems, procedures and structures and, in doing so, identify and rectify problems in the functioning and operation of these new components of the workplace. Performance and self-esteem increase as individuals redevelop their self-image.

Stage Five - Internalization - Individuals have reconstructed themselves as valuable resources, have improved the functioning of various components of the new organization and have redefined their social relationship with other people within and outside the organization. People have redefined reality and have defined their self-image within that new reality. The new organization becomes the norm; people feel secure within this normalcy, and self-esteem and performance return to previous levels or may increase.

Managing changes in self-esteem and performance are only two of a number of factors which are perceived as important to consider during change/ transformation processes. Additional factors will be expanded upon in the next section.

2.5.7 - Factors Encountered during Organizational Transformation

Both supportive and hindering factors to change emerge during a transformation process. To ignore any one of these factors is to place the transformation process in jeopardy. Resistance to change centres on fear of the unknown; helping people to overcome this fear is probably the most important step in reducing barriers to change and facilitating the process towards a favourable outcome (Fletcher 1990, 100).

Goldstein (1989, 34) defines resistance to change as "the equilibrium-seeking mechanism of homeostasis." Within an organizational context, stress is created as a result of the lack of a perceived or defined future. The first response, for many individuals, is to resist or construct bar-
riers. Goldstein (1989, 35) identifies five definitive characteristics of organizational resistance:

1. It is systemic -- blocking change by way of homeostatic mechanisms;

2. It has to do with survival when the change introduced is perceived as threatening the fundamental identity assumptions of the work group;

3. It has the appearance of wilful opposition because it sees survival as being the primary issue;

4. It will increase in strength if met with offensive action; and

5. It strives to maintain equilibrium in terms of its identity, assumptions, behaviours and environment.

This section examines a number of barriers to organizational transformation and presents suggestions, identified in the literature, to overcome these barriers.

Desire to Maintain the Status Quo

A great assortment of actions come into play during the denial and defense stages of organizational change. Dyer & Dyer (1986, 20) describe the desire to maintain the values, beliefs, and assumptions of the organization. According to Goldstein (1989, 35), individuals react by attempting to maintain organizational equilibrium in terms of identity, assumptions, behaviour, and environment. McCurdy (1989, 307) notes this action comes into play as a natural force in aging organizations. Essentially as Kirkpatrick (1993, 31), Mink (1992, 30), Schermerhorn et al. (1991, 500) and others report, the need for change is neither felt nor perceived.

During the defense stage of change, a process of subversion may take place when people, particularly those in preferred positions, feel that change may result in more harm than good (Kirkpatrick 1993, 31). Change may require too much effort, may come at a bad time, or may
result in more responsibility. Key formal and informal leaders in an organization may attempt to subvert the change process by providing contrasting information (Schermhorn et al. 1991, 500) or by providing mis-information (Forester 1989, 36). Mis-information can be countered with information which clarifies the uncertainties of the situation and which is honest about components of change which cannot be explained or clarified (Carnall 1989, 136). Organizational members should also be provided with a mechanism which provides a continual flow of information. An excellent discussion of methods to overcome misinformation is presented in Planning in the Face of Power (Forester 1989, 33-47).

**Leadership and Uncertainty**

From early childhood, humans are taught to be in control, particularly in situations which may be threatening or embarrassing. Skilled leaders spend a great deal of time, through education and practice, acquiring the problem-solving skills which secure organizational continuity within their particular profession. Argyris (1991, 100) terms the skills of problem-solving "single loop learning," or learning which modifies basic routine behaviour. Leadership is awarded to individuals who have demonstrated an ability to respond to change in a controlling manner which ensures organizational continuity (survival).

Ironically, successful problem-solvers often cannot cope with "double-loop learning" which Argyris (1993a, 5) defines as learning which corrects errors by questioning the values, beliefs and assumptions of an organization. In double loop learning, the very norms of structured problem-solving are questioned. Successful problem-solvers, with a lack of experience in failure, become defensive, ignoring criticism and blaming other people for organizational problems. As Argyris contends, leaders' "ability to learn shuts down precisely
at the moment when they need it the most" (1991, 100).

Leaders, and the organizations they lead, enter a state which Schermerhorn et al. (1991, 500) call the "fear of the unknown." There is a desire to survive and to maintain control. Too many changes occur at once and individuals are incapable of tolerating a high level of ambiguity. Bosses who used to know the answers don't any more. The organization enters a state of dysfunctionality. Schermerhorn et al. note that, for profit-driven organizations, this will lead to bankruptcy if it is allowed to continue. For non-profit organizations or government institutions this state of dysfunctionality may continue for some time if the illusion of meeting institutional mandates can be maintained.

Overcoming these barriers to change is difficult, as leaders must acknowledge that the skills which they have most prized and which are most prized by their peers, must be discarded. In order to meet the challenge of double loop learning, Argyris (1991, 100) recommends a new way of thinking called "reasoning productively." Constant questioning of organizational values, beliefs and assumptions is a basic component of double loop learning. The constant testing of inferences and critically questioning conclusions should become standard components of decision-making.

**Leadership and Vision**

Lewis Carroll's famous quote "If you don't know where you are going, any road will lead you there," can be applied to the change process. The unknown, with its accompanying elements of uncertainty and unfamiliarity, will close down people's ability to adapt and evolve towards a new organizational state. People can be reactive and allow change to take them and their organization where someone else may want it to go, or they can be proactive and attempt to
shape the future.

The process of visioning (Barczak et al. 1987, 26) can assist organizations in reducing the ambiguity brought about by change. Visions of changed goals and visions of the transformation process (Moore & Gergen 1988, 380) experienced in moving towards the changed state can provide a level of concreteness or comfort to people. Tolerance for ambiguity, and acceptance of adaptation, should be instilled as elements of the transformation process, because the end state of change may not evolve as originally anticipated.

Learning

As previously discussed, change involves discarding a significant portion of accumulated knowledge, learning new knowledge, and often learning new ways of learning (Argyris 1990, 136). Mink (1992, 34) notes that learning has traditionally involved training which centres on highly-structured, standardized, and repetitive processes to develop skills in problem-solving. Skills of judging, focusing, and rejecting are valued (Carnall 1989, 38-39).

Carnall (1989, 129) suggests that learning in support of organizational change will require the exploration of deeply held values, beliefs, and assumptions. Furthermore, he adds that this type of learning will involve conflict. Drucker (1985, 260) feels that organizations are evolving to a state of continuous learning, where habits of flexibility will become normal and accepted skills. Skills which explore contradictions and dilemmas, generate rather than judge ideas, creatively scan rather than focus thought, and incorporate rather than reject constructive criticism will be valued.

Planning, Decision-making and Communication

Formal planning to assess the impact of organizational change receives low priority for
the majority of large organizations (Yellin 1993). When planning does take place, it tends to be undertaken by top management (experts) in a mechanistic manner. Since only top management participates in the process, only one perspective to problem identification and resolution is entertained. Difficulty is encountered in isolating the problem (Carnall 1990, 38) as the problem, in many instances, lies within the group doing the planning. Once a solution has been identified, difficulty is again encountered in implementation. People affected by the change were not involved in the problem-solving process (therefore the wrong problem may have been identified) and may not be consulted or personally informed about the proposed change to the organization (Kirkpatrick 1993, 31). This unidirectional process of planning results in the repression of feelings, ideas and potential solutions.

Opening up the process of planning and decision-making can result in multichannel (upward, downward, lateral) communication (Mink 1992, 35). Encouragement to express feelings and ideas, without the fear of reprisal, can result in a process of organizational self-examination; value, belief and assumption shifts; and organizational reconstruction. Moore & Gergen (1988, 380) suggest that more flexible and responsive communication channels can result in the early identification of difficulties in the transformation process. Corrective actions can be undertaken to assist in guiding the change process to a positive conclusion.

**Power and Politics**

An important component of the culture of an organization is its political structure and the power that this structure wields. Formal leaders normally espouse processes of change, while informal leaders can derail a change process if their power is not recognized and adjusted for (Schein 1985, 37). Schein maintains that, within a political arena, "the effective change agent
needs a power-oriented approach to achieve organizational change objectives" (1985, 37). Important factors in understanding power are centrality/dispersal and individual/collective gains. Power bases are continually developed and redeveloped. Power can be acquired through expertise, information, political access, staff support, tradition, or through a combination of these factors. Power, and the direction of power through politics, should not be perceived as negative elements which should be suppressed or avoided. They are an integral part of any organization.

The Role of the Individual

Ignoring individuals may be one of the most formidable mistakes in attempting to implement change (Carnall 1989, 128). Individuals fear losing their jobs, status, contacts or favourable working conditions (Kirkpatrick 1993, 31). People fear failure, do not understand the benefits of change, or don't trust the change initiator (Mink 1992, 30). According to Moore and Gergen (1988, 375), the major reason for resistance to change is the lack of a culture which encourages risk-taking.

Schmerhorn et al. (1991, 500) suggest an "environment of security" must be built before individuals can buy into the change process. Carnall (1990, 119) stresses the important role rebuilding self-esteem plays in moving the change process forward. Support must be provided to allow individuals to deal with problems -- sometimes in a confrontational manner. Resistance, confrontation and conflict must be recognized as integral components of the change process and, rather than being suppressed, they should be used in a positive manner.

Creating this climate of respect for individuals can be undertaken through the use of empathy and through the development of an environment which encourages risk-taking and experimentation. The testing of new realities will help shape a new vision of the organization
and will demonstrate where individuals fit into that vision.

**Resources**

Finally, Schermerhorn et al. (1991, 500) identify the lack of resource control as a key impediment to organizational change. Mink (1992, 35) identifies rewards such as salary, benefits, budgets, and symbols as potential resources. Carnall (1989, 132) identifies additional resources, including political resources; control of information, agendas or access to key people; skill resources such as negotiation, influencing, mobilizing support, mobilizing bias; and the use of emotion, ceremony, ritual and professional "mystery." Methods of demystifying or wrestling these resources from established power structures must be accomplished for change to take place.

**Summary**

Humans seek to be in control at all times. We feel good when we can produce consequences that are intended. We dislike being out of control. According to Orstein and Ehrlich (1989, 74), in early childhood, we develop mental programs which allow us to be in control and to avoid embarrassment or threats. Planning for the future is one technique which allows us to guide change. Planning involves thinking through how change and adaptations will affect a situation and then responding to these potential changes in a manner which will result in positive and beneficial change.

Important elements of organizational change which may apply to community institutions have been reviewed in this section. The next section will examine theories of change and transformation within community planning and development literature.
2.6 - Planning Theory

The history of modern planning\textsuperscript{18} has been shaped by a belief that enormous societal problems can be solved through the application of foresight and coordination within the public realm. Planners can be perceived as future-oriented facilitators who have skills in rational analysis and problem-solving. A major focus is on ensuring the rationality of decisions. Friedmann (1987, 98) observed that "Human beings strive for formal rationality\textsuperscript{19} in their actions, but the more they try, the more they run headlong into trouble: society is not a logical structure designed by engineers, but rather consists of both logical and illogical elements and relations."

Friedmann (1987) organizes planning theory into four traditions which describe two centuries of evolutionary planning thought. He classified the first two traditions, Social Reform and Policy Analysis, as processes of planning which maintain the status quo, while the last two, Social Learning and Social Mobilization, are classified as processes of planning which allow for societal change and transformation.

2.6.1 - Traditions of Planning - Status Quo

The Social Reform planning tradition focuses on the concept of institutional social guidance. Friedmann (1987, 33) describes social guidance as a concept which is concerned with

\textsuperscript{18} A brief history of modern planning is summarized in Dear (1986, 377) and Hodge (1991, 2-133). During its early stages of development, Canadian planning was strongly influenced by the traditions of British planning. The history of modern British town planning is summarized in Goodchild (1990, 126).

\textsuperscript{19} Formal rationality describes a process of logical thinking and decision-making based on one's upbringing and experience (i.e. personal attitudes, concepts and ideas). Therefore, formal rationality may vary significantly from one individual to another.
system maintenance through established state\textsuperscript{20} institutions. State institutions include organizations directly controlled by the state, such as bureaucracies, and organizations indirectly controlled by the state, such as the corporate economy.

Social guidance implies a top-down form of management and control of public affairs. Social Reform promotes the concept of professionalism in planning; the planner is seen as a specialist who utilizes the scientific paradigm to arrive at knowledge-based recommendations which address opportunities or problems facing society. The complex knowledge-based science of planning results in the citizen being disassociated from the planning process.

This paternal form of societal control ensures political stability through the concentration of knowledge within a professional elite. It presupposes that change or social transformation, when required, is incremental and is brought about by working within the established institutional structure of the state.

Policy Analysis is the second tradition of planning which reinforces the power of the status quo. Policy Analysis focuses on rationalizing the decision-making process. An early proponent of this tradition of planning, Herbert Simon, centred his research on utilizing the objectivity of science to improve the decision-making process of large organizations. He viewed Policy Analysis as the "Science of Design" (Simon [1969] 1981). His methodology "stressed synoptic analysis and decision-making as the means of identifying the best possible course of action" (Friedmann 1987, 78).

\textsuperscript{20} The state is ultimately controlled by the elite of any society. This elite is comprised of private- and public-sector leaders who provide societal direction which will insure the continuation of the "status quo." This concept is applicable to both communist and market social-political systems.
According to the Policy Analysis tradition, the complexity of society could and should be reordered into simplistic models. Society becomes a machine which can be taken apart, analyzed, engineered, and then reassembled as a more efficient machine. A central theme of Policy Analysis is that the unencumbered market should be allowed to allocate resources to their highest and best use. Decisions which result in economic growth and societal equilibrium are sought. Abstract components of decision-making, including political processes and environmental considerations, are either ignored or acknowledged in a quantitative manner.

Social Reform and Policy Analysis are the dominant traditions which guide planning practice and modern development theory. Both traditions serve neo-classical economics and established power structures. Planners within the tradition of Social Reform function as advisors to the power elite and strive to optimize the allocation of resources within the constraints imposed by the powers of the state. Policy analysts function as specialists in the structuring of decision-making for the powerful. Both traditions provide tools to arrive at the "best choice." Unfortunately the question of what is "best" is narrowly defined within the parameters of neo-classical growth economics.

There are many critics of the above two planning traditions. Birkeland (1991, 82) notes that planning, while originally trying to address distributional issues, has become an integral element of the economic resource allocation process that is destroying humankind and the planet. The patriarchal relationships (domination of man over woman, man over nature, and the strong over the weak) established within industrialism are retarding change towards a more equitable development paradigm. Dear (1986, 379) describes post-modern planning practice as a "ritualized choreography of routines," concentrating on justifying the actions of the state and of...
the property development industry. Dear asserts that most post-modern planning activities have lost the long heritage of utopian visions and the ideological commitments of the 1960s and 1970s.

Duany (1991) chastises community planners, stating: "It is an extraordinary arrogance of the current planning profession to fix zoning forever." Jane Jacobs, who is less polite, comments that "our planning departments seem to be brain-dead in the sense that we cannot depend on them in any way, shape or form for providing intellectual leadership in addressing urgent problems involving the physical future of the city" (Barber 1993, A-3). Jacobs commends citizen activists for championing innovative solutions to urban problems, in spite of the inertia, red tape and barriers put up by city planners and other bureaucrats. As agents of the state, a great deal of professional planning activity involves maintaining the status quo through the creation and administration of official community plans and zoning and subdivision by-laws, all of which inhibit change.

2.6.2 - Traditions of Planning - Change and Transformation

Social Learning is an ongoing process that "begins and ends with action" (Friedmann 1987, 181). Knowledge obtained from experience defines future action which results in additional knowledge. Initiated and led by established institutions, Social Learning is a bottom-up approach to planning which is based on a knowledge of reality and practice. Social Learning should take place within small task-oriented groups or temporary social systems which learn from their actions and the actions of others around them. Groups may be assisted by change
agents\textsuperscript{21} who stimulate, guide, and facilitate the process of learning.

The process of Social Learning encompasses interpersonal skills such as listening, trust, empathy, and the ability to suspend hierarchical relationships. Personal growth and discovery are major goals in the social learning process. Social learners may use either single-loop learning, which involves changing strategy, or double-loop learning, which involves modifying images of reality through changes in values, beliefs and assumptions. Changes can take place at an individual, group, organizational, community or societal level. The double-loop process of learning results in significant change because it ultimately restructures reality.

Friedmann (1987, 181) defines Social Learning as "a complex, time-dependent process that involves, in addition to the action itself (which breaks into the stream of ongoing events to change reality), political strategy and tactics (which tell us how to overcome resistance), theories of reality (which tell us what the world is like), and the values that inspire and direct the action." Social Learning recognizes change as a basic component of human existence and advocates a proactive approach to guide change processes to positive ends.

The first three traditions of planning, Social Reform, Policy Analysis and Social Learning, advocate managed change from within institutionalized power structures. Social Mobilization advocates politics of confrontation. The origins of Social Mobilization as a planning tradition can be traced to the negativism of the "Industrial Revolution" and the positivism of the "Enlightenment." Advocates of Social Mobilization believe the immediate

\textsuperscript{21} A change agent is anyone (planner, community development worker, citizen activist, teacher, etc.) who encourages, guides and assists in the process of changing reality. Using formal knowledge, they enter into a transactional relationship with their client (group, community, etc.) which results in mutual learning (Friedmann 1987, 185).
negative aspects of industrial capitalism (the social and economic degradation of human beings) far outweigh the benefits.

Utopianism, social anarchism, and historical materialism constitute the three major movements of the social mobilization tradition. Experiments in utopianism have provided examples of new types of community-based social and economic systems operating in isolation from the state. The utopian movement is primarily concerned with "the perfectibility of life on earth" (Friedmann, 1987, 229). Utopians believe that changing the environment in which people live results in behaviour change. Utopian thought has given us the passion of Fourier and the social harmony of Owen.

Experiments in social anarchism have shown us the power of forming large federations of cooperative and mutually supportive groups, and have demonstrated the effectiveness of mass action against hierarchical organizations. A central theme of social anarchism is the "denunciation of all forms of authority, especially the state's" (Friedmann, 1987, 236). Concepts of universal spontaneity, public consciousness, and social self-management are advocated for the maintenance of civil order.

Marxist historical materialism, which culminates in a "science of social revolution," has helped us understand the historical evolution of class structure and the use of politics to suppress class struggle. It has demonstrated the significant role class consciousness plays in mobilizing revolutionary practice.

Social mobilization has contributed a rich quality of thought to planning theory through the development of alternatives to the status quo. The last of Friedmann's planning traditions has played an important role in questioning "what is," and thus creating the intellectual space to
think of "what can be."

2.6.3 - Summary

Over the past century, and particularly since the second world war, planning, within the traditions of Social Reform and Policy Analysis, has been used by the state as a tool of control. As the principal forms of planning within industrialism, these two traditions of planning have promoted economic growth. The result has been unprecedented rates of material progress and wealth accumulation.

The state has permitted controlled experimentation within the tradition of Social Learning. This experimentation has principally taken place within segments of society (rural regions and urban ghettos in developed countries) which have been marginalized by economic progress. Friedmann (1987, 185) suggests that "double-loop" social learning processes can potentially create profound changes in the imaging of reality, values and beliefs. Milbrath (1989, 85) views Social Learning as a way of "learning our way out" of the present environmental crisis.

Advocates of Social Mobilization have recognized how industrialism has controlled change in society. Operating outside the influence of the state, this planning tradition has developed new paradigms of development. Utopianism, social anarchism and historical materialism have attempted to redefine reality through behavioral and/or structural change.

Social Learning and Social Mobilization offer exemplary examples of passive and active confrontational processes. Knowledge of Friedmann's four planning traditions, combined with an understanding of how industrialism maintains itself, can allow planners to discover ways to create and implement processes which can lead humankind towards new, sustainable development paradigms.
2.7 - Change Processes Towards Sustainability

Over the greater part of history humankind has been dominated by nature. As society evolved, this relationship was reversed through the harnessing of steam power and use of vast reserves of non-renewable energy resources. Figure 2.4 illustrates our present linear relationship with the environment. By drawing resources from the natural environment and disposing wastes back into it, humankind dominates the environment. The circle denoting the economy is larger than the circle for the environment, illustrating our belief that the economy holds more importance than the environment for the continuance of human society.

FIGURE 2.4
Anthropocentric Human-Natural Environment Relationship


As we redefine our lifestyles to reflect our dependence on the natural environment, our association with nature might be represented by Figure 2.5. This new relationship acknowledges the encompassing importance of nature. It recognizes that the community is a subset of nature, while the economy is a subset of both nature and community. In this representation, the role of
the economy is to serve both the community and the natural environment.

**FIGURE 2.5**

Biocentric Human-Natural Environment Relationship

![Biocentric Human-Natural Environment Relationship](image)

Source: Sadler and Jacob. 1990.

Figure 2.6 represents a model of a change process which has been envisioned to move humankind from an anthropocentric worldview (where development is focused on economic activity and a dependence on growth) to a biocentric worldview (where development is focused on ecological sustainability and social equity). The left-hand side of the model represents the dominant industrial paradigm (anthropocentrism) of development. The width of the concentric rings or bands of social, economic and ecological value sets represent the magnitudes of importance held by society towards these values. On the right-hand side of the model, the new ecological paradigm of development (biocentrism) is represented. The width of the bands have
changed to a more equitable representation of social, economic and ecological values. The principal set of values in this new development paradigm is ecological in nature. This acknowledges the need for sustainability to be dominant in our development models and activities. The overall magnitude of the circles are reduced to represent the reduced impact of humans on the natural world.

**FIGURE 2.6**
Change Process from an Anthropocentric to a Biocentric Worldview

![Diagram](image-url)

The area between the two development paradigms is defined as the zone of change and transformation. Lines cross within this zone denoting an environment of turbulence and uncertainty in which change and transformation occurs. Within the Zone of Turbulence, incremental processes of social learning and social mobilization occur. This inter-paradigm zone corresponds to the denial and defense stages of Carnall's (1990, 138) coping cycle (see Section 76).
2.5.6) model; individuals, organizations, and communities either find ways to adapt to the new realities of community sustainability or they find ways to resist change in an attempt to maintain the familiarity of the status quo.

A small number of researchers have begun to examine this Zone of Turbulence which encompasses the transformation process from anthropocentrism to biocentrism. Carley and Christie (1993, 147-201) call for innovative management processes to assist in this movement towards sustainability. They describe increasing environmental degradation and a rise in public awareness as a progression in problem complexity to a level they term "meta-problems." These meta-problems are so complex, and their component elements are so dispersed throughout society, that they cannot be addressed by traditional government institutional structures and processes (Stewart 1991, 171).

Politicians and the general public may understand that automobiles are a major cause of environmental degradation (the substantive issue), but rarely do they understand the complex nature of government institutions and private sector organizations which plan and maintain the automobile system. Nor do politicians and the public understand the complex procedures required to create change (process issue) within this bureaucratized automobile system. Yet as Carley and Christie argue (1993, 161), institutional transformation and accompanying decision-making processes are basic prerequisites for the movement towards sustainability.

Self (1986, 329) describe these meta-problems, or breakdowns in institutional problem-solving as the "limits of governance." Two factors, one encompassing the external environment within which government institutions function and the other internal to the structure of government, create this "limits to governance." The former limiting factor relates to the dynamic
nature of modern society. Carley and Christie note (1993, 149) that, with the rapidity of change and the evolution towards a global economic market structure, a climate of endemic uncertainty and turbulence pervades society. The second limiting factor relates to the compartmentalization, both in their structure and in their policies and regulations, of government institutions.

The rapidity of change calls for new organizational structures to deal with the meta-problems of environmental degradation, while the compartmentalization of government institutions and the accompanying resistance to change call for the evolution of structures, policies and regulations to address these meta-problems. Carley and Christie would like to see the unification of inter-agency and inter-governmental policies and the forging of more tenable environmental management systems. The establishment of new environmental management systems, however, are being impeded because of "fear of internal conflict, or because political resources are fragmented or ideological divisions are intense [within government institutions]" (Carley & Christie 1993, 149).

As Carley and Christie note, "governments regularly pursue contradictory policies and politicians lack the will or a motivation strong enough to force them to undertake the difficult mediation among conflicting economic, social, and environmental goals that diverge substantially from the status quo" (1993, 149). Traditional "command and control" (C&C) management techniques lack the responsiveness, creativity and initiative to deal with the meta-problems of environmental degradation, and they are not able to foresee and to prevent currently evolving meta-problems. Traditional C&C management systems are well adapted to dealing with planned or first-order change and cause-and-effect problem-solving. Unfortunately, when confronted with unplanned change and second-order change processes, which redefine
community values or present decision-makers with multiple sets of competing values, traditional management systems cannot cope. Institutional barriers rapidly evolve to maintain familiarity (refer to Section 2.5.6 - Stages in the Organizational Change Process), and elements of denial and defense are developed to maintain the status quo.

Lee (1993, 5) describes a need for both a scientific compass, or substantive knowledge, to chart the way and a gyroscope to maintain political stability as we develop new management skills which can assist in the transformational process towards sustainability. Lee feels that, over the past decade, the compilation of substantive knowledge defining a sustainable future has surpassed the formation of political processes and the development of new management skills to overcome complex barriers to change.

Pearce et al. (1993, 186) outline a transformational process (refer to Table 2.11) towards sustainability which recognizes the initial reluctance of developed nations to move away from their present consuming lifestyles. This transformational model implicitly incorporates the "limits of governance" discussed by Self and the need for new management systems discussed by both Carley and Christie, and Lee. The model recognises humankind's reluctance to change by incorporating incremental change steps during the transformational process. This model, which represents one of an infinite number of processes or scenarios which could be followed by society in the movement towards sustainability, is presented for illustrative and discussion purposes.

During the early change stage (ultra-weak sustainability), organizations outwardly acknowledge the need to integrate policy, but they do little to accommodate this integration process within and between organizations. Minor tinkering with the economy to improve
economic efficiency is viewed as the optimum method to move towards sustainability. Only a small segment of society is aware of the substantive changes needed to achieve sustainability. The rest of society has only a vague conception of how sustainability would impact on its current lifestyle. Discussion groups are set up within organizations to explore the impact that sustainability may have on the future internal sustainability of the organization. Experimentation in inter-organization consultation takes place.

TABLE 2.11
A Possible Map of the Sustainability Transition

<table>
<thead>
<tr>
<th>Stage One Ultra-Weak Sustainability</th>
<th>Policy</th>
<th>Economy</th>
<th>Society</th>
<th>Discourse</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Lip service to policy integra-</td>
<td>Minor tinkering with eco-</td>
<td>Dim awareness and little</td>
<td>Corporist discussion groups; consultation</td>
</tr>
<tr>
<td></td>
<td>tion</td>
<td>nic instruments</td>
<td>media coverage</td>
<td>exercises</td>
</tr>
<tr>
<td>Stage Two Weak Sustainability</td>
<td>Formal policy integration and</td>
<td>Substantial re-structur-</td>
<td>Wider public education</td>
<td>Round tables; stakeholder</td>
</tr>
<tr>
<td></td>
<td>deliverable targets</td>
<td>ing of microeconomic</td>
<td>for future visions</td>
<td>groups; parliamentary surveillance</td>
</tr>
<tr>
<td>Stage Three Strong Sustainability</td>
<td>Binding policy integration</td>
<td>Full economic valuation;</td>
<td>Curriculum integration;</td>
<td>Community involvement; twinning of</td>
</tr>
<tr>
<td></td>
<td>and strong international</td>
<td>green accounts at</td>
<td>local initiatives as part</td>
<td>initiatives in the developed and</td>
</tr>
<tr>
<td></td>
<td>agreements</td>
<td>business and national</td>
<td>of community growth</td>
<td>developing world</td>
</tr>
<tr>
<td></td>
<td></td>
<td>level; green taxes; off-</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>sets</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>


During stage two (weak sustainability), formal policy integration takes place and achievement targets are defined. The economy undergoes significant restructuring through the use of microeconomic incentives. At a societal level, future visions of sustainability are
examined through a social learning process. Discussion is stimulated and maintained through the use of stakeholder groups in "Round Table" processes. Parliamentary surveillance is employed to insure progress towards sustainability rather than reversion to traditional societal norms.

Pearce et al. expect the first two stages to span up to twenty years; the final stage may take much longer to accomplish. During this final, or strong sustainability stage, national policy integration will be accompanied by strong international agreements. Economic externalities will be eliminated, and full economic valuation will become the norm. Green accounts, green taxes and offsets will be established at both the enterprise and the community, regional, provincial, and national levels. The organization of natural and social sciences into compartmentalized disciplines will be replaced by curriculum integration within educational institutions. The substantive and process knowledge to bring about sustainability will be developed to a sophisticated level allowing implementation of initiatives which contribute to sustainable community development. Participatory processes will allow inclusive discourse at a community level and between communities in the rich and poor nations of the world (Refer to Appendix D for a possible process to move towards a sustainable urban transportation system).

Carley and Christie discuss skills needed to facilitate this transformation process towards sustainability. These skills, holistic thinking, risk taking, action learning, integrating, action teaming, and networking, coalesce around the two limiting factors of governance discussed earlier: the first encompasses the dynamic nature of society which brings about turbulence and uncertainty, and the second encompasses the compartmentalization of agencies which isolate policies and decision-making.
Environmental problems must be confronted, addressed and resolved in a turbulent atmosphere which is characterized by the following elements: uncertainty; conflicting and ill-defined needs, preferences, and values; blurry consequences of potential actions; and uncertainty in resource availability. According to Stewart (1991, 171), problems within such a turbulent atmosphere must be addressed using holistic thinking and risk-taking skills. Argyris and Schon (1974) see the need for a process of learning (theory-in-action or action learning) in which knowledge is continually tested and reconstructed.

Action learning, which is based on self and organizational development encompassing cultural change, is a process which accepts possible alterations to deeply held beliefs and entrenched patterns of organizational behaviour. Carley and Christie feel that "organizations [confronted with meta environmental problems] that do not engage in cultural change, which gives rise to innovation remain immured in what have been called 'culturally programmed strategies.' These [strategies] emphasize continuity, consistency, and stability in order to maintain the status quo" (1993, 177).

Evaluative processes, designed to constantly question culturally programmed strategies which perpetuate unsustainability, are needed. Elder (1992, 127) suggests that the role of Environmental Impact Assessment (EIA) can be expanded to address social and economic sustainability issues. Environmental Impact Assessment is "a systematic process that examines the environmental consequences of development actions, in advance" (Glasson et al. 1994, 3). It is a tool or technique which is used in the decision-making process to assist in defining trade-offs associated with a proposed development action.

The present dominant use of EIA has a number of flaws which must be overcome if it
is to be used in assessing sustainability issues and actions. According to Elder (1992, 130), these flaws include "the scope of the process (it often applies only to projects, not policies, programs, new products, or technologies), the fact that it applies to new, not existing activities, a lack of opportunities for public involvement, inadequate post-project analysis, and a lack of objectivity in using technical information." Gardner et al. (1988, 42) support Elder's observations noting that to support sustainability, EIA must move from a reactive mode (pre-project evaluation) to a proactive or anticipatory mode (carrying capacity assessment) which evaluates new and ongoing activities and processes.

Within the institutional realm, Elder (1991, 843) suggests that EIA should become part of the planning and approval process within international, national, provincial and local levels of government. "Any policies, plans, legislative and expenditure proposals, programs, projects and operational procedures with the potential to cause a net negative impact on the biogeophysical environment, or on human health or well-being, would be included [in ongoing EIAs]" (Elder 1992, 139).

To realize this new role for EIA, new norms of operation should be introduced into traditional government management and decision-making processes. Gardner et al. (1988) and Elder (1992 & 1991) suggest a number of new operational norms. The first would involve placing responsibility for sustainable environmental impact assessment (through legislation) on all government decision-makers. This would move sustainability concerns from environmental-oriented government institutions to all government sectors and all levels of decision-making (Elder 1991, 842). The second would involve opening up, to public scrutiny, the traditionally secretive process of policy development (Elder 1992, 139).
The third new norm of operation would have ongoing EIA processes consider the cumulative effects of human activity on the natural environment. Many severe environmental degradation processes, such as forest loss, soil degradation, climate change, water degradation (refer to Table 2.4, Key Indicators of Ecosphere Degradation), and urban growth and infrastructure expansion (refer to Chapter Two, Section 2.3.4) result from many small incremental actions which, in totality, contribute to severe ecological deterioration.

Gardner et al. (1988, 9) describe this new norm of operation as "Cumulative Environmental Assessment" (CEA). They believe that "CEA should take EIA beyond the project level to program and policy level concerns, broaden its spatial and temporal scope, and be more comprehensive and interdisciplinary, as well as better integrated with impact monitoring and management systems" (Gardner et al. 1988, 9). According to Elder, CEA would ensure that "if plans and policies are assessed, a series of projects should no longer be able to accomplish piecemeal an overall plan which escaped assessment." (1992, 139).

EIA and CEA are two of a number of tools which are needed in the movement towards sustainability. Pearce et al. (1993, 193) discuss the need for new skills in integrative management. Integrative approaches, such as consensus decision-making, and decision-making involving top-down and bottom-up inclusionary processes, in which policy and other guiding elements of organizational culture become complementary rather than contradictory, should be encouraged.

The complexity of environmental problems may require the formation of temporary organizations and action teams to work with established bureaucracies. Unencumbered by an established organizational culture, these action teams could focus solely on environmental
problems. They could draw resources from existing agencies when needed, learn by confronting what would normally be considered unresolvable problems or dilemmas, and grow into more sophisticated tasks. When they were not needed, team members could return to their line agencies, but they would remain as key links into these agencies if new human or informational resources were required by the environmental action team.

Key links into established organizations can evolve into multi-agency networks or action-centred networks. Carley & Christie (1993, 177) observe that these networks can be structured to encourage learning, adaptation and change within and between organizations. The networks allow employees the psychological space to indulge in the creative and innovative processes of learning to learn.

2.7.1 - Concluding Comments

Complexity, change, and turbulence are common characteristics of modern society. Environmental issues are meta-problems which encompass the characteristics of uncertainty, conflicting values of a multitude of stakeholders, and obscure outcomes for actions taken. As Carley and Christie note, it is "common for governments to excuse inactivity on a meta-problem by arguing that not enough is known about it, or because it spans functional departments and political jurisdictions" (1993, 164). This inactivity cannot continue. The reshaping of the natural world is degrading the functioning of that world in ways unanticipated by society. Barriers perpetuating inactivity must be identified and overcome to propel society towards sustainability. The next chapter presents a research methodology which is designed to identify barriers to change and to examine a number of institutional barriers in-depth.
CHAPTER THREE - RESEARCH DESIGN

3.1 - Introduction

Researchers, and increasingly political representatives, government officials and the public, discuss the need for a movement towards a state of sustainability (refer to Chapter Two, Section 2.4 and 2.7; Daly & Cobb 1989; Rees 1992a; United Nations 1992). Some political commitment to sustainability exists, yet actions to create change do not seem to be taking place. Instead, current actions seem to be moving society towards a greater state of unsustainability (refer to Chapter Two, Section 2.4 and Chapter Four, Sections 4.3 & 4.5). Few studies have examined why sustainability solutions are not being implemented by society. Those studies that do exist (British Columbia Round Table 1994, Carley & Christie 1993, and Pearce et al. 1994) tend to examine implementation problems at an international, national or provincial level. Studies which examine attempts to implement concepts of sustainability at a local level are not apparent in the literature.¹

This chapter begins with the development of a conceptual model of the planning process at a local level. This model helped to develop the researcher’s understanding of local planning processes and why these processes might not be assisting the movement towards sustainability. Due to the complexity of communities, it was necessary, at this point, to focus the research on one community and one substantive issue. The rationale for choosing a site and substantive issue are described. The foregoing conceptualization process assisted in the

¹ Local-level studies of this type were not discovered in the literature search carried out for this research program. A recent Master’s thesis (Moore 1994), completed during the final stages of writing this dissertation, is an exception. The thesis examined barriers impeding the implementation of recommendations supporting a movement towards sustainability contained in the report Clouds of Change (City of Vancouver 1990).
definition of a research question and subsidiary questions. These questions defined what methodological approach to use.

3.2 - Development of Conceptual Framework

A framework was developed to conceptualize the planning process which takes place at a local government level. This conceptual framework assisted in defining what questions to ask, what data to analyze, and how to organize the study findings.

The planning process can be most simply conceptualized as a system with inputs and outputs. The theoretical planning process model, which appears in Figure 3.1 was developed by the researcher drawing on ideas from organizational and community change literature.\(^2\) As Figure 3.1 shows, the outputs from the system (budgets, formal plans, informal plans, position papers, processes, and procedures) can be conceptualized as dependent variables whose form, and implementation depend upon a planning system which is comprised of a set of independent variables (structures, corporate culture, skills, etc.). These planning system components can also be considered a set of dependent variables whose structure and function should theoretically depend upon inputs to the system (independent variables such as citizen pressures, political directives, and external consultants reports).

The Input Stage takes place predominantly within the political realm where public debate and political decision-making result in inputs to the planning system.


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Once within the planning system, public involvement is limited to public participation exercises which are initiated by the planning system itself. There is limited opportunity for the public to scrutinize the actions of local government bureaucracy. Components of the planning system include formal and informal planning procedures, formal and informal elements of the corporate culture, resources (monetary and human), structural linkages within the organization or with other agencies and organizations, staff skills, and professional cultures. These components of the planning system influence both the actions and the outputs of the theoretical planning process.

Finally, the final stage encompasses the outputs of the planning system. This stage includes formal plans which represent stated strategies (espoused theories); informal plans which represent the real strategies (theories-in-use), position papers which may call for change or inertia; and processes, budgets and procedures which represent the power implementation
strategies of any organization. Plans are tools which define what changes should take place, but processes, budgets, and procedures are the tools used for implementation.

After an examination of the case study site and the substantive issues selected for this research, the linkage between the variables which make up the various stages of the planning process and the research questions will be discussed.

3.3 - Research Focus (Site, Substantive Issue, and Time Frame)

Two forms of purposeful sampling techniques, convenience and critical case, were used to select the City of Vancouver as the research inquiry site (Patton 1990, 169-181). The city was identified as a critical case sample because, in adopting the report entitled Clouds of Change: Final Report of the City of Vancouver Task Force on Atmospheric Change, in 1990, Vancouver has been perceived as a city which is moving towards sustainability. Background activities in the area of sustainability planning were also underway a number of years prior to adopting this report.

Because transportation plays an important role in the sustainability or unsustainability of a community (refer to Chapter One, Section 1.2), the particular issue of sustainability to be studied in this dissertation is the institutional nature of transportation infrastructure planning and implementation.

The interesting component of automobile infrastructure planning is that, during a period of time when citizens are calling for a shift in modal split away from automobiles, municipal institutions, such as Vancouver's, seem instead to be perpetuating the use of the automobile through their planning and construction activities.

Even though the Vancouver culture may be more auto-centred (refer to Chapter Four,
Table 4.2), Vancouver’s transportation planning institutions may reasonably be considered to be representative of North American cities. As a number of sources point out (Engwicht 1993, Lowe 1990, Transportation and Environmental Studies 1991, United Nations 1993), a resistance to change in the structure and process of transportation planning is being experienced in all communities in the developed nations.

The time period of this case study begins with the approval of Clouds of Change report on October 16, 1990 and ends on April 15, 1995.

3.4 - Research Question and Subsidiary-Questions

The general research question is

What barriers within Vancouver’s planning system impede change towards a significantly less automobile-dependent transportation system?

It must be stressed that while there are important barriers to change towards sustainability within the input stage of the planning process (for example, people’s continued desire to drive automobiles), this research focuses on determining what barriers exist at the planning system stage.

Subsidiary research questions which this case study attempts to answer are

Subsidiary Question One
What does sustainability mean to people involved in transportation planning for the City of Vancouver?

Subsidiary Question Two
What factors, within the city’s planning system, are creating barriers which impede the shift towards a sustainable transportation system in the City of Vancouver?

Subsidiary Question Three
What opportunities exist for overcoming these barriers?
Subsidiary Question Four

What is the planner’s role in overcoming these barriers?

The first subsidiary question was developed to determine the level of understanding of the concept of sustainability among persons involved in the planning of Vancouver’s transportation system. It was felt that a lack of understanding of sustainability would, in itself, be a barrier to change.

The purpose of this research is not only to identify barriers but to find methods to overcome these barriers. Questions two and three addressed these issues.

Because this is a community planning dissertation, the final question was developed to assist in identifying how planners can become more involved in the movement towards sustainability.

The general research question and subsidiary research questions led to the development of interview questions (Yin 1989, 13-26) (presented later in this chapter).³

3.5 - Rationale for Selection of Research Methodology

The research questions dictated the type of research methodology to be used. Qualitative research methodology was selected as this form of inquiry "is generally used to

³ An additional subsidiary research question was developed during the conceptualization of this research inquiry which asked "What factors within the city’s planning system, are assisting in the shift towards a sustainable transportation system in the City of Vancouver?" A question addressing this subsidiary research question was asked in the interview protocol (refer to Section 3.6.2), and data was compiled and analyzed. As these findings did not directly address the primary research question and were not discussed in the concluding chapter, the researcher decided to remove the findings to Appendix I. The "positive factors" will be the focus of a separate research paper.
shed light on a phenomena not understood" (Grams 1995, 4). In this case, the phenomena which is not understood is why, despite policies and plans which state goals of sustainability, humankind is not taking strong actions towards these goals.

Patton (1990, 169) states that "qualitative inquiry typically focuses in-depth on relatively small samples, even single cases (n=1), selected purposefully." Numerous authors (Guba & Lincoln 1989, Marshall & Rossman 1989, Patton 1990, Robson & Foster 1989, Yin 1989) write that this form of sampling, referred to as purposeful sampling, has become an acceptable technique and forms one of the foundational concepts in qualitative research.  

An exploratory single case study design was used to inquire into the planning process for the provision of street and road transportation infrastructure in the City of Vancouver. Yin (1989, 17 & 23) defines case studies as empirical inquiries which "answer how and why forms of research questions; focus on contemporary events; investigate a contemporary phenomenon within its real-life context when the boundaries between phenomenon and context are not clearly evident and where multiple sources of evidence are used."

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4 In comparison, quantitative inquiry studies either a representative portion of a sample population or an entire sample population with the ultimate purpose of generalizing research results to a larger population. Each inquiry methodology relies on very distinct logic in the conceptualization and implementation of the inquiry.

5 All inquiry paradigms have strengths and weaknesses. Lincoln & Guba (1985) provide a sound description of naturalistic inquiry while Babbie (1992) describes inquiry using the logical-positivistic approach. A debate surrounding which inquiry approach is superior has now moved to a discussion of which method is most appropriate within the context of a particular research question (Miles & Huberman 1984, 20). Some research questions may be more appropriately addressed using either qualitative or quantitative methods while other questions may draw from both inquiry paradigms. The important consideration in this discussion is that the research question defines the methodology; the methodology should not define or shape the research question.
The decision to use a case study inquiry method was influenced by a number of considerations. As Yin (1989, 12) notes, the case study method is ideally suited for studying the complexity of organizational phenomena generally. Specifically, in studying a planning process, there is a need to understand, in an holistic manner, characteristics of real-life events (such as organizational and community change processes). Within the qualitative case study approach, quantitative methods (document content analysis, and financial analysis techniques) were used to examine case study results in more detail.

The unit of analysis⁶ for this research inquiry is the institutional system for planning the delivery of transportation infrastructure in the City of Vancouver.

Major scholarly influences during conceptualization, came from the following publications: Qualitative Evaluation and Research Methods (Patton 1990), Qualitative Data Analysis: A Sourcebook of New Methods (Miles & Huberman 1984), and Fourth Generation Evaluation (Guba & Lincoln 1989).⁷

3.6 - Data Collection Methodological Design

Movement towards sustainability is a complex and difficult process of changing fundamental values, beliefs and assumptions. In order to understand this fundamental change

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⁶ According to Yin (1989, 31), the unit of analysis defines "what the case is."

⁷ Research methodologists who address conceptualization in a very effective manner include Earl Babbie (1992, 86-164), Lincoln & Guba (1985, 221-49), Marshall & Rossman (1989, 9-120), Miles and Huberman (1984, 28-33), Patton (1990, 7-199), and Robert Yin (1989, 13-60). Earl Babbie examines quantitative research in the social sciences; Lincoln & Guba, Marshall & Rossman, Miles & Huberman and Patton concentrate on qualitative research; and Yin focuses on case study methodology.
process, it is necessary to examine people's perceptions, feelings and knowledge in real life situations. For this study of Vancouver's transportation planning system, the principal sources of evidence were document content review, semi-structured interviews, and unstructured interviews.

Data collection took place in three stages (as indicated in Figure 3.2).

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8 Patton (1990, 24) explains that the purpose of qualitative research methodology is to equip the researcher with tools which "provide a framework within which people can respond in a way that represents accurately and thoroughly their points of view about the world."
During the initial stage of data collection, an overview of available information was undertaken. Data collection at this stage had two purposes. The first purpose was to compile secondary data for analysis. To this end, budgetary information (changes in resources allocated to the automobile and to other modes of people transportation) and planning process information (methods of municipal government planning) were compiled. The second purpose of this information overview was to identify documents that could be sources of information for further detailed study. Question themes and specific questions were developed from this information and were used to develop an interview protocol (Patton 1990, 283).

The second stage of data collection involved detailed, in-depth, semi-structured interviews (Marshall & Rossman 1989, 82 & 94) with key informants (persons knowledgeable about Vancouver's transportation planning system) to determine their understanding of what are the variables and relationships in, and the political environment of, the system of institutional barriers to sustainability. The interviews were structured to facilitate interviewees providing a complete map of the system of barriers. These interviews also led to the identification of illustrative cases (discussed in Section 3.6.3) of unsustainable transportation planning.

The third stage of data collection encompassed detailed investigation of the illustrative cases. Secondary data collection was undertaken using document content review. In addition, primary data collection occurred in the form of in-depth unstructured interviews (Patton 1990, 281).

3.6.1 - Document Review

Each data collection activity was a purposeful attempt to discover methods used to
resist change towards sustainability. Information obtained during the second and third stages of data collection are discussed in Chapter Five (Case Study Findings).

3.6.2 - Semi-Structured Interviews

In-depth, semi-structured interviews were used to collect primary data from key people involved in Vancouver's transportation planning process. The interview design allowed for open-ended answers. Probes were used to stimulate discussion only when required (see Appendix G for an examples of probes used). The formal portion of each interview lasted from one to two hours and was audio-taped. Most participants continued the discussion after the formal (tape recorded) portion of the interview ended. Field notes were compiled during these discussions. This informal discussion lasted from ten minutes to two-and-one-half hours.

The interviews were structured around the following questions:

**Question One**

The term "sustainable development" is being used more frequently to describe a new way of planning and developing our communities. From your perspective, what does this term mean?

**Question Two**

Based on the present planning system, what will the transportation system for the movement of people in the City of Vancouver look like in the next 25 years?

**Question Three**

What do you think of these trends? (If required, Probe - Do you think this should happen?)

**Question Four**

What forces are in place which are promoting the shift from automobiles to other modes of people transportation? (Probe for examples)

**Question Five**

What forces are in place which are hindering the shift from automobiles to other modes of people transportation? (Probe for examples)
**Question Six**  
Why are these hindering forces in place which are slowing the shift from automobile to other modes of people transportation?

**Question Seven**  
How can these hindering forces be overcome?

**Question Eight**  
What is the planner’s role in overcoming these hindering forces?

**Question Nine**  
In citizen surveys, Vancouver residents call for a cleaner environment and more transit, but they still desire high levels of mobility. Eighty percent of air-born pollution is caused by the automobile. Do people see this connection between increasing auto usage and increasing pollution levels?

**Question Ten**  
How can we overcome this dilemma between the desire for a cleaner environment and the desire to drive automobiles?

Interview Question One solicited responses which addressed the first subsidiary research question. Interview Questions Two and Three acted as bridging questions between the first and second subsidiary research questions. The questions provided the respondents with an opportunity to think about the future structure of the transportation system and about the elements of the process which are necessary for change in accordance with their goals for future transportation delivery in Vancouver.

Interview Questions Five, Six, and Seven solicited responses which addressed the third subsidiary research question. Finally, interview Question Eight solicited responses which addressed the fourth subsidiary research question.

The information obtained from interview questions four, nine and ten was not analyzed in this study because it was decided that the questions, and the interview responses, did not provide relevant information to answer the research questions.
The dominant feature of each interview session was the recording of the perceptions, feelings, and knowledge of participants (Patton 1990, 10) involved in planning transportation policies and policy implementation. Appendices F and G contain the Letter of Initial Contact used during the introductory portion of the interviews and a complete Interview Protocol.

The in-depth interviews, using the key informants data collection technique (also called, by some, elite interviewing) (Marshall & Rossman 1989, 94), were particularly suited to the collection of primary data for this research program. People are elevated to the level of elite within organizations and communities primarily through becoming influential and well-informed. Elites usually rise to their position of prominence through a knowledge of an organization’s or a community’s policies, past history, and future plans.9

Maximum variation sampling (Patton 1990, 169) was used to ensure that the greatest number of perspectives would be represented in the study.10 Individuals involved in transportation planning and implementation included municipal politicians, community activists, and provincial, regional and municipal government officials.

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9 According to Marshall and Rossman (1989, 94-95), "Elites respond well to inquiries related to broad areas of content and to a high proportion of intellectually provocative, open-ended questions that allow them the freedom to use their knowledge and imagination," and "Elites often contribute insight and meaning to the interview process because they are intelligent and quick-thinking people, at home in the realm of ideas, policies and generalizations."

10 Patton notes that the strength of qualitative research "lies in selecting information-rich cases for study in depth. Information-rich cases are those from which one can learn a great deal about issues of central importance to the purpose of the research" (1990, 169). Rather than random sampling, the researcher purposefully seeks out events, activities, processes, and people who can provide information-rich descriptions which answer, or at least assist in expanding the understanding of, the questions under study.
The selection of municipal politicians was limited to those who have taken political positions calling for a reduction in the reliance on automobile usage in the City of Vancouver. Community activists were represented by individuals who were confronting, or had experience in confronting, the process of transportation planning in the city.

At the provincial level, officials were identified from the planning and policy arms of the Ministry of Transportation and Highways -- currently, segments of this ministry are under the new Ministry of Employment and Investment -- and BC Transit. At the regional level, officials were selected from the Greater Vancouver Regional District (GVRD). Finally, at the municipal level, officials from the Planning and the Engineering Departments and officials involved in attempting to implement components of the Clouds of Change report were identified. The following selection criteria were used to identify research participants:

1) Knowledge of, and involvement in, the planning and/or implementation of transportation infrastructure for the movement of people in the City of Vancouver.

2) Either extensive experience or relatively recent experience in the activity mentioned in 1) above. The desire to interview relative newcomers, as well as experienced people, was based on the presumption that these individuals would not be tainted by the idea that certain things could not be achieved or changed. They were individuals who may not have been indoctrinated into all the values, beliefs, norms, and assumptions of the transportation planning process and/or of their prospective organizations.

The importance of this dimension of participant selection was highlighted when the researcher met one participant (with many years of municipal experience) at the elevator immediately after the interview. The person asked me about my thoughts and initial impressions of the interviews. I commented on particular information which was not discussed during the formal (tape-recorded) portion of the interview, but was openly discussed once the tape-recorder was turned off. Eleven of the eighteen individuals interviewed discussed the poor working relationship between the City of Vancouver engineering and planning departments. This person commented that this was such an accepted part of the city culture that they didn’t even think to include it as a hindering factor.
The characteristics of interview participants are described in more detail in Chapter Five, Section 5.2.

A significant observation during the selection procedure was the openness of personnel from most government agencies, and from local politicians and community activists, towards being interviewed. In many cases, the researcher was referred up the organizational ladder to more senior people who would be most qualified to answer the questions. This was not the case with the City of Vancouver Engineering Department. Phone calls to key departmental staff were returned by subordinates. The researcher was screened out from interviewing the key decision-makers in the department and interviewed middle, rather than senior, managers. Therefore, the interview participants are not representative of all components of decision-makers involved in planning and implementing the transportation system in Vancouver.

In qualitative research the major criterion for the determination of sample size is the need to avoid redundancy. A state of redundancy was reached after 18 interviews with six community activists and politicians and twelve provincial, regional, and municipal government officials. At that point 492 pages of interview transcripts had been compiled.

3.6.3 - Illustrative Cases

Many examples of resistance to change towards a transportation system which supports

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12 Lincoln and Guba (1985, 202) explain that qualitative inquiry is "based on informational, not statistical, considerations. Its purpose is to maximize information, not facilitate generalization. Its procedures are strikingly different, too, and depend on the particular ebb and flow of information as the study is carried out rather than a priori considerations. Finally, the criterion invoked to determine when to stop sampling is informational redundancy, not a statistical confidence level."
concepts of sustainability were identified during the interviews. Three of these, the city's investment patterns in alternative (non-automobile) modes of transportation, an informal transportation plan for the city, and the planning process encompassing the redevelopment of the Lion's Gate Bridge crossing were considered as rich areas for further exploration. These illustrative cases were examined more closely to identify mechanisms and techniques used to impede change towards sustainability.

For these illustrative cases, the units of analysis were the process of decision-making by the City of Vancouver Engineering Department in the areas of municipal capital and operational investments (refer to Chapter Five, Section 5.3.1 -- Transportation Investment Priorities), the process to widen selected city streets into an urban arterial highway system (refer to Chapter Five, Section 5.3.2 -- Informal Transportation Plan), and the process to solicit public input for the expansion of a major segment of this urban arterial highway system (refer to Chapter Five, Section 5.3.3 -- Lion's Gate Bridge).

The operating (1986, 1992, 1993) and capital (1986 to 1993) budgets and the 1994-96 capital plan were reviewed to determine how Vancouver's new transportation priorities were being implemented. Kenneth Bayne, Comptroller for the City of Vancouver provided the following information for this segment of the research: Statement of Revenues, Expenditures, and Encumbrances for the years 1993, 1992, and 1986; Basic and Supplementary Capital Budgets for each year beginning in 1986 and ending in 1993; and the Capital Plan: 1994 to 1996 (June 1993).

A number of participants expressed frustration over the existence of an informal transportation plan which they said the city's Engineering Department was apparently using
to create an interconnected urban freeway system on the streets of Vancouver. Document content analysis and unstructured telephone and face-to-face interviews were used to determine whether this plan actually exists and continues to be used. Provincial legislation (the Freedom of Information and Protection of Privacy Act) (Ministry of Government Services 1994a) was also used to obtain information which the City of Vancouver Engineering Department would not otherwise release to the researcher.

The desire by the provincial Ministry of Transportation and Highways and the city Engineering Department to redevelop the First Narrows highway crossing (Lion's Gate Bridge) was a concern with a number of interview participants who suspected that the Ministry and the city were controlling public debate. Document content analysis and unstructured telephone interviews were used to identify and analyze this planning process.

3.7 - Data Analysis Methodological Design

Methods used to analyze the raw data obtained from the semi-structured interviews replicated the following process: organization, data reduction (coding and development of preliminary categories), \(^{13}\) description (formulation of final categories and themes), interpretation, reporting of findings, and extrapolation of findings to other sites and situations (Patton 1990, 371-459). A computer program, Textbase Alpha (Tesch 1989), was used to electronically code and display data.

Care was exercised during the analysis phase not to attach frequencies to research data

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\(^{13}\) Interview results were first inductively categorized. Further categorization and interpretation drew on concepts from system-oriented organizational change literature and a specially created system-based model of planning process (refer to Figure 3.1).
This exploratory research focused on individual responses rather than attempting to elevate the importance of one idea above another through the use of frequencies (Lincoln & Guba 1985, 202).

The analysis of budgets and the capital plan encompassed the selective reorganization of past expenditures and future allocations within categories which reflect both investments in the automobile transportation system and investments in alternative transportation systems (bicycle, pedestrian, and transit).

The exploration of the City of Vancouver's informal transportation plan and the Lion's Gate Bridge planning process involved the selection and analysis of information which would clearly describe the investigative process.

3.8 - Validity and Reliability

All research designs contain methodological strengths and weaknesses. Qualitative methodology weaknesses were reduced during the conceptualization, data collection and analysis, and writing components of the research inquiry through an appropriate selection of methodological options. Table 3.1, adapted from Yin (1989, 41), summarizes methods used to improve validity and reliability. External validity is currently being tested through the replication of this study in Prince George, British Columbia.

In case study inquiry, the researcher becomes the data collection instrument. For this study, the researcher's interviewing skills (from his Masters program and practical

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14 According to Patton (1990, 11), the validity and reliability of the research inquiry is dependent upon the methodological skill, sensitivity, and integrity of the researcher.
community planning experience) were augmented by reviewing the following books on the subject: The Research Interview (Brenner, Brown & Canter 1985), Qualitative Evaluation and Research Methods (Patton 1990), and Basic Interviewing Skills (Gorden 1992). The validity and reliability of interview results were enhanced by pretesting the interview protocol.

TABLE 3.1
Methods to Improve Validity and Reliability

<table>
<thead>
<tr>
<th>Tests</th>
<th>Case Study Tactic</th>
<th>Phase of Research in which Tactic Occurs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Construct Validity</td>
<td>Logical thinking in conceptualization</td>
<td>Conceptualization</td>
</tr>
<tr>
<td></td>
<td>Multiple sources of evidence</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Chain of evidence (audit trail)</td>
<td></td>
</tr>
<tr>
<td>Internal Validity</td>
<td>Pattern matching</td>
<td>Data analysis</td>
</tr>
<tr>
<td></td>
<td>Explanation building</td>
<td></td>
</tr>
<tr>
<td>External Validity</td>
<td>Replication</td>
<td>Conceptualization</td>
</tr>
<tr>
<td>Reliability</td>
<td>Case study protocol</td>
<td>Data collection</td>
</tr>
<tr>
<td></td>
<td>Case study database</td>
<td></td>
</tr>
</tbody>
</table>

Researcher biases and methodological errors were reduced by using multiple sources of evidence (Yin 1989, 95), including documents from various sources, unstructured interviews during stage one and stage three of data collection, and semi-structured interviews during the second stage of data collection. A case study database was maintained to insure the existence of an audit trail.
CHAPTER FOUR - CASE STUDY CHARACTERISTICS

4.1 Introduction

The particular characteristics of the Vancouver case are described to provide the reader with a context with which to determine the applicability of the research conclusions to other cities. The following case study characteristics are described in this chapter: geography, economy and population; ecological degradation and environmental attitudes; organization of the transportation system for the movement of people; and financial investments in the regional transportation system.

4.2 Geography, Economy and Population

The Vancouver CMA (Census Metropolitan Area) is the principal service centre (refer to Figure 4.1) for the province of British Columbia and the primary port of trade for western Canada. Forestry, tourism, and mining are the major economic activities of the province. Port facilities handle container cargo, grain, potash, sulphur, asbestos, metals and other materials. The city is also a centre for health care, education, business and consulting services, retail trade, and wholesale distribution. The majority of provincially-based organizations locate their head offices in the city.

A fundamental change is taking place in the structure of Vancouver's economy. As Hutton notes (1994, 1), the economy is experiencing tertiарisation or service-led economic restructuring. Primary and secondary occupations are declining in importance and service-oriented employment, particularly in the professional and knowledge-based sectors, is rapidly
increasing in importance. The city has not experienced the negative socio-economic repercussions of deindustrialization which has plagued other urban regions in North America and Europe.

**FIGURE 4.1**  
Administrative Boundaries in the Vancouver Region


In the past decade, increasing trade and cultural ties with Pacific Rim nations have resulted in strong population and economic growth and a significant expansion of the urban built
environment. Table 4.1 summarizes information describing population growth for the period 1961 to 1991 for the City of Vancouver and the Census Metropolitan Area. A population forecast to the year 2021 is also provided.

Table 4.1
Population Trends in the Vancouver Census Metropolitan Area
1961 to 1991 with Forecast to 2021
(in 000s)

<table>
<thead>
<tr>
<th>Year</th>
<th>City of Vancouver</th>
<th>Region (CMA)</th>
<th>City of Vancouver as a % of Region</th>
</tr>
</thead>
<tbody>
<tr>
<td>Forecast 2021</td>
<td>567.4</td>
<td>2,905.5</td>
<td>19.53</td>
</tr>
<tr>
<td>1991</td>
<td>459.3</td>
<td>1,715.3</td>
<td>26.78</td>
</tr>
<tr>
<td>1986</td>
<td>434.8</td>
<td>1,380.7</td>
<td>31.49</td>
</tr>
<tr>
<td>1981</td>
<td>418.0</td>
<td>1,268.2</td>
<td>37.69</td>
</tr>
<tr>
<td>1976</td>
<td>413.7</td>
<td>1,166.3</td>
<td>35.47</td>
</tr>
<tr>
<td>1971</td>
<td>429.8</td>
<td>1,082.2</td>
<td>39.72</td>
</tr>
<tr>
<td>1966</td>
<td>413.4</td>
<td>932.7</td>
<td>44.32</td>
</tr>
<tr>
<td>1961</td>
<td>387.8</td>
<td>824.1</td>
<td>47.06</td>
</tr>
</tbody>
</table>


The City of Vancouver has increased in population from a level of 387,800 residents in 1961 to a level of 459,300 residents in 1991. Forecasts compiled by the Development Services Department of the Greater Vancouver Regional District (GVRD) suggest a population level of 567,400 persons by the year 2021. These actual and anticipated new 179,600 residents of Vancouver (from 1961 to 2021) represent an increase in population of 46.3% over the 60 year period or an increase of less than 1% (0.84%) per year.
The Census Metropolitan Area grew from a level of 824,100 persons in 1961 to a level of 1,715,300 persons in 1991. Forecasts to the year 2021 are that the population will continue to expand to a level of 2,905,500. Over the 60 year period, from 1961 to 2021, the population is forecasted to have increased by over two million residents. This level of growth represents an increase in population of 253% (1961 to 2021) or growth of over 4.2% per year during the time period. From 1991 to the year 2021, the CMA population is projected to increase by approximately 70% for the period, or 2.3% per year.

Unless there is a change in the modal split, a City of Vancouver report claims that an increase in river crossings from 47 bridge-lanes to more than 80 bridge-lanes will be required by the year 2021 (City of Vancouver 1994b, 3) to accommodate the projected increase in population.

4.3 Ecological Degradation and Environmental Attitudes

Accompanying the recent economic restructuring and rapid population growth of Vancouver are problems of ecological degradation. Approximately 80 percent of air pollution in the greater Vancouver region comes from the automobile (City of Vancouver 1990, 17). Therefore, to improve air quality, technological solutions must be found to reduce automobile-derived air pollution, or social solutions must be found to reduce the volume of automobiles using the transportation system. Although air pollution may be resolved through technological innovation, the problems of noise and congestion may only be resolved through the reduction of the volume of automobiles using the transportation system.

Table 4.2 displays information on the use of different modes of urban transportation in
selected cities across Canada. In addition, commuting times are provided. The use of the automobile ranges from a low of 60% of commuter trips in Ottawa-Hull, to a high of 73% of commuter trips registered in Winnipeg. Vancouverites use the auto for 72% of their commuter trips.\footnote{Internationally, Table 2.6 in Chapter Two, Section 2.3.1 shows private car use lowest in Tokyo and Hong Kong with 16% and 3%, respectively, of urban trips taking place in the automobile. The highest use of automobiles in urban transportation is in Phoenix, Arizona where the car is used for 93% of all urban movements.}

Internationally, Table 2.6 in Chapter Two, Section 2.3.1 shows private car use lowest in Tokyo and Hong Kong with 16% and 3%, respectively, of urban trips taking place in the automobile. The highest use of automobiles in urban transportation is in Phoenix, Arizona where the car is used for 93% of all urban movements.

<table>
<thead>
<tr>
<th>City</th>
<th>Car Only (%)</th>
<th>Public Transit, all or Part Way (%)</th>
<th>Average Daily Commute (Minutes)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Montreal</td>
<td>63</td>
<td>18</td>
<td>54</td>
</tr>
<tr>
<td>Ottawa-Hull</td>
<td>60</td>
<td>16</td>
<td>51</td>
</tr>
<tr>
<td>Toronto</td>
<td>61</td>
<td>20</td>
<td>59</td>
</tr>
<tr>
<td>Winnipeg</td>
<td>73</td>
<td>15</td>
<td>51</td>
</tr>
<tr>
<td>Calgary</td>
<td>72</td>
<td>12</td>
<td>45</td>
</tr>
<tr>
<td>Vancouver</td>
<td>72</td>
<td>12</td>
<td>60</td>
</tr>
</tbody>
</table>


The use of public transit in Vancouver is the lowest (12%) of that in the Canadian cities illustrated in Table 4.2 and well below cities such as Stockholm (46%), Vienna (45%), Tokyo

\footnote{Within this dissertation document, data on transportation modal splits are explicitly either for the City of Vancouver or for the region of Vancouver. This is due to the use of difference modal split definitions, different time periods, and different data collection techniques.}
(59%), and Hong Kong (62%). Vancouver also registers the longest average daily commute time of 60 minutes when compared to other Canadian cities.

Vancouver’s transportation system, although not as inferior as those of some cities in the United States, compares very poorly to those of cities in Europe and Asia. Part of this inferiority may be explained by the attitudes of Vancouver residents towards the natural environment and the use of their automobiles. Although Vancouver residents value clean air, they are reluctant to give up their unregulated use of the automobile. Table 4.3 summarizes attitudinal information compiled from questions contained in the Greater Vancouver Urban Futures Opinion Survey 1990 (Hardwick et al. 1990).

### Table 4.3
**Attitudes of Greater Vancouver Residents Towards Selected Environmental and Transportation Issues**

<table>
<thead>
<tr>
<th>Summary of Question Content</th>
<th>%</th>
<th>Category of Respondent stating ...</th>
</tr>
</thead>
<tbody>
<tr>
<td>* Concern by residents related to air pollution from autos.</td>
<td>82.9</td>
<td>Very or Critically Important</td>
</tr>
<tr>
<td>* Pollution from autos should be reduced by increasing fees, tolls or taxes.</td>
<td>33.7</td>
<td>Agree or Strongly Agree</td>
</tr>
<tr>
<td>* Rush hour commuters should pay for using urban facilities (infrastructure) at peak times.</td>
<td>26.1</td>
<td>Agree or Strongly Agree</td>
</tr>
</tbody>
</table>


Although over 80 percent of the survey respondents felt that air pollution from automobiles was a very important or a critically important issue, only one-third (33.7%) agreed or strongly agreed that direct taxation for the use of the automobile should be used to reduce air
pollution. Even fewer people (26.1%) felt that automobile commuters should pay for using urban facilities (infrastructure) during peak rush hour periods.

This contradiction between automobile use and the perceived desire to improve environmental quality is replicated in the most recent transportation plan developed by the region and the province, (A Long-Range Transportation Plan for Greater Vancouver). The authors state that this long-range transportation plan is "based on the GVRD's Creating Our Future action plan..." (GVRD & Province of BC 1993a, 1). The authors of Creating Our Future (GVRD 1990, 1) describe a visionary goal of planning progress:

"Greater Vancouver can become the first urban region in the world to combine in one place the things to which humanity aspires on a global basis: a place where human activities enhance rather than degrade the natural environment, where the quality of the built environment approaches that of the natural setting, where the diversity of origins and religions is a source of social strength rather than strife, where people control the destiny of their community, and where the basics of food, clothing, shelter, security and useful activity are accessible to all."

The authors of the Long-Range Transportation Plan for Greater Vancouver (also known as Transport 2021) (GVRD & Province of BC 1993a, 43) provide another future picture of the Greater Vancouver region:

"Vehicles in the BC Lower Mainland will themselves not achieve the CO₂ target for all sources combined; their CO₂ emissions will likely rise 10% in the 1990s and climb thereafter: a 15% to 20% increase between 1991 and 2021 is projected under this plan, compared with 25% to 30% under trend conditions."

The authors of this last statement acknowledge that the Transport 2021 plan will not yield the visionary city of Creating Our Future. Instead, they accept the continued domination of the automobile in the Vancouver region and that pollution, in the form of CO₂ emissions, will be significantly worse in thirty years time than pollution levels now.
4.4 Organization of the Transportation System for the Movement of People

The Vancouver intra-regional transportation system for the movement of people comprises a freeway and road network; a public transit system, which includes buses, a light rail line (SkyTrain), and ferries; pedestrian sidewalks and pathways; and the beginnings of a bicycle network.

The current approach to planning and implementing the people mobility system is through a complex structure which encompasses the federal, provincial, regional, and municipal governments and the private sector. Figure 4.2 illustrates the structure and agency interrelationships of this planning and implementation system.

The federal government, through crown corporations and departments, plays a role in the transportation system, providing funding and policy direction for projects which have national significance or which impact on the movement of people over water or in the air. In Vancouver, this role encompasses the funding of projects such as the Arthur Lang Bridge, which provides access to Vancouver International Airport, and of roads which provide access to and within port facilities.

The provincial government is responsible for the planning, policy development, and cost-sharing components of the transportation system which may have provincial or regional significance. This is a powerful role due to the taxation and redistribution abilities of the province. The provincial government is heavily involved in the region's transportation system, providing subsidies for roads and subsidies to BC Transit for buses, ferries (SeaBus) and the "advanced light-rail" (SkyTrain) public transit system.
The next level of government, the Greater Vancouver Regional District (GVRD) provides planning services to the region through the Creating Our Future planning process and through regional strategic plans, function plans, and corporate plans. A Long-Range Transportation Plan

for Greater Vancouver (GVRD & Province of BC 1993a) is an example of a regional strategic plan.

At the lowest level of government, the municipalities shape the transportation system through the use of official community plans, zoning and development control regulations, capital and operating budgets, and economic development programs.

The private sector is involved in transportation planning creating a demand for infrastructure through monetary investments in land development project.

The pressures of community and special interest groups and the actions of individuals also shape the transportation system in the Vancouver region.

Historically, responsibility for transportation planning has shifted among the various levels of government in British Columbia. Transportation planning at a regional level began over forty years ago with the establishment of the Lower Mainland Planning Board. In the late sixties, the region was subdivided into four regional districts, but in 1983 the province withdrew the formal planning mandate from regional responsibility.

Since 1983, the GVRD and the municipalities within its boundaries have attempted to plan and implement a transportation system using a consensus-based model of decision-making. During this time period, the provincial government has made major transportation infrastructure investments outside of this consensus-based decision-making model. For example, SkyTrain was constructed as a showcase of transportation technology for Expo 86; the province sought minimal regional or municipal input before beginning construction on this project.

In the City of Vancouver, the major transportation planning function is contained within the Engineering Department. The Planning Department gives minor input into the process. Both
departmental directors report directly to the City Manager's Office. In August 1993 the Engineering Department had a staff of 1663 employees (the city maintains a large construction workforce and ancillary support services), while the Planning Department had a staff of 140 employees (City of Vancouver 1993e). In August 1993, the City of Vancouver had approximately 7,200 full-time staff members.

The Engineering Department is responsible for planning, designing, constructing, and managing the city's transportation system (City of Vancouver 1993e, 5). This system includes streets and lanes, curb-side parking, sidewalks and pathways, street and traffic lights, bridges and structures (in conjunction with other levels of government), and transit infrastructure (in conjunction with BC Transit).

The Planning Department's minor role in transportation planning is limited to advising City Council on community views through the Local Area Planning process and negotiating with the Engineering Department when major building proposals impact on the existing transportation network.

Development in the city is not guided by an official community plan. An attempt was made in the 1920s (Bartholomew 1928) to develop a community plan, but the city did not officially approve this early plan. Subsequent attempts to implement an Official Vancouver Plan have failed. The city does have a plan for the downtown business district and environs, the Central Area Plan, which was approved by Vancouver City Council in 1991. An extensive participatory planning process, called CityPlan (City of Vancouver 1992b), is presently underway in Vancouver. One of the goals of this planning process is to bring the transportation and land-use functions of city planning closer together within an official community plan.
Planning efforts at a regional level also reflect, to some degree, the ideas and aspirations of residents and officials of the City of Vancouver. In the late 1960s, the original Lower Mainland Planning Board was replaced by four regional districts: Greater Vancouver, Central Fraser Valley, Dewdney-Alouette, and Fraser-Cheam (refer to Figure 4.3).

**FIGURE 4.3**  
Lower Mainland Regional Districts


A major planning effort in the early 1970s culminated in the Livable Region plan (GVRD 1975) which was adopted by area municipalities in 1975. The fundamental goal of this early plan was the management of urban growth. The basic principles proposed to achieve growth management included the designation of regional town centres outside of the existing "regional core" (downtown Vancouver), the establishment of protected urban fringe greenbelts, the
The Livable Region plan was updated in 1990 with the adoption of Creating Our Future (GVRD 1990). The new plan focused on environmental protection, job creation, and the original goal of growth management. New plan principles included 1) maintaining a healthy environment, 2) conserving land resources, 3) servicing a changing population, and 4) maintaining the region's economic health.

One of the major impediments to implementing the Livable Region plan (and the subsequent Creating Our Future plan) was the removal of statutory powers for regional planning in 1983. Since that time, the GVRD has relied on a consensus-based decision-making model for the implementation of regional planning strategies and the difficulty in securing consensus among a large and diverse group of municipalities has resulted in minimal achievements in managing urban growth. The GVRD (1991), and other organizations and individuals, have questioned the jurisdictional, environmental, social, and economic adequacy of the present consensus-based decision-making model. As a result of this poor record in growth management, the government of British Columbia intends to return statutory regional planning powers to the GVRD in 1995 (Hutton 1994, 23).

4.5 Financial Investments in the Regional Transportation System

On a typical day, the people of Greater Vancouver journey 3.5 million times (83% of total trips) by private automobile, 0.33 million times (9% of total trips) by public transit, and 0.29 million times (8% of total trips) by foot or bicycle (GVRD & Province of BC 1993a, 5).
Substantial investments have been made in the regional transportation system over the past decade. Tables 4.4 and 4.5 summarize financial information which illustrate capital investments and maintenance and operations expenditures for the road system and the BC Transit system.

Table 4.4
Capital Expenditure for Transportation Infrastructure in Greater Vancouver 1983-1992*
(in millions of constant 1992 dollars)

<table>
<thead>
<tr>
<th>Year</th>
<th>Municipal Road</th>
<th>Provincial Road</th>
<th>Sub-Total Mun. &amp; Prov. Road</th>
<th>BC Transit</th>
<th>Transit as % of Road</th>
</tr>
</thead>
<tbody>
<tr>
<td>1992</td>
<td>87.1</td>
<td>133.3</td>
<td>220.40</td>
<td>136.4</td>
<td>61.89</td>
</tr>
<tr>
<td>1991</td>
<td>103.6</td>
<td>123.6</td>
<td>227.20</td>
<td>84.9</td>
<td>37.37</td>
</tr>
<tr>
<td>1990</td>
<td>77.4</td>
<td>92.6</td>
<td>170.00</td>
<td>51.2</td>
<td>30.12</td>
</tr>
<tr>
<td>1989</td>
<td>73.9</td>
<td>45.0</td>
<td>118.90</td>
<td>44.2</td>
<td>37.17</td>
</tr>
<tr>
<td>1988</td>
<td>66.9</td>
<td>66.3</td>
<td>133.20</td>
<td>84.0</td>
<td>63.06</td>
</tr>
<tr>
<td>1987</td>
<td>75.2</td>
<td>119.8</td>
<td>195.00</td>
<td>47.5</td>
<td>24.36</td>
</tr>
<tr>
<td>1986</td>
<td>94.7</td>
<td>124.2</td>
<td>218.90</td>
<td>243.0</td>
<td>111.01</td>
</tr>
<tr>
<td>1985</td>
<td>100.2</td>
<td>160.6</td>
<td>260.80</td>
<td>364.5</td>
<td>139.76</td>
</tr>
<tr>
<td>1984</td>
<td>87.7</td>
<td>91.5</td>
<td>179.20</td>
<td>269.8</td>
<td>150.56</td>
</tr>
<tr>
<td>1983</td>
<td>87.7</td>
<td>40.7</td>
<td>128.40</td>
<td>157.1</td>
<td>122.35</td>
</tr>
<tr>
<td>Total</td>
<td>854.40</td>
<td>997.60</td>
<td>1,852.00</td>
<td>1,482.60</td>
<td>80.05</td>
</tr>
</tbody>
</table>

* Figures for the construction of municipal and provincial roads do not include administrative costs while transit figures do include these costs.

Source: Adapted from GVRD, and Province of British Columbia. 1993b. Historical Public Transportation Expenditures in the BC Lower Mainland.

Tables 4.4 and 4.5 were adapted from the report entitled Historical Public Transportation Expenditures in the BC Lower Mainland (GVRD & Province of BC 1993b). The figures in the
columns titled "Municipal Road" and "Provincial Road" include a portion of the cost of the public transit system, as the road system is also used by public transit buses. The figures in the column titled "BC Transit" include a portion of the cost of the road transportation system, as the major transit capital investments (82% of all transit capital expenditures) were for SkyTrain in the 1980s (1984-1986). The dominant purpose of SkyTrain (rather than buses or light rail transit along existing road right-of-ways) is to create a grade separation between public transit and the automobile, thus reducing automobile traffic congestion.

Table 4.5
Maintenance and Operations Expenditure for Transportation Infrastructure in Greater Vancouver, 1983-1992*
(in millions of constant 1992 dollars)

<table>
<thead>
<tr>
<th>Year</th>
<th>Municipal Road</th>
<th>Provincial Road</th>
<th>Sub-Total Mun. &amp; Prov. Road</th>
<th>BC Transit</th>
<th>Transit as % of Road</th>
</tr>
</thead>
<tbody>
<tr>
<td>1992</td>
<td>151.2</td>
<td>28.7</td>
<td>179.90</td>
<td>217.3</td>
<td>120.79</td>
</tr>
<tr>
<td>1991</td>
<td>175.0</td>
<td>25.7</td>
<td>200.70</td>
<td>198.8</td>
<td>99.05</td>
</tr>
<tr>
<td>1990</td>
<td>140.3</td>
<td>27.1</td>
<td>167.40</td>
<td>172.9</td>
<td>103.29</td>
</tr>
<tr>
<td>1989</td>
<td>135.6</td>
<td>25.9</td>
<td>161.50</td>
<td>162.4</td>
<td>100.56</td>
</tr>
<tr>
<td>1988</td>
<td>129.5</td>
<td>23.8</td>
<td>153.30</td>
<td>166.4</td>
<td>108.55</td>
</tr>
<tr>
<td>1987</td>
<td>109.8</td>
<td>21.8</td>
<td>131.60</td>
<td>173.7</td>
<td>131.99</td>
</tr>
<tr>
<td>1986</td>
<td>103.0</td>
<td>19.3</td>
<td>122.30</td>
<td>144.2</td>
<td>117.91</td>
</tr>
<tr>
<td>1985</td>
<td>90.7</td>
<td>18.9</td>
<td>109.60</td>
<td>123.4</td>
<td>112.59</td>
</tr>
<tr>
<td>1984</td>
<td>90.5</td>
<td>19.5</td>
<td>110.00</td>
<td>137.4</td>
<td>124.91</td>
</tr>
<tr>
<td>1983</td>
<td>95.8</td>
<td>19.9</td>
<td>115.70</td>
<td>137.2</td>
<td>118.58</td>
</tr>
<tr>
<td>Total</td>
<td>1,221.40</td>
<td>230.60</td>
<td>1,452.00</td>
<td>1,633.70</td>
<td>112.51</td>
</tr>
</tbody>
</table>
* Figures for the maintenance and operation of municipal and provincial roads do not include administrative costs, while transit figures do include these costs.

Source: Adapted from GVRD, and Province of British Columbia. 1993b. Historical Public Transportation Expenditures in the BC Lower Mainland.

The debt financing costs for BC Transit have been removed by the authors of the GVRD report. Roads are paid for through current municipal and provincial expenditures, therefore no adjustments were required to compensate for debt financing.

The tables were developed to provide a picture of the general level of investment in each mode of transportation. Between the years 1983 and 1992, the municipalities of the Greater Vancouver region and the provincial government made a capital investment of $1.85 billion dollars, and a maintenance and operating expenditure of $1.45 billion in road related infrastructure. During the same time period, the provincial government, through BC Transit, made a capital investment of $1.48 billion and a maintenance and operating expenditure of $1.63 billion in the regional public transit system. Annual levels of capital investments in road and transit infrastructure fluctuated substantially due to major construction projects.

While these investments were taking place, significant changes were underway in how people moved about the region. The number of automobile trips increased by 48% (measured during the peak morning period) and the number of transit trips increased by 25% from 1985 to 1992 (GVRD et al. 1994b, iv). Single occupant automobile and pedestrian mode shares increased while multiple occupant automobile, transit, and bicycle mode shares decreased.

Tables 4.6 and 4.7 summarize revenues and expenditures for the road and public transit systems from 1983 to 1992.
Table 4.6
Transportation Revenues and Expenditures In Greater Vancouver for Roads - 1983 to 1992
(in millions of constant dollars)

<table>
<thead>
<tr>
<th>Year</th>
<th>Revenue</th>
<th>Expenditure*</th>
<th>Surplus(Deficit)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1992</td>
<td>324.5</td>
<td>400.3</td>
<td>-75.80</td>
</tr>
<tr>
<td>1991</td>
<td>316.3</td>
<td>427.9</td>
<td>-111.60</td>
</tr>
<tr>
<td>1990</td>
<td>284.6</td>
<td>337.4</td>
<td>-52.80</td>
</tr>
<tr>
<td>1989</td>
<td>283.3</td>
<td>280.4</td>
<td>2.90</td>
</tr>
<tr>
<td>1988</td>
<td>265.5</td>
<td>286.5</td>
<td>-21.00</td>
</tr>
<tr>
<td>1987</td>
<td>234.6</td>
<td>326.6</td>
<td>-92.00</td>
</tr>
<tr>
<td>1986</td>
<td>255.8</td>
<td>341.2</td>
<td>-85.40</td>
</tr>
<tr>
<td>1985</td>
<td>251.7</td>
<td>370.4</td>
<td>-118.70</td>
</tr>
<tr>
<td>1984</td>
<td>191.8</td>
<td>289.2</td>
<td>-97.40</td>
</tr>
<tr>
<td>1983</td>
<td>220.1</td>
<td>244.1</td>
<td>-24.00</td>
</tr>
<tr>
<td>Total</td>
<td>2,628.20</td>
<td>3,304.00</td>
<td>-675.80</td>
</tr>
</tbody>
</table>

* These figures do not include administrative costs.

Source: Adapted from GVRD, and Province of British Columbia. 1993b. Historical Public Transportation Expenditures in the BC Lower Mainland.

Revenues in Table 4.6 came from a number of sources. Road revenues were obtained from vehicle licensing fees and from the fuel tax. Transit revenues are obtained from user fees, the Vancouver Regional Transit System fuel surtax, a non-resident property tax, and the BC Hydro levy. Expenditures incorporate both capital investments and operating and maintenance expenses.²

² Capital costs were included as annual expenses. It was assumed by the researcher that capital investments would continue at a high level for a number of years into the future and then begin
Between 1983 and 1993, the road transportation system achieved a small surplus in only one year (1989). The figures presented in Table 4.6 do not illustrate a movement towards self-financing. Indeed, the opposite is evident in an accumulated deficit of $675 million over the ten year period. In 1991 and 1992, deficits ran $111.6 million and $75.8 million respectively.

Table 4.7 demonstrates that the transit system was also not financially self-supporting over the ten year period; a deficit of $1.646 billion was accumulated. A significant portion of this deficit was accumulated through investments in the mid 1980s.

A number of conclusions evolve from this financial information. First, it is difficult to obtain information which defines capital investments and operating expenditures for various modes of transportation. When this information is available, its accuracy is questionable. For example, the financial figures for the construction and maintenance of municipal and provincial roads excludes administrative costs (operational costs of provincial ministries responsible for transportation), yet administrative costs for BC Transit are included in the historical transportation expenditures. This makes comparative analysis by mode of transportation difficult; the information presented in the tables of the report Historical Public Transportation Expenditures in the BC Lower Mainland (GVRD & Province of BC 1993b) are misleading and misrepresentative of the costs of both roads and the public transit system.

to decline as the transportation system became fully developed. As capital investments decline, the transportation infrastructure will continue to age, resulting in increasing maintenance and operating costs. Declining capital investment will therefore be balanced by increasing maintenance and operating costs.
Table 4.7
Transportation Revenues and Expenditures In Greater Vancouver for BC Transit - 1983 to 1992
(in millions of constant dollars)

<table>
<thead>
<tr>
<th>Year</th>
<th>Revenue</th>
<th>Expenditure*</th>
<th>Surplus (Deficit)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1992</td>
<td>208.1</td>
<td>353.7</td>
<td>-145.60</td>
</tr>
<tr>
<td>1991</td>
<td>197.9</td>
<td>283.7</td>
<td>-85.80</td>
</tr>
<tr>
<td>1990</td>
<td>188.1</td>
<td>224.1</td>
<td>-36.00</td>
</tr>
<tr>
<td>1989</td>
<td>189.1</td>
<td>206.6</td>
<td>-17.50</td>
</tr>
<tr>
<td>1988</td>
<td>172.5</td>
<td>250.4</td>
<td>-77.90</td>
</tr>
<tr>
<td>1987</td>
<td>186.2</td>
<td>221.2</td>
<td>-35.00</td>
</tr>
<tr>
<td>1986</td>
<td>119.9</td>
<td>387.2</td>
<td>-267.30</td>
</tr>
<tr>
<td>1985</td>
<td>84.5</td>
<td>487.9</td>
<td>-403.40</td>
</tr>
<tr>
<td>1984</td>
<td>64.7</td>
<td>407.2</td>
<td>-342.50</td>
</tr>
<tr>
<td>1983</td>
<td>58.4</td>
<td>294.3</td>
<td>-235.90</td>
</tr>
<tr>
<td>Total</td>
<td>1,469.40</td>
<td>3,116.30</td>
<td>-1,646.90</td>
</tr>
</tbody>
</table>

* These figures include administrative costs.

Source: Adapted from Greater Vancouver Regional District, and Province of British Columbia. 1993b. Historical Public Transportation Expenditures in the BC Lower Mainland.

A major capital cost in the construction of SkyTrain was the creation of grade separations between the road system and the public light-rail transit system. Arguably, the elimination of level crossings benefits the road system as much, or more, than it benefits the light-rail transit system. Yet, all the costs for grade separation are allocated to the public transit system. With 82% of transit capital expenditure invested in the SkyTrain system (over the period 1983 to 1992), this represents a massive misrepresentation of public transit costs and a massive subsidy.
to the automobile. This inequality is compounded when the public transit system must pay for capital costs through debt financing, while the road system is funded through current municipal and provincial expenditures.

The current transportation system has created procedures which routinely misallocate massive expenditures to the public transit system when these expenditures should be allocated to the road system. Once misallocated, the transportation system requires public transit to debt finance this massive road subsidy, adding substantially to the costs of operating the public transit system.
CHAPTER FIVE - CASE STUDY FINDINGS

5.1 Introduction

The purpose of this chapter is to present the case study findings. The findings are divided into two major sections. The first section uses qualitative methods to present and analyze primary data obtained from key informants involved in the transportation planning system. During the interviews, recurring comments implied that certain activities or processes are present within Vancouver's transportation planning system which are major impediments to change towards community sustainability. These impediments are further investigated in the second section of this chapter which presents the results of a number of illustrative cases.

The first illustrative case involves a detailed quantitative analysis of the city's operating and capital budgets. This study was undertaken to determine what the city's transportation priorities actually are. The second illustrative case utilizes qualitative investigation techniques to explore interview participants' claims that an informal transportation plan exists for the city. The final illustrative case study further examines participant comments that government initiatives surrounding new transportation options restrict debate, are manipulative, and lack policy coordination. As noted in the review of literature and methodology chapters, budgets, informal plans, and the ability (or inability) to coordinate and integrate policy represents three of a number of resources and techniques which are used either to maintain the status quo or to create change, and they represent the power plans and processes of an organization (refer to Chapter Two, Section 2.5.7).
Each section of the case study results evolved from a research analysis process based on the following steps: data organization, reduction, description, and interpretation. The sections are presented in a format which logically results from this research analysis process: representative participant comments are presented and then these comments are discussed and interpreted. Refer to Chapter Three, Section 3.7 for a more detailed description of this research analysis process.

5.2 In-depth Interviews with Key Informants

To gain a more comprehensive understanding of the institutional barriers impeding change towards sustainability, in-depth, semi-structured interviews were conducted with eighteen key people involved in planning and implementing the transportation system responsible for moving people about the Vancouver region. The interviews took place over a four-month period beginning in January 1994 and ending in April 1994. They lasted from one to two hours with informal discussion continuing for anywhere from ten minutes to two and one half hours after the formal (audio-taped) portion of the interviews. This additional discussion demonstrated the high level of interest interviewees held for the topic.

A total of 492 pages of transcripts were compiled from the eighteen interviews. A preliminary coding manual was generated inductively after an initial review of four transcripts. The coding manual was subsequently tested and modified twice. The final coding manual (refer to Appendix H) was used to categorize and reduce the raw data to 174 pages of coded quotes. Data organization and reduction continued with the
redefinition of categories based on patterns identified in the data. The final organization of the research data evolved deductively from the review of literature and research questions and inductively from raw data. The complexity of institutional barriers is attested to by the 72 pages needed to describe the research findings.

A critical consideration in the development of categories was the maintenance of the integrity of the raw data. The researcher constantly strove to select quotes which represented the views and ideas of each participant or which provided an overview of the collective thoughts of a number of participants. A case protocol was maintained, and an audit trail was constructed, to allow future verification of findings. The numeric code following each quote allows ready access to the raw data.

The research results were intended to serve two audiences: 1) researchers interested in the scholarly exploration of change processes towards sustainability and 2) people involved in implementing, or attempting to implement, concepts of sustainability at a community level. Perceived barriers were generally categorized into those of "first order change" and those of "second-order change."

First-order change (also referred to as system change or single-loop learning) normally results in change to organizational strategy. This level of change is problem-oriented and focuses on incremental improvements in the output of organizations. Diagnostic processes are used to determine problems and improve sub-systems.

Second-order change (also referred to as cultural change, transformational change or double-loop learning) is "multidimensional, multi-level, qualitative, discontinuous, radical organizational change involving a paradigmatic shift" (Levy and Merry 1986, 5).
Diagnostic processes focus on dysfunctional effects of core values, beliefs, and assumptions.

During the interviews, the importance of the skill of understanding and using first- and second-order change processes became apparent. According to the literature, knowledge of the factors and processes which contribute to second-order change is one of the critical elements needed to move towards communities which are sustainable (Dyer & Dyer 1986). Therefore, a search for these factors and processes became a critical component of the data description and interpretation segments of the research analysis. The comments of interview participants were scanned to determine whether second-order change processes were being used in the transportation planning system.

The characteristics of the eighteen interview participants are presented in Table 5.1.

Six community advocates were interviewed: three politicians and three community activists. The remaining twelve interviewees were made up of seven City of Vancouver employees, three Greater Vancouver Regional District employees and two Province of British Columbia employees. The government employees included two community planners, three environmental analysts, five transportation planners, and two transportation engineers. The common characteristic of all interview participants was their active involvement in planning Vancouver's people-moving transportation system.
Table 5.1
Characteristics of Interview Participants

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>NUMBER OF INTERVIEWEES</td>
<td>18</td>
</tr>
<tr>
<td>COMMUNITY SECTOR</td>
<td></td>
</tr>
<tr>
<td>Community Activist</td>
<td>3</td>
</tr>
<tr>
<td>Community Politician</td>
<td>3</td>
</tr>
<tr>
<td>Municipal Employee</td>
<td>7</td>
</tr>
<tr>
<td>Regional Employee</td>
<td>3</td>
</tr>
<tr>
<td>Provincial Employee</td>
<td>2</td>
</tr>
<tr>
<td>GENDER</td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>6</td>
</tr>
<tr>
<td>Male</td>
<td>12</td>
</tr>
<tr>
<td>OCCUPATION¹</td>
<td></td>
</tr>
<tr>
<td>Community Planner</td>
<td>2</td>
</tr>
<tr>
<td>Environmental Analyst</td>
<td>3</td>
</tr>
<tr>
<td>Transportation Planner</td>
<td>5</td>
</tr>
<tr>
<td>Transportation Engineer</td>
<td>2</td>
</tr>
<tr>
<td>YEARS IN OCCUPATION (Range)</td>
<td>242</td>
</tr>
<tr>
<td>(4-20)</td>
<td></td>
</tr>
<tr>
<td>AVERAGE YEARS IN OCCUPATION</td>
<td>13.4</td>
</tr>
</tbody>
</table>

(1) Excludes community activists and politicians

Six participants were female and twelve were male. Collectively, they had 242 years of career experience in municipal planning activities which ranged from a low of four years to a high of 20 years. The average length of career experience was 13.4 years. This information is presented to illustrate that each segment (stakeholder) of the transportation planning system is represented and has contributed to the primary data.
5.2.1 - Understanding Sustainable Development

Question One

The term sustainable development is being used more frequently to describe a new way of planning and developing our communities. From your perspective, what does this term mean?

This section reduces approximately 44 pages of interview dialogue into a format which allows for a succinct presentation of raw data. Occasionally, during the interview, probing was required to focus the thoughts of the interviewees on the urban context of the question. Responses to this question were subdivided into categories which comprise key elements of sustainability as identified in the literature.

Definitions of Sustainable Development

Several respondents dealt directly with the meaning of the term within transportation planning institutions and the political and cultural systems that provide context for these institutions. The following quotes illustrate the confusion that two of the respondents see surrounding the meaning of sustainable development:

"Two perspectives on sustainable development: the real one is ... it's a buzz word. A lot of the talk I hear about sustainable development is just that, it's fine words and, occasionally, fine policy documents written down and sworn on the bible of sustainable development that we are going to actually implement these proceedings. ... In terms of my ideal definition of sustainable development, I guess I'd have to cast back a bit. I wouldn't be too ideal with it, I'd say do less harm, enact policies that move in the right direction, not look to solve things overnight." (18-12-16)

"... I'm having trouble with what they're talking about. How can you have sustainable development and talk about doubling the population of Vancouver in the next 30 years, increasing the number of automobiles three-fold, and talk about sustainable development. Nobody has given me a dictionary definition of it so I'm having real problems with it. I have no
idea what it means." (12-11-17)

The first participant's (a transportation planner) reference to sustainable development as a buzz word suggests that the term is used in the transportation planning system but is not used with much thought or conviction. This quote also highlights the difficulty in implementing the concept. The first participant's reluctance both to be too idealistic and to move too fast may reflect conformity to the expectations of his organization and thus conformity to the organizational culture. The individual's cynicism indicates that idealism is not a value cherished by his organization and that change is understood to be a slow, incremental process.

The second participant's comments (a community activist) displayed a lack of understanding of, and confusion about the term. A third respondent (a transportation engineer) viewed sustainable development as a process of cleaning up pollution in a well thought out, rational, mechanistic manner which manages human emotion.

The fourth and fifth quotes are from a local politician who was uncomfortable with the term sustainable development because of its use by some to justify the concept of sustainable growth (a belief that further growth is sustainable).

"... we have to quantify the cost and benefits of different pollutants and cleaning them up and getting rid of them, and make very intelligent and informed decisions, realistic decisions as to what can we deal with and in what priority order and not get caught up with emotional arguments and threats from Americans that they're going to boycott our conventions, and things like this. We've got to deal with the problems in rank order on a very carefully thought out basis." (08-79-86)

"... using the term sustainable development ... it's politically very palatable because it implies ... it implicitly says that further development is sustainable and it's a lot easier to market a concept like that. Marketing the
idea that there are absolute limits is much more difficult. So I tend to react very badly to sustainable development." (17-34-40)

"You get a lot of slick people making slick presentations on sustainable development which really aren't held up by any basic biology or ecology or chemistry." (17-52-54)

Throughout the interviews and during the analysis of the field data, it became increasingly evident that the term sustainable development is understood in different ways and that various factions are attempting to promote and implement their own interpretations of sustainability at a community level. This terminological confusion is thus a key barrier to implementing sustainability.

Consumption

The researcher's definition of sustainable development, as identified in the literature (Ekins 1992, Pimentel & Pimentel 1994, Rees 1989, Rees & Roseland 1991), as discussed in Principle Five - Use Limits and Conservation of Resources (refer to Appendices B and C), involves reducing the consumption of renewable and non-renewable resources. Comments by a number of interview participants (community planners) demonstrated their own understanding of the need for a reduction in resource consumption patterns, but they were also cognizant of the municipal government's lack of awareness of this need.

"... I don't think we're [City Hall] really looking at the major crux of the environmental debate which is consumption." (09-71-78)

"City Hall considers environmental issues to be sustainable ... They talk about sustainability under environment issues. Each report to Council now is supposed to include an environmental section. What are the environmental implications of any report ... air quality issues, water quality issues,
toxic soils issues, noise issues perhaps. So that's what we look at generally right now and we're not at all into the consumption ... capital consumption issue." (19-44-52)

The point that the city administration was addressing sustainability under the umbrella of environmental issues was a significant observation. A number of interview participants felt the concept of "clean up at the end of the waste stream" continues to hold the municipal government's attention.

This can result in an exacerbating state of inaction. Dealing with environmental issues but stating that these actions will solve issues of long-term sustainability results in an "image of action." This image of action could be more damaging than inaction if the public is lulled into believing that fundamental sustainability problems are being addressed and resolved. The phenomenon of stated action on sustainability which, in fact, is inaction (i.e. activity which sets back the process of moving towards sustainability) will be a recurring theme as the results of this case study unfold.

Although all interview participants provided some kind of definition of the term sustainable development, many of the definitions did not show a clear idea of what the term means, and there was by no means any consensus on its definition.

5.2.2 - Vision of the Transportation System 25 Years Hence

Question Two

Based on the present planning system, what will the transportation system for the movement of people in the City of Vancouver look like in the next 25 years?
This second question in the interview protocol was used as a bridging or transitional question which allowed participants to transfer their thoughts from sustainable development to the future of Vancouver's transportation system.

This question, although not a formal research question, provided some interesting information into what experts think Vancouver's future transportation system will look like. The question also created an opportunity for respondents to begin to consider forces which are, or may be hindering a shift away from the automobile to other modes of transportation.

Forty-seven pages of transcribed conversation were generated from this question. Most participants reflected for several moments before beginning their monologue. Very little probing was required. When used, probing helped clarify particular concepts expressed during discussion.

Throughout the initial conceptualization and organization of the research inquiry, the assumption was made that politicians and government employees would be optimistic about the future development of Vancouver's transportation system. This assumption was based on the perception that the interview participants were part of the power structure guiding the growth and development of the regional transportation system. It was expected that these respondents would see assertive steps, such as traffic demand management, improved transit, and cycling and pedestrian systems (all mentioned numerous times in planning documents) as integral components of this future transportation system.

An analysis of the data showed this assumption to be false. The future vision of
all politicians and government employees interviewed in the study is represented by the following quotes.

"... 20 years from now you'll see a lot of development right up the [Fraser River] valley. Probably employment will follow to the extent that employers want to locate near their labour force. So you get a whole kind of suburban type of development. Not unlike American cities ... the way they developed ..." (10-50-67)

"It's going to look much the same because of the fact that we're [GVRD] really having difficulties implementing new strategies or changing the status quo ..." (07-42-46)

In the first quote, the respondent (a transportation planner) assumes that suburban sprawl will continue up the Fraser Valley. In the second quote, another transportation planner observes that those persons who should be most influential in changing the transportation system are encountering great difficulty in "implementing new strategies or changing the status quo ..." An element of defeatism exists within the transportation planning system as a result of the continuing disjunction between stated transportation and land use principles and the operationalization of these principles.

The following quotes summarize the comments of the community activists who were interviewed:

"Absolute congestion. ... moving vehicles from the suburbs into the city, cutting through residential neighbourhoods and probably blocking off the local communities ... so we're probably talking about four lane highways -- two lanes going each way." (03-41-46)

"I find the whole thing extremely frightening -- extremely. They've put in six lanes at Pacific Boulevard, and now they're trying to pedestrianize it. They widen streets, and then they say they're pedestrianizing them." (12-59-65)
The comments reflect these respondents' involvement in neighbourhood activism. Recurring comments about cutting roads through residential neighbourhoods, blocking off local communities, and street widening (more direct quotes are used in later sections of the case study findings) indicate that the City of Vancouver has an informal transportation plan which envisions four-lane and six-lane arterial highways cris-crossing the city.

A final vision of Vancouver's future transportation system introduces the barrier of inadequate regional governance:

"... until that fundamental governance problem is sorted out we're not going to have any better transportation system 20 years from now ..." (18-92-95)

This respondent (a transportation planner) identifies a fundamental governance problem as a major impediment retarding the change process towards a non-automobile-dominated transportation system.

The question of why most participants are so pessimistic about the future transportation system might be answered in a number of ways. One answer may relate to the confidential nature of the interviews. Argyris (1982, 458) discusses "espoused theories," (what people say they do -- a version of success presented by supervisory staff or public relations personnel) and "theories-in-use," (what really happens). The confidential nature of the interviews may have provided officials with an opportunity to discuss theories-in-use. The credibility of this explanation was reinforced in an informal discussion session with one of the government officials after the audio-taped segment of the interview. This person mentioned that several employees had lost their jobs after expressing personal views contradicting the position of the organization. Concern was
expressed that the content of the interview remain confidential.

This episode and the negative views of participants are significant. They demonstrate a suppression of values and beliefs within government organizations. Kirkpatrick (1993, 31) discussed how the suppression of feelings and ideas within organizations results in the repression of potential solutions. These elements of organizational dysfunctionality seem to be present in the government institutions responsible for the management and development of Vancouver's transportation system. Although the individuals running Vancouver's transportation system are aware of some methods of encouraging community sustainability, the existing organizational culture will not allow these methods to be openly expressed, tested or implemented.

5.2.3 - Forces Hindering the Shift from Automobiles to Other Modes of Transportation

"People say, 'Well I'd like to come down to the West End but it's so hard to find a place to park.' And then we tell them, 'Don't drive, come down, here's how you can do it.' And there's a moment when you can see in their eyes this sudden revelation that you're actually serious about them not driving ... At that point it's where that cultural shock occurs because they realize then they're going to have to consider walking or taking taxis ..." (15-559-573)

Case Study Participant, 1994

The introductory quote, made by a West End resident, illustrates one of a vast array of hindering forces (in this case the perception, by many people, that the automobile is the only form of transportation) which impede the movement away from the automobile to other modes of urban people movement. This section examines what interview partici-
pants identified as forces hindering the development of a sustainable transportation system in Vancouver. The question used in the interview protocol to stimulate discussion was:

**Question Four**

"What factors, within the city's planning and implementation system, are impeding the shift towards a sustainable transportation system in the City of Vancouver?"

Interview participants did not encounter difficulty when responding to this question. Responses comprised 228 pages or 46.3 percent of the transcribed interview data. Discussion during this segment of the interviews moved rapidly with only an occasional probe needed for clarification.

Tables 5.2 and 5.3 summarize the forces which interview participants identified as hindering change away from automobiles to other modes of transportation in the Vancouver region. This section analyses the important themes which evolve from this large array of impeding forces. The participants' responses were organized into two major categories: forces hindering change — first-order level; and forces hindering change — second-order level.

**Forces Hindering Change — First-Order Level**

Table 5.2 displays the first-order forces which are hindering change. This category was further organized into the following sub-categories: Status of the Automobile, Public Subsidies, Public Transit Problems, Low Political Support, Inability to Plan, Professional Planning Mindset, Professional Engineering Mindset, Conflict between Vancouver's Planning and Engineering Departments, and Lack of Regional Control.
| Table 5.2 |
| Forces Hindering Change - First Order |

| 1. Status of the Automobile |
| * Commercial interests |
| * System maintenance |

| 2. Public Subsidies |
| * Subsidies to the automobile |
| * Penalties on other transportation modes |

| 3. Transit Problems |
| * Current Trends |
| * Competition for urban road space |
| * Other problems |

| 4. Low Political Support |

| 5. Inability to Plan |
| * Complexities of planning |
| * Impressions of planning |
| * Mismatched decision-making |
| * Dilemma of planning work/home relationships |

| 6. Professional Planning Mindset |
| * Idealism of planners |
| * Lack of Knowledge |

| 7. Professional Engineering Mindset |
| * Education |
| * Technocratic focus |
| * Impressions of objectivity |
| * Defending the automobile |
| * Neighbourhood planning |
| * Implementing the informal plan |

| 8. Conflict Between Planning and Engineering Department |
| * Lack of cooperation |
| * Impact on city planning |
| * Impact on neighbourhood planning |

| 9. Lack of Regional Control |
| * Defused responsibilities |
| * Disconnected decision-making |
| * Need for a new regional government structure |
Forces Hindering Change (First-Order Level) - Status of the Automobile

This category is organized into the following sub-categories: commercial interests and system maintenance.

**Commercial Interests**

Participants suggested that private-sector interests use government systems to promote their interests while at the same time suppressing the interests of other sectors of society. The following quotes by two local politicians represent numerous comments by interview participants describing the powerful private interests which shape the City of Vancouver and the larger metropolitan region.

"... there are private interests that have a lot of power in our society in terms of convincing you and I that we should buy a new car or that when you are sixteen the most important thing for you to do is to go learn to drive. I mean how does that come about. It's because we have a very, kind of, automobile driven culture, right? I mean when kids are growing up that's what they grow up believing -- that those things are important. ... somehow we have to change that." (18-293-384)

"... there's the auto industry. There's the oil and gas industry. There's also a set of cultural mythology which admittedly isn't as strong in Canada as it is in the United States, but it's still extremely strong." (07-226-229)

Participants talked about the private interests of the auto, oil, and gas industries and the powerful tools they use to shape consumer demand. The most powerful tool continues to be advertising. Owning a car -- having the image of power and glory at your fingertips -- defines our "auto driven culture." One of the rites of passage into adulthood continues to be a driver's licence. Advertising can prolong the "defense" stage of the change and
transformation process (Carnall 1990, 40).

**System Maintenance**

Participants discussed how real estate interests insure that the present system of land development is perpetuated. The following quote (by a local politician) offers insight into why the real estate industry is so interested in municipal government:

"... if you did any study of any urban environment you always have to ask yourself, 'why are developers and real estate interests always so interested in the municipal arena?' I mean it's really the level of government that has the least amount of power in a sort of an overall sense. But the reason they're so interested is because we do have the ability to dictate land use ..."

(18-429-445)

Participants (a local politician, environmental analyst, transportation planner, and community activist) considered the power of the Vancouver land development industry as a major hindering force in the movement towards community sustainability. According to these participants, the industry supports a well-organized and heavily funded car lobby whose research continues to support the automobile as the dominant transportation mode in urban areas. Users of other transportation modes (pedestrians and transit) do not have this kind of support. When modal-split discussions take place at a community level, alternative transportation lobbies make weak opposition to the car lobby which can quantitatively and passionately support the automobile. The lack of diverse, strong transportation lobbies results in an urban landscape where the automobile is (as one participant noted) "... taking away comfortable neighbourhoods ... and replacing them with a streetscape with rapidly moving automobiles ..."
Forces Hindering Change (First-Order Level) – Public Subsidies

Various methods are used to subsidize the automobile and penalize other forms of urban transportation. This category examines these hindering forces.

**Subsidies to the Automobile**

Respondents not only said that private sector industries create an urban environment where the automobile dominates, but seven of the fifteen government employees and local politicians (no community activists commented on this point) also noted that various public subsidies have been put in place to ensure that other transportation modes cannot compete for urban ridership. A large portion of taxes (refer to Section 5.3, Illustrative Cases -- City’s Investment in Alternative Modes of Transportation) are used to maintain, expand and redevelop the road infrastructure used predominately by automobiles. The following three quotes provide a representative sample of comments (from a transportation planner, an environmental analyst, and a local politician) in this area.

"...the automobile is being heavily subsidized for every car that’s on the road. We get cheap gas, cheap auto insurance ... free access to the highways." (06-245-248)

"... the car seems to get all the support. I’m trying to think of the figures that were done for the GVRD. We subsidize the private automobile in the GVRD area, I think about $2,800 [per automobile] a year. And we certainly don’t subsidize the bus transit system by that much. So there’s those inequities there that are going to be hard to overcome." (10-255-261)

"Councils continue to approve parking lot expansion which vastly decreases the amount of time it takes to get somewhere. If you’re tearing around looking for a parking spot, there are a lot of public transit vehicles that have a chance to catch up to you. So the continued willingness to expand the road system and the parking system [means] that cars can be favourably
competitive with public transit." (07-312-318)

One of the above participants (an environmental analyst) pointed out that the various levels of government were providing an automobile subsidy of $2,800 per year. The actual figure contained in the GVRD report (Simpson 1993) was $2,600 per year for each automobile used for urban transportation purposes within the Vancouver metropolitan region.

One of the interesting automobile subsidies is the provision of parking to automobile users. A downtown parking space costs $12-15,000 to construct (excluding land costs) and an additional $350 to $400 to maintain annually. The cost of constructing and maintaining bicycle parking facilities is estimated to be five percent of auto costs. Under federal and provincial Income Tax Acts, the cost of parking is classified as an expense of doing business (non-taxable). The same acts classify transit costs as an expense to the individual which is taxable.

**Penalties on Other Transportation Modes**

The last quote noted that the city continues to provide parking for the automobile

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1 Personal conversations with Michel Desroches, Planning Analyst, Central Area Projects Division, City of Vancouver Planning Department and Wayne Mercer, Director of Operations City of Vancouver Downtown Parking Corporation. June 6, 1994.

2 A standard automobile stall is ten feet by twenty feet. A bicycle occupies an area of approximately two feet by five feet or five percent of the area of an auto. Besides size, other factors would further reduce the cost of building and maintaining bicycle parking spaces. Construction costs would be reduced due to the weight differences between cars and bicycles. In terms of maintenance, bicycle parking spaces do not require fans to eliminate exhaust fumes and bicycles do not deposit pollutants on building surfaces.
thus insuring that the automobile maintains its competitive position in relation to public transit. The following quote, made by a local politician, points to another method which government uses to penalize alternative modes of people-based urban transportation.

"... there's not a desire by the government to levy operating costs from car users in the same way that they feel very comfortable levying a large portion of the operating costs of transit from its users." (07-281-285)

Inequalities in levying costs is illustrated in the free auto infrastructure (no tolls: only gasoline taxes invested in the road system) provided to automobile users. In addition, the provincial government continues to maintain cost-shared (provincial-municipal) automobile infrastructure construction programs. No cost-shared programs exist between the provincial and municipal governments for the construction of bicycle infrastructure.

**Forces Hindering Change (First-Order Level) – Transit Problems**

Alternative modes of transportation have difficulty adapting to an urban landscape designed for the automobile. These difficulties are reflected in the comments of participants when discussing the present use and future prospects for public transit in the City of Vancouver and region. This category is subdivided into three sub-categories: current trends, competition for urban road space, and other problems.

**Current Trends**

Public transit in the city and region is provided by BC Transit: a provincial crown corporation. The corporation is under constant pressure by politicians and the public to expand its services, although transit riders, as a percentage of total road and transit users, is declining. The following quote by a transportation planner attempts to explain this
pressure which might be expected in a region experiencing increasing levels of road congestion.

"When the communities are built around the automobile the reality is no matter what we do, our market share is really very low, and those are things that are going to take years to change around." (13-441-447)

This participant noted that current suburban design practices do not take into consideration the economical provision of public transit, yet municipal and provincial politicians demand this service for their constituents. Thus, municipalities with higher densities served by public transit subsidize long distance transit riders and inter-suburban transit users living in lower-density suburban regions. Another participant claimed that BC Transit provides service to suburban areas, such as Surrey, Delta, Langley, where the market share for transit in peak hours is only three to five percent of total commuter traffic.

This situation may be politically expedient, but it economically penalizes the overall delivery of transit, it disadvantages the urban transit user, and it rewards the suburban dweller.

*Competition for Urban Road Space*

Respondents painted the following picture. In the past fifty years, streets have been transformed from people places to automobile places. The concept of the street has evolved from a multi-use community environment to a corridor dominated almost exclusively by the automobile. The street, which was once a place to linger, to talk with neighbours, and to purchase goods and services, has become a thoroughfare for automobiles to move through as rapidly as possible. Transportation planners and
engineers have allowed the automobile to dominate and to control virtually all available space within the streetscape. When confronted by lobby groups demanding some of the streetscape for other modes of transportation, engineers and planners cannot comprehend the concept of reducing space for the automobile. The trade-off is not between cars and buses. A situation has been manufactured in which the trade-off is between transit and small business. The following quotes provided by a local politician and a transportation planner illustrate this point:

"So I don't see much opportunity to convert general-purpose lanes. I don't think there's much willingness on the part of local governments to convert general-purpose lanes to bus traffic. I think it's going to ... If you're going to get bus lanes, it's going to come at the expense of parking. And even that's a tough one [be]cause it involves community groups, businesses and things like that. (13-917-934)

"Now the problem we run into is just space allocation -- resource allocation. And Marpole HOV lanes are a great example of that. Are you going to take space away from one mode of transport to give it to another? That's when your priorities are really clear." (15-483-490)

The second quote refers to a controversy during the interview period (Winter, 1994) when the City of Vancouver attempted to remove street parking in the commercial core of the Marpole neighbourhood to allow for the installation of high occupancy vehicle (HOV) lanes during rush-hour periods. Rather than proposing the removal of a "general purpose lane" (car lane), which would encourage car users to explore other modes of transportation (other than the single occupant vehicle), the City Engineering Department

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reframed the situation. The car versus transit tradeoff became a tradeoff between transit and small business.\textsuperscript{4} In this particular case, the small-business lobby won.

The concepts of reframing and presenting alternatives or scenarios which allow you to achieve your preferred option or goal is a common, but sometimes ingeniously disguised, technique used to influence decision-making. The Marpole HOV lane controversy may be an example of the application of this technique.

The following quotes illustrate difficulties encountered by the public transit system when competing for limited urban road space.

"And if the bus that you would take otherwise, in a split choice, is still travelling on the same streets as all this congestion, then we're not much further ahead." (09-199-203)

"So the main thing is, transit can't compete on time ... often can't compete on convenience either. [It can't] compete on cost but that's relatively unimportant. Time and convenience and speed -- those are the two factors that have to be addressed if transit is going to compete." (13-320-325)

In Vancouver, these respondents (transportation planners) felt the worsening urban road congestion will not force people out of their cars and into public transit. The vast majority of transit (excluding SkyTrain which has its own dedicated ROW) must use the same roads congested by automobiles.

\textit{Other Problems}

Two additional problems associated with the transit system in Vancouver were identified. The first problem relates to a union-management conflict at BC Transit which

\textsuperscript{4} Street parking is an important element in the livability of commercial neighbourhoods. It creates a physical barrier between rapidly moving vehicles and pedestrian street life and it provides a place to load and unload goods.
is impeding changes to the public transit system.

"If you try and put, say just a bicycle facility through the Massey Tunnel that would allow bicycles on buses ... put a bike rack on a bus ... BC Transit started the process and the union jumped up and said "Well, if you're not going to give us more money, forget it" and they walked away from the table." (04-208-213)

"Part of it will be the union. The relations between BC Transit and the bus drivers union is awful. It's also a model for poor management-labour relations. And until that changes, any sort of liberalization of transit policy is going to be impossible. Because drivers will expect, or will negotiate on the basis of 'we want to be paid more if we are going to do something different'." (13-422-428)

This topic was approached very cautiously by the two participants (both transportation planners) who discussed poor union-management relations. They felt the confrontational and adversarial association between many organizations and their employee union representatives results in retarding change, or, in this example, not taking appropriate action in the provision of appropriate services.

The final problem identified by the following quote (provided by a local politician) illustrates a significant trend in city unlivability:

"... transit systems aren't safe for kids. So therefore, as much as we may regret it, the automobile is connected with security." (15-239-245)

As cars push pedestrians off streetscapes, the safety and livability of the urban environment declines (refer to Chapter Two, Sections 2.3.3 and 2.3.4). This cycle feeds on itself. Streets become unsafe, therefore children must be driven to school and children, women and the elderly must be driven to other events contributing further to the auto domination/pedestrian decline of streetscapes. Through creating unsafe environments, the individual automobile itself becomes the environment of security.
Forces Hindering Change (First-Order Level) – Low Political Support

According to some participants, non-auto modes of transportation are given a low priority in funding. The following comments, provided by local politicians, point to a number of factors which cause these low funding priorities.

"We've seen two billion dollars borrowed for BC 21. We know that nearly half of that is going to go into the Island Highway. We then throw a sixth of it or a seventh of it to the Lion's Gate Bridge. Then you have the highways minister's own pet project of getting all the roads in the Buckley Valley paved. And you now begin to see that the capital ... I mean under the Bennett and Van Der Zalm governments there were more capital funds going into improving public transit than we've seen under the New Democrats." (07-251-261)

"... that worldview [dominant worldview shaping current transportation planning] comes from personal experience and hence find out who the decision-makers are and what form of transportation they use and you'll probably get a pretty good idea of where the resources and priorities are." (15-143-146)

BC 21 is a capital investment program created by the provincial government to invest in transportation infrastructure. The first quote gives an idea of where most of the program's funds are allocated; very little money is left for capital improvements to public transit systems. The second quote gives one possible explanation for this situation. A significant majority (virtually all) of decision-makers do not use transit nor do they cycle. Therefore, this respondent felt their worldview is from behind the windshield of a car. From this perspective, alternative modes of transportation do not seem viable. Therefore money continues to be allocated to the automobile.

Compared to other Canadian cities, Vancouverites how have the longest average daily commute (60 minutes) (refer to Chapter Four, Section 4.3). One participant felt that
the City of Vancouver needs "to double or triple the number of kilometres of rapid transit in the city" (12-637-641). Although the need exists, this participant felt the political will does not exist, and therefore money is not available to carry out public transit infrastructure expansion.

**Forces Hindering Change (First-Order Level) — Inability to Plan**

The metropolitan region of Vancouver is unique in the structure of its regional planning organization and the authority this organization holds in carrying out planning activities. Respondents' comments concerning this subject are divided into the following sub-categories: the complexities of planning, impressions of planning, mismatched decision-making, and the dilemma of planning work/home relationships.

**Complexities of Planning**

Chapter Four reviewed the organizational structure of community planning and transportation planning in the Lower Fraser Valley of British Columbia. Although this research inquiry focuses on the City of Vancouver, the regional transportation authority, BC Transit, and the complexities and interconnectiveness of the regional system cannot be ignored. In the area of transportation planning what happens in the city and the region impact greatly on each other. All participants working at the regional and provincial levels of the transportation planning system discussed the difficulty of working within the existing structure. Participants expressed the following views pertaining to this topic of planning:
"... in this particular region we don't have regional planning. The GVRD has said they want to do regional planning, but there's no real legal way for them to achieve that." (13-127-129)

"... an unplanned city is one where you allow private-sector economic forces to take over the development of your community ... and develop the city as the market will bear." (03-180-195)

"Conceptually the region is proud of its town centre concept and it's idea of a regional system where you can sort of live and work where you want, but typically that doesn't happen." (17-286-296)

According to a transportation planner, when the provincial government removed planning responsibilities from the Greater Vancouver Regional District in the early 1980s, the greater community's ability to undertake comprehensive planning was crippled. The second participant (a environmental analyst) felt this devolution of planning responsibility has resulted in an "unplanned city" where private-sector market forces dictate land use development. The third participant (another transportation planner) used one of the cornerstones of the Greater Vancouver Regional District (GVRD) planning philosophy, the "Town Centre Concept," (GVRD 1975) as an example of an espoused theory which in reality doesn't work.

**Impressions of Planning**

Participants made the following comments about research conducted by the GVRD:

"... GVRD put these wonderful coffee table documents out ... but they're just saying grand things that we can't do." (06-117-122)

"... the illusion of change can be harmful. It makes people relax and think that yeah maybe the politicians and the bureaucrats do have things in hand and I needn't worry, and I needn't get involved." (04-651-654)

"... Sometimes I wonder if these reports are just diversionary tactics. ... left-turn bays are going in, streets are being widened, boulevards are being
removed, trees are disappearing on those boulevards ... business as usual."
(16-183-188)

The first two quotes, both made by government transportation planners, convey 1) frustration with not being able to implement report recommendations and 2) concern with the impression the reports are making on citizens. The second government employee was worried about citizens being lulled into a state of non-participation or inaction. Thus, the illusion of planning could be more harmful than no planning. The final quote (from a community activist) implies that planning can be used as a subversionary tactic; expansion of the automobile transportation system proceeds as usual while decision-makers talk about planning for a diverse-mode transportation system (refer to Chapter Five, Section 5.3 for a discussion of this tactic).

Mismatched Decision-making

Two quotes illustrate the problem of mismatched and uncoordinated decision-making:

"The people who are making the decisions about land use have been making the decisions to develop areas that really cannot support public transit. And yet, at the same time, because they're not paying for public transit directly, they're demanding public transit services. So it's a system that just does not support a long future. It'll have to change if we're going to get out of the cycle that we're in now." (13-131-140)

"The fact that transit is actually operated by a provincial crown corporation, is delivered by the province ... most of the money is coming from the province, not from multiple governments. You don't have a linkage ... and yet land-use decisions are being made by local governments far removed from the transit planning decisions." (13-152-157)

These quotes (by a provincial transportation planner) address the issue of one level of government being responsible for land-use decisions and another level of government:
being responsible for major automobile and transit transportation decisions. SkyTrain provides an excellent example of the provincial government, in their hasty preparation for Expo 86, unilaterally deciding on the type and location of what has become an extremely expensive light rail transit system. This provincial decision-making, in situations where a regionally constituted organization with legal responsibility for planning and implementation should have authority, continues to cripple transportation planning in the city and in the region. The lack of regional authority in decision-making will be discussed in a later category under the title "Lack of Regional Control."

**Dilemma of Planning Work/Home Relationships**

In the City of Vancouver, urban planning practices continue to encourage long distance commuting:

"[The] City of Vancouver has been ... creating 3 to 4 times as many jobs as they have residents ... And only just recently have they been looking at bringing more housing on in the city core. But it's not the kind of housing where people are going to be working downtown. It's not the clerks and the secretaries and office administrators and middle managers that are able to buy the condos and the high-end housing that's going on in Vancouver. People who are doing those kinds of jobs are living in Burnaby or Surrey or increasingly further out the valley." (17-255-268)

"... the region [GVRD] is proposing that the city continue to accept more jobs than housing units which means ... the only thing that can mean to me is continued long-distance commuting." (01-43-46)

The city has recently changed its policies and is now encouraging more housing in the downtown core. But, as the first quote (provided by a transportation planner) conveys, the type of housing is for a select group of high-income workers. This situation, coupled with the desire expressed by GVRD for the city to accept more jobs than housing units
continues to encourage long-distance commuting and erodes the mythical (as one participant implied) regional "Town Centre Concept."

In the metropolitan region, all respondents said suburban sprawl is a problem which continues to plague progress towards utilizing other modes of transportation. The separation of land uses and the high reliance on automobiles for mobility have been discussed in previous sub-categories.

This sub-category introduces a new concern about suburban to suburban commuting -- a form of commuting which has replaced traditional suburb to downtown commuting as the dominant form of rush hour mobility. With the evolution of industrial malls and business parks, an increasing segment of employment opportunities are now in suburban locations. Houses and places of employment are increasingly dispersed in low density landscapes which cannot be serviced economically by public transit. With the increase in two-income households, a respondent who had experienced the situation said that the problem of dispersed place of work is compounded (08-399-409). Employment specialization may result in one spouse working in a suburban location far removed from the other spouse’s place of work.

**Forces Hindering Change (First-Order Level) – Professional Planning Mindset**

Participants perceived the planning profession as a contributing factor to the problems of continued unsustainability in Vancouver's urban transportation system. These perceptions were based on the feeling that planners are not equipped with the skills or knowledge to facilitate a process towards a sustainable transportation system.
Idealism of Planners

Two participants (both transportation planners) felt the planning profession and planning education were not preparing planners for the reality of practice, nor were they producing professionals who could assist in the transformational process towards sustainability.

"... lot of people come out of planning school with very high ideals. Well, at least they go in with very high ideals ... I don't know how they come out. But the people who come out ... a lot of them think they are going to change the world and set it on fire and they're going to implement sustainable development ..." (04-769-776)

"... planners are co-opted as soon as they leave school. And if they're not, they're not hired for very long." (13-701-702)

One interview respondent felt planners lacked an understanding of the practical aspects of practising day-to-day planning. According to one transportation planner, planners become "co-opted" by the dominant growth paradigm or they are dismissed or marginalized or leave the planning profession altogether.

Lack of Knowledge

Participants expressed reservations about the planners' apparent lack of public transit planning knowledge:

"And I think there's a real lack of understanding in terms of how the urban form affects transit -- that transit passengers are pedestrians before they get on the bus, and they're pedestrians after they get off the bus." (13-582-589)

One participant (a transportation planner) observed that official community plans contain "motherhood statements" when referring to public transit, but a deeper understanding of "how the urban form affects transit" is not evident in the practice of most
planning professionals. In addition, during the development review process, meaningful
dialogue between transit planners and the land-use planners does not take place.

**Forces Hindering Change (First-Order Level) — Professional Engineering Mindset**

Within the segment of the interview which explored hindering forces, the attitudes
of interview participants towards transportation engineers generated the most lively
responses. Eleven of the eighteen interviewees discussed the engineering mindset. Two
politicians, two transportation planners, and one environmental analyst did not comment
on this hindering force. Five of the seven who did not comment were professional
engineers. Excerpts from this segment of the interview are divided into the following sub-
categories: education, technocratic focus, impressions of objectivity, defending the
automobile, neighbourhood planning and implementing the informal plan.

**Education**

The following quotes describe engineers both from an engineer's and a non-
engineer's perspective.

"My educational background is in engineering -- very much a problem
solving sort of thing. Prepare a technical report and the job is done. ... From
the public's perspective it's certainly difficult from my background. ... About five years ago ... we established a political committee to oversee
our role. And the first thing they wanted was ... information communica-
tions kinds of services. We couldn't provide it for them. I mean I did not,
even after working for 25 years, have the first clue about how to get
involved there." (03-351-375)

"... the guys that I meet, that have been out of school for a few years and
who are now working as transportation planners or transportation engineers
with the city or with the Ministry of Transport or something, or BC
Transit, they seem to have this concept of ... or all they were really edu-
cated towards is how to accommodate the automobile or how to add lane capacity, how wide a lane is supposed to be ... Instead of thinking well there will actually be less traffic and less congestion if we maybe don't widen this street. Instead of that type of thinking they're still back in that old line of thinking; they're accommodating supply not demand." (06-488-499)

As the first participant (a environmental analyst) relayed, engineers are educated in problem-solving skills. Skills of communication (dealing with the public in an open communicative manner) are foreign to many engineers. Trained as experts, they experience difficulty in having their conclusions questioned within a political environment.

The second quote (from a transportation planner) made by a participant who works closely with engineers on a day-to-day basis, highlights how some participants thought engineers perceived themselves. Through their education and through their practical experience, the second participant noted that engineers perceive their prime purpose as accommodating the automobile. They are not trained to question or to look for alternatives to an automobile-based transportation system, and they do not view these activities as part of their responsibilities.

**Technocratic Focus**

Part of this apparent desire to accommodate the automobile comes from the engineering profession's traditional stance of power within the municipality and its strong professional culture:

"North American cities are designed by engineers and they're real power structures in the engineering department. Livability truly is a secondary issue. Whatever is left over after the engineers have gone through with it ... it's handed over to planning [the planning agency] to fix or to do something with. But it's simply moving cars and it seems to be the number one priority in any city." (16-210-215)
"I'd love to sit down and try and understand the Engineering Department one day. Part of it I think is ... I've often found that they're structured somewhat in a military fashion. In Engineering you pretty well have to go through the chain of command. And I think that may be part of it. The corporate culture in Engineering, I think, used to be quite uh ... they kept everything pretty close to the vest as far as information. They didn't share a lot of information with people. That I think is changing. There's a new [Vancouver] City Engineer as of a couple of years ago, and I think that certainly he's more into looking at things more corporately, like across the city and working with other departments. It's funny [be]cause I get the same ... feedback from my counterparts in Calgary, in Edmonton, in Toronto. That they have that same brick wall that they run into sometimes." (10-352-371)

The first quote (from a community activist) describes the power of engineers within engineering departments. Pfeffer (refer to Chapter Two, Section 2.5.4 and Pfeffer 1981, 3) discusses how organizational leaders can be concerned with control and maintenance of the status quo. Institutional power politics, used effectively, can severely reduce an organization's ability to adapt to internal and external environmental conditions. Yellin (refer to Chapter Two, Section 2.5.4) suggests that many organizations and their leaders are "Change Incompetent." The comments of this community activist suggest that the City of Vancouver continues to promote the automobile (maintenance of the status quo) while ignoring livability issues.

The second interview response (provided by an environmental analyst) contains some interesting observations. Although the respondent states that the elitist attitudes of the Vancouver Engineering Department seems to be changing, the department, and apparently engineering departments in other cities across Canada, continues to be "structured somewhat in a military fashion." This implies a reliance on the outmoded methods of "Universalistic Management" (Taylor 1911). This form of management relies
on scientific techniques which focus on concepts of stability, predictability, and maximization of individual productivity in the workplace. This participant also pointed to the existence of a "corporate culture in Engineering." As Schein notes (refer to Chapter Two, Section 2.5.4 and Schein 1985, 24), the existence of a corporate culture can insulate employees from constant changes in the external environment.

**Impressions of Objectivity**

One component of corporate culture which helps mould employees into a strongly knit group is the presence of a "professional mystique." Professional organizations use this technique to separate and elevate their members to the position of experts. Experts are perceived to be objective, but, as one respondent (a community activist) says, this is not always the case:

"One of the things about engineers is because they use numbers and numbers are unbiased, there's truth in numbers and so I like to use their numbers against them because they really cheat with numbers. They have told us for years that there are 60 to 70,000 trips per day in the West End. Well, we know that only about 5,000 West Enders per day use their cars, so that must mean we're all going around in mad, mad circles." (16-220-226)

This community activist felt that engineers used mathematical and statistical methods to justify their own goals rather than providing balanced assessments. This problem is discussed in more detail in the following section.

**Defending the Automobile**

Interview participants were highly critical of the position engineers maintain in dealing with the automobile in the City of Vancouver.
"... they're [engineers] mandated in some ways to change the transportation system, yet they seem defenders of the status quo, which I find quite interesting. You mention something that's good for bikes and their [engineers] first reaction is 'what is the negative impact on cars?'" (12-243-259)

This participant (a community planner) felt that municipal engineers, although hired to serve people, see their role as serving automobiles. Change in the transportation system is being initiated by lobby groups which are promoting alternative forms of people-based transportation such as bicycles. But, as this respondent described, engineers react to these suggestions by looking for possible negative impacts on cars. This strong assumption of the engineering department, that space cannot be taken away from existing general-purpose automobile traffic, represents one of the major impediments to moving towards a more sustainable people transportation system in Vancouver.

*Neighbourhood Planning*

The conflict between the Engineering Department and residents of Vancouver seems to be acute in the area of neighbourhood planning. According to all community activists, the Engineering Department was either not able or not willing to respond to resident concerns.

The words of one community activist demonstrate how the technique of incrementalism is used to slowly modify streetscapes to serve the needs of automobiles rather than the needs of neighbourhoods. The process of increasing capacity is an accepted, unquestioned assumption of transportation engineering. The process of decreasing capacity is a foreign, unthinkable concept:

"... usually it's the Engineering Department infringing on pieces of our neighbourhood without us knowing. It starts slowly ... they take off
parking on some of our residential streets, which means that increases the traffic flow and traffic volume. Next thing you know, we've got them widening the street to increase the traffic flow, and gradually, the liveability of our neighbourhood becomes decreased …" (02-100-110)

Another quote conveys the activist's frustration with the Engineering Department's narrow perception of community planning. The focus of these plans seems to be on the needs of the automobile rather than on the needs of neighbourhood residents.

"... my struggle, and that's all I can call it, with the Engineering Department was that, first thing when I asked ... said to the Engineering Department that we, for our neighbourhood, wanted a community plan on how traffic would operate within our neighbourhood, they said well we have a community plan. So I asked them to have a look ... I asked to have a look at that plan. Well I found out they were talking about two streets, and I said my idea of a community plan is not two streets. My neighbourhood is more than two streets." (02-131-140)

The final two quotes describe subversive techniques used by engineers to circumvent neighbourhood plans.

"... the Engineering Department worked with that piece of the community, they agreed on certain things, and we were at a meeting subsequently about six months later or a year later because what they were doing was going in total violation of what was actually agreed on …" (02-183-187)

"... then they go on and do what they wanted to do in the first place, which is get traffic from point A to point B as quickly and as efficiently as possible in their terms which does not pay any attention to the neighbourhood they go through." (02-201-205)

These quotes imply that plans are developed, approved by City Council, and then ignored by the Engineering Department. One participant reported on the formation of a neighbourhood watch committee whose purpose was to guard against engineers increasing capacity on the arterial and local streets running through their neighbourhood.

Implementing the Informal Plan
Participants felt that the absence of an official community plan continues to have grave consequences on the livability of the city. The absence of an official community plan and a formal transportation plan was discussed in Chapter Four, Section 4.4. Increasing traffic capacity has its roots in what participants (two community activists) referred to as the "old highway program" or the "bigger plan."

"They [the Engineering Department] wanted that street and they worked very conscientiously over the years in setting up a system through this city. There's a old highways program, freeway or whatever you want to call it, going back to the 1950s, and everything that's changed is just another little piece. Nothing is ever changed. We live in a city that says we don't endorse freeways, but that's really what we're building." (16-247-252)

"I don't want to be Machiavellian about it or anything, but I think that they [city engineering department] have a bigger plan ..." (02-129-130)

Theoretical concepts developed by Selznick and Argyris help explain the reason why this informal transportation plan exists in Vancouver. Selznick (refer to Chapter Two, Section 2.5.3 and Selznick 1957, 16) advanced the concept of "institutionalization" whereby, in the absence of appropriate internal direction and external feedback, organizations take on a "life of their own." In this case the Engineering Department seems to be performing to meet the needs and desires of the employees of the department rather than the residents of the City of Vancouver.

Argyris (1982, 458) discussed "espoused theories," which are what people say they do, and "theories-in-use," which are what really happens in an organization. A number of interviewees (01, 08, 13, 14) working at a local level discussed a council policy which gives higher priority to non-auto modes of transportation in investment decisions (espoused theory). Other interviewees (02, 04, 12, 16) described the existence of an "informal
plan," which provided the framework for the continued expansion of a highway system in the city (theory-in-use).

After the taped portion of the interview, one respondent (01) indicated that, although the Engineering Department does not acknowledge its existence, an informal transportation plan is on computer at the City Engineering Department and is used to make day-to-day decisions supporting the expansion of the automobile dominated transportation system.

The significance of informal plans was discussed in Chapter Three, Section 3.2. The existence of a publicly approved official transportation plan (as a component of a comprehensive official community plan) for the city would require each transportation decision to conform to the goals and policies of the official plan. In the absence of an official plan, staff can pursue their own goals. How this happens is discussed in more detail in Section 5.3 (Illustrative Cases - Transportation Investment Priorities).

**Forces Hindering Change (First-Order Level) – Conflict Between Planning and Engineering Department**

The City of Vancouver's separation of community planning and community engineering activities into autonomous departments has resulted in a high level of conflict between these departments. This category examines the impact that this lack of cooperation is having on city and neighbourhood planning.

**Lack of Cooperation**

According to two participants (a community planner and a transportation planner), a high level of professional and institutional animosity exists between the Planning
Department and the Engineering Department within the City of Vancouver's municipal administration:

"It's sort of common knowledge that there's not very much respect between the Planning Department and the Transportation [Engineering] Department." (04-378-391)

"In City Hall there's been a split, for better or for worse, between the Engineering Department which takes care of all streets [and the Planning Department]. Anything that's a public right-of-way ... entrusted to the Engineering Department. And what the Planning Department really does is deal with private development. In some ways planning regulates what happens on land between the right-of-ways." (12-715-722)

These comments create an image of two institutional organizations in continuous conflict while they attempt to serve the public through the provision of planning and development services. As the second quote describes, each agency has defined their "turf": the Engineering Department plans public ROWs and the Planning Department regulates development on private lands. The impact of this dichotomy on the city is a disjointed urban planning process. As the community planner stated, "at City Hall, planners have very little to do with transportation." (12-325-327)

After one session, the researcher met the interview participant on the elevator. This person's involvement in city planning and development spanned almost twenty years. The person asked if the researcher had made any meaningful preliminary observations related to the research. The researcher stated a number of observations including the conflict between the Planning and Engineering Departments. This person was somewhat taken aback, saying "you know, that's such a part of City Hall that no one thinks about it anymore." The person who did not mention the conflict during the taped interview,
went on to describe time and effort wasted trying to work in this antagonistic environment.

This is a significant observation. The antagonistic relationship between the Planning Department and the Engineering Department has grown from an organizational problem to a basic assumption of the organizational culture of Vancouver's municipal bureaucracy -- something which has become part of "doing business at City Hall." Participants identified this conflict as one of the significant hindering forces affecting the delivery of government services and affecting change towards a sustainable people-based transportation system.

**Impact on City Planning**

Participants felt the process of community planning in Vancouver has suffered due to the antagonistic relationship between the Planning Department and the Engineering Department:

"... the confluence of land use and transportation, which is so obvious, it's almost a truism, is lost in that kind of bureaucratic environment." (04-378-391)

"Another part is they're not forced together by planning, I mean by the broader vision of the city. There is no Vancouver City Plan. If there were a Vancouver City Plan, then they might be forced to get together. You might be able to say to them, you must consider the transportation and land use aspects together on any proposals. You must have, for any development permit a transportation perspective. You must have, for any road infrastructure, a planning perspective." (13-424-432)

Although the relationship between land use and transportation is a fundamental principle of urban planning, the second participant (a transportation planner) felt "the broader vision of the city" was not being addressed due to bureaucratic turf wars. The second quote also identifies the need for a community plan which could be used to force
the Planning Department and the Engineering Department together in a consultative land development and approval process. The current CityPlan process, the latest in a number of unratified efforts since 1928, is attempting to reduce the barriers between the two agencies.

**Impact on Neighbourhood Planning**

Bureaucratic conflict not only affects planning at a municipal level, it also impacts on neighbourhood planning activities:

"... when we did our neighbourhood plan, we actually went to City Council and asked that the Planning Department and the Engineering Department would work with us. And we frankly saw a really major conflict between the Planning Department and the Engineering Department because, as I said, the Engineering Department doesn't plan." (02-405-412)

"... we insist that in our community we will have absolutely no dealings with an engineer without a planner present. And what planning [Planning Department] ends up doing for us is just being a mediator. They just don't have the power that engineering does ..." (16-293-296)

The first quote, illustrates the recurring engineering/planning conflict from the perspective of a neighbourhood activist. The participant felt that, from a neighbourhood planning viewpoint, "the Engineering Department doesn't plan." The neighbourhood group with which the resident worked experienced numerous confrontational problems with the Engineering Department before calling in a planner to fulfil a mediation role. The planner's activities only increased the animosity between the two agencies, but at least the needs of the community were addressed.

The experience of this neighbourhood group raises the question of how often the needs of the community are forgotten as a result of interdepartmental conflicts. One
community activist observed that the Engineering Department is more powerful than the Planning Department and that the former department has "convinced people that they're [engineers are] very objective" while "planners are called subjective" (16-301-302).

**Forces Hindering Change (First-Order Level) -- Lack of Regional Control**

The present maintenance, operation and expansion of the people-based transportation system in Vancouver and the region is undertaken by a unique association of agencies (refer to Chapter Four, Section 4.4). According to interview participants, two elements of this regional government structure are retarding a movement towards a sustainable people-based transportation system: defused responsibilities and disconnected decision-making. To overcome these problems, participants called for a new regional government structure.

**Defused Responsibilities**

The following quotes describe a regional government structure which is in a state of dysfunctionality brought about by incremental anaemia.

"Identifying what needs to be done is not the issue in my mind. ... People know what they want and even individual municipal councillors and mayors know what they want. The stumbling block, if you will, is really how do we get it. What structures are in place? Are the existing structures adequate to take us along that path to where we do realize the vision that we have, and I think that's where we're having a lot of trouble and we're really grappling with some of these issues." (18-196-209)

"... we've set up structures in the province that basically make it impossible for any level of government to take the whole responsibility for a particular problem. Everybody's got a piece of every problem and as a result there's no accountability for it. And in the end people get together and say, 'Well we had this great idea we want light rapid transit out to Coquitlam,' the
province wanted commuter rail so what did we get? It's provincial money, it's a provincial decision, you'll get commuter rail. When the more sensible answer is probably a SkyTrain extension or an LRT extension or a bus way [lane] even." (17-439-449)

"The big problem is a jurisdictional one. Parking rates are largely controlled by municipalities who feel the wrath of the downtown businessmen as soon as you jack up parking rates, and it's much easier to point to the province and say well you put tolls on the bridges and annoy a million people instead of annoying 700,000 commuters. It's a responsibility matrix that always focuses on having someone else take the heat for the decision that's going to cause people to shift their habits." (17-214-222)

The first quote (by a local politician) indicates that the vision to restructure the regional transportation system is present, but structures and mechanisms to support the process of implementation are not in place. As the second participant (a transportation planner) pointed out, the existing institutional structures "make it impossible for any level of government to take the whole responsibility for a particular problem." This participant felt that far too many funding responsibilities, for clearly regional issues, are controlled by the provincial government.

The final quote (by the same transportation planner) provides an example of how defused responsibilities can lead to municipalities shifting responsibility to the provincial government when confronted with an unpopular issue. Constant shirking of responsibility can lead either to inaction or to the use of inappropriate mechanisms to resolve problems.

**Disconnected Decision-making**

Defused responsibilities, when dealing with transportation issues, lead to disconnected decision-making. The following quote summarizes one transportation planner's views on the disconnected nature of land-use planning and transportation
"The real difficulty in my view is that the people who are making the land use decisions are not the people that are responsible for the transportation system, by and large. Municipalities are responsible for basic access to business and to individual residences but moving them around the community is something that they don’t accept responsibility for. And it makes it very convenient from a political perspective because municipalities do their planning. It may be unfriendly to transit, it may be designed to encourage people to move on to a provincial roadway or to a public transit system in order to move around. Then when that system gets congested or breaks down, it’s finger pointing time." (17-54-66)

The conflict, at a municipal level, between the Planning and Engineering departments, is compounded at a regional level. Municipalities are not required to consider the impact that their local land-use decisions have on the region. Because of this disconnected decision-making process, the provincial government must continually respond to the traffic congestion created by municipalities.

The following quote describes the political environment within which transportation planning must operate.

"And provincial governments being the more senior level tend to fall into that trap really easily. They accept that somebody has to do the planning, or somebody has to resolve the issue, because it's been unable to be resolved up until now. So they jump in with both feet. You typically get a 'we' and 'they' kind of attitude at that point and then there's huge efforts spent on trying to coordinate or manage or facilitate the work of all of these agencies. BC is a jurisdiction that I find quite amazing because the province is so willing to jump into local issues. I'm not quite sure what the reason is although I suspect a lot of it has to do with the number of ex-municipal politicians that are in the provincial government." (17-66-79)

The fragmentation of the decision-making process creates a situation of cooperative collapse. One participant (a transportation planner) observed that monumental efforts are
invested in attempting to coordinate the efforts of numerous transportation agencies, and even greater efforts are expended to solicit cooperation for each decision. Another participant observed that the provincial government is always ready to step in and disrupt this already complex decision-making process.

**Need for a New Regional Government Structure**

All the participants working at a regional or provincial level and the local politicians recognized that a change in regional government structure is needed:

"... my feeling is that although we've come some distance in terms of this voluntary program for strategic planning, I am a skeptic here. I really question whether or not it is actually going to work. My feeling is that inevitably we're going to need some kind of elected regional government that really will be mandated to deal with a regional objective in terms of land use, environment, growth management and so on." (18-180-187)

The essence of the participant's (a local politician) comments relate to a desire by the people within the planning system to develop a people-based transportation system. For this change to come about, a restructuring of the entire regional transportation planning system (and the larger urban and regional planning system) is required. The quote also reflects the need to move from a voluntary and cooperative system of regional planning to an elected body with mandated authority and definitive responsibilities.

**Forces Hindering Change - Second Order**

This section explores forces hindering change towards transportation sustainability which are perceived by the researcher to be operating at a second-order level (system redefinition through changes in basic values, beliefs and assumptions). Participants had
difficulty identifying second-order forces which hinder change. The second order forces which hinder change that participants discussed during the interviews (summarized in Table 5.3), have been organized into the following sub-categories: values, beliefs, and assumptions; change incompetence; fear of the unknown; status quo maintenance; need for control; and bureaucratization.

| Table 5.3 |
| Forces Hindering Change - Second Order Level |

1. **Values, Beliefs, and Assumptions**
   - * Power of Values, Beliefs, and Assumptions
   - * Societal Values, Beliefs, and Assumptions
   - * Belief in the Freedom of Movement
   - * Assumptions and Beliefs Regarding the Environment

2. **Change Incompetence**
   - * Change - Individual Level
   - * Change - Institutional Level

3. **Status Quo Maintenance**
   - * Frontier Mythology
   - * Growth Mythology
   - * Power of Advertising
   - * Successful Lifestyle Images

4. **Fear of the Unknown**
   - * Fear of Change
   - * Risk-Taking
   - * Car Equated with Control

5. **Bureaucracy**
   - * Embedded Beliefs
   - * Processes of Subversion
Forces Hindering Change (Second-Order Level) -- Values, Beliefs, and Assumptions

Values, beliefs and assumptions provide a foundation for an organizational or community culture (refer to Chapter Two, Section 2.5.4). An organizational or community culture provides people with an atmosphere of security and comfort, creates a sense of continuity, and helps insulate people from constant change. Therefore, an organizational or community culture, in fulfilling its role in system maintenance, can contribute to system destruction by not allowing adaptation to take place. This section explores the power of values, beliefs and assumptions and how society and the environment are affected by them. The belief in the freedom of mobility receives close scrutiny due to the impact of this belief on land and transportation planning.

Power of Values, Beliefs, and Assumptions

As the following quotes (provided by a local politician) demonstrate, values, beliefs and assumptions (VBAs) can become powerful tools in the maintenance of culturally created systems:

"I think there's something about the nature of organizations ... Same can happen with families, as once gets into routines and norms that at times vanish or they don't become recognizable anymore. So people are unaware of what we're doing. So those underlying and now invisible assumptions of norms and practices need to come up and out to sort of, 'Oh, wait a minute. This is ... Well, we've always done it that way.'" (19-292-298)

"... university ... students are taught how to do things and they're fed certain kinds of information, but they're not asked to explore their own values, their own issues, their own ... I mean questioning is not something that one is supposed to do even." (19-422-428)

The first quote describes the influential role which VBAs play in hindering change towards transportation sustainability in Vancouver. Norms have been established and
routines have been developed which few people involved in planning and implementing
Vancouver's transportation system question.

VBAs need to be constantly challenged, but, as this local politician noted "...questioning is not something that one is supposed to do ..." Jantsch (1980) advocated planning at a value level which would involve examining how values, beliefs and assumptions impede the evolutionary growth of humankind. The second quote implies that this type of discourse should be expanded within the post-secondary educational system.

Societal Values, Beliefs, and Assumptions

Participants suggested that there are societal VBAs which can impede change:

"[A] lot of it is history. It's the evolution of the way the communities have come up, [and] the way our political system has come up, the evolution of expectations of individuals as they've grown up." (17-455-459)

"... [It's] associated with culture and choice ... It's [single family dwelling] an extremely beautiful piece of technology that gives you all of these wonderful things. Works great for the individual. And our society, particularly western values, emphasizes the virtues of individualism." (15-436-446)

VBAs are embedded in each individual and, as the first participant quote (provided by a transportation planner) noted, in our political system; they have defined how our communities have grown and evolved over time. One of the most significant assumptions in North American society is that families reach economic and social success only after the purchase of a single family dwelling. The second participant (a local politician) referred to the single family dwelling as "... an extremely beautiful piece of technology." Duany (1991) describes the single family dwelling as the "MacMansion": the perfectly conceived, most marketable commodity experienced in our urban regions since the evolution of
Belief in the Freedom of Movement

Associated with the single family dwelling (SFD) has been the important role the automobile has played in allowing human activities to spread across the countryside in a dispersed, low-density manner. This spread or dispersion has been encouraged by, an interview participant (a local politician) noted, a fundamental belief that personal mobility is a basic right:

"In 1976, 1977 when we proposed the mini-park and diverter scheme to block our streets. It was heresy, it was a communist plot. Freedom of movement ... You know, your car was equated with democracy." (16-78-81)

"... there is a proposal ... for a replacement of the Lion's Gate Bridge, I keep talking about this because it's consuming my life lately. But he [the daily commuter] talks about this wonderful urban experience of driving through the park everyday and how it has to be enhanced and augmented. Well I thought this was the most preposterous thing I'd ever heard of -- jamming 25 million cars a year through Stanley Park with the serious environmental degradation that it causes." (12-272-286)

The idea of equating the automobile with democracy illustrates the value which society places on its vehicles.

The second quote discusses one of the current transportation issues confronting citizens of Vancouver: declining environmental quality and livability due to increasing numbers of automobiles in the region. The proposal to expand the Lion's Gate Bridge may represent the turning point in the cycle of continually responding to traffic congestion through the expansion of automobile infrastructure. Stanley Park represents one of Vancouver's greatest natural and cultural assets. A segment of the community feels that
the park's natural assets have been degraded by the increasing volumes of automobile pollution which have been introduced by the major provincial highway which cuts through the heart of the park. Another segment of the community describes the "wonderful urban experience of driving through the park everyday" on the commute to work. They feel the expansion of the Lion's Gate Bridge will result in reduced congestion and enhancement of their wilderness experience. These individuals value their freedom of movement, but over time their movement will be further restricted if the bridge is expanded.

**Assumptions and Beliefs Toward the Environment**

The following quotes represent the VBAs of transportation decision-makers (three environmental analysts, and a transportation planner) about the current global environment issues of CO₂ pollution and global warming:

"... some of the documents I see coming from them [engineers] are, 'Well, did you know that nature puts out more CO₂ than humans ever will?' And I keep pointing out the part we're concerned with is the part that humans are putting out that's over and above what nature can take care of. So there's that kind of attitudinal problem that's kind of pushing against any of these changes." (10-211-228)

"Is the rising temperature related to an actual increase in atmospheric pollution or is it related to [an] urban heat island effect where the city grows around the airport where the testing equipment is and the city is warmer than the surrounding countryside used to be, so it seems like you get a wide comprehensive increase whereas what you are really seeing is urbanisation and not an increase in temperature." (13-35-42)

"I understand that there has been climatic change throughout the history of Earth and to put that change, which may take place over a 20 to 50 year period, into the context of what may happen in the next 500 years, that's where I would imagine we really need more information." (03-638-644)

"I mean obviously it's not good that CO₂ is increasing with global warming. From a municipality's perspective there's not a lot of control
that we have over CO₂." (08-113-116)

These quotes demonstrate that many of the most influential transportation decision-makers in the Vancouver region do not take predictions of global warming seriously. They downplay environmental concerns by commenting that human-derived CO₂ is insignificant when compared to natural CO₂ production, by questioning data collection techniques, and by discounting short-term temperature increases as natural variations. The last respondent (an environmental analyst) recognized the problem of global warming but questioned the ability of municipalities to contribute to its solution.

The Clouds of Change report (City of Vancouver 1990), adopted by Vancouver City Council on October 16, 1990, contained the following recommendation: "resolve that the City of Vancouver take responsibility for the carbon dioxide emissions of its citizens and to that end commit itself to an initial reduction in 1988 level carbon dioxide emissions of 20% by the year 2005." The government of Canada, through the Green Plan, committed to the stabilization of greenhouse gas emissions at 1990 levels by the year 2000 (Canada 1993a, 52). While the City of Vancouver and the Federal Government recommend reduction or stabilization in carbon dioxide emissions, the words of the last respondent puts the City of Vancouver's commitment to this effort into question. Furthermore, the recently-released regional transportation plan (Transport 2021), if implemented, will result in a 15-20% increase in CO₂ by the year 2021.

Transport 2021 defines proposed developments over the next 25 years. The following quotes highlight one participant's responses (an environmental analyst) to the document:
"the Transport 2021 document really tends to downplay the impact of the automobile. They talk about air pollution, but they talk about, well it should get better because emission control devices are getting better ... It ignores one emission from cars and that's carbon dioxide ... The more cars you have the more gas you burn, the more gas you burn, the more carbon dioxide you have. You can put as many emission control devices on as you want but you don't reduce the amount of CO₂ produced. And one frustration I've had with Engineering is I don't think they've bought into the global warming, greenhouse gas argument." (10-211-228)

"I'd go back to who was sitting on the Transport 2021 committee. I think you'll find a predominance of engineers -- highways people. Their interest is in moving people, moving vehicles, moving goods, and I don't think a lot of them buy into the greenhouse gas argument." (10-413-421)

This participant's comments support the feeling that engineers have not changed their basic assumptions and beliefs towards the environment. Transportation decision-makers ignore municipal and national pollution reduction targets and call for more information and more accurate information. They ignore CO₂ reduction targets because to accept them as one of their planning parameters would require a complete rethinking of the values, beliefs and assumptions which shape the urban transportation system in the Vancouver region.

**Forces Hindering Change (Second-Order Level) -- Change Incompetence**

Yellin (1993) reported on the results of a Gallup Poll which concluded that the majority of American business leaders could be classified as "change incompetent" (refer to Chapter Two, Section 2.5.4). The survey found that, when asked why organizations resist change, 82 percent of the executives replied that management had to protect the status quo, 79 percent noted that they didn’t like to lose control, and 77 percent reported
that they simply didn't know what to do about change. This category, and the following three categories, will explore these elements of change resistance in Vancouver. Change incompetence at an individual and institutional level will be examined within this category.

**Change -- Individual Level**

Participants offered the following comments with respect to resistance to change at an individual level.

"History is one answer. History and the personalities involved have those personal experiences and they’re just continuing them, and no one’s willing to change. ... the way people started doing things and now there’s some people who are challenging the norms. There are people who are still in the old mode and resist change." (12-764-770)

"... [there is a] fundamental push to change lifestyles. And I think that’s very difficult to do. It's changing attitudes, it's changing lifestyles, it's changing expectations with people. And that's why there's a lot of confusion about what it [sustainable development] really means in conceptual terms and what it means to an individual." (17-21-44)

"You can instill a lot of change over one or two generations. If you try to do it over a period of 10 years you're going to find people digging their heels in." (03-271-273)

Carnall’s change cycle theoretical construct contains five stages: denial, defence, discarding, adaptation and internalization (refer to Chapter Two, Section 2.5.6). Individuals in the rich nations of the world seem to be locked into the denial and defence stages of this cycle. The first of the above quotes (from a community planner) contends that history and the life experiences of individuals in powerful decision-making positions are significant contributors to the resistance to change. The historical element can be explained by the past century of unprecedented wealth accumulation and by the rising levels of economic quality-of-life indicators brought about by growth economics. This
economic growth has slowed since the 1970s (refer to Chapter One, Section 1.1), yet, as the first participant observed, individuals in powerful decision-making positions in the rich nations of the world continue both to deny the existence of the significant change processes which are taking place around them and to defend "old mode" ways of acting. The second participant (a transportation planner) discussed the need to change lifestyles and felt that this involved an extremely difficult process of changing attitudes and expectations. A significant observation of this participant related to the "confusion about what it [sustainable development] really means in conceptual terms and what it means to an individual." Confusion surrounding sustainable development relates to a need to change basic expectations of people and thus change lifestyles which we have become accustomed to.

The final quote (by an environmental analyst) introduces the element of time into the change process. The "... two or three generations raised in totally suburban environments" that one participant described will find it extremely difficult to change lifestyles over the short period of time many authors (see Chapter Two) feel remains before the global carrying capacity is exceeded.

**Change - Institutional Level**

This section presents participants' views on resistance to change at an institutional level.

The contributor (a community activist) of the following monologue reinforced the conclusions of the Gallup poll which was reported on by Yellin (refer to Chapter Two, Section 2.5.4) - that institutions are not designed for change. Organizations do not
incorporate flexibility into their operational design nor do they know how to initiate or to manage change.

"But I would say that the biggest thing is that they're [institutions] not designed for change, they're not designed for flexibility, and they don't know how to initiate it or manage it very often. And when, in my experience with some of the organizations I have worked with, who come to the point where they say, 'we want to change, we recognize that there is a need.' We've got to stop doing this hierarchical stuff. We want to work in teams and empower employees so that people are working much more in higher levels of decision-making capacity rather than just the top making all the decisions and telling people what to do. But the fact is that the people, the large mass of people, don't know how to do it. They don't have the personal skills; they don't have the knowledge. The capacity isn't there to change. So even when it's recognized that the change is needed, then there's an incredible amount of resource and energy that has to go into initiating the change." (19-309-324)

The hierarchical structure of institutions, with the traditional concentration of decision-making at the top, continues to suppress and disempower employees. As another participant related, "You're not going to get forefront thinking. You're not going to get new and innovative ideas. Because you can get stomped on" (04-205-208).

The next two interview excerpts (from a local politician and a community activist) summarize the views of respondents regarding the problems of institutional structures:

"... to me, it's really easy to identify what needs to be done. That's not the problem ... The stumbling block, if you will, is really how do we get it. What structures are in place? Are the existing structures adequate to take us along that path to where we do realize the vision that we have. And I think that's where we're having a lot of trouble, and we're really grappling with some of these issues." (18-196-209)

"... where it really comes unstuck is where you try and translate that [sustainability] into much bigger sort of systems where you basically are trying to change a whole structure for decision-making to produce a different outcome. And that's where I think we're really struggling." (16-
According to these participants, there is a vision of sustainability, but the movement towards this vision is being impeded by, as another participant put it, "fine people with fine ideas being stuck in institutions that don't work very well." (04-265-267)

This problem was forcefully demonstrated at a conference held in Vancouver on March 4, 1994. The conference was entitled "Integration of Government Program Delivery and Shared Responsibility in the Fraser Basin" and was sponsored by the Fraser Basin Management Board. Discussion focused on the following topics: overlapping agency boundaries, conflicting mandates, the lack of a common vision for change, methods of eliminating government sectoral compartmentalization, and shifting from top-down to bottom-up forms of governance. The researcher observed a room full of predominately middle- and senior-government managers painfully discussing or attempting to ignore the need for change.

Several weeks later, the researcher met a newly elected councillor from the municipality of Pitt Meadows who had attended the conference. He was shocked at the level of change incompetence displayed at the conference. His observations reinforced participants' comments and the researcher's conclusions that knowledge is severely lacking in the area of bringing about second-order change within institutions.

**Forces Hindering Change (Second-Order Level) — Status Quo Maintenance**

One of the key elements in resistance to change is the desire to maintain the status quo. Society has developed numerous methods to impede change. Four methods — the
frontier mythology, the growth mythology, the power of advertising, and successful lifestyle images -- are discussed below.

**Frontier Mythology**

According to one participant (a local politician), the mythology of the western frontier blinds people to reality.

"L.A. was always a good visual to look at, although our [Vancouver's] per capita air pollution is higher than L.A.'s and has been for some time, which is kind of unfortunate because I have found for the last 10 or more years people in Canada generally, and certainly out here, felt very smug. And so they keep assuming that this will always be wild, and free, and clean and beautiful B.C. And they're not getting it, as some of the most consumptive ... and wasteful people on the planet. (19-170-177)

The images of Los Angeles' air pollution are striking. But few Vancouverites are probably aware (or conveniently ignore the fact) that, on a per capita basis, Vancouver's air pollution is higher than pollution levels in Los Angeles. This participant noted that residents of British Columbia are also world leaders in the consumption of resources. This overshadowing cultural myth of "wild and free and clean and beautiful B.C." perpetuates as the environment, which we hold so dear, is consumed.

**Growth Mythology**

The following two quotes describe how the growth mythology is perpetuated within society.

"... academic institutions, engineering schools, schools of technology, that employ loads of people to teach people, other people, how to keep all that going including building roadways ..." (19-259-264)

"... we have certain entrenched historical ways of doing things and it's ... you know, I'm not ... it's hard to blame individuals. It does become a very kind of system thing. It's like dealing with racism. One can say, look
we’re going to try and eliminate racism and you can’t go out and call someone a derogatory term. I mean that’s stuff you can deal with, but it’s really the systemic forces that are at work that are so entrenched in our culture … in our way of doing things." (18-499-507)

The first quote (from a community activist) illustrates how the educational system is set up to maintain the growth mythology. Another participant (a community planner) described a study which demonstrated that, in the United States, civil engineering students receive an average of 15 minutes of instruction in the area of bicycle transportation during an undergraduate program which focuses almost exclusively on providing engineering services to automobile drivers. (12-328-338)

The second quote (from a local politician) provides an example of the difficulty of overcoming established ways of acting. It is not possible to stop racism, for example, by just telling people to act a certain way. To really stop racism, a change in people’s values, beliefs, and assumptions would be required (second-order change).

Power of Advertising

An earlier section of the research findings, entitled "Forces Hindering Change (First Order Level) - Status of the Automobile," briefly discussed the powerful tool of advertising in prolonging the "defence" stage of the change and transformation process (refer to Carnall 1990, 40). Participants' comments pertaining to advertising as a powerful change-hindering tool are presented below.

"... the way society is set up right now, there are so many car ads per hour on prime time television and there aren’t any public transit ads, and it’s pretty clear that the aspirations of society are continuing to go in the direction they were going in the 1950’s …" (07-128-132)
"Our society is somewhat to blame. The advertising and seduction of owning your car ... having all that power and glory at your fingertips ..."
(11-302-305)

The first quote conveys a local politician's views on the uncompetitive position alternative modes of transportation are placed in. The industrial-auto complex, using advertising as its dominant form of information dissemination, bombard society with the virtues of the automobile. As the second quote (from a transportation engineer) suggests, the image of the 1950s is perpetuated, whereas the unadvertised reality is one of urban traffic congestion and increasing levels of pollution.

Successful Lifestyle Images

This final section examines the static sense of reality brought about by growth economics:

"People's expectations [stem] from what they've grown up with. Everybody wants to do as well or better than their parents did. People who haven't lived in a single-family home want to have one. People who've had one don't want to move to anything lower on the chain." (17-239-243)

Let's look at what the automobile offers: freedom and flexibility, status, privacy and security. Those are very valuable commodities. People pay a lot for those things, particularly [for] the freedom and the status, and increasingly [for] the security." (15-229-233)

Values, beliefs and assumptions of bygone decades still drive society. As the first participant (a transportation planner) noted, the single-family dwelling remains a major goal defining individual and family success. People caught in "denial" and "defence" stages of the change cycle, prior to a second-order paradigmatic shift, create images of reality which attempt to maintain bygone lifestyles. The second quote (from a local politician) describes the strong values which cause people to aspire to automobile
ownership. The automobile, in conjunction with the single-family dwelling remain the strongest images defining a successful lifestyle. These two commodities are also the greatest consumers of both land and non-renewable fossil fuel resources.

**Forces Hindering Change (Second-Order Level) — Fear of the Unknown**

During a transformation process, some people are motivated while others are completely overwhelmed by the rapidity of change. One of the factors which can contribute to this feeling of being overwhelmed is the fear of the unknown. This factor can be divided into three sub-factors: fear of change, risk-taking and images of control and safety.

**Fear of Change**

The following quotes describe participants' thoughts on how fear may be impeding the transformation process:

"I guess there's always fear of change. Change is, uh ... you know. The activists, the advocates want change, but general members of the public are cautious about change. You may be disrupting their daily lives ... Or they may have myths about things." (12-571-576)

"... [There is often a] fear of the unknown or fear of losing what they already have. And they're [hindering forces] in place because our designs of the past are no longer functional today. And the designs of the past are pretty solid; they're kind of tough to undo." (19-448-452)

"This is a very difficult message to go out and say: 'Hey folks you're going to be poor and here's a much better way for you to live as a consequence.' Not a message that people want to hear." (15-264-266)
The first quote (provided by a community planner) describes the continuing tension between community activists, who want change, and the general public who are cautious about change. This participant also introduced the concept of myths. Dyer and Dyer (refer to Chapter Two, Section 2.5.4) discuss how myths form an important element in defining organizational and community culture and can be used to impede change. The second participant’s comments (from a community activist) consider the demoralizing effects of the fear of the unknown which can lower the self-esteem of an individual, an organization or a community (refer to Chapter Two, Section 2.5.6 and Carnall 1990, 40). The accumulated knowledge of individuals may become suspect or may be rejected as no longer having value. Reality is redefined, and the individual, the organization, or the community must grope about in an attempt to redefine reality.

The final quote (expressed by a local politician) demonstrates that the message that sustainability advocates are trying to convey can elicit a response of fear and anxiety from the general public.

Risk-Taking

Movement towards a sustainable people-based transportation system will require risk-taking. The following quotes describe participants’ perceptions concerning people’s tolerance to risk.

"... [there] are really critical ways for reading the urban environment and a lot of people simply don’t have the skills anymore to know how to do that. Their lives now are structured around automobiles. They know how the automobile works, they know time/space considerations, they know how to park, [and] they know what it costs. They’re comfortable with that, and they see no reason to go into cultural environments that they’re uncomfortable in." (15-380-387)
"... [We are] asking people to leave their cars but to get onto a system that doesn't serve their needs." (10-234-237)

During the discarding stage of the change/transformation cycle, Carnall (1989, 143) explained the need for an atmosphere which allows for experimentation and risk-taking. As the first quote (provided by a local politician) suggests, skills in experimentation and risk-taking are not common in society today. In fact, society strives to create environments which are familiar and comfortable. When most of society's efforts have gone into creating such an environment within the automobile-mobility system, the second quote (from an environmental analyst) notes that people see no reason to take risks with alternative systems in which these efforts have not been invested.

*Car Equated with Control*

As the following quotes (from an environmental analyst and a community planner) indicate, attached to the automobile are beliefs and assumptions that it represents the only form of transportation where one has control of one's time, control of one's ability to move around, and control of one's safety:

"In North American society, the ownership of the automobile sort of goes back to the cowboy and his horse ... If you know you have the freedom, even if you're constrained from using it, there's something comforting about that." (03-519-523)

"I think it still largely falls back on the individual perceptions, which is a combination of safety and convenience as well as other things. Just status to a degree, but I don't think status is probably as big a deal sometimes as the safety and the convenience factor." (19-241-245)

Although these perceptions are real, research reveals that the automobile is the major contributor to urban congestion (refer to Chapter Two, Section 2.3.1). Increasing
use of the automobile reduces both one's control of time-space factors and reduces one's freedom to move around urban areas. Safety problems actually increase as the use of the automobile increases (refer to Chapter Two, Section 2.3.3). Pedestrian street usage declines as the volume of automobile traffic increases, and the loss of street life results in increasing crime rates.

**Forces Hindering Change (Second-Order Level) — Bureaucracy**

This final section presents participants' ideas about how bureaucratization impedes the process of change towards community transportation sustainability. Participants discussed, at length, how bureaucracy is one of the major forces hindering change. Comments relating to this topic are separated into two sub-categories: embedded beliefs and processes of subversion.

**Embedded Beliefs**

Many participants commented on the entrenched processes of inaction which they have observed in bureaucracies responsible for people-based transportation in Vancouver. The following two quotes (from a local politician and a transportation planner) summarize these comments:

"... a negative force is an entrenched bureaucracy that makes decisions that sees the development of roads for automobiles as sort of like something that you can't question." (18-305-316)

"... you become big and you become a bureaucracy and you tend to think that, you know, your people sort of get into a mould where thinking is indifferent; it's just not going to work. I think also one of the things that hurts transit is that increasingly we recognize we can't go on the way we have been but at the same time not knowing how to change." (13-427-432)

The above quotes describe two factors within bureaucracy which hinders change towards
a sustainable transportation system: the concept of entrenched decision-making which continues to support the automobile (a recurring theme discussed by all participants during the interviews) and change incompetence (discussed by fourteen of the eighteen participants) within bureaucracy. The first quote implies that entrenched decision-making results from embedded beliefs which are not questioned by the organization.

**Processes of Subversion**

How bureaucratic organizations subvert the desire of the politicians and citizens they serve was a popular topic of discussion during the interviews:

"Very little priority [is] given to public transit. And I think again there's a council policy on it, but it's carried out by the bureaucrats of the city. The Engineering Department, when you really get down to it, is not all that supportive of that." (13-827-833)

"And it's really interesting to note that the bureaucracy has a life of its own and has a way of operating. I mean I work for the provincial bureaucracy so I should know that. When you try to make changes and you go to the politicians who are supposed to have the power and they support your change and still the bureaucracy still somehow doesn't allow it to happen. It gets pretty frustrating." (02-669-677)

According to the first participant (transportation planner), the Engineering Department of the City of Vancouver has ignored a City Council policy which supports public transit. This situation is studied in more detail in Chapter Five, Section 5.3 where the Council transit priority policy is examined within the context of city capital and operating budget investments.

The second quote (from a community activist) illustrates Selznick's concept of institutionalization (refer to Chapter Two, 2.5.3 and Selznick 1957, 16) which describes how organizations can take on a "life of their own," functioning in a manner which meets
the needs of the employees rather than the needs of the constituents the organization was
set up to serve.

5.2.4 - Means to Overcome the Forces Hindering the Shift from Automobiles to Other
Modes of Transportation

Question Five

"How can these impeding factors be overcome?"

This section explores participants' suggestions regarding how forces hindering the
movement towards community sustainability in the transportation system can be overcome.

Although Question Five generated 54 pages of transcribed information, difficulty
was encountered with this question. Interview participants provided numerous suggestions
as to what the hindering forces are, but they experienced more difficulty in articulating
ways to overcome these forces. Since participants tended to return to discussing specific
hindering forces, probes were necessary to prompt additional suggestions for overcoming
these forces.

This analysis is organized by techniques and processes which would assist in the
transformational process towards sustainability. Skills related to these techniques and
processes are discussed in detail in the next section (The Planner's Role in Overcoming
Hindering Forces).

Supply and Demand Management

Supply management denotes techniques and processes which control the availability
of a product or service -- in this case transportation infrastructure. Participants provided
a number of second-order change suggestions which would ultimately result in first-order change by affecting how the supply of infrastructure is managed. One local politician felt that the basic values and principles of land-use planning must be redefined so that land use becomes compatible with environmental considerations:

"... Ensure that the land use is conserving ... that the natural environment is protected ... agricultural land is protected ... don't overuse water ... [so that] land use is compatible and not in conflict with environmental considerations ..." (12-47-65)

Many people would say that these considerations are practised today; participants felt differently. While an extensive planning process exists on the Lower Mainland, participants felt that very few demand-management techniques, that would result in improved social or ecological liveability, are actually being implemented.

Demand management denotes techniques and processes which, in the case of transportation planning, affect changes in people's attitudes. Participants suggested methods which would encourage Vancouver and area residents to seek modes of transportation other than the automobile. One of these methods, increased taxation levels, would reflect the full-life costing of automobiles and automobile infrastructure by requiring drivers to pay user fees and market-price parking.

P**olitical Participation**

At a community level, public participation is a currently accepted method which is used to bring about community change. Within the realm of one type of public participation, political actions, participants' comments focused on the need for second-order change which would result in the redefinition of community values and political
"What needs to be created is a political or social mandate. The creation of
a mandate, I think, is very different than a government actually taking
action. If you look at which governments implement most social democratic
policies in Canada, it's very clear that there was one political formation
backed up by a movement that created the mandate and then many other
political formations that actually carried out the mandate." (11-376-383)

This participant (a local politician) described the need for a social movement which
would initially transcend government parties. In an ideal scenario, the mandate for change
would become so strong and definitive that people from diverse segments of society would
coaalesce around the issue. Established parties would initially ignore the prospect for
radical change, but, over time, they would be drawn into the movement. According to this
participant, the sustainability debate is in the early stage of development into a social
movement. Referring again to Carnall's change/transformation cycle (1990, 40), the
urban sustainability political debate remains in the denial and defence stages for most of
Vancouver's political representatives and senior civil servants. A growing portion of the
residents of Vancouver are entering the discarding and adaptation stages of the cycle; they
are leading the way towards sustainability.

Another participant (a community planner) observed that changes are brought about
through a "series of shared community values as to what we care about in the city and how
we go about implementing that" (03-360-376). This participant noted that these values
were always present, but they are now being articulated in Vancouver through the
CityPlan process. A framework or value-set which represents residents' visions of the city
is now being developed.
Public Education

An important component of the change process is education. Participants provided the following suggestions as to how education can be used to create awareness, support early innovators, and make components of the change vision socially acceptable:

"I think education is an awareness. Like the program that's going on now, CityPlan, is certainly bringing to attention within the City of Vancouver a lot of the major issues that are confronting the citizens ... giving them [citizens] realistic choices ..." (19-628-632)

"... recognizing and supporting people who do what we collectively think is a socially desirable thing. ... one up on you when you see a car load of people and a thumbs down when you see an individual travelling in the car. Then you might start to see some significant changes." (03-124-129)

"What you've got to do is turn the bicycles into the Cadillacs of their times or the Maserattis or the Mustangs. People have to individualize them and associate them with status and their personality." (15-454-458)

The first quote (by a transportation engineer) cites the City of Vancouver's CityPlan as a process which is creating the space to allow citizen dialogue and, through information exchange, a clearer understanding of the choices and tradeoffs which must be made in the redevelopment of the city into a more sustainable community.

One participant (a community planner) provided an analogy between car driving and the continuing program to make cigarette smoking a socially undesirable habit. Methods must be found to support and acknowledge efforts of the early innovators in the movement away from automobile dependence. The suggestions contained in the second (a community planner) and third (a local politician) quotes provide several basic methods to discourage automobile use and to encourage alternative forms of transportation.
\textit{Institutional Decision-making}

A substantial number of comments concentrated on the need to change the way in which local and regional decisions are made. The following quotes (from a community activist and a community planner) summarize participants' comments on this topic:

"... bring about an environment where, as much as possible, decisions are made by the people who will be affected. The more you can do that the more I think you can make good decisions." (12-399-403)

"... Being more inclusive in the factors that you consider around any decision. ... Starting to recognize that we are not, as humans, apart from the planet, we are birthed by the planet." (13-460-466)

"... the more we can convince people though, that if we change the way decisions are made, that will be a key change that will allow a lot of other things to happen. For me that would be a big one and so in my political life I've often tried to focus on that issue ..." (12-531-535)

Participants believed that all segments of the community must have an opportunity to participate in the decision-making process. They also thought that potential parameters must be redefined in order to consider a broader range of positive and negative impacts of decisions. The pivotal role which the redefinition of decision-making can play in the movement towards sustainability is reinforced in the second quote.

The British Columbia Committee on Resources and the Environment (CORE 1994) process on Vancouver Island, and in other regions of the British Columbia, provides an excellent example of the difficulty of experimenting with non-traditional decision-making. Although these planning activities have not succeeded in the ultimate goal of resource conflict resolution, the process has developed and tested new concepts of decision-making. This valuable information adds to the information base which will provide new avenues
to reach complex community-level decisions.

Interview participants generally experienced difficulty in identifying ways to assist in overcoming barriers which impede the movement towards sustainability. They did make a number of suggestions including changing basic values and principles of land-use planning, the need to redefine community values and political structures, creating community educational processes which would incorporate double-loop learning and would acknowledge the efforts of early innovators, and inclusionary public participation and decision-making processes. All of these suggestions may contribute to second-order change.

5.2.5 - The Planner's Role in Overcoming Forces Hindering the Shift from Automobiles to Other Modes of Transportation

Question Six

"Specifically, what is the planner's role in overcoming these impeding factors?"

Interview participants provided thirty-two pages of transcribed information when responding to this question. This represented 6.8 percent of the total pages compiled from the interviews. Two of the three respondents with an engineering background (who worked at the local level) had difficulty articulating a role for planners in overcoming these impeding forces. This may be explained by the animosity which exists between the engineering and planning professions at City Hall (refer to Section 5.2.3 - Conflict between Planning and Engineering Departments) or by a lack of understanding about the role of planners.
Sustainability advocates must possess unique skills to create change towards sustainability within a community's transportation system. Carnall (1989, 129 & 132) suggested that the following skills are required to influence a change process: negotiation, influencing, mobilizing support, mobilizing bias, and the ability to deal with conflict.

Drucker (1985, 260) described the need for skills in dealing with flexibility, exploring contradictions and dilemmas, generating rather than judging ideas, creatively scanning rather than focusing thought, and incorporating rather than rejecting constructive criticism (refer to Chapter Two, Section 2.5.7).

The ideas discussed by participants were organized into skill categories. Information presented in this section also contains descriptions of important skills (identified by participants in the previous section) needed to overcome forces that are hindering the shift from automobiles to other modes of transportation. These ideas are included in this section in an effort to reduce information repetition.

**Information Skills**

One of the elements of Rees' definition of sustainable development (1989, 3) is a need for an educational process which is "informed, open, and fair." Throughout this educational process (a basic element of double-loop learning), Argyris (1991, 100) calls for a new way of thinking ("reasoning productively") which encompasses a constant questioning of values, beliefs and assumptions. Because community residents need information to engage in this kind of self-reflection, participants felt that planners should have a primary role as educators:
"... we felt that we needed planners to understand some of those longer, those vision kinds of issues, and the long range kinds of issues. ... [planners] allowed us to put things in a different perspective ..." (08-412-421)

The community activist who made the above quote stressed the ability of planners both to provide citizens with the opportunity to look at situations from a different perspective and to look at long-term visionary issues such as growth options or alternative transportation scenarios. Another participant added a dimension which focused on educating youth (08-285-290). This participant believed that changing the values, beliefs and assumptions of young people would be easier than changing the values, beliefs, and assumptions of adults whose established norms and habits can be difficult to modify.

Another quote, made by a local politician, describes how a planner's ability to offer a full range of options can improve the chances that some form of change will be adopted by a community:

"... [the planner] puts the options on the table ... without putting the radical options on the table, the planner risks the rejection of even the most moderate of the options put forward. Unless it's shown that there's a range from the status quo to banning cars, the idea about planned phase out, even a gradual one over 50 years loses credibility ..." (11-512-522)

When a full range of options is offered, people can debate the choices and choose the option they are most comfortable with. When a full range of options is not offered, people are faced with an uncomfortable choice which they may reject whole-heartedly.

*Negotiation Skills*

Forester describes the practice of planning as a process which requires "planners to be able to 1) envision problematic situations, 2) prepare and manage good arguments,
and 3) negotiate strategically to intervene" (1989, 164). Participants agreed that negotiation skills can be useful tools for creating change:

"... make positive change. The only way I can do that is by convincing the ladder of responsibility all the way up." (10-783-795)

"... having meetings with municipal representatives, putting it on the table, saying OK what can we do to implement this? Right now. Let's talk about it. Let's get it out. I can use a lunch conversation. I can use a memo. I can use a meeting on an entirely different topic." (10-816-829)

"... have to first get people to the table; second, make them comfortable; third, you have to give them your ideas; fourth, you have to listen to their ideas; and fifth you have to make sure that everyone knows what happened at the meeting and you are moving in the same direction when the meeting is over ... even if it is just to the next meeting." (10-893-900)

"I'd suggest making your ideas sound acceptable to people. With bikeways we've tried to sell it to the community and say, 'hey man, you may have some traffic calming on your street. You may have more bicycles, but you'll never notice the bicycles. In fact you may have just fewer cars and slower traffic on your street. It may become more of a livable street." (17-821-826)

Numerous books have been written on negotiating (Fisher & Brown 1988; Fisher & Ury 1981; Nierenberg 1968; Ury 1991) which continues to be one of the most important tools used by advocates to create change. Participants felt that many planners lacked negotiation skills. Planning can be defined as the process of creating change, and new ideas are not readily accepted by individuals, organizations or communities. These ideas need to constantly be prodded, pushed, sold, and promoted.

The above quotes identify specific negotiation techniques which participants found useful. The first quote (from a transportation planner) recognises that passing a new idea on to an immediate supervisor, or publishing a new idea in a planning document, rarely
achieves change. Delicate methods must be used to inform influential (powerful) people of the merits of an idea without offending supervisory personnel who still believe in a rigid hierarchical chain of command.

The second and third quotes (by the same transportation planner) describe techniques which can be used to influence decision-makers. This participant recognizes that you cannot be passive: ideas do not sell themselves. Assertiveness, debating, listening, and talking are all valuable skills of the negotiation process.

The final quote (provided by a community planner) describes a unique dimension of communicating: "making your ideas sound acceptable to people." An earlier category (Forces Hindering Change [First-Order Level] - Professional Planning Mindset) contained criticism of the lack of preparatory education provided to novice planners by the planning profession and by planning schools. Participants felt that planners were not equipped with the basic political and process skills needed to implement concepts which would move communities towards sustainability.

**Facilitation Skills**

Participants felt that planners should act as facilitators in the continuing debate over community sustainability. The following quote describes a community activist's vision of how planners can facilitate a bottom-up process of community debate:

"A planner should be someone who has some understanding of what's going on but is able to impart that knowledge to ordinary people so that it's people again, who are affected by what goes on, who are making the decisions to make the changes ... And your planner should be a person who I think is a resource person, is a facilitator, is a catalyst that provides people with the support and the resources that they need in order to make those critical decisions." (12-547-562)
In this scenario, planners would not plan. Their role would be catalytic; they would provide citizens with the information they need to make informed decisions about their own future. The community activist who contributed the above quote felt that planners should ensure that all segments of a community have an opportunity to contribute their thoughts and ideas to the debate surrounding community sustainability. As an interview respondent stated in the previous section, open processes of public participation result in an improvement in the quality of debate and ultimately in an improvement in decision-making.

**Mediation Skills**

According to participants, planners should also possess the skills to act as mediators between citizens' groups and government organizations:

"... we insist that in our community we will have absolutely no dealings with an engineer without a planner present. And what planning ends up doing for us is just being a mediator. They just don't have the power that engineering does ..." (16-293-296)

"I think, for land use planners, I think they have to get much more involved with transportation. They have to understand transportation ... the relationships between land use and transportation." (14-667-676)

The conflict between the city's Engineering Department and neighbourhood citizens' organizations is reintroduced in this section in order to illustrate the planner's role in conflict resolution. The first quote was given by a community activist who felt that planners should play a role in mediating the debate between what is desirable and what is achievable. To play this role, the planner must provide background information, must describe a full range of options, and must allow all interested groups an opportunity to
participate in the debate.

The second participant (a transportation planner) recommended that planners become more involved in the transportation debate. One interview respondent felt that planners have been pushed away from transportation planning by the aggressive tactics of the engineering profession.

*Transformation Skills*

Another important skill focuses directly on the redefinition of personal values—a process which results in the promotion and expedition of the transformation process. A community activist discussed the need to examine one’s self image—to look inward while also examining the exterior environment:

"... it's a willingness to examine self, examine behaviour, [and] examine the system ... [a] willingness to change one's own behaviour, to say ... this isn't going to work ..." (13-475-477)

"... It's about making choices. It's about becoming a lot clearer about what we truly value ... I mean truly value." (13-478-479)

Drucker (refer to Chapter Two, Section 2.5.7 and Drucker 1985, 260) discusses the skill of exploring contradictions and dilemmas in values, beliefs, and assumptions which direct individual, organizational and community actions. As the first of the above quotations notes, accompanying this exploration must be a willingness to change one’s own behaviour.

The second quote (by the same community activist) stresses the need to make choices. A major observation made by participants throughout this research inquiry, is the state of inaction in decision-making within the planning system for people-based
transportation in Vancouver and the greater metropolitan region. If planners have the skills to facilitate value clarification, then choices can be made based on those values.

Section 5.2.1 (Definition of Sustainable Development) portrayed traditional decision-making as a rigid, mechanistic process of quantifying problems, analysing potential outcomes, selecting best alternatives, making decisions, and proceeding on to the next problem. Management by Objectives (MBO) theory illustrates the shortcoming of mechanistic management decision-making. The focus of MBO on small-scale tactical interventions in particular organizational components could result in significant, unanticipated, negative impacts on other organizational components and ultimately on the organization's overall performance.

This form of intervention to create change at a first-order level must be supplemented with a new way of analysing problems which takes into consideration the complexity of natural and human-made systems (second-order change processes):

"... the ability to take a fresh look at something you may have committed to and then you can get responses, and they say, 'Well, have you thought about this,' or 'I don't think that I fit into the square ... being it doesn't fit into your round goal,' and you have to go back and do it over." (04-420-425)

"... has to do with a willingness to participate, a willingness to commit, a willingness to risk, a willingness to engage. ... that's scary stuff. Participating, engaging, all that kind of stuff means vulnerability, and there's lots of not nice people out there." (13-749-756)

The two quotes (from an environmental analyst and a community activist) reproduced above identify new skills which participants felt must be added to the planning process: risk-taking and experimentation, incorporating rather than rejecting constructive
criticism, and championing issues and causes through engagement and commitment.

The final two quotes from a community activist use the analogy of creating a house of cards to depict the delicate process of transformation:

"... with that level of intricacy and complexity ... it's like a house of cards -- to undo it without collapse also is going to require a great deal of sensitivity and skill and time and transformation. And I don't think we have a whole lot of those kind of people around." (13-269-273)

"... creating mini collapses, the possibility of mini collapses so the whole thing doesn't collapse. ... Where is the best point to initiate or to move in? ... it is a challenge, a real challenge of knowing where to start mucking, monkey wrenching or tinkering." (13-378-390)

According to this participant, either we can be reactive as transformation engulfs us, or we can create "mini-collapses" which will result in incremental modifications to our existing cultural system.

Although this intimates the concept of "social engineering," which has met with animosity and failure in most nations of the world, this participant has acknowledged that some form of intervention in the evolutionary progress of society is required. If society does accept formal intervention in its evolution, change agents must use the skills of

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5 Schumpeter introduced the concept of entrepreneurship (refer to Chapter Two, Section 2.4.4 and Schumpeter [1943] 1987, 132) and linked entrepreneurial activities to change processes in society. Theobald (1987, 42) introduced the concept of social entrepreneur and defined these types of individuals as "people who have the skills and are willing to take risks involved in bringing new ideas to individuals, groups, and institutions."

A new form of entrepreneur is evolving: the "ecological entrepreneur." These people focus on discovering new ways for social activities to take place which do not degrade the natural world and, where possible, rehabilitate natural systems which have been degraded in the past. They are interested in finding ways to both live off natural interest and wean society from continued consumption of natural capital.
sensitivity, knowledge in the complexities of social cultures, and understanding in testing and experimentation to create "mini-collapses" rather than system destruction.

**Implementation Skills**

Crucial to the process of transformation is the need to implement, test, evaluate, and modify new ideas and concepts. The following quote (made by a transportation planner) describes the high level of commitment required when developing new ideas and when going through the political process of implementing those ideas:

"If you don't really pursue [a policy paper] with as much aggressiveness as you pursued getting it written, if you don't pursue it afterwards, it's going to work against you." (10-842-845)

Interview respondents used the *Clouds of Change* report (City of Vancouver 1990) to illustrate the importance of commitment. The major criticism of the report process was the low level of involvement, by municipal government managers, in the planning and development of report recommendations. Consequently, once the report was approved by City Council, the city administration did not display commitment to its implementation.

Participants felt that the primary skill of understanding the political process of implementation should be complemented by the following abilities: describing "complex issues in ways that other people can understand"; knowing when to push an idea and when to pull back; and knowing that you can support an individual or agency at one time and disagree with them at other times. This final skill involves criticizing ideas not individuals.
Summary

Interview participants identified a large number of barriers which are impeding the movement towards sustainability in Vancouver. They experienced little difficulty discussing hindering forces at a first-order level but experienced greater difficulty identifying barriers at a second-order level.

Although participants were asked what barriers exist at the planning system stage of the planning process, they also identified barriers which exist at the input and output stages. These barriers are extremely complex, interrelated, and ingrained in the values, beliefs, and assumptions which comprise the dominant anthropocentric worldview of North American society.

5.3 Illustrative Cases

The second section of the case study findings examines three significant components of the transportation system in the City of Vancouver: transportation investment priorities for the movement of people in the city; the existence of an informal transportation plan; and restrictions in the debate surrounding transportation options.

5.3.1 Transportation Investment Priorities

A number of interview respondents discussed the city's change in priority from a focus on automobiles to a focus on pedestrians, bicycles and public transit. Through a number of policy statements, the city has indicated that it will support, and place priority on, sustainable transportation initiatives. This section presents study participant comments
regarding the city's transportation priorities, examines city documentation which support these claims, and then analyzes the city's operating and capital budgets and its capital plan (1994 to 1996) to determine the impact these policies appear to be having on the city's transportation system.

Study participants (an environmental analyst, a transportation engineer, and a transportation planner) made the following statements concerning the city's investment policy for the movement of people:

"... Clouds of Change made the city's transportation priorities number one — pedestrians; number two — cyclists; number three — transit; number four — goods movement; and number five — the automobile." (05-212-216)

"We have a Council motion that we're not to add any capacity (automobile) in the city. ... we've changed our priorities over the past few years so that they're ordered in pedestrian first, followed by cyclists, third is transit, then goods movement and then the automobile." (07-96-100)

"A lot of our budget for the capital plan for '94 to '96 is put into bicycle and pedestrian improvements. There's a lot of work on-going right now with Greenways for pedestrians. [We're] looking at ways to encourage the use of transit, say, by bus priority measures such as queue jumpers, bus lanes ... even the integration of buses and bicycles." (18-42-51)

These quotes indicate that the city has shifted its transportation priorities away from the automobile towards other modes of transportation. According to the first participant, this change of policy originated from the Clouds of Change: Final Report of the City of Vancouver Task Force on Atmospheric Change (City of Vancouver 1990).

The Clouds of Change report was reviewed to determine the source of this reprioritization policy. Although no direct reference was made to a new prioritization policy, the report contains numerous suggestions and recommendations to reduce the
dominant position of the automobile in Vancouver's transportation system. For instance, Recommendation #11 - Bicycle Transportation - (City of Vancouver 1990, 7) discusses methods with which to make bicycling a better alternative. Recommendation #16 - Energy-Efficient Land Use Policies - (City of Vancouver 1990, 11) calls for new principles of urban planning which incorporate dominant roles for pedestrian, cycling and transit modes of transportation.

Further investigation through the Office of the City Clerk resulted in the discovery of numerous city council motions recommending changes to transportation policy in Vancouver. One of these motions, already referred to in Chapter One, Section 1.2, called for transportation decisions to favour, in order of priority, walking, cycling, public transit, goods movement and then the automobile" (City of Vancouver 1991, 32).

In another example, on July 25, 1989, in responding to a proposed regional transportation policy, City Council approved the following motion which emphasizes investment in public transit rather than investment in increasing road capacity:

"That Vancouver City Council disagrees with the fundamental approach of the regional transportation strategy as outlined in the GVRD Report Freedom to Move as Council feels there should be a greater immediate emphasis placed on, and money spent on, public transit and not on increasing road capacity" (City of Vancouver 1989, 4).

In 1992, City Council, through a unanimously supported motion, stated their position concerning the addition of traffic capacity on provincial roadways entering Vancouver.

"That Council's position be reiterated to the Minister [of Finance and Corporate Relations] that there be no further significant investment to expand motor vehicle crossing into Vancouver in terms of adding capacity" (City of Vancouver 1992a).
Participants' comments, the *Clouds of Change* report, and City Council motions indicate that a shift is taking place in the city which is resulting in a significant decline in automobile infrastructure investment and a significant increase in pedestrian, bicycle, and transit infrastructure investment. To determine the magnitude of this shift, past, present and proposed future city expenditures were examined.

Figure 3.1 in Chapter Three presented a diagram depicting three stages in the planning process: inputs, the planning system, and outputs. In the output stage of the planning process, budgets were described as power implementation strategies. Various elements, including political directives, citizen pressure, studies, plans, and position papers, may influence the planning process, but budgets are instruments which implement change. Therefore historical operating and capital expenditures and the capital plan (1994-96) were analyzed to determine if the City's stated policies were indeed being implemented.

*Analysis of City of Vancouver Operating Expenditures*

An analysis of the operating expenditures for the City of Vancouver was undertaken for the years 1986, 1992 and 1993 to determine investment patterns for the maintenance and operation of automobile and non-automobile infrastructure. In 1986, new accounting procedures were established in the City of Vancouver. Therefore, 1986 operating expenditures were examined to provide a comparative historical picture with the most recent operating expenditures of 1992 and 1993. Table 5.4 summarizes the results of this analysis.
Expenditures for pedestrian, bicycle and transit modes of transportation have remained relatively constant over the years 1993, 1992, and 1986, representing less than nine percent of total investment in transportation. During the time period 1992 to 1993, when implementation of City Council policy and recommendations of the Clouds of Change report should have begun, pedestrian, bicycle, and transit operating expenditures declined by 8.3 percent (from $1.83 million to $1.68 million) while roadway expenditures increased by 12.7 percent (from $19.16 million to $21.59 million).

Table 5.4
Allocation of Expenditures for Automobile and Other Transportation Modes
City of Vancouver Operating Budget (1986, 1992 & 1993) (in 000s)

<table>
<thead>
<tr>
<th>Year</th>
<th>Total Expenditure (Transportation)</th>
<th>Total Roadway</th>
<th>Roadway as % of Total Transportation Expenditure</th>
<th>Total Other (Bicycle, Pedestrian &amp; Transit)</th>
<th>Other as % of Total Transportation Expenditure</th>
</tr>
</thead>
<tbody>
<tr>
<td>1993</td>
<td>23,271.4</td>
<td>21,589.80</td>
<td>92.77</td>
<td>1681.6</td>
<td>7.23</td>
</tr>
<tr>
<td>1992</td>
<td>20,990.3</td>
<td>19,156.10</td>
<td>91.26</td>
<td>1834.2</td>
<td>8.74</td>
</tr>
<tr>
<td>1986</td>
<td>14,553.9</td>
<td>13,382.30</td>
<td>91.95</td>
<td>1171.6</td>
<td>8.05</td>
</tr>
</tbody>
</table>

Note: The figures represent actual amounts spent, not constant dollars.
Sources: City of Vancouver, Statement of Revenues, Expenditures and Encumbrance (Final Close), 1993d, 1992c, and 1986.

Analysis of City of Vancouver Capital Expenditures

Capital expenditures are undertaken to expand or redevelop infrastructure and are

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6 The city plays a role in the public transit system, providing, for example, appropriate facilities for entering and leaving buses and stronger road surfaces where buses continually brake to pick up passengers.
indicative of the future vision of a community. Capital expenditures should therefore reflect the current policies of the city. Changes in investment patterns should be evident, although a lag period of several years may be required in order to implement policies and recommendations which both discourage investments in automobile infrastructure and encourage investments in pedestrian, bicycle and transit infrastructure.

Table 5.5 summarizes historical trends in transportation infrastructure investments from 1986 to 1993. Policies supporting a movement away from automobile domination were passed in 1990. Therefore declines in roadway capital investments and increases in pedestrian, bicycle and transit capital investments should have begun to appear in 1992 or 1993. The analysis of capital expenditures indicates that the percentage invested in capital improvements for pedestrian, bicycle, and transit increased and then declined over the period from 1986 to 1993. While alternative modes of transportation (bicycles, transit, pedestrian) are increasing in popularity and are being supported through political directives, government spending patterns indicate that no additional capital funds have been allocated by the city to these modes.

To provide a more concrete sense of capital investment priorities, a comparative analysis of investments in the Vancouver Bicycle Network and investments in the construction of left-turn bays was undertaken. In the 1993 budgetary year, the city allocated $250,000 for the Vancouver Bicycle Network. During the same year, $700,000 was allocated for the construction of one left-turn bay on Knight Street at Kingsway and King Edward. The city invested almost three times the funds to build one left-turn bay as it invested in the entire Vancouver Bicycle Network (City of Vancouver 1993c).
Table 5.5
Allocation of Expenditures for Automobile and Other Transportation Modes
City of Vancouver Capital Expenditures (1986 to 1993) (in 000s)

<table>
<thead>
<tr>
<th>Year</th>
<th>Total Expenditure (Transportation)</th>
<th>Total Roadway</th>
<th>Roadway as % of Total Transportation Expenditure</th>
<th>Total Other (Bicycle, Pedestrian &amp; Transit)</th>
<th>Other as % of Total Transportation Expenditure</th>
</tr>
</thead>
<tbody>
<tr>
<td>1993</td>
<td>27,526.00</td>
<td>24,604.00</td>
<td>89.38</td>
<td>2,922.0</td>
<td>10.62</td>
</tr>
<tr>
<td>1992</td>
<td>30,305.00</td>
<td>27,073.00</td>
<td>89.34</td>
<td>3,232.0</td>
<td>10.66</td>
</tr>
<tr>
<td>1991</td>
<td>24,749.00</td>
<td>21,539.00</td>
<td>87.03</td>
<td>3,210.0</td>
<td>12.97</td>
</tr>
<tr>
<td>1990</td>
<td>22,060.00</td>
<td>18,685.00</td>
<td>84.70</td>
<td>3,375.0</td>
<td>15.30</td>
</tr>
<tr>
<td>1989</td>
<td>22,178.00</td>
<td>18,188.00</td>
<td>82.01</td>
<td>3,990.0</td>
<td>17.99</td>
</tr>
<tr>
<td>1988</td>
<td>21,055.00</td>
<td>17,545.00</td>
<td>83.33</td>
<td>3,510.0</td>
<td>16.67</td>
</tr>
<tr>
<td>1987</td>
<td>17,172.00</td>
<td>13,762.00</td>
<td>80.14</td>
<td>3,410.0</td>
<td>19.86</td>
</tr>
<tr>
<td>1986</td>
<td>13,215.00</td>
<td>11,395.00</td>
<td>86.23</td>
<td>1,820.0</td>
<td>13.77</td>
</tr>
<tr>
<td>Total (86-93)</td>
<td>178,260.00</td>
<td>152,791.00</td>
<td>85.71</td>
<td>25,469.00</td>
<td>14.29</td>
</tr>
</tbody>
</table>

Note: The figures represent actual amounts spent, not constant dollars.


Analysis of City of Vancouver Capital Plan

Capital plans are indicative of how community leaders and senior municipal decision-makers envision the future shape of their communities. The City of Vancouver's Capital Plan for the period 1994 to 1996 was examined to discover if shifts in spending were planned. Table 5.6 summarizes the results of this analysis.

The Capital Plan for the period 1994 to 1995 allocated approximately $79,000,000...
for transportation over a three year period. Road infrastructure represented approximately 76 percent of this total, while the remaining 24 percent was allocated for development of pedestrian, bicycle and transit infrastructure.

Table 5.6
Allocation of Proposed Expenditures for Automobile and Other Transportation Modes
City of Vancouver Capital Plan (1994 to 1996)
(in 000s)

<table>
<thead>
<tr>
<th>Department Funding Requests</th>
<th>Priority Category &quot;A&quot; Requests</th>
<th>Priority &quot;A&quot; as % of Funding Request</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Proposed Expenditure</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Transportation</td>
<td>79,146.00</td>
<td>62,696.00</td>
</tr>
<tr>
<td>Total Roadways</td>
<td>60,516.00</td>
<td>51,796.00</td>
</tr>
<tr>
<td>Roadways as % of Proposed Transportation Expenditure</td>
<td>76.46</td>
<td>82.61</td>
</tr>
<tr>
<td>Total Proposed Other Transportation</td>
<td>18,630.00</td>
<td>10,900.00</td>
</tr>
<tr>
<td>- Bicycle</td>
<td>5,275.00</td>
<td>1,250.00</td>
</tr>
<tr>
<td>- Pedestrian</td>
<td>12,525.00</td>
<td>9,350.00</td>
</tr>
<tr>
<td>- Transit</td>
<td>830.00</td>
<td>300.00</td>
</tr>
<tr>
<td>Total Proposed Other as % of Proposed Transportation Expenditure</td>
<td>23.54</td>
<td>17.39</td>
</tr>
</tbody>
</table>

Note: These figures represent funds requested by the Engineering Department and approved by Vancouver City Council.


Municipal departments prioritize capital expenditures according to the following categories: Category A - investments for replacement, safety and mandated services
(highest category); Category B - investments to maintain and remedy services; and Category C - investments for new and increased services (lowest priority).

The Priority Classification column of Table 5.6 outlines staff recommendations for Category A investments. While 86% of investments in road infrastructure fell into the Category A classification, only 59% of investments in non-auto infrastructure were considered Category A. Only 24% of bicycle and 36% of transit infrastructure investments were considered Category A. The prioritization system shows a greater commitment to the maintenance of traditional automobile infrastructure than to the development of new transportation systems.

5.3.2 Informal Transportation Plan

Four interview respondents (two community activists, a transportation planner, and a community planner) made reference to an informal transportation plan for the City of Vancouver. The concept of this informal transportation plan was introduced in Section 5.2.3 under the sub-section entitled the "Professional Engineering Mindset." This section will describe participants' comments, and recount discussions with City of Vancouver staff, about this informal transportation plan.

Community activists described the frustration they experienced with engineers who agreed at city meetings that limiting the expansion of the automobile transportation system is necessary but then went on to modify or expand the transportation system (refer to Section 5.2.3 - Forces Hindering the Shift from Automobiles to Other Modes of Transportation, Sub-section - Implementing the Informal Plan and Sub-section -
Neighbourhood Planning). Citizen activists and planners felt that the Engineering Department is being guided by an informal plan whose purpose is to develop a highway system using the city streets of Vancouver.

Three sources of evidence were found to support participants' claims that an informal transportation plan exists within the Engineering Department: information contained within documentation used during the CityPlan process; the actual built environment; and planning processes which examine the redevelopment of the Clark Drive-Broadway Avenue intersection, the Lion's Gate Bridge, and the Burrard Street Bridge, which suggest that a highway system is being constructed incrementally throughout the city.7

CityPlan Process

In a review of transportation planning literature for Vancouver, a statement in a brochure from the CityPlan process called for the city to "develop a comprehensive freeway network" (City of Vancouver 1993f). An attempt was made to discover the source of this statement. The brochure, entitled People and Goods Movement Ideas, stated that the information contained within was a summary of citizen ideas from the CityPlan Ideas Book (City of Vancouver 1993g).

7 Each research episode may not directly point to the existence of an informal transportation plan, but collectively the research process suggests that an informal plan may exist for the City of Vancouver.

In conversations with the Engineering Department, the engineers are very careful to explain that the road improvements are contributing to the efficiency and safety of the transportation system. They do not talk about increasing road capacity or the construction of an urban highway system.
A review of the Ideas Book provided several interesting insights. Section Four, "Transportation," contained sixty-five pages of ideas describing how the transportation system could develop in Vancouver. Content analysis revealed that the vast majority of the ideas (fifty-nine pages, or 91% of the text) discussed the need for new ways of moving people using transit, bicycle and pedestrian systems. Yet, in the brochure, the first item to appear was "Improve Roads." Items contained within this category, beyond the already mentioned "develop a comprehensive freeway system," included widening arterials, providing more left-turn bays, synchronizing traffic signals, extending peak-hour on-street parking restrictions, and building a third crossing to the North Shore.

The prominent placement (i.e. first) of the "Improve Roads" category was somewhat surprising. In this case, a reverse relationship existed; "Improve Roads," which was discussed in less than ten percent of the Transportation section of the City Plan Ideas Book, received the prominent position in the summary document.

The planner responsible for this phase of the City Plan process was contacted to determine why the "Improve Roads" section was placed in such a prominent location. The city planner stated that an engineer from the Engineering Department was responsible for compiling this brochure. The focus of city engineers on building roads might explain the prominent location of the "Improve Roads" section.

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8 The only reference in the Ideas Book calling for the development of a comprehensive freeway network was contained in a brief from the Downtown Vancouver Association and the Downtown Vancouver Business Improvement Association. The brief defined a number of policies and principles which would reinforce the downtown area as being the hub of commercial and cultural activity in the Lower Mainland (City of Vancouver 1993g, 64).
Built Environment

Because the examination of CityPlan documents reinforced interview participants' comments about the existence of an informal transportation plan, an examination of the built environment was undertaken to look for further evidence of such a plan.

A portion of Cambie Street (west side) between 14th Avenue and 16th Avenue was widened in 1992 during the redevelopment of the block into Pacifica: a multi-use high-density complex. The zoning section of the Vancouver Planning Department was contacted to determine why the street was widened only in this one block. A representative of the Planning Department stated that this particular property (3033 Cambie Street) had been identified by the Engineering Department as property adjacent to a city street where further road widening was proposed. Upon inquiring about this proposed road widening program, the researcher was informed that a building line survey had been undertaken by the city Engineering Department, and a map was available which identified streets in the city which were designated for widening as properties came up for redevelopment. The Planning Department representative stated that additional information on the building line survey, and on the negotiation process which resulted in the widening of Cambie Street, could be obtained through the Engineering Department.

The Engineering Department was contacted. An engineer from the street construction branch indicated that the results of the negotiation process with the developers of Pacifica were finalized through an Internal Design Report approved by City Council on April 16, 1992. The Design Report (which became Comprehensive Development By-Law CD1-165) summarized negotiations which resulted in the developers giving concessions
to the city in the form of one additional road lane on Cambie Street.

The street construction engineer stated that the additional road lane will initially to be used for parking, but, once traffic volume along Cambie Street increases, the lane will be converted into a general-purpose traffic lane. He stated that the long-term plan for Cambie Street calls for the permanent removal of parking and the development of six traffic lanes. When asked about this long term plan, the street construction engineer referred the researcher to a street design engineer who is responsible for building lines.

The street design engineer stated that a building line survey identifies all streets which the city would like to widen. When asked about the purpose of the Pacifica street widening, the street design engineer identified two purposes: capacity will be increased through the widening of existing lanes (wider lanes allow the speed of traffic to increase), and the curb lane is designed to allow for both parking and bicycle movement. For this particular street redevelopment, the curb lane was widened to 3.7 meters, the middle lane was 3.3 meters, and the centre lane (adjacent to opposing traffic) was 3.5 meters. According to the design engineer, the new design will improve the efficiency (reduce congestion) and safety of Cambie Street.9

9 In a similar case, the objectives of improved safety and reduced congestion were again used to justify the expansion of the intersection at Clark Drive and Broadway Avenue. According to an engineering report, pedestrians (including children attending Queen Alexandra Elementary School) were "slowing curb lane right turners" resulting in "only one lane [being] reliably available for straight through movement" (City of Vancouver 1994d, 2). In a letter to the Vancouver School Board Director of Planning and Facility Services, Queen Alexandra Elementary School Principal, Dave Short, noted:

"It is my opinion that the main purpose of the proposal [Broadway and Clark Drive intersection expansion] is to develop a more effective way of moving traffic
During the conversations with the street construction engineer and the street design engineer, the researcher was perplexed by their description of the Cambie Street improvements. A physical inspection of the street revealed that, while the engineers described a redevelopment which involved three lanes, room for four lanes actually existed (although street marking delineated only three lanes). This suggests that the long-term plan for this particular portion of Cambie Street involves an eight-lane major arterial.

Wishing to compare these observations with the Engineering Department's long-term plan, the researcher asked how to obtain a copy of the building line map. The street design engineer indicated that a copy of the map could be obtained from the Mapping and Graphics Branch of the Engineering Department.

through the intersection, which, if achieved, would lead to even greater volumes of traffic. The traffic that is currently flowing through the intersection is not adhering to the present traffic rules. On almost every traffic signal exchange, at least one or more vehicles are running the red lights. Those people wishing to turn left are also running through the red signal which holds up the traffic further and makes everyone upset.

To widen the street will only place our children in more danger because they will be in the intersection longer, walking the width of another lane. The majority of the children crossing the Broadway and Clark Drive intersection are very young, 8 years of age or younger. My experience at 12th Ave. and Clark Drive, a wider intersection, is students often get cut off and trapped in the intersection, because drivers turning right prevent them from crossing the road uninterrupted" (Short 1994).

Until funds can be obtained for a pedestrian bridge, the City of Vancouver Engineering Department, through City Council, is requesting "the Vancouver School Board ... provide funding for adult crossing guards for Queen Alexandra Elementary School at Clark Drive and Broadway" (City of Vancouver 1994d, 1).

In this case, not only does the City of Vancouver Engineering Department propose to continue to increase automobile capacity under the auspices of improved safety and efficiency, but they are also asking the Vancouver School Board to pay the added social costs of crossing guards.
After repeated calls, the researcher decided to visit the Mapping and Graphics Branch. The person originally contacted was not available, and the front desk clerk was asked for a copy of the building line map which showed where streets would be expanded in the city. The clerk disappeared into the back office and, after some time, reappeared to say that such a map did not exist.\textsuperscript{10} The researcher replied that two engineers and a representative at the zoning counter in the planning department said that such a map did indeed exist. Again, a copy was requested. The front desk clerk again went into the back office area and returned with a surveyor who invited the researcher into his office.

Upon entering this office, a map with a number of major arterial streets highlighted, was observed prominently displayed on one wall. When asked if this was the building line map, the surveyor stated that no such map existed\textsuperscript{11} and that the map on the wall was not for public use. What ensued over the next one-half hour was a rhetorical battle, with the surveyor attempting to deflect the researcher's attention from the wall map. He stated that the wall map was produced in 1987 (the only markings on the map were the City of Vancouver, a date 11/1987, and a code L415), that it was changing all the time, that it was no longer accurate, and therefore that it was no longer relevant to the public. Its prominent location in his office, however, suggests that the map has some relevance to the Engineering Department.

\textsuperscript{10} While waiting, the researcher observed a small scale truck route map which may have been developed using the building line map.

\textsuperscript{11} As only a number of arterials appeared on the wall map, the researcher surmised that this was not the building line map, but it probably contained components or elements of the city-wide building line map.
When the surveyor attempted to deflect attention to the city by-laws which he said contained all the existing building lines, the researcher stressed that it was the Engineering Department's long-term plan for the expansion of streets in the city that was of interest.

After numerous attempts to obtain a copy of the wall map, or any map which defined long-term street expansion, the researcher suggested that the British Columbia Freedom of Information Act could be used to obtain a copy of the long-term transportation plan. At this point, the surveyor made the following statement: "You might be able to get a copy of the map, but if someone else gives it to you, I'll have problems with that." Why he said this is unclear, but the statement does indicate that the map has some significance in the Engineering Department.

On November 3, 1994, the Freedom of Information and Protection of Privacy Act (Ministry of Government Services 1994a) was extended to local government bodies in British Columbia. Prior to this date, access to City of Vancouver information and documentation could be denied to individuals and organizations if city staff felt that information should not be released to the public. The extension of this legislation to municipal governments provided an opportunity to again attempt to access maps and other documents which were denied the researcher in July 1994. Provision of the Act requires information to be provided no later than 30 days after the request is received by the government body.

A letter was sent to Mr. Ken Dobell, the Vancouver City Manager, on November 30, 1994 (Curry 1994) requesting the following information:

a) copies of all information in various forms, including maps, written documents,
and electronically stored material, which has described, over the past ten years, the long-term plan for the expansion of streets and highways in Vancouver.

b) copies of all information in various forms, including maps, written documents, and electronically stored material, which describe the current long-term future plan for the expansion of streets and highways in Vancouver.

c) a description of electronically stored information, and access to this information through computer programs in city offices, if site licensing program agreements do not permit the copying and viewing of electronically stored information.

d) any other information not covered by a), b) and c) which would be of importance to this research.

e) access to original material after the review of copied information.

The letter requesting the above information was passed on to the Office of the City Clerk, and a telephone conversation took place with Mr. Steve Kautz, researcher with the Clerk's Office, on December 13, 1994. As the letter from Mr Kautz (dated December 13, 1994) summarizing this telephone conversation indicates, the "application sets out an extremely broad request, both in terms of the number of records requested and the time period covered" (City of Vancouver 1994a). The researcher indicated to Mr. Kautz that, as he was denied access to City maps and documents in July 1994, a detailed focused description of the information required to continue research could not be provided.

After additional discussion and negotiation, it was concluded that the following information would be made available to the researcher by January 6, 1995:

'... a ten-year chronology of building setback maps and appropriate background material or reports on the topic of transportation planning for the City. We will also research the topic of a separate map or computer data base that provides information on plans for the long-term expansion of streets in Vancouver" (City of Vancouver 1994a).
Additional correspondence was received from Mr. Kautz on January 3, 1995 (City of Vancouver 1995a) indicating that:

"Staff have been requested to prepare material responding to your request, including a ten-year chronology of building setback maps and appropriate background material or reports on the topic of transportation planning by the City. They have also been directed to research the topic of a separate map or computer data base that provides information on plans for the long-term expansion of streets in Vancouver."

Mr Kautz also requested a 30-day extension to the statutory deadline, as "it seems unlikely they [the records described in the previous paragraph] can be prepared by January 5, 1995."

On February 6, 1995 a letter was received from the Office of the City Clerk with the following attachments:

a) Schedule "E" to the Zoning and Development Bylaw No. 3575, describing the Building Lines in the City;

b) A description of building lines in the City, giving the dates of their enactment, described as LB 155;

c) The City of Vancouver 1994-1996 Capital Plan;

d) The Transport 2021 Report "Long-Range Transportation Plan for Greater Vancouver;" and


Item (a) (Schedule "E"), which describes building lines (building setbacks to ensure additional traffic lanes can be added to streets when traffic volume warrants street widening), and item (b), a description of building lines in the City (LB 155), can be construed to represent part of the informal transportation plan (long-term transportation
plan) for the City. These documents delineate the areas where the Engineering Department anticipates that traffic volume will increase to a level which will warrant street expansion in the future.

Mr. Kautz's letter of February 6, 1995 went on to state:

Your application referred to an "informal transportation plan" described as a map, database and other forms of information that identifies all streets in the City proposed for widening. Staff report that no informal transportation plan exists."

The comments of interview participants and the comments of two city engineers, a representative at the zoning counter of the City Planning Department and the surveyor ("You might be able to get a copy of the map [long-term transportation plan], but if someone gives it to you, I'll have problems with that."), contradicted Mr. Kautz's letter. Therefore, on February 28, 1995 the researcher wrote a letter to the Information and Privacy Commissioner requesting a review of the City of Vancouver's response to the original request for access to information of November 30, 1994 (Curry 1995).

A letter was received from D. H. Rudberg, General Manager of Engineering Services for the City of Vancouver (City Engineer), on March 21, 1995. This letter (refer to Appendix J), in response to the researcher's letter of February 28, 1995 to the Information and Privacy Commissioner, included a number of maps defining major arterials routes (existing and proposed) in the City.

Map ZE 34 and map YB 58 (described as Plans in the letter) show primary and secondary arterials and proposed connectors (refer to Figure 5.1). Map L-415 (again described as a Plan in the letter) indicates the location of "established building lines" and
widening lines" (refer to Figure 5.2).

This mapped information was requested in the researcher's original Freedom of Information request letter of November 30, 1994 to Mr. Ken Dobell, Vancouver City Manager. Mr Steve Kautz, researcher with the City Clerk's Office, in responding to my original request, stated in his letter of December 13, 1994 that the City would "commence processing your application by providing a ten-year chronology of building setback maps ..." Map L-415 represents one of the "ten-year chronology of building setback maps." This information was not provided in their official reply (February 6, 1995) to the researcher's application for records under the Freedom of Information and Protection of Privacy Act.

The existence of an "Informal Transportation Plan" was denied in Mr. Kautz's letter of February 6, 1995 ("Staff report that no informal transportation plan exists") and in Mr D. H. Rudberg's letter of March 21, 1995 ("We do not have an 'Informal Transportation Plan' as referred to in your November 30, 1994 letter."). Mr. Rudberg goes on to state:

"Plan L-415 was prepared as an administrative tool for City staff to be able to quickly identify roads that may [his emphasis] be the subject of a building line. It does not represent City policy or future plans. It is simply a tool that allows staff to quickly glance at the plan to determine if more research is needed, in Schedule 'E,' to determine if a building line exists and its defined dimensions."

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FIGURE 5.1
Illustrative Segment of Map YB 58, Primary and Secondary Arterials and Proposed Connectors, City of Vancouver
FIGURE 5.2
Illustrative Segment of Map L. 415, Building Line Map
City of Vancouver
Based on the comments of participants during semi-structured interviews, comments of city staff during unstructured interviews, and the words of the City of Vancouver’s Chief Engineer, Mr. Rudberg, the researcher must conclude that Plan L-415 (11/1987) represents one of a possible set of maps "which identifies all streets proposed for widening in the city" (refer to the second paragraph of the researcher’s November 30, 1994 letter to Mr. Ken Dobell, City Manager which appears in J).

A rhetorical battle seems to surround the term "Informal Transportation Plan," which seems to be deflecting attention away from determining whether the City of Vancouver continues to plan for an automobile-dominant transportation system which is contrary to the stated goals of both the City of Vancouver and the Greater Vancouver Regional District.

A number of significant considerations evolve from Chief Engineer Rudberg’s letter of March 21, 1995. The first is that the map, described as Plan L-415 (11/1987), is not the map which the researcher observed during a visit to a city surveyor’s office in July 1994. The map observed at that time contained one segment of the city with "a number of major arterial streets highlighted" (refer to the above-mentioned meeting described in an earlier part of this section) rather than all the city streets which Mr. Rudberg’s Plan L-415 (11/1987) illustrates. Without access to the appropriate map, the researcher can only postulate that the map in the surveyors office in July 1994 was a working copy which identified detailed proposed arterial development schemes.

The second significant consideration of Chief Engineer Rudberg’s letter is that he
states that "Plan L-415 was prepared as an administrative tool for City staff to be able to quickly identify roads that may be the subject of building lines." If urgency in decision-making is required, the researcher questions why more up-to-date maps (post 1987) have not been compiled. If more up-to-date maps do exist, the researcher questions why the City has not send more current maps as Mr. Kautz stated they would ("commence processing your application by providing a ten-year chronology of building setback maps ...") in his letter of December 13, 1994.

The final significant consideration is that the researcher perceives that he is being denied access to current transportation planning documents and current ongoing planning process information. Detailed information is provided only when specifically requested. Therefore, another letter was sent to the Information and Privacy Commissioner on April 10, 1995 requesting the surveyor's working map, building line maps from 1988 to present, and the information requested in the original November 30, 1994 letter to the City Manager of Vancouver. In addition this letter expressed concern at the difficult process of accessing what is perceived as public information from a local public institution (refer to Appendix J).

The researcher anticipates that it may take a number of months to access the additional map(s) and computerized database(s) which constitute the long-term transportation plan (informal plan) of the Engineering Department of the City of Vancouver. This research will continue in Vancouver and in other municipalities which the researcher is currently studying. Identifying how information, which should be available to and debated by the public, is suppressed and secretly kept from the public
represents knowledge which is important in the movement towards sustainability.

**Burrard Street Bridge Redevelopment Process**

Evidence of an informal plan was also found in the planning process to redevelop the Burrard Street Bridge. The City of Vancouver Capital Plan proposes an expenditure of $10,340,000 for pedestrian and cycling facilities (City of Vancouver 1993b). In the fall of 1993, prior to a plebiscite on the Capital Plan, a brochure summarizing proposed capital expenditures was distributed to each household in Vancouver. This brochure contained the following description within the section entitled "Pedestrian and Cycling Facilities":

"Work on Vancouver's bicycle network will be accelerated, including a new facility to reduce conflicts between bicycles, pedestrians and cars on Burrard Bridge."

The redevelopment of the Burrard Street Bridge has since been redefined (reframed) and a new brochure, entitled "Proposed Burrard Bridge/Hornby Connector: Improvement Options for Non-motorized Users" (City of Vancouver 1994c), includes the following statement.

"City of Vancouver is intent on improving the safety, convenience and user friendliness of the bridge for all users while maintaining an efficient flow of vehicles in a high traffic area and respecting its heritage and aesthetic values. ... An added issue is how to best improve the bridgehead connections, again for all its users."

As the redefined project title and the quotation imply, the original (publicly advertised and publicly voted on) proposal to improve pedestrian and cycling facilities on Burrard Bridge has evolved to include a highway connector (refer to Figure 5.3) from the bridge to Hornby Street. City engineers indicated that the "added issues" of how to best improve the bridgehead connections had "always been a part of the project" (Henderson
& Dixon 1995) but was excluded from the text of the public plebiscite of 1993.

FIGURE 5.3
Proposed Option for Burrard Bridge Hornby Connector, City of Vancouver


Some city residents are concerned that automobile improvements couched under the auspices of "efficient flow" will result in a less pedestrian and bicycle user friendly bridge, that the original $10 million capital expenditure for "Pedestrian and Cycling Facilities" will be primarily used for automobile improvements (the estimated cost of the Hornby connector is $18 million), and that the Hornby connector will be another link in a city highway system which has not received approval by residents or local political
representatives.12

The proposed Hornby Connector may represent a link in the informal transportation plan for the City of Vancouver which provides for a significantly expanded highway system. The proposed redevelopment of the Lion’s Gate Bridge may represent another link in this downtown highway system. The next section examines the current debate surrounding the redevelopment of the Lion’s Gate Bridge.

5.3.3 Restrictions in the Debate Surrounding Transportation Options: the Case of the Lion’s Gate Bridge

Interview participants identified a number of ongoing techniques used to continually narrow the debate surrounding the future transportation system to options dominated by

12 A phone interview with a city official, who refused to be named, brought the researcher’s attention to a similar situation. This tactic of redefinition (reframing) was also used in the planning process that examined the potential impact, on the Downtown South district, of the proposed False Creek North redevelopment by Concord Pacific (City of Vancouver 1993h). In lieu of 1000 automobile parking spaces, Concord Pacific has agreed to provide $8 million to the city to be used to improve pedestrian, bicycle, and transit connections between Downtown South and False Creek North.

Under the Engineering Department proposal, a significant portion of the funds will go to widening streets for bicycles and buses. The widened streets will ultimately provide increased automobile capacity. When, during the planning process, a proposal called for closing off Richard’s Street to vehicle traffic, the Engineering Department undertook an extensive analysis that demonstrated that the existing street system was the only viable option. This analysis, which included a detailed appraisal of fuel energy savings, concluded that "from the point of view of traffic impacts, fuel consumption (and pollution), it appears the existing street system is the best option" (City of Vancouver 1993h, 54).

The Engineering Department’s analysis projected future movements based on historical traffic patterns and rates of driving and ignored potential reductions in traffic resulting from the use of alternative modes of transportation. Not only is the Engineering Department using reasons of "Efficiency and Safety' to expand automobile infrastructure, they are also using reasons of "Fuel and Pollution Reduction" to maintain the existing street system and, ultimately, to allow expansion to vehicle capacity.

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the automobile. This section of the research findings explores techniques used by the Provincial government and by the City of Vancouver Engineering Department.

The following two quotes, reproduced from case study transcripts, illustrate the need to debate a full range of mobility options. According to one interviewee (a local politician), having a full range of options results in an improvement in the quality of debate.

"With widened options, the advocacy groups' roles are strengthened because they can see their options on the table. And with the widened frame of reference, I think human civilization generally benefits and the level of quality of the debate of the issue goes up." (11-588-592)

This same participant is sceptical of even moderate changes being successfully implemented if a full range of options is not provided.

"Without putting the radical options on the table, the planner risks the rejection of even [the] most moderate of the options put forward. Unless it's shown that there's a range, from the status quo to banning cars, the idea about planned phase out, even a gradual one over 50 years, loses credibility ..." (11-512 522)

The current discussion in Vancouver over the Lion's Gate Bridge illustrates how exploring the full range of options for bridge redevelopment can introduce sustainability options to the debate. The situation also illustrates how tactics are used by transportation planners to limit debate to automobile-dominated options.

The original bridge redevelopment proposals encompassed a range of automobile dominated options: bridges or tunnels, size options (three to six lanes), and city point of entry options (through Stanley Park or through downtown). The Lion's Gate Coalition of Communities and Neighbourhoods group has added the following options to the debate:
pedestrian, cycle, and transit use only; removal of the bridge completely; and non-bus transit (ferry, SeaBus, light rail or SkyTrain) (Pudwell 1994, 3).

The Minister of Transportation and Highways, the Honourable Jackie Pement, has been inconsistent in her letters to coalition members. In one letter she states "that all options remain open" (Pement 1994a, 1), while in another letter she closes down discussion by stating that "transportation service criteria require that the [crossing] option maintain at least existing [automobile] capacity" (Pement 1994b, 2).

The City Engineer, Mr. D.H. Rudberg, in an Administrative Report to Vancouver City Council on March 22, 1994 (City of Vancouver 1994e), also demonstrated inconsistency in stating City Council policy, analysing the Lion's Gate Bridge redevelopment issue and then providing recommendations.

In his report, Chief Engineer Rudberg summarizes City Council policy as:

1. The Clouds of Change report approved by council, included, among other recommendations, that the average number of persons per vehicle travelling into the downtown area in the morning peak period be increased, that cycling be made a more attractive transportation alternative, that road pricing be used to reduce single-occupant vehicle use, and that high-occupancy vehicle lanes be developed.

2. Creating our Future supported principles such as that the best use be made of existing investment, that improvements in public transit be supported, and that improvements in roadway capacity consider transit, goods movement, route continuity, safety effects on the community and the environment, and high-occupancy vehicle lanes.

3. Council's transportation priorities are walking, cycling, transit, goods movement, and automobiles, in that order.

4. On September 4, 1992, council supported the following:

"THAT there be no further significant investment to expand motor vehicle
capacity in Vancouver in terms of adding additional capacity.

5. On February 15, 1993, the Park Board approved the following motion:

"THAT Vancouver Park Board be on record as being opposed to any expansion of the right-of-way through Stanley Park related to the proposed new Lion's Gate Bridge."

6. On March 2, 1993, Council affirmed the Park Board's position and deferred a decision on the bridge until "the completion of the Transport 2021 project" and "Council has considered all possible options at a meeting convened specifically for this purpose."

In Chief Engineer Rudberg's analysis of the issue, he went on to state that "from a Vancouver perspective, some [bridge] options do little but actually make existing situations poorer." Chief Engineer Rudberg included in this category any bridge options that would "increase peak hour automobile capacity." He stated that these versions "are contrary to council policy and should be removed from further consideration. It should be noted that, at this point in his report, Rudberg inserted the concept of "peak hour automobile capacity" while Council policy refers to overall "motor vehicle capacity."

After reviewing Council policy and analysing the current situation, Rudberg made a number of recommendations which Council subsequently approved on April 7, 1994. One of these recommendations contradicts Council policy and will allow an increased number of vehicles into the downtown (Boothroyd 1994). Rudberg recommended that "the Ministry of Transportation and Highways be requested to remove ... any options that increase peak capacity for single occupant automobiles into downtown." This recommendation will allow the overall number of vehicles (single occupant vehicles, high occupant vehicles, and buses) to increase, further contributing to congestion in
Vancouver's downtown.

Correspondence from the Minister of Transportation and Highways also clearly indicates the lack of concern for policy coordination between provincial government agencies — a situation which has been identified as one of a number of major impediments in the movement towards sustainability (Carley & Christie 1993). Pement's letters were composed one month and three months after the British Columbia Round Table on the Environment and the Economy published its report "State of Sustainability: Urban Sustainability and Containment" (BCRT 1994). The report revealed that "British Columbians are among the world's biggest per capita consumers of natural resources, a condition that is profoundly incompatible with a sustainable future or with responsible global citizenship" (BCRT 1994, 10). Yet, when it comes to development options for the Lion's Gate bridge, the Minister of Transportation and Highways wants to perpetuate the high consumption rate of British Columbians by at least maintaining the status quo; most options will lead to increased resource consumption through increased lane capacity.

The Minister's second letter also ignores the following piece of advice given by the British Columbia Round Table: "Many urban sustainability problems are linked to a transportation system that is dominated by the private automobile. Continued construction of highways [the Lion's Gate bridge is part of the provincial highway system] limits funding of transportation alternatives and creates car-focused land-use patterns that insure dependence on automobiles" (BCRT 1994, 10). While the Lion's Gate Coalition of Communities and Neighbourhoods and the British Columbia Round Table call for a movement away from automobile dependency through the development of transportation
alternatives, the Ministry of Highways, supported by Vancouver city engineers, seem to aspire to the continuation of an automobile-centred transportation system.

5.4 Summary

The illustrative cases support interview participants' comments that a number of institutional barriers exist within Vancouver's municipal government which impede the movement towards sustainability.

An analysis of the City of Vancouver's operating and capital expenditures shows that these expenditures do not support municipal policy. Municipal policy documents and motions have called for priority to be directed away from automobile transportation, yet city spending practices have continued to favour the development and maintenance of automobile infrastructure. An analysis of the Capital Plan indicates that a movement towards a more sustainable transportation system may yet take place, although staff recommendations still give priority to investments which favour the automobile.

An exploration of a number of municipal planning processes (CityPlan, Cambie Street-Pacific development, Clark Street-Broadway Avenue intersection, Burrard Street Bridge, and Downtown South) strongly supports the existence of an informal transportation plan within the city's Engineering Department, although officials within that department continue to deny the existence of such an informal plan. The Freedom of Information and Protection of Privacy Act had to be used to obtain access to a number of transportation planning documents which officials within the Engineering Department would not provide to the researcher.

The Lion's Gate Bridge planning process illustrates how municipal and provincial
officials favour the automobile and restrict debate surrounding alternative transportation options. This planning process also demonstrates the lack of policy coordination at a provincial level.

A number of broader points evolve from these illustrative cases. The Engineering Department seems to be functioning as a technocracy; they are planning major transportation development schemes for the city without soliciting meaningful public input into their planning and decision-making processes.

The liveability of the city is being, and will continue to be, degraded. At least some streets are designated as eight-lane (while others are designated six lane) arterial city highways under the informal transportation plan. In the case of the Pacifica complex, the developers provided the city with an expanded public right-of-way as a concession for the development of their property. In the property development negotiation process, the giving of road ROW concessions can mean the loss of social liveability concessions, such as on-site daycare, social housing, pedestrian open space, or greenspace. Increasing motor vehicle space continues to cause a decline in the availability and quality of people space in Vancouver.
CHAPTER SIX - BARRIERS TO CHANGE

6.1 Introduction

This chapter will couple the Theoretical Planning Process Model (Figure 3.1), developed in Chapter Three (Research Design) with the study findings to answer the research question "What barriers within Vancouver's planning system impede change towards a significantly less automobile-dependent transportation system?"

The variables which were identified in the various stages of the Theoretical Planning Process Model can act as barriers to a movement towards transportation sustainability. These variables were identified in the review of literature. The research findings confirmed that some of these variables act as barriers to sustainability in Vancouver's transportation planning process. These barriers, along with other barriers identified in the in-depth interviews with key informants and in the illustrative cases, are presented in Table 6.1. It should be emphasized that although some of the original theoretical barriers were not identified in the findings, they may still be present in Vancouver's planning change process.

The research question, and consequently the interview questions, specifically asked what barriers are present within the planning system (Stage Two) because this part of the planning change process was the focus of this research and it was anticipated that the key barriers to change would be found in this stage. However, participants did not limit themselves to Stage Two; they also identified important barriers in the movement towards a sustainable transportation system in the Input (Stage One) and in the Output (Stage Three)
6.2 Barriers at the Input Stage

According to participants, the major input barriers impeding a change towards transportation sustainability in the City of Vancouver fall within areas of societal values, beliefs, and assumptions (VBAs) and change incompetence at the individual and societal levels. Other significant areas, closely connected to the first two barriers, include...
commercial/market interests, car dependency, and low political support. Another important barrier to creative sustainable advances in the BC Transit system is management-union relations.

Values Beliefs and Assumptions (VBAs)

Participants felt that a movement towards transportation sustainability can only be brought about through a fundamental change in people’s VBAs. They questioned, however, how easy it would be to bring about this change. Many people can accept the concept of sustainability in an abstract form, but few people understand what sustainability really means or what lifestyle changes it entails.

The strong VBAs which must be overcome include the beliefs that cities must be designed around the automobile, that personal mobility is a basic right, that the automobile is synonymous with democracy, that the automobile represents the only acceptable form of transportation, that the automobile increases one’s freedom to move around urban areas, and that the automobile increases one’s level of safety.

Coupled with the basic belief that cities must be designed around the automobile is the belief that the single family dwelling is the only form of housing for which to aspire. The single family dwelling, and its consequent urban form, has resulted in a transportation infrastructure which is extremely expensive to construct and maintain and which is therefore unsustainable. The cycle of constantly responding to the demands of the automobile by supplying additional infrastructure, which results in additional automobile demand, which results in additional infrastructure demand, was discussed in the literature and by interview participants.
The demand for an automobile-dominated transportation system comes from myths that attempt to maintain bygone images of successful lifestyles. These myths are reinforced by a frontier mentality and by a constant exposure to VBAs which support continued economic growth. The major mechanism for delivering these myths is advertising which portrays car ownership as a means to power, glory, and freedom.

These advertising myths create a false sense of security about the automobile’s effect on the environment by promoting "images of cars juxtaposed against serene and lush natural scenes in which car and driver are poised on the brink of a sublime experience."¹ In reality, Vancouver is experiencing declining environmental quality and liveability and social alienation due to an increasing number of automobiles and an expanding automobile infrastructure.

The frontier mythology, perpetuated through advertising, continues to blind people to reality. Transit riders, as a percentage of total commuters continues to decline in Vancouver. The proposed expansion of the Lion’s Gate Bridge will allow more people to partake in the wonderful urban experience of driving through Stanley Park, although the natural assets of the park continue to be degraded by the intrusion of the automobile and its pollution. On a per capita basis, Vancouver’s air pollution readings are higher than those of Los Angeles.

*Change Incompetence*

According to interviewees, there are three major causes of change incompetence

¹ Contributed by Heather Ross, Education student, University of British Columbia, 1994.
at an individual and societal level: the adherence by decision-makers to the status quo, fear of the unknown, and a lack of knowledge about the change process.

Case study participants comments can be interpreted to mean that, in terms of sustainability, a large segment of North American society, particularly persons in powerful decision-making positions, is locked into the denial and defense stages of Carnall's change cycle (refer to Chapter Two, section 2.5.6). The concept of sustainability encompasses the maintenance of natural capital and the consumption of natural interest at a level which does not exceed replacement rates. Those who are not willing to accept the lifestyle changes needed to achieve sustainability have corrupted this definition so that it incorporates the possibility of sustained growth; movements towards sustainability are only taken when convenient (when they do not threaten growth).

A significant portion of the past two or three generations of North Americans have been raised in suburban environments where life has revolved around wealth accumulation and growth economics. This is the environment which has produced many of our powerful decision-makers. Although these decision-makers are now surrounded by significant environmental and social degradation, they attempt to maintain the familiarities of the status quo rather than to reduce resource consumption in an effort to adapt to new ecological realities.

Change incompetence also evolves from a fear of the unknown. While many community activists are comfortable with the changes in lifestyle which sustainability entails, interview participants noted that the general public is more cautious about change. Community activists, because of their in-depth understanding of what a sustainable future
looks like, are at the adaptation or internalization stage on Carnall's change continuum, while the general public, because of their fear and lack of understanding, is still in the denial and defense stage.

According to interviewees, people, in general, do not understand the change process. They especially do not understand the concept of second-order change. This is an important observation, because second-order change is what is needed to bring about a change in people's values, beliefs and assumptions -- a change which, as indicated above, is necessary to allow for a movement towards a sustainable transportation system.

The next three barriers, commercial/market interests, car dependency, and low political support are closely related to the barriers which have been already discussed.

**Commercial/Market Interests**

Over the past century the human species has gone through a rapid urbanization process which has been assisted by powerful economic forces. Vancouver, being a relatively young city, has experienced rapid expansion over the same time period that the automobile has dominated the process of city-building.

Commercial/market interests have had an enormous impact on the growth and development of Vancouver. A significant portion of the city and region has been isolated into distinct marketable packages -- residential suburbs, business parks, shopping malls, and recreational complexes -- which are linked by automobile infrastructure. This urban landscape is perpetuated by a land development industry and an automobile industry which use the powerful tool of advertising to perpetuate myths surrounding the automobile and the single family dwelling. Alternative transportation lobbies are marginalized when they
call for new urban landscapes which are incompatible with current and powerful commercial/market interests.

Car dependency

As mentioned earlier, a basic belief of North American Society is that the car is the only acceptable form of urban transportation. This has resulted in what can be termed the car reinforcement cycle. As the number of cars increase, the number of pedestrians decrease. As the numbers of pedestrians decrease, the streets are perceived as unsafe. Consequently, more people retreat to the safety of their vehicles thus making the streets more unsafe. Children, women, and the elderly must be driven to, and picked up from, their destinations. The number of public transit passengers also decreases as the perception of unsafe streets increases. Through the creation of unsafe street environments, the automobile becomes the environment of security.

Political support

Unless strong visionary leadership is present, political systems have a tendency to perpetuate current VBAs. Politicians, many of whom may not use alternative modes of transportation, may have a limited view of transportation options. Government funds may be invested in automobile-dominated forms of infrastructure.

Case study interviewees gave the example of the BC21 infrastructure investment program, where the major portion of funds are invested in expanding the highway system throughout British Columbia. A very small portion of funds have been allocated for public transit. One participant commented on heavy investment in automobile infrastructure being brought about by decision-makers whose history and life experience are based on
automobile transportation.

**Union-Management Relationships**

Poor union-management relations at BC Transit are resulting in a static public transit system. Case study participants talked about methods which were proposed to increase the efficiency and effectiveness of the transit system. Apparently, these were not put into practice due to a rigid contractual relationship between the BC Transit Corporation and the union which represents its employees.

One proposed measure was to mount bike racks on buses (similar to ski racks on public transit buses in the town of Whistler) to assist cyclists across certain bridges in the region which do not have bike lanes. This proposal was not approved by the union because it would add an additional responsibility to bus drivers on these routes.

This type of poor union-management relationship does not encourage the use of creative transportation sustainability measures.

### 6.3 Barriers at the Planning System Stage

The two most significant planning stage barriers impeding change towards transportation sustainability in Vancouver are the lack of effective structure and the power of an entrenched organizational culture which is fueled, in part, by an ingrained professional engineering culture. Other important barriers to change found within this stage of Vancouver's planning change process, human resource traits which impede change, are closely tied to the organizational culture.
Lack of Effective Structure

This barrier was a common theme in many of the interviews. One cannot talk about Vancouver's transportation planning system without considering the regional transportation planning system; the many transportation systems within the region are interdependent. In the early 1980s the provincial government removed planning responsibilities from the regional districts in the Lower Mainland. Thus, the ability to undertake comprehensive planning was crippled and a fundamental governance problem was created. Major efforts are invested in attempting to coordinate the activities of numerous transportation agencies (federal and provincial government agencies and crown corporations, regional districts, and municipal governments), and even greater efforts are expended at attempting to arrive at consensus decisions. These efforts, which must be undertaken each time a decision is required, result in a vast expenditure of energy to achieve incremental change.

As one participant noted, the vision to restructure the regional transportation system has been present for years, but the structures and mechanisms to support the process of implementing this vision are not in place. The result of ineffective structures is what can be termed an unplanned city where regional planning concepts are developed but not implemented. The GVRD Regional Town Centre Concept (GVRD 1975) provides a good example of a visionary element of a regional plan which has not come to fruition and which has only received cursory support.

Another participant discussed the wasted efforts of the GVRD in producing detailed planning reports which received only cursory attention within the planning system. These
reports provided recommendations which could have resolved significant liveability problems, but these recommendations were not acted upon.

Participants also noted that diffused planning responsibility has led to one level of government shifting responsibility to another level of government when confronted with an unpopular decision. This is clearly illustrated within the transportation planning system where one level of government (municipalities) is responsible for land use and another level of government (provincial) is responsible for highways and public transit. Because the municipalities are not required to consider the impact of their local land-use decisions on the region, the provincial government must continually respond to traffic congestion created by the municipalities.

There is a continual undercurrent of conflict within the regional planning system. A number of participants felt that far too many planning responsibilities and accompanying funding, for clearly regional issues, are controlled by the provincial government. A complex cooperative process of planning may exist but, when expedient, the provincial government is always prepared to step in to disrupt this complex cooperative decision-making process. The SkyTrain light-rail transit system illustrates this point. In the hasty preparation for Expo '86, the provincial government unilaterally selected the technology and defined the route of the SkyTrain system. This unilateral decision has burdened the City of Vancouver and the region with an extremely expensive light-rail transit system.

At a municipal level, the existing structure which separates Vancouver's Planning and Engineering Departments has created a division of planning activity which should appropriately be combined. This separation has resulted in the Engineering Department
planning the public right-of-ways and the planning department planning the spaces between the public right-of-ways. Participants felt that this situation has created grave consequences for the liveability of the city. Departmental separation has also contributed to animosity between the two departments. The consequences of this animosity will be discussed in the following section (Corporate Culture).

The lack of an official formal plan, complete with policies, at the municipal level has also inhibited or thwarted sustainable transportation development decisions. The City of Vancouver is unique among large Canadian cities in its lack of an official community plan with which to guide development in a manner which has been collectively envisioned by the city’s citizens. In the absence of an official plan, and the supporting structure to implement that plan, individuals and departments are free to pursue their own visions.

The City of Vancouver does not have a formal system in place to maintain and amend the policy directives of city council. Therefore a newly elected council is not bound by policy motions of preceding councils nor is a sitting council bound by its own past policy decisions. As one civic employee stated, "city policy is written in water." A policy may be passed which contradicts previous motions of council and which affects long established operating and planning procedures of the civic administration. Rather than creating change, a new motion may become lost in the labyrinth of existing explicit and implicit policy. This phenomenon is evidenced by the example of the reverse transportation policy which was passed by city council but which was never implemented.

Selznick (refer to Chapter Two, Section 2.5.3 and Selznick 1957, 16) studied the above phenomena which he termed "institutionalization." He noted that, in the absence
of clear internal direction and external feedback, organizations take on a life of their own. Within this case study, the Engineering Department seems to be operating to meet the needs and desires of the department itself and what it interprets as the needs and desires of city residents. This phenomenon of institutionalization can have a major effect on the operation of an organization and, in the case of a government organization or department, on the delivery of services to the public. This lack of accountability becomes ingrained in the culture of an organization.

**Power of Entrenched Organizational Cultures**

The confidential nature of the case study interviews allowed participants to say what they really thought about the transportation planning system in Vancouver. Their comments revealed that a suppression of anti-automobile VBAs exist within government agencies. Many key actors within Vancouver's planning system were aware of methods being used in other communities which could assist in moving Vancouver's transportation system towards sustainability, but they felt that the existing culture of the organization would not allow these methods to be expressed, tested, and implemented.

Kirkpatrick (1993, 31) discussed how the suppression of ideas and feelings results in the repression of potential solutions. This situation is termed "organizational dysfunctionality." One participant acknowledged the difficult environment within which planners work. Many planning schools teach a holistic vision of community-building which includes social, ecological, and economic values. Upon graduation and employment, many planners learn to focus on the strong economic values espoused by the culture of their organization. Planners may do this to keep their jobs, but a stronger
motivation may come from the need to belong to a social group and to feel that their work is important to the organization. (It is hard to feel your work is important when it is marginalized and ignored.)

Entrenched VBAs of transportation planners are being questioned by certain segments of Vancouver's population. For example, the bicycle lobby is questioning the dominant role that automobiles play in the Vancouver's transportation system. Neighbourhood groups are questioning traditional land-use and transportation planning principles which are based on the separation of land uses. In the case of the Lion's Gate Bridge, citizen activists are lobbying against the basic assumption that transportation infrastructure should always expand.

The traditional development model of growth economics supports and perpetuates VBAs which are contained within the transportation planning system. The two main mechanisms that ensure the perpetuation of these VBAs are the entrenched powers of both the automobile and the land development industries and the ingrained powers of the professional engineering culture. The entrenched powers of the automobile and land development industries were discussed in the input section (Commercial/Market Interests).

As discussed earlier, the city's Engineering Department is responsible for the planning and development of the municipal right-of-ways. Thus, officials in this department are responsible for the planning and implementation of the transportation network in the city. Participants noted that a powerful professional culture exists within the Engineering Department. A professional mystique has been created which has separated and elevated engineers to the position of experts. Although, one participant
noted, experts are perceived to be objective, engineers are operating from deeply embedded VBAs which may affect their objectivity.

The VBAs of engineers come from an education system which concentrates on the accommodation of the automobile. Participants felt that engineers are not trained to question or to look for alternatives to the automobile-based transportation system. They do not view these activities as part of their responsibilities. One participant described a study which demonstrated that, in the United States, civil engineering students receive an average of ten minutes of instruction in the area of bicycle transportation planning over a four to five year undergraduate program (which focuses almost exclusively on providing engineering services to automobile drivers).

Interviews and illustrative cases provided a number of examples of engineers' VBAs towards the natural environment. Interview participants felt that transportation decision-makers in Vancouver do not take predictions of global warming seriously. Thus, while the City of Vancouver's Clouds of Change report (1990) and the federal government's Canada's Energy Outlook 1992-2020 report (Canada 1993a) recommend reductions or stabilization of CO₂ emissions, the provincial government and the Greater Vancouver Regional District, in their long-range transportation plan entitled Transport 2021 (GVRD & Province of British Columbia 1993a), forecast a 15-20 percent increase in CO₂ by the year 2021.

There was a strong feeling among interview participants that, even with numerous projections of environmental degradation, engineers have not changed their basic VBAs towards the environment. In the case of the Transport 2021 plan, including the
requirement of CO₂ reduction as one of the planning parameters would have required a complete rethink of the VBAs which shape the present urban transportation system in the Vancouver region. Rather than undertaking this transformational change, transportation planners ignored the need for CO₂ reduction and continued planning in their traditional way.

In order to stay within this realm of familiarity (traditional VBAs), techniques and mechanisms are developed within the organizational culture to maintain the status quo. Change-impeding tactics are used to avoid conformance to new policies and/or directives. The use of such tactics is made possible by the lack of appropriate structure (discussed in the previous section). Table 6.2 summarizes tactics used to impede change within the City of Vancouver's transportation planning system.

Table 6.2
Tactics Used to Impede Change within the City of Vancouver Transportation Planning System

<table>
<thead>
<tr>
<th>Tactics Used to Impede Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Espoused theories vs. theories in use -- informal transportation plan.</td>
</tr>
<tr>
<td>• Mystique of scientific objectivity.</td>
</tr>
<tr>
<td>• Reframing situations -- reframing and presenting alternative scenarios which permits the achievement of preferred options or goals.</td>
</tr>
<tr>
<td>• Limiting options for debate.</td>
</tr>
<tr>
<td>• Incrementalism -- slowly modifying the urban landscape to accommodate additional automobiles.</td>
</tr>
<tr>
<td>• Ignoring policies of city council/political directives.</td>
</tr>
<tr>
<td>• Ignoring external reports.</td>
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<tr>
<td>• Illusions of planning -- actions which result in inaction.</td>
</tr>
<tr>
<td>• Unclear presentation or manipulation of information.</td>
</tr>
<tr>
<td>• Secrecy -- denying public access to civic government documents.</td>
</tr>
<tr>
<td>• Interdepartmental animosity -- perpetuation of the status quo.</td>
</tr>
</tbody>
</table>

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Comments of interview participants drew the attention of the researcher to the potential existence of an informal plan which was perceived to be directing the expansion of an automobile-dominated transportation system in Vancouver. This informal transportation plan seems to be the principal means to subvert the desires of some citizens to move towards a more diverse transportation system in Vancouver. The potential existence of this informal transportation plan is supported in theory by Argyris’ (refer Argyris 1982, 458) concept of espoused theories (stated goals) versus theories-in-use (actual practices).

To implement this informal transportation plan, case study evidence shows that persons and agencies directing transportation planning in the city use the other techniques identified in Table 6.2.

One change-impeding tactic discussed by interview participants was the mystique used by engineers to create the illusion of objectivity. One respondent felt that engineers use mathematical and statistical methods to justify their own goals instead of the goals of the organization.

This illusion of objectivity effectively masks the second change-impeding tactic: reframing situations. This tactic was identified in this study on more than one occasion. The attempt to introduce high occupancy vehicle lanes into the Marpole district of Vancouver illustrates how a debate was manufactured which pitted public transit against small business. The real issue encompassed a need to reduce the volume of single-occupancy vehicles along the Granville transportation corridor. Another example of the
use of this change-impeding tactic is the current discussion on redeveloping the Burrard Street Bridge. The original proposal to better accommodate pedestrians and bicycles on the bridge now includes provisions to expand the arterial road system with the construction of the Hornby Highway Connector.

A third change-impeding tactic encompasses a process of limiting the breadth of debate during the planning of transportation infrastructure. This technique is presently being used in the debate surrounding the redevelopment of the Lion's Gate Bridge. Although some citizens are pressing for reduced automobile capacity on the bridge, the provincial government has not included this concept in the discussion of options.

Incrementalism is a fourth change-impeding tactic which is used to gradually alter streetscapes to service the needs of automobile drivers rather than to serve the needs of neighbourhood residents. The fact that a neighbourhood group has actually set up a neighbourhood engineer watch program, in an attempt to stop engineers from incrementally changing their streets into automobile thoroughfares, illustrates how seriously some citizens perceive these change-impeding tactics. The illustrative case which examined the Pacifica development on Cambie Street illustrates another use of incremental tactics.

Ignoring policies of council was identified on a number of occasions as a change-impeding tactic used to ensure that change does not come about in the transportation system. Policy statements, such as the Clouds of Change report and the "reverse transportation priority policy," have been approved by city council, but their implementation is not evident in the capital and operating budgets or in the capital plan for the City.
of Vancouver. Scientific evidence of environmental degradation, which is attributed to urban automobile-based transportation systems, is also ignored. Forecasts and trends of environmental degradation are discredited through charges of insufficient data and/or rudimentary models.

The illusion of planning is another form of the previous change-impeding tactic. In this case, an actual planning process is undertaken, planning documents are produced and are distributed to the public, but no mechanisms or resources are made available to implement the plan. This illusion of planning can be more harmful than inaction, as the public is lulled into believing that sustainability issues are being addressed and resolved. The use of this tactic was evident when the Engineering Department and one neighbourhood group underwent a local planning process, a neighbourhood plan was approved by city council, and the Engineering Department subsequently ignored the plan and continued its traffic expansion activities. One participant talked about wonderful "coffee table" plans published by the GVRD which describe planning futures which cannot be implemented.

Unclear presentation or manipulation of information is another change-impeding tactic. When examining investments in the regional transportation system, and budgets and capital plans for the City of Vancouver, the researcher encountered difficulty in readily understanding what funds were invested in the automobile infrastructure and what funds were invested in alternative modes of transportation. A great deal of effort was invested in re-categorizing and reorganizing information to allow an objective review of transportation mode investment patterns.
An example of information manipulation is the allocation of grade separation costs only to transit (rather than to both transit and the automobile systems) and then requiring transit to finance capital expenditures. This gives the appearance of public transit being an uneconomical transportation mode when compared to the automobile. Another example of the information presentation change-impeding tactic was in the CityPlan process, where the results of an extensive public participation process were completely misrepresented by an employee of the Engineering Department. Another variation to this tactic is used when the Engineering Department promotes the expansion of the automobile transportation system under the auspices of improving the "efficiency and safety" of the transportation system (as in the case of the Burrard Street Bridge and the Clark Street/Broadway Avenue intersection).

Department of Engineering staff were not anxious for the researcher to see documents related to future plans for the transportation system in Vancouver. This element of secrecy was questioned by the researcher, as normally municipal plans are public documents. Efforts to keep Engineering Department plans secret from the public indicates that the department is afraid of public reaction to their plans (i.e., because the Engineering Department is following its own conception of a future transportation system rather than a public conception). This environment of secrecy seems to be the accepted norm of city engineering staff and represents another powerful change-impeding tactic. (For example, to gain access to transportation planning documents and maps denied to the researcher by engineering staff, the British Columbia Freedom of Information and Privacy Act had to be used.)
The relationship between land use and transportation is fundamental to urban planning. The case study participants felt that the purposeful separation of these two processes in Vancouver, transportation planning in the Engineering Department and land-use planning in the Planning Department, is inhibiting progressive sustainable development initiatives in the city. Several participants felt that the animosity between the Engineering Department and the Planning Department was perpetuated in an effort to maintain the status quo.

Pfeffer (refer to Chapter Two, Section 2.5.4 and Pfeffer 1981, 3) describes how leaders of organizations can focus on processes of control and maintenance of the status quo. This practice can severely impede an organization's ability to adjust to internal and external change. Interview participants referred to Vancouver's Engineering Department as being structured in a military fashion. Power and control seem to be used extensively to carry out the engineering functions for the city. Carley and Christie (1993, 149) refer to this type of management style as command and control. They feel that command and control management techniques cannot respond to meta-problems such as environmental degradation in a large urban area.

Yellin (refer to Chapter Two, Section 2.5.4 and Yellin 1993) observed that institutional organizations are not designed for change. This observation was supported by participants who felt that the hierarchical structure of Vancouver's municipal government does not encourage the initiation of change nor does it have the ability to manage change in a proactive manner. Employees know from experience that new ideas are, in the words of one interview participant, "stomped on." Another interview participant described the
transportation planning system in Vancouver as containing "fine people with fine ideas being stuck in institutions that don't work very well."

The findings of the 1993 Gallup poll, referred to by Yellin, which showed that a significant portion of decision-makers do not have any idea of how to initiate change, were illustrated at the Fraser Basin Management Board conference referred to in Chapter Two (Section 2.5.4). Decision-makers at this conference did not display any knowledge of the second-order change processes which are needed to initiate change towards sustainability.

**Human Resource Traits Which Impede Change**

Individuals involved in the planning and implementation of Vancouver's transportation system are influenced by the same VBAs which were discussed in the Barriers at the Input Stage section. As individuals, they bring these VBAs into the work environment and thus shape the corporate structure. As discussed above, a segment of this group, the engineers, is also strongly influenced by its professional culture. These VBAs have a major influence on the organizational culture because of the powerful position that engineers maintain within the organization.

Although a great deal of information exists about the introduction of a more sustainable transportation system, none of the participants foresaw a sustainable transportation system for the Vancouver region twenty years hence. The past functioning of the planning transportation system has conditioned the participants into believing that no other future, other than an automobile-dominated system, is possible. This belief inhibits the attempt to implement any creative solutions to Vancouver's present
transportation dilemma and is a major barrier to change.

Participants pointed to a lack of skills as one of the barriers impeding a movement towards transportation sustainability. The following specific skills were suggested as being important in achieving a movement towards sustainability: negotiation, facilitation, mediation, transformation, implementation, communication, and public participation.

The last significant planning system barrier to change towards sustainability is the lack of knowledge both about sustainability and about second-order change. The diversity of definitions of sustainability expressed by the participants demonstrates a lack of a common understanding as to what the term means. Those involved in the planning and implementation of Vancouver's transportation planning system must have a common understanding of this concept if they are to cooperate in the development of a sustainable transportation system.

Another critical gap in knowledge is a lack of understanding of second-order change. As discussed earlier, knowledge about second-order change is critical to achieve any changes in individual and organizational VBAs which, in turn, must be achieved to initiate a movement towards sustainability.

6.4 Barriers at the Output Stage

Informal plans, budgets, planning practices, and public subsidies are outputs of the Planning System Stage. The effects that informal plans and budgets have on the implementation of a sustainable transportation system were already discussed in the previous section.
The design of an inefficient transit system and the use of traditional urban design techniques are two planning practices which result from the barriers identified at the Planning System Stage. Interview participants discussed how public transit subsidizes long-distance suburban transit riders. They commented that this situation may be politically expedient, but it penalizes the overall delivery of transit, and it also penalizes transit users in high density areas. One interview participant also commented that, without dedicated transit rights-of-way, as congestion created by automobiles increases on urban roadways, transit will be penalized.

Traditional urban design techniques make it difficult for alternative modes of transportation to adapt to an urban landscape designed for the automobile. Planning practices continue to encourage long-distance commuting and urban sprawl. Traditionally, within the downtown core area of Vancouver, more jobs than housing units have been encouraged. This has further contributed to the perpetuation of long-distance commuting. Recently, the City of Vancouver has attempted to rectify this problem by encouraging more housing in the downtown core, but, as one interview participant noted, the type of housing which is being encouraged is for a select group of high-income workers. The current practice of continually expanding roads is yet another planning practice which perpetuates the domination of automobiles.

The final output barrier is the use of public subsidies to support an automobile-dominated transportation system. Interview participants described the use of taxes to construct roadways while debt financing is used to construct public transit. This adds an interest expense to the cost of building and operating a transit system. The fact that, under
the income tax act, the cost of parking is classified as an business deduction, while transit fees are not, is another example of a public automobile subsidy. If the income tax act were changed, free company parking would not be available to employees. Subsequently, due to a significant increase in commuting costs, many automobile commuters might make the switch to transit.

6.5 Summary

This chapter has presented the barriers impeding a movement towards a sustainable transportation system in Vancouver which were identified in the interviews of key informants and in the illustrative cases. Table 6.1 summarizes these barriers within the context of the theoretical planning process model which was introduced in Chapter Three.

The research findings revealed a complex set of barriers which exist at the Planning System Stage of Vancouver's planning process. This system of barriers can be organized into three main categories whose components relate to the following issues:

1. Vancouver's institutional structure of transportation planning makes comprehensively-oriented planners subservient to narrowly-oriented engineers and divides the closely-related functions of land-use and transportation planning. The city has no mechanisms to ensure that sustainability policies are followed or to allow for public accountability; the public is unaware of minor projects (such as chronic street-widening plans) and there is no mechanism for reviewing these projects publicly or for understanding their cumulative effects. Finally, the regional planning body has no power to implement any of its transportation plans.
2. An established organizational culture within the city's planning system clings to society's traditional anthropocentric VBAs and reflects society's lack of understanding of the change process (both identified in the Input Stage of Vancouver's Planning Process). Fueled by the public's acceptance of the automobile culture, transportation engineers and planners often ignore city sustainability policies and inhibit change through the use of change-impeding techniques such as information manipulation and secrecy. This results in unsustainability-oriented planning implemented through mechanisms such as budgets, public subsidies, informal plans, and unsustainable planning practices (all identified at the Output Stage of Vancouver's Planning Process).

3. The human resource base within Vancouver's transportation planning system lacks the skills and knowledge needed to place the city on a straight course towards transportation sustainability.
CHAPTER SEVEN - CASE STUDY IMPLICATIONS

"The solutions are sitting right in front of everybody's nose and have been for the past 40 years. Everybody's been talking about, in general terms: densification, better use of transit, less use of the automobile, less sprawl. To go over that stuff again is just ludicrous because everybody knows it. The things you have to do are not complex. They're simple. It's the organizational system. It's the atmosphere you have to move through that is complex."

Case Study Participant, 1994

7.1 Introduction

This concluding chapter discusses the following implications of the case study findings: implications for action which will give planners, and other community sustainability advocates, the knowledge needed to begin the process of overcoming barriers to change towards sustainability in their communities; implications for organizational change theory; and implications for future research in the area of community sustainability planning and implementation.

7.2 Implications for Action

The case study has the following implications for supporting a movement towards sustainability in Vancouver and, possibility, other communities. Three sources were considered in the development of these implications: interview participant comments, findings from illustrative cases, and literature sources.

Three categories of action implications are presented: those dealing with the education of citizens and government employees, those dealing with structural/organizational changes, and those dealing with planning practices. Of these three
areas, first-order structural change would be the easiest to implement and would have the most immediate impact in creating a movement towards sustainability. The most significant change, however, would encompass a long-term, ongoing second-order change process whereby societal VBAs would shift towards sustainability.

7.2.1 - Education

Common Understanding of Sustainability

There is a need to move towards a common understanding, among all elements of the community (citizens and those involved in planning and developing communities), of the basic concepts and principles of sustainability. The researcher recognizes the difficulty in coming to such a consensus; issues surrounding sustainability are new and very complex, a great deal of debate surrounds which new concepts and principles of community planning and development will replace traditional ones, and the numerous interpretations of sustainability are based on differing VBAs. Achieving a common understanding of sustainability will involve major second-order change.

Although reaching a common understanding of sustainability will be very difficult, it is the researcher's opinion that such an understanding is crucial for sustainability to be achieved. Elements of this common understanding should include the need to maintain natural capital and the need to consume natural interest at a rate equal to or below natural replacement rates.

Values, Beliefs, and Assumptions

The change of basic VBAs towards sustainability, which is beginning to take place in certain segments of the population, should be supported through social learning
processes (refer to Section 2.6.2 – Traditions of Planning - Change and Transformation) which educate the public about concepts and principles of community sustainability (see Appendices B and C for an example of a set of guiding principles which communities could adopt). Social learning should include evaluative processes designed to continually question culturally-programmed strategies which perpetuate unsustainability.

**Training**

Training programs should be provided in a continuous-learning mode to ensure that those involved in the planning and development of communities are knowledgeable about the following:

* community sustainability (what it is, what it looks like, and what must be done to get there)
* first- and second-order community and organizational change processes, how VBAs must be changed to accomplish second-order change, and how change incompetence can impede the movement towards sustainability
* the transformational change process and the zone of turbulence between the anthropocentric worldview and the biocentric worldview
* the existence of subversive tactics and how they are used to impede the movement towards community sustainability

Training programs should be provided to ensure that those involved in the planning and development of communities are versed in the following skills:

* information dissemination
* conceptualization
* negotiation
* consensus decision-making
* decision-making involving top-down and bottom-up inclusionary processes
* techniques which assist in the transformation process
* working comfortably in turbulent environments characterized by uncertainty, poorly-defined needs, conflicting preferences and values, resource uncertainty, and blurry outcomes
* working successfully in action teams
* holistic thinking
* working in an environment which is continually testing and reconstructing knowledge
* influencing and mobilizing support
* generating rather than judging ideas
* creatively scanning rather than focusing thought
* incorporating rather than rejecting constructive criticism
* exploring contradictions and dilemmas in VBAs
* planning at a values level
* implementation
* describing complex issues in a way that the lay person can understand
* risk-taking and experimentation
* sensitivity (empathy)
* mediation between citizen groups and government organizations
* facilitation (catalytic role whereby planners provide citizens with the information they need to make informed decisions about sustainable futures)
* planning, designing, and implementing alternative transportation systems

**Post-Secondary Institutions**

Municipalities should pressure the post-secondary education system to produce planners and engineers with the above knowledge and skills.

**7.2.2 - Structural/Organizational Changes**

**Government Structure**

The complexity of environmental problems (meta-problems) requires the establishment of new environmental management structures which overcome the problem of compartmentalization. New structures, such as temporary organizations, action teams, multi-agency networks, and action-centred networks, must be encouraged to allow a structural fluidity that addresses meta-environmental problems.

Two critical elements of community-building, land-use, and transportation planning, are usually separated at a local government level. These activities should be
brought together to ensure that land-use development patterns will support a multi-modal transportation system.

The practice of municipalities planning land use without consideration for regional impacts on the transportation system must be discontinued. A regional planning authority must have mandated responsibility for land-use planning which impacts regional transportation infrastructure systems.

**Management Practices**

Organizational structures should be perceived as open systems that utilize feedback loops which allow organizations to draw on, and to learn from, past experience in order to adapt to a changing environment.

The process of change and transformation should be perceived by all staff as a basic element of the organizational culture. It should be understood that all those affected by change should be involved in the change process. People should be made aware that change is accompanied by an endemic environment of uncertainty, and they should be assisted in developing skills to function in this type of environment.

In hiring new employees to plan and manage the transportation system, municipalities should look for candidates who have the knowledge and skills listed above. Employees should be expected to constantly evaluate whether their activities and the activities of their departments, and of other departments and agencies, are consistent with the stated goals of the organization.

Employees should be encouraged to seek out new, innovative ideas which can be used to implement policies of sustainability. Creative efforts, ideas of employees, and
risk-taking which support a movement towards sustainability should be rewarded. Employees should not fear reprisal when expressing feelings or ideas. Reports, such as the Clouds of Change in Vancouver, should be periodically produced and updated to provide focus for new initiatives.

Citizen activists should be recognized as an integral part of creating change rather than being perceived as a confrontational force to combat and discredit. Government employees should be expected to tap into local knowledge and into the energy of citizen groups.

**Official Plans and Policies**

Official plans must incorporate concepts and principles of community sustainability. Where official plans are not in effect, they must be developed and approved. These plans should result from a planning process which encourages citizens to examine and question their basic VBAs.

Formal city policies should be in place to ensure that municipal decisions are consistent with the official community plan, previous motions of council, and other formal planning documents. It is recognized that even though policies may be in place, they can be ignored by government officials and/or politicians. Ideas presented in the following section (Checks and Balances) may assist in overcoming this problem.

**Checks and Balances (to overcome subversive tactics)**

Cumulative environmental assessments must be an integral part of every community planning and development decision to ensure that the effects of incremental change are evaluated.
Ecological entrepreneur positions should be created within municipalities' civic administrations. These entrepreneurs would focus on discovering new ways for human activities to take place which would not degenerate the natural world and, where possible, which would rehabilitate degraded natural systems. These individuals would be constantly seeking new ways to live off natural interest and to wean society from continued consumption of natural capital.

Monitoring bodies, whose responsibility would be to ensure that each municipal decision or action supports the official community plan and its provisions for community sustainability, should exist. These watchdog bodies would be made up of civic decision-makers, ecological entrepreneurs, representatives of non-governmental organizations, and community residents. The watchdog body could also become a partner in multi-agency networks, or action-centred networks, that could draw on action learning and action research taking place in other municipalities.

Ecological entrepreneurs would also sit on boards, committees, and other authorities which are responsible for community planning and development. These individuals would assess how the day-to-day implementation of policies, procedures, and design criteria contributes to, or impedes, a municipality’s movement towards sustainability. Regular sustainability assessment reports would be communicated back to the monitoring body.

Citizens should be involved in all stages of the planning process, informed of proposed changes to municipal infrastructure (through appropriate signage and other mechanisms), and have full access to planning and policy documents. A formal process
should be put into place which allows citizens to register appeals with the monitoring body when decision-makers ignore directives for change towards sustainability.

Regular, open, non-confrontational forums must be held to encourage the expression of innovative new ideas which will facilitate the movement towards community sustainability, to institutionalize action learning and change processes within the organizational culture, and to encourage the organizational culture to seek ways to change rather than ways to cling to the status quo.

7.2.3 - Planning Practices

**Action Learning**

Planning processes should incorporate action learning in which knowledge is continually tested and reconstructed.

**Recognizing Innovative Ideas**

Innovation and creativity of individuals and groups in the community should be acknowledged and rewarded though such mechanisms as highly-publicized annual community sustainability awards.

**Operationalizing Sustainability**

Community-based projects and planning processes should be used to operationalize the concepts and principles of community sustainability. These experiments should be evaluated to determine the effectiveness of community sustainability concepts and principles, and they should be revised if they are not both maintaining natural capital and ensuring the consumption of natural interest at a rate below or equal to natural replacement rates.
Planning Practices Consistent with Sustainability

There should be a redirection of planning practice away from those which support the traditional status quo (low density urban sprawl, expansion of the automobile-based transportation system, separation of land use) and towards those that support community sustainability (densification, provision of alternative and more sustainable forms of transportation and the reduction of the amount of urban space dedicated to the automobile, and mixed land use).

Public subsidies which support unsustainable development should be eliminated and should be replaced by disincentives (such as, in the case of transportation, user fees, gas taxes, road pricing, and full-life automobile costing).

Investing in Community Sustainability

Where costs for grade separation between the automobile transportation system and the transit system are allocated solely to public transit, they should be shared between the two systems, as both benefit at least equally from grade separation.

The image of public transit should be improved through higher civic investment in public transit space. In order to draw more transit users, attempts must be made to ensure that these public realms are both safe and aesthetically pleasing.

7.3 Implications for Organizational Change Theory

Organizational change literature played a significant role in the development of this research program and in the conceptualization of the major factors which impede change within organizations and institutions. This section discusses how the findings of this research inquiry support what other researchers have described as key elements in the
change process; what barriers to change, identified in the literature, were identified by the study findings as being used within Vancouver’s transportation planning system; and what value the research findings and implications have in broadening the existing body of knowledge.

The research findings demonstrate that officials within the City of Vancouver’s civic administration are ignoring directives for change towards transportation sustainability. Many city officials appear to be in the Denial and Defense Stages of Carnall’s (1990) change/transformation cycle. Although sustainability directives have been passed by city council, certain elements of the civic administration seem to have become institutionalized, taking on what Selznick (1957) describes as a "life of their own." Some employees seem to feel threatened by the uncertainty brought on by concepts of sustainability. Both Carnall and Schermerhorn et al. (1991) describe the evolution of an organizational/institutional ethos where change dysfunctionality is masked by raised levels of productivity and increased levels of support for the traditional institutional culture (as described by Schein 1985).

Interviewees pointed to the difficulty of evading an organization’s culture. They suggested that it does not take long for idealistic planning graduates to conform to the VBAs of their organization’s culture. These comments support Schein’s views that employees are most comfortable and secure when they are accepted within the social bosom of their organization’s culture.

In their desire to cling to the traditional VBAs espoused by their institutional culture, city officials seem to be employing subtle subversive techniques to avoid having
to deal with a period of uncertainty, discomfort, and declining self esteem -- all of which are described by Carnall as common symptoms experienced during the change process. Study findings strongly suggest the existence of an informal transportation plan in Vancouver. The existence of such a plan would support Etzioni's (1964) concept of stated goals versus real goals (the city has stated goals of sustainability, but the illustrative cases document various planning processes and projects which contradict these stated goals).

Additional tactics found in the literature were described by key informants and/or were uncovered through the illustrative cases. For example, the informal transportation plan demonstrates a desire to maintain the status quo which, in turn, is based on societal VBAs and the past education of city officials. A desire for status quo maintenance is discussed by Pfeffer (1981), March and Simon (1958), and Yellin (1993) who assert that organizational leaders are concerned about maintaining the status quo and that rationality plays a relatively minor role in the functioning of an organization.

Control of resources is another barrier which the literature identifies as a change-impeding tactic. Figures contained within the city's capital plan and operating budget indicate that financial resources are not being invested in a manner which will result in a more diversified transportation system. Schermerhorn et al. describe how resource control (in this case financial resources) is a key element in facilitating or impeding organizational change.

Forester (1989) and Schermerhorn et al. discuss how information can be manipulated in an effort to impede change. This tactic was identified in a number of situations in the illustrative cases.
The research findings also support a number of the barriers that were identified in the one known study which examines barriers to change towards sustainability (Moore 1994): a lack of understanding about what sustainability means, the continued acceptance of the automobile as a symbol of the status quo, a lack of cooperation among civic departments, and the overwhelming complexity of the concept of sustainability -- what Carley and Christie (1990) refer to as meta-problems. The first three barriers were specifically identified by key informants, while the last barrier was implicitly evident during the analysis of the raw data.

This research inquiry adds to the pool of knowledge within the area of organizational change by demonstrating that organizational change theory seems to be applicable to change towards sustainability in Vancouver and possibly in other communities.

An extensive list of change barriers is presented, and the analysis of the illustrative cases demonstrates how these barriers are used. The research also provides a case study which can be replicated to determine the generalizability of this research to other communities and situations. The "Implications for Action" section also provides practical and policy suggestions which can be tested in Vancouver and other municipalities. Prior to the commencement of this study, there was no information which specifically listed barriers to transportation sustainability or which suggested methods to overcome these barriers.

7.4 Implications for Future Research

Evolving from the exploratory case study are a number of research themes which are logical next steps in the study of community sustainability. Table 7.1 summarizes
suggestions for future research.

Table 7.1
Suggestions for Future Research

1. Replicate this study in other communities and in other community systems to determine whether the conclusions can be generalized.
2. Undertake action research which incorporates social learning processes to examine deeply held values, beliefs, and assumptions which impede change.
3. Develop a set of principles of sustainability and test these principles at a community level.
4. Examine organizational procedures, regulations, and design criteria which may be impeding change.
5. Study change processes at a community level with particular emphasis on processes which occur in the zone of turbulence.
6. Study what, and how, barriers are used during the denial and defense stages of the change cycle:
   - how organizational and community cultures suppress change
   - how mandated change directives are subverted
   - how myths and fear of the unknown can impede change processes
   - how images of action are used to disguise inaction.
7. Examine which skills are needed by change agents to facilitate a movement towards sustainability.
8. Examine how a formalized policy framework could be established for municipalities.
9. Examine the relationship between municipal planning and engineering departments to provide organizational and process insights into how to overcome barriers impeding a movement towards sustainability.
10. Study the planning process of the municipal engineering department to determine how citizen concerns and political directives are acted upon or ignored.
11. Study the impact of automobiles on urban liveability:
    - examine both changes in land use and the process of street widening
    - review operating and capital budgets by mode of transportation
    - examine changes in street liveability due to increased traffic volume
12. Analyze property redevelopment processes to determine how social and environmental liveability elements may be lost due to the expansion of urban freeway systems.

To determine whether the conclusions of this study can be generalized, it should be replicated in other communities. It is likely that change-impeding tactics are also used in other community systems such as health care, food production, energy supply, and goods manufacturing. These change-impeding tactics could be exposed by replicating this
research for these, and other, community systems.

Future studies should involve action research, which incorporates social learning processes, to both examine and provoke deeply-held values, beliefs, and assumptions which impede change towards community sustainability and to make citizens aware of how decision-making processes can facilitate or impede the movement towards sustainability. Traditional observational forms of research will not resolve existing problems. Independent observation and research reporting can produce confrontational situations in which researchers do not contribute to change and transformation but merely lay blame. For example, the secrecy surrounding the Vancouver Engineering Department's informal transportation plan probably evolved as a result of confrontational episodes with citizen groups calling for change.

A number of approaches could be used by both action researchers and community activists to favour a more democratic form of decision-making than the autocratic form which was evident in this study. Two approaches, social mobilization and social learning, which provide proactive approaches to guide change, should be tested in the area of community sustainability. For example, following a social learning tradition, the action researcher who champions sustainability becomes a counsellor and an advisor to those who are interested in changing their own, and their organization's, deeply-held values, beliefs, and assumptions. Guba and Lincoln (1989, 152), who refer to this process of consultation and interaction as a hermeneutic dialectic circle (refer to Appendix K), have tested this evaluative research methodology and have found it to be very effective in overcoming organizational barriers to change.
Action researchers should support citizens' sustainability efforts through the dissemination of knowledge which clarifies what sustainability means and how the concept can be implemented at a community level. To meet this challenge, operationalizing the concept of sustainability, through community-based testing and experimentation, must be accorded the highest research priority. For example, the eight principles of community sustainability presented in Appendix B could be integrated into a community planning process, and the initial reactions of citizens, politicians and civic employees could be monitored. After using the principles to guide community planning and decision-making (possibly after periods of six and twelve months), the process could be analyzed and, if required, modifications to the principles could be made. The hermeneutic dialectic circle research technique might be very applicable to this form of community-based action research.

This research has documented how sustainability policies are ignored by public officials responsible for their implementation and how budgets are used to perpetuate the automobile dominant culture. Other elements of bureaucratic organizations, such as procedures, regulations, and design criteria, are also used to maintain the status quo. Changing policy is insufficient unless the accompanying procedures, regulations, and design criteria are also changed. This is an area which should be investigated. For example, the current design criteria used by engineers in the design and expansion of Vancouver's city streets or the subdivision design criteria used by planners for new neighbourhood construction could be critically analyzed from a community sustainability viewpoint.
Figure 2.6 depicts the process of change from the dominant industrial paradigm to the new ecological paradigm. The region between the two worldviews is termed the "zone of turbulence." In this zone, change and transformation takes place. Additional knowledge of the processes and actions which occur within this zone of turbulence is critical if concepts of sustainability are to be implemented at a community level.

Preceding change and transformation are periods of denial and defense. Studying what, and how, barriers are used during the denial and defense stages of the change cycle is also critical. Topics which should be studied include how organizational and community cultures suppress change, how individuals and organizations subvert mandated directives calling for change, how myths and fear of the unknown can impede change processes, and how images of action can be used to disguise inaction. The various works of Argyris, Forester, and Carnall, which have been cited previously, have contributed significant insights that help to describe the transformation process and the skills that are needed by change agents to facilitate this process. Their research, and the research of others, should be examined in more detail to identify knowledge which could assist the process of transformation towards community sustainability.

Literature which examines change at a local government level should be sought out. Because this researcher found little organizational change literature dealing with this level of government, business organizational change literature was relied upon to develop a theoretical framework to study change towards sustainability. The danger in using business literature is in the relatively simple models used and the power which business leadership wields in impeding or encouraging change. The private sector literature may
not be completely relevant to communities and to the public sector. At a community level, change processes are much more complex, power may be defused among a number of community factions, and processes of planning and decision-making may be haphazard. Contributing to knowledge that assists in understanding community change processes is a crucial element of a research agenda that will assist in implementing sustainability. Educators responsible for curriculum development at planning and engineering schools should investigate what types of new knowledge and accompanying skills would allow planners and engineers to play a more effective and facilitative role in assisting communities' movements towards sustainability. This research could result in new courses in the areas of transformational change processes, ecological entrepreneurship, and communication theory. Transformational change process courses need to teach students how to analyze change processes at an individual and community level. Understanding the minute details of the change process will assist planners and engineers in first identifying barriers to change and then overcoming these barriers. Finally, research in planning and engineering schools should further develop principles of sustainability that could then be tested at the local level.

Case study results indicate that barriers are encountered in Vancouver's transportation planning system when sustainability concepts are introduced into the community. One of the barriers identified in the study was the lack of an official plan or other formal policies to guide community sustainability initiatives. Research should be undertaken to examine how a formalized policy framework could be established for municipalities.
The confrontational relationship that exists between the Vancouver's Planning and Engineering Departments was identified as another barrier to sustainability. Planners work in a political environment in which they have little or no power. This is particularly true in their relationship with engineers and with the engineering departments. The existence of this confrontational and disempowering (with respect to planners) relationship may be a deeply-held assumption of the culture of civic administrations. Detailed case studies, examining the relationship between planning and engineering departments, could provide many organizational and process insights into how barriers impeding a movement towards sustainability can be overcome. The use of hermeneutic dialectic circle research methodology could be highly effective in understanding and overcoming this confrontational situation (refer to Appendix K for a description of this research methodology).

The planning process of engineering departments should be studied in order to determine how citizen concerns and political directives are acted upon or ignored. In cases where researchers are denied critical information, acts similar to British Columbia's Freedom of Information and Privacy Act, where they exist, should be used to continue to compile documentation which may prove or disprove the existence of informal transportation plans.

The impact of the automobile on the liveability of municipalities should be examined. The following analysis methods could be used: examination of both changes in land use and the process of street widening, detailed reviews of operating and capital budgets by mode of transportation, and examination of changes in street liveability due to increased traffic volume. A financial analysis of municipal operating and capital expendi-
tures over an extended time period would determine what forms of transportation municipalities invest in.

A detailed analysis of property redevelopment processes (such as the Pacifica development on Vancouver's Cambie Street) should be undertaken to determine how engineering departments expand municipal road systems. An interesting and important aspect of such studies would be a comparative analysis to determine what community liveability concessions (on-site daycare, open space, greenspace, pedestrian promenades, etc.) are being compromised or lost due to the expansion of the road system.

7.5 Concluding Comments

Over the past number of decades, humankind has incrementally degraded the global environment. Accompanying this environmental deterioration is a desire, by a growing number of people, to take action which will lead towards sustainability and a positive future. Vancouver, British Columbia is one of a small number of pioneering communities which are attempting to take the initial steps towards sustainability. In approving a number of sustainability policies, the city has created the opportunity to study barriers which impede a movement towards sustainability.

The research focuses on why Vancouver, although officially committed to sustainability, continues to build an unsustainable transportation system. Implicit in this research focus is the question of how a sustainable transportation system can be achieved. The simple answer to these questions is that Vancouver's transportation planning system is driven by powerful societal VBAs that are based on consumerism and growth and that:

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a social learning process, which incorporates second-order change, is a prerequisite for a movement towards sustainability.

Many of the participants interviewed for this study were aware of successful sustainable transportation precedents in other cities, yet study findings show that most of these measures are not being attempted in Vancouver. This lack of initiative is due to a complex array of barriers that are impeding the movement towards a sustainable transportation system. These barriers, which were inductively identified through open-ended interviews and illustrative cases, occur at all three stages of the planning process model introduced in Chapter 3 (refer to Figure 3.1).

At the Planning System Stage of the planning process model, a complex set of institutional barriers was identified that has structural, cultural, and human resource dimensions. These barriers were classified into three different categories: structural barriers, barriers related to the organizational culture, and human resource barriers.

Structural barriers were encountered at the local, regional, and provincial levels of Vancouver’s transportation planning system. At the municipal level, the important relationship between land-use and transportation planning is neglected due to the two planning functions being separated into distinct departments. This compartmentalization of planning functions impedes comprehensive decision-making. Furthermore, no mechanisms exist to ensure that sustainability policies, once passed by city council, are being implemented, nor are there mechanisms to review the cumulative effects of the incremental expansion of the municipal road system.

At the regional level, no legislative powers exist to implement transportation plans,
nor, as in the case of the City of Vancouver, are there mechanisms to assess the cumulative effects of the incremental expansion of the regional road system. In the absence of a regional authority with a mandate to plan and implement a transportation system, land development decisions at a local level are made without due consideration of their impacts on the regional transportation system and decisions are made at a provincial level without due consideration of their impacts on the municipal transportation system.

A sophisticated organizational culture within the city's planning system appears to have difficulty responding to pressure from community organizations for changes in the VBAs on which transportation decisions are made, to reports which contain recommendations based on sustainable transportation ideals, and to scientific evidence of environmental degradation that is attributed to automobile-based urban transportation systems. The planning system is, however, responding to dominant societal VBAs which encourage consumption and growth rather than sustainability.

In response to these pervasive VBAs, the city's transportation planning system appears to condone a complicated, sophisticated, and effectively disguised set of change-impeding tactics to promote an informal transportation plan which perpetuates the continued expansion of an unsustainable automobile-oriented transportation infrastructure.

Although many of the change-impeding tactics identified in this study appeared to originate from the city's Engineering Department, engineers are not, as many interviewees appeared to believe, the only members of the city's transportation planning system who are clinging to the status quo. Engineers, after all, are only responding to the VBAs of society and to politicians who often undermine their own policies. In addition, city
planners ignore sustainability policies when they perpetuate an urban landscape which simply cannot support a sustainable transportation system.

The third major source of change-impeding barriers within Vancouver's transportation planning system stems from a human resource base which lacks the skills and knowledge necessary to facilitate the process towards sustainability.

The practical implications of this study are that sustainability can be encouraged by focusing efforts into three categories of mutually-reinforcing actions: education, structural change, and planning practice.

Within the realm of education, post-secondary institutions and continuing education programs must provide students with an understanding of concepts of sustainability and with the skills and knowledge necessary to facilitate change.

To overcome structural barriers, official community plans and other municipal policy directives must be based on concepts and principles of sustainability. Drawing on the findings from the Vancouver case, it was demonstrated that sustainability policies are not sufficient to bring about change. In order to ensure that policies of sustainability are implemented, assessment procedures and mechanisms for accountability must be incorporated into municipalities' planning systems. Procedures should be put into place to monitor municipal decision-making, and mechanisms should exist to allow the dissemination of information which will enable the public to monitor municipal progress towards sustainability. Cumulative environmental assessment should become a necessary component of the planning system.

Finally, planning practice must evolve away from traditional principles which
encourage low-density development and must evolve towards land-use patterns which support a multi-modal sustainable transportation system.

Pierce et al. describe a process whereby society moves from a state of ultra-weak sustainability to a state of strong sustainability. They envision this process as taking at least twenty years. According to Lee (1993, 5), research in the past decade has produced a large body of substantive knowledge that defines a sustainable future while process knowledge (which examines political systems and the development of management skills to overcome complex barriers impeding a movement towards sustainability) has received only cursory attention. This research program contributes to building process knowledge that will assist society to make the transition to a sustainable future.

The results of this case study suggest that municipalities can use a two-pronged approach to overcome barriers to sustainability. This two-pronged approach would encompass both short-term first-order change (the most important of which would be the structural changes discussed above and a knowledge of the change process) and long-term second-order change in societal VBAs. The process of social learning is an important ingredient in accomplishing a change in VBAs, as it would inform and mobilize people (including civic officials) around the concepts and principles of sustainability.

7.6 Limitations of Case Study

A number of factors limit the generalizability of this case study to other communities and situations. The factors include the study focusing on only three areas of theory and practice resulting in the exclusion of other potentially important knowledge,
methodological limitations, and the need for a further development of the role land use planning plays in urban development and regeneration.

The study focused on a review of literature in the areas of transportation planning, sustainable development, and organizational change. The three areas of knowledge are extensive and required considerable time to undertake a comprehensive review. Therefore other important areas of knowledge, such as political, public administration and selective planning theories, which would have contributed to improving this research inquiry, were not examined. For example, Forester’s Critical Theory, Public Policy, and Planning Practice (1993) published concurrently with the writing of the review of literature chapter contributes to our understanding of social interaction by describing the microsociology and micropolitics of public policy and planning processes. Forester delineates the manipulation of the public by persons in positions of authority using techniques of back room consensus, the use of beliefs as facts, myths of expertise, trust, and selective attention to and neglect of information (Forester 1993, 161). Forester’s observations reinforce the conclusions of this study.

Limitations may result from what some may see as the use of an "investigative journalism" approach during the second stage (illustrative cases) of data collection. While this may be of concern by some scholars, investigative journalism has become an accepted form of qualitative research methodology (see for example Lincoln & Guba 1985, Miles & Huberman 1984, and Patton 1990).

In addition, methodological limitations may be present due to sampling effects. Although the researcher attempted to interview a representative sample of persons involved
in the transportation planning process, he was denied access to senior personnel in the City of Vancouver Engineering Department. Requests for interviews with senior engineers were consistently answered by middle or junior staff. Therefore, interview results do not include potential important thoughts, ideas and insights of senior city engineers.

The use of the Freedom of Information and Protection of Privacy Act may produce distorted information and the existence of the information which was produced through the use of the Act doesn't necessarily mean that, in Vancouver's case, the Engineering Department has secrets which they are keeping from the public. The change-impeding tactics used by the Engineer Department may be passive in nature and unintentional rather than active and manipulative. Information withheld from the public may simply be in various stages of development and therefore cannot be released until the idea or concept is fully formed. The previous statement does imply the continuation of an organizational ethos which encourages the planner/engineer to perform as an expert. The public may not be brought into the planning process until a latter stage where change/adaptation to a proposed development is difficult or impossible. Thus, this study recommends a continuous open planning process which is evaluated through cumulative impact assessment procedures.

The study did not examine other potentially important sources of information such as minutes of City Council which might have identified politicians as using change-impeding tactics to retard the process towards transportation sustainability. For example, members of Vancouver City Council may simply provide sustainability rhetoric to appease environmental lobbyists. In addition, the study did not examine literature from the early
1980s when the concept of sustainability underwent initial conceptual development. Authors such as Brooks (1981), Brooks et al (1983), and Elder (1984) examined sustainability through research in the area of energy planning.

Nor did the study examine the role of the provincial government or BC Transit in impeding change. The complex nature of transportation planning in the City of Vancouver and the interrelationships with other municipalities, the Greater Vancouver Regional District (and other regional districts in the Lower Mainland), and provincial and federal agencies are important considerations when studying a movement towards transportation sustainability.

Finally, this study did not attempt to examine the dynamics between land use and transportation. Both are important considerations in community sustainability. This research focused on transportation as transportation is one significant intervention point in the movement towards a sustainable future.
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APPENDICES

A. Components/Characteristics of the Industrial Development Paradigm and the New Ecological Paradigm

B. Principles of Community Sustainability

C. Summary of Principles of Community Sustainability

D. A Possible Process to Move Towards a Sustainable Urban Transportation System

E. Strengths and Weaknesses of In-depth Interviewing

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J. Correspondence Pertaining to the Freedom of Information and Protection of Privacy Act

K. Hermeneutic Dialectic Research Process
Appendix A
Components/Characteristics of the Industrial Development Paradigm
and the New Ecological Paradigm

<table>
<thead>
<tr>
<th>Dominant Industrial Paradigm</th>
<th>New Ecological Paradigm</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Definition of Progress</strong></td>
<td></td>
</tr>
<tr>
<td>● Past perceived as primitive and savage. Modern society perceived as civilized.</td>
<td>● History is defined within evolutionary biological framework.</td>
</tr>
<tr>
<td>● Humankind evolving towards a stable and secure future.</td>
<td>● Rather than following linear evolutionary path, humankind evolving in more organic, circular, rhythmic paths, drawing on experience of past and present to create a better future.</td>
</tr>
<tr>
<td>● Must sacrifice in present to achieve greater happiness in future.</td>
<td>● Recognizes that focusing solely on creation of better future results in sacrificing present enjoyment.</td>
</tr>
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<table>
<thead>
<tr>
<th><strong>Image of Self</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>● Humans defined as mechanistic, rationalistic and materialistic.</td>
<td>● Humans defined in physical as well as spiritual sense. Mind and matter viewed as interdependent elements which make up humankind.</td>
</tr>
<tr>
<td>● Human nature viewed as innately anti-social, (aggressive, competitive, acquisitive).</td>
<td>● Human nature perceived as inherently social, exhibiting characteristics of aggression and compassion, competition and cooperation, and acquisition and sharing.</td>
</tr>
<tr>
<td>● Strong identification with job, organization, profession, and possessions.</td>
<td>● Identity of individual transcends identification with job, organization, and profession and included self-in-community.</td>
</tr>
<tr>
<td>● Purpose of individual is to produce and consume.</td>
<td>● Individual has multi-purposes, striving for development of self, development of interpersonal relationships, development of community and development of society.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Human Interrelationships</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>● Humans viewed as increasingly secular, pragmatic, manipulative, rational, and utilitarian.</td>
<td>● Humans viewed as increasingly spiritual, romantic, cooperative, and intuitive.</td>
</tr>
<tr>
<td>● Compassion exists only at level of friends, family, and possibly neighbourhood.</td>
<td>● Everyone and everything, present and future, viewed with compassion and having purpose in itself rather than having purpose only to serve humankind.</td>
</tr>
</tbody>
</table>
Little concern for those outside this immediate circle of people (including welfare of future generations).

Within formal employment, individualism is sacrificed to priority of group. Individual exists to serve needs of company, rather than the company existing to develop the individual.

Workers become experts, developing a specialty which serves needs of group and/or society.

Hierarchical structures are perceived as most efficient form of management.

At a group level, within formal employment, needs of individual are promoted along with needs of group and organization.

Social interaction perceived as process of relationship development resulting in growth of individual, group, community, and society.

Disastrous environmental effects of scientism during industrialism results in constraints put on role of experts, evolution of more holistic vocations, and increase in the role of interdisciplinary teams.

Management restructured, moving responsibility of decision-making as close as possible to people affected by decisions.

Nature/Humankind Relationships

Humankind viewed as fundamentally different from all other species. Separation results in domination and manipulation of nature through individual will/reason.

Domination of nature viewed as necessary; nature is seen as both hostile and present to serve humans.

Natural resources have low valuation due to perceived limitless reserves available from natural environment.

Use of nature's resources to produce goods is acceptable.

Economic growth continues to be valued over environmental protection due to attitude that humankind has not inflicted serious damage to nature and whatever damage exists is reparable and exploitation of nature is seen as an acceptable cost to providing jobs for people.

Humans remain one among many species that depend upon the earth's ecosystem for survival. Dependence upon nature results on recognition that all nature has intrinsic value.

Humankind must live in harmony with nature. Consequences of degrading nature are understood.

Earth's resources are limited and therefore a high valuation of nature is a mandatory requirement for the continued survival of humankind.

Nature has value for its own sake. Therefore environmental protection should be given priority over economic growth.

Processes of thinking

History of humankind is one of progress.

Current era of progress achieved through rapid accumulation of scientific and technical knowledge.

Rational, logical, and objective processes of scientific inquiry perceived as only means of experiencing world. Objectivity is valued

Recognition that a balance must be created between dimensions of knowledge such as rationality and intuition, facts and values, thoughts and feelings.

Forms of knowing, such as mythologies, subconscious, and intuition are accepted in academies of knowledge. Recognition that
over subjectivity. Forms of knowing such as mythology, subconscious, intuition hold little value in academies of knowledge. Fact is separated from value and thought is separated from feeling.

- Humankind is understood to be master of its destiny. Goals can be defined and humankind has innate ability to learn whatever is required to realize these goals. If a problem is encountered, there is always a solution. Therefore progress never ceases.

Growth

- No limits to growth. World is vast, ample natural reserves, and material/economic growth required to meet needs of growing population.

- Growing population is not viewed as a problem from an ecological perspective; it is viewed as market opportunity from an economic perspective.

- Acceptable for consumption to be manipulated through use of both planned obsolescence to shorten life of products and advertising pressure to create artificial needs.

Societal Structures

- Organizational efficiency is brought about by hierarchical relationships. Top-down planning, imposed goals, ordered decision-scientism and reductionistic thinking have resulted in the creation of disharmony and disequilibrium in humankind's relationship with the environment.

- Although human inventiveness has resulted in what has been perceived as the expansion of biological carrying capacity limits, there is now a recognition that ecological laws in the longterm cannot be altered for humankind.

- Humankind's destiny is influenced by an infinite number of natural factors. The pursuit of knowledge is not to master the destiny of humankind but to understand the role humankind and other entities play in evolutionary processes. If a problem is encountered, there is not always a solution. If a perceived solution exists, activities must pause to determine repercussions.

- World viewed as a delicately functioning system with limited natural resource reserves. Photosynthesis is the only productive source of energy. All other human and natural energy-making processes degrade the quality of the world's resources.

- Increasing human populations and corresponding increases in the consumption of resources are perceived as the most significant limiting factors to the future of the world.

- A shadow carrying capacity has been created through the exploitation of naturally occurring capital (fossil fuels). This situation is recognized as being unsustainable.

- Physical and biological limits must be put on human activity. Humankind must adopt a simpler lifestyle which recognized concepts of self-actualization, conservation, recycling, and innovation and creativity which serves authentic rather than artificial needs.

- Organizational efficiency is defined from the point of view of economic efficiency and social development. Organizational structures are made

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The evolution of large bureaucratic organizations contribute towards economic efficiency.

- Specialization results in the evolution of powerful knowledge elites.

Political structures

- Within the western world view, politics are polarized in left-right political associations.
- Differences between parties once based on disagreement over ownership of production. Differences reduced as emphasis on market control comes to dominate societal structures.
- Non-elected political experts responsible for giving direction to party policy.
- Party policy focuses on economic issues and complicates process of direct political action through development of rigid political institutions. Political institutions are highly centralized and result in concentration of political power within a small political elite.
- Tradition of political debate and various checks and balances formalized in political processes. This slows down responses to, stops, or dilutes needed controls on human activities which cause irreversible impacts on nature.

Definition of economy

- Consumerism, competition, and efficiency are valued within a market-driven economic system.
- Precise model of economy.
- Definitive laws, such as those found in newtonian physics. are developed for economics in an attempt to eliminate uncertainty and unpredictability.

- Conservation, cooperation, and the efficient use of renewable resources are valued within an economic system which incorporates concepts of ecology.
- Dynamic ebb and flows of nature encourage a recognition that economic activities include a dynamic element of uncertainty.
- Balanced emphasis on public rather than private goods. Economy focuses on societal values and on the public interest rather than on private enterprise.
Marketsystem results in increasing affluence in developed countries and within the economic elite of developing countries. Life becomes departmentalized into work and non-work activities.

**Definition of Work**

- Concept of work removed from household and elevated to position of high importance which ultimately defines the person. Within the context of organization, purpose of work is to maximize profit and productivity.

- Strong polarization of labour versus management, consumer versus manufacturer, etc.

- Work environment defined by aggression, competition, and specialization. Job descriptions sharply defined and people developed to fit jobs.

- Within context of individual, purpose of work is to maximize income with least expenditure of effort. Jobs provide income to address economic needs or wants. Ultimate goal of work is to escape from work so wages can be used to purchase enjoyment of consumer goods and services.

**Definition of Success**

- Success defined quantitatively through

- New ecological economics results in an increase in spiritual affluence and in a sharing of the world's resources between all peoples and species and between present and future generations.

- Methods are found to decrease and redistribute per capita consumption of all resources. Systems for population control are put into place.

- Concept of work becomes one of maximizing the welfare of the worker, the organization, and the community.

- Work is redefined to include activities which improve the quality of life for the individual, the family, the community, and society in general. Within the context of the organization, the purpose of work is to produce goods and services which address the basic needs of all society while ensuring the minimal disruption of the natural environment.

- Labour and management, consumers and manufacturers realize that in working together creative solutions can be found to minimize humankind's impact on the environment.

- The work environment is defined by cooperation, flexibility, and creativity. There is a strong emphasis on worker satisfaction; jobs are developed to fit the person while serving the needs of the organization. Specialists continue to exist, but they seek other specialists and form permanent and semi-permanent working groups in a quest to resolve problems confronting society.

- Within the context of the individual, a blurring develops between work and play. Work becomes rewarding in itself rather than a means to do other ends.

- Success defined in both qualitative and quan-
status symbols, level of income, profits, and wealth accumulation. Quotas strived for and tangible assets acquired in complex and fast lifestyle.

- At a nation level, success defined by growth in per capita Gross National Product (GNP).

Risk

- Significant improvements in quality of life due to development of science and technology. Development of hard technologies emphasized; regulation of marketplace de-emphasized.
- Risk and reward accepted as major concepts which drive economic development. Pollution perceived as a risk taken to achieve economic growth/progress. Although spot pollution exists, no serious damage has been inflicted on environment by humans.
- In cases where environmental community has documented perceived major environmental disruption, advocates of the dominant industrial paradigm either ask for more proof, state the problem is only temporary due to fluctuations in natural patterns, or offer/seek technological solutions only after proof that a problem exists is documented scientifically.

Recognition that the complexity of life has increased dramatically due to the development of science and technology.

- Humankind has developed processes and systems to control the use of science and technology.

- Safety of society and nature is of major importance. Environmental lobby is no longer required to prove that a direct cause and effect relationship exists before society begins to address environmental problems. Catastrophic disruptions to the ecosystem are no longer common occurrences.

Technology

- Society continues to increase its reliance upon technological solutions to societal problems. Humankind becomes subservient to runaway, unbridled technology.
- Belief that technology is value-free and industrialization is the only vehicle for progress.
- Goal of economic efficiency results in continual replacement of old technologies by

titative terms. Achieving high levels of creativity, fulfilment, and the development of relationships are valued higher than the acquisition of tangible assets.

- Countries strive for development in quality of life rather than economic growth measured in per capita Gross National Product (GNP).

- Recognition that the complexity of life has increased dramatically due to the development of science and technology.

- Safety of society and nature is of major importance. Environmental lobby is no longer required to prove that a direct cause and effect relationship exists before society begins to address environmental problems. Catastrophic disruptions to the ecosystem are no longer common occurrences.

- Society recognizes that continued reliance on hard technology results in humankind becoming a slave to technology. Forms are developed to debate the value of evolving scientific discovery and technological innovation. Restrictions on the development of new science and technology result in more effort being invested in the development of proven and appropriate technologies.

- Rather than pursuing values of "survival of the fittest," society pursues values of "survival of the
new technologies in an environment that values "survival of the fittest."

- Complexity of technology results in an intricate, centralized, regulatory system to provide needed controls. Complex and centralized nature of regulatory system results in slow responses to environmental and social degradation.

Spacial relationships

- Large, centralized, formal organizations and communities considered more efficient than small, decentralized informal organizations and communities.
- Goal of economic efficiency and continual growth. Small communities and small enterprises evolve to become big communities and big enterprises. Unquestioned recognition that public and private systems either grow or flounder.

- Remnants of past (including nature), although unique, considered hindrance to progress. Traditional communities, extended families, and neighbourhoods perceived as inhibiting growth of modern, rational, well-planned communities. Nature is redesigned into empty, universal, standardized planes which easily accept a variety of people, buildings, transportation systems and other improvements.
- Planning and architecture is codified and universalized. Goal of planning and architecture is to create year-round, uniform micro-environments which extract a maximum amount of money from individuals with smartest. Creativity is valued more than wealth accumulation.
- Complex centralized regulatory system still required to ensure environmental problems are addressed. Frequency of problems reduced due to controls placed on science and technology.

- Although large, centralized, formal organizations and communities have a limited role for certain tasks, there is an evolution towards the concept of "small is beautiful." The concept of "economies of scale" is further developed into a recognition of "appropriateness of size" for organizations and communities. The concept of "appropriateness of size," through optimal, social, ecological, and economic efficiencies, becomes a valued goal in organization and community development.
- Communities and organizations are decentralized whenever possible to create living environments which have a human scale and which coexist in harmony with the natural environment.
- Society strives for the maximization of diversity in ecological relationships and of lifestyle alternatives in urban and rural communities and bioregions.
- Traditional communities and small populations, such as extended families and neighbourhoods are perceived as contributing to a sense of diversity in communities.

- Planning and architecture build on the uniqueness of localities, creating symbiotic relationships with nature.
minimal expenditure of resources and creative inspiration.
• Increasing urban concentrations and emergence of conurbations spatially support globalizing world economy.
• Traditional communities (which exhibit a strong sense of place) are replaced by mega-neighbourhoods, and the separation of land uses ensures the creation of urban efficiencies.

Role of planning

• Planning is dominated by strictly economic motives and material values emphasizing incremental planning processes and short-term solutions.

• Planning is separate from the democratic process and is a vocation where specialists plan for the people.
• Society is perceived as a machine; the role of planning is to eliminate friction from component parts of the machine.
• Land planning is dominated by principle of "separation of land uses."
• Planning becomes a process of finding new and better ways to accommodate the automobile.

• Planning is based on principles of ecological development and takes on spiritual values which transcend economic efficiency and material gain. Societal and natural values are taken into consideration.
• Planning activities are performed through democratic processes of participatory decision-making (planning with people rather than for people). Processes of planning become more important than final product in the form of static planning documents.
• Planning is based on the major principles of integrating land uses and eliminating the automobile.
APPENDIX B
Concepts of Community Sustainability

Within the greater exploration for a new development philosophy is a search for ideals and principles which can shape the growth and redevelopment of human settlements in a manner which respects the integrity of the natural environment. As the writings of Ebenezer Howard (1902) and Patrick Geddes (1915) demonstrate, new ideals or principles for shaping the growth of human settlements can be developed which are based on a reasonable and responsible consideration for the natural environment and humans alike. The concepts can be implemented on a limited scale as Howard demonstrated in England with the creation of the new Garden Cities of Letchworth and Welwyn and as Geddes demonstrated during his planning career in England and India.

Community planners need a set of sustainability principles to assist them in their sustainable community development efforts: particularly when dealing with changes towards sustainability in urban transportation systems. The following set of principles were developed from the literature of a number of disciplines. For each conceptual theme, the literature is summarized, and tentative principles are presented to guide action. The principles are statements of ideals which ultimately may be unobtainable, but, they are nevertheless something to strive for in daily planning practice. For in the process of striving, portions of the ideals may be achieved (Lacey 1990, 122).

Principle of Integration

Throughout the greater portion of history, the activities of humankind were integrated with, and limited by, underlying ecosystems. Geddes recognized this relationship and stressed that human settlements must maintain a symbiotic relationship with the surrounding natural environment (Geddes 1915, 95). He developed the "Valley Section" to illustrate humankind’s inseparable dependence on the natural world (the social economic, and ecological interrelationships of humans and nature).

Unfortunately, since the dawn of the Industrial Age, society has come to believe that humankind has domination over, is superior to, and is separate from the remainder of the natural world. As Rees notes, "we act as if the economy is somehow separate from the rest of material reality" (1991, 458). We have created economic models to represent a reality which is anthropocentric (people centred) rather than biocentric (nature centred) models which truly represent reality. We have come to believe that human ingenuity is boundless, and therefore infinite growth is possible. The result has been an unsustainable situation: a human population explosion in the poor nations and high levels of resource consumption in the rich nations.

Numerous authors (Crombie 1992, Geddes 1915, Howard 1902, Register 1990, Van der Ryn & Calthorpe 1986) have called for an end to the concept of urban/nature
separation in community planning. This practice denotes yet another example of humankind attempting to be separate from and superior to nature. Rather than being respected, the natural world is ploughed up and replanted to create a more orderly, less diverse humanistic world. Howard's Garden City concept acknowledges that through the pre-planning of communities and the integration of city and country, many urban wastes could become resources to the surrounding hinterland. Sustainable community development implies more compact urban areas interspersed with productive areas - the latter areas being used for renewable energy collection, agriculture, forests, and waste recycling. The concept of separating urban from rural must be discarded and replaced with a definitive understanding of the symbiotic relationship between urban and rural areas.

1 - Principle of Integration

Community Sustainability views human activity as limited by and integrated with underlying ecosystems. The all encompassing function of the natural world in sustaining life is acknowledged through the constant search for methods to integrate nature into the fabric of communities.

Principle of Ecosystem Integrity

The concept of conservation and the wise management of natural resources have been a valued part of North American culture since the turn of the century, when Gifford Pinchot in the United States and Clifford Sifton in Canada advocated the use of "scientific" management processes in the management of natural resources (Taylor 1992, 26). Conservation implied a more efficient utilization of renewable resources (less wastefulness, less disruptive environmental practices in resource extraction, and considerations for refurbishing the resource base in a manner which would guarantee efficient resource extraction in the future). The preservation of natural areas was of only minor consideration in their concept of wise management for human use. Therefore, any lands set aside for the preservation were usually areas exhibiting high recreation or aesthetic value or lands where resource extraction could not be undertaken in an economically efficient manner. Consideration of ecological boundaries, the needs of native species, and ecosystem processes were not part of the criteria used in the definition of lands included or excluded from the resource extraction process (Noss 1992, 11).

The evolving concept of ecosystem integrity and the need for protection of representative ecosystems, rather than just lands, is beginning to redefine regional land planning. Authors from diverse disciplines (Cholette et al 1991, Daly 1990, Goodland & Daly 1992, Rees 1992a, Robinson et al. 1990, Rotering 1993) have recognized the
important role natural ecosystems play in maintaining life support systems for all species, including humans.

Sustainable development involves "positive socioeconomic change that does not undermine the ecological and social systems upon which communities and society are dependent" (Rees 1989, 3). Our limited knowledge of the natural world means that we must be extremely cautious in our interactions with ecosystems. Robinson et al. (1990, 44) state that "the continued existence of the natural world is inherently good. The natural world and its component life forms, and the ability of the natural world to regenerate itself through its own natural evolution, have intrinsic value." We must find non-monetary ways to value nature. This will be one of the greatest challenges of the next century.

Representative ecosystems must be set aside or rehabilitated for the exclusive use of non-human species while other ecosystems must provide for the needs of humankind. In the latter case, the scale of human activity must be maintained at a sustainable level which is within each ecosystem's carrying capacity. In virtually all ecosystems impacted by humankind, decontamination of air, water and soil and reduction in waste flows will be required. In many ecosystems where human impact is presently at a low level, impacts should be withdrawn to secure ecosystem integrity. Withdrawal from ecosystems will be difficult, as the confrontation between environmentalists and loggers in the Clayoquot Sound and the Carmanah and Walpern Valleys of Vancouver Island demonstrate. But ultimately ecosystem integrity will become a principle of human survival and will be integrated in the planning process.

2 - Principle of Ecosystem Integrity
Humankind's dependence on nature for the maintenance of the earth's life support systems implies that the basic planning unit must be the ecosystem. The basic goal of planning must be to insure the maintenance of ecosystem integrity. Human activity must be maintained at a level which is within each ecosystem's carrying capacity.

Principle of Diversity

One of the major goals evolving from the practice of modern economic development has been the application of a standard theory of growth and development on all cultures and in all regions of the world (Goulet 1992, 467). A central assumption of both socialist and capitalist theory has been the exploitation of the natural world for the benefit of humankind. The basic law of nature, "diversity creates stability," was replaced by the economic concept of "standardization creates efficiency." In all areas of human endeavour standard techniques and processes, which resulted in higher
economic efficiency were encouraged. In agriculture, intensive breeding of seed stock was undertaken so that plant species would be the correct size, shape, firmness and strength for machine handling purposes; the correct constitution for transportation, storage and display purposes; and the correct colour, texture, and smell for consumer buying purposes. The result was the elimination of vast quantities of genetically diverse seed stock. This process of standardization impacts on all aspects of life, including the way we think and the way we design our human settlements.

Long term sustainability is only possible if diversity is reinstated as an integral part of human systems and if natural biodiversity is protected. The importance of diversity in maintaining healthy and sustainable ecosystems has been identified by many authors. Noss (1992, 13) recognizes the critical role which biodiversity plays in ensuring long term regional and global sustainability. He calls for a system of protected areas which contain representations of all native ecosystem types and the maintenance of sufficient lands to ensure natural movement patterns and viable populations for native species.

The principle of diversity applies to human and non-human species alike. Wismer and Pell (1981) contend that diversity should be cultivated throughout the realm of all "human, plant and animal life in order to maximize our capacity of flexibility, innovation and adaptability in the face of unknown futures. Van der Ryn and Calthorpe (1986, ix) state that the practice of ecologically sound agriculture using organic farming and gardening techniques would contribute significantly to the maintenance and expansion of biodiversity in both cities and the countryside.

We are beginning to rediscover the important role which native species play in the provision of food, medicine, fuel and fibre. Register (1990, 4) discusses the need for a "Green hierarchy in ecocity planting," where native plant species become more important for ecological and social health than ornamental plant species. Integrating nature into the urban landscape creates ecological diversity, assists in enhancing the stability of urban regions, and reduces pollution caused by pesticides, herbicides and fertilizers used on urban lawns and ornamental gardens.

**3 - Principle of Diversity**

Diversity plays an essential role in maximizing flexibility and contributing to the stability of systems and processes. Community Sustainability acknowledges ecological and cultural diversity by supporting the unique characteristics and expressed needs of each region.
Principle of Ethical Allocation of Resources

The current economic system relies on the trickle-down theory of resource distribution to provide for the needs of all members of society. A basic assumption is that the quality of life, measured in national economic accounts, improves as the economy expands. Therefore, the wealthy become richer but the poor also become richer. Unfortunately this growth in economic prosperity has been at the expense of the natural environment. As Rees contends (1992a, 14) much of the economic growth and the accumulated wealth has been through the drawing down of "natural capital."

Long term sustainability will only be possible if the economy adjusts to a level whereby society lives off current yields from the photosynthesis process, or "natural interest." In this adjustment progress the rich, representing the top 20% of society and controlling 80% of the economic wealth (Boothroyd 1991b), will attempt to maintain their economic position using institutionalized systems of economic control. The remaining portion of society, particularly the poor and disempowered, representing the bottom 20% and controlling only 2% of economic wealth, will have difficulty addressing even their basic needs for food, clothing and shelter.

Unless an ethic of human and environmental compassion emerges, ecological deterioration will accompany widespread poverty and human degradation. Already Bangladesh in Asia and the countries of Ethiopia, Sudan, Somalia, Angola and Mozambique in Africa are experiencing the collapse of natural ecological processes due to populations which exceed the ecological carrying capacity of each region. Desperate people are concerned with survival, not with the long-term quality of the environment. They are consuming that environment on which they depend for long term survival. Possibly the only way that humankind will develop an ethic of compassion is making the connection that the world's poor are slowly, but methodically, destroying natural ecological processes which all humankind depend on for survival.

Numerous authors (Cholotte et al. 1991, Gardner 1988, Robinson et al. 1990, Wismer & Pell 1981) consider the achievement of a minimum level of equity as a basic pre-condition for society to realise a state of sustainability. As the World Commission notes (1987), people alive today must use resources in a manner which ensures an equitable distribution of resources to future generations and all peoples of the world. Rotering (1993) feels that natural resources should be viewed as "an irreplaceable heritage to be allocated by ethical as much as economic decisions" and that a new form of economics, called "ecological economics," must be developed to achieve these ends.

Sustainable communities are those communities which incorporate, into their fabric, provisions for social justice (Robinson et al. 1990), self-determination (Gardner 1988), and cultural-determination (Wismer & Pell 1981). Community members have equitable access to community-decision-making processes, resources, and benefits; gender equity
is realized by planning the community so that all its members have an equal opportunity to realize their full human potential; and planning activities take into consideration both the interests of those who are adults today and the interests of future generations.

4 - Principle of Ethical Allocation of Resources

Community Sustainability views resources as an irreplaceable heritage to be allocated by ethical as much as by economic decisions. To move towards sustainability, communities must achieve a minimum level of equity which includes consideration of the needs of future generations.

Principle of Use Limits and Conservation of Resources

One of the basic premises of growth (neo-classical) economics is the need to continually expand economic activities through the consumption of renewable and non-renewable resources. This is brought about through the transformation of resources from a natural state to a form which can be used by humankind.

Neo-classical economic theory assigns little or no value to resources in their natural state. Only through human ingenuity and creativity can the value of natural resources be enhanced (Rees 1991, 459). Therefore a resource with no economic purpose has no value. The challenge is, through human ingenuity, to add value to unvalued resources. Creating value, where none existed before, has been the path to economic success.

In the past, the seemingly inexhaustive inventory of natural resources, the undervaluing of natural resources, and the ability to readily find substitutes resulted in little concern directed towards depletion of natural resources or the destructive extractive techniques used in resource recovery. But as Robinson et al. (1990, 44) note, humankind must acknowledge the negative environmental impacts of human activity and strive to "develop methods to minimize energy and material use per unit of economic activity."

An ethic of preservational use of resources must develop. This principle of resource preservation recognizes that a portion of any natural resource, a portion of any natural landscape, or a representative unique ecosystem must first be set aside in perpetuity before the use of a natural resource is permitted. This will insure that resources are not driven to extinction and that restorational resource stocks are available when society finally recognizes the need to regenerate those portions of the natural environment destroyed by human activity. Daly (1990) suggests that, after a significant representative segment of nature is set aside, renewable resource extraction should be permitted at a level whereby "(a) harvesting rates should not exceed regeneration rates
and (b) waste emissions should not exceed the renewable assimilative capacity of the environment."

Non-renewable resource use presents a more difficult dilemma. As the Worldwatch Institute notes (1992) the standard of modern life is heavily dependent on the continued use of non-renewable resources. Ideally, humankind should immediately stop the extraction of non-renewable resources, but in the short-term a more realistic goal would be to limit their use and encourage recycling of non-renewables. Daly (1990) recommends a longer term goal of exploiting non-renewable resources "at a rate equal to the creation of renewable substitutes."

Community recycling programs are contributing towards the reduction of renewable and non-renewable resource extraction through the substitution of traditional waste from human systems into the raw material segment of the commodity manufacturing process. Recycling and the reduction in the per unit use of natural resources in commodity manufacturing will aid in reducing humankind's impact on the natural environment. Possibly the most effective concept to be used in redefining humankind's relationship with the natural world is the idea of "Carrying Capacity." Ecologists believe that the well-being of any ecosystem can be sustained through the maintenance of a dynamic balance between plant and animal species and the natural environment. The "Carrying Capacity" concept must become the basis for new community, regional, national and global accounting techniques to assess sustainability.

Moving towards a state of sustainability implies a movement towards a "steady state" economic system. Basic laws of this economic system would include economic stability, selective economic expansion and contraction (Rotering 1993), ecological limits on material consumption (Rees 1989, 3), and the wise use of scientific discovery and technological innovation in the restoration of natural ecosystems.

1 The concept of "Carrying Capacity" can be defined as "an ecosystem's capability to continue supporting life for an indefinite period. If a carrying capacity is exceeded, the quality of life will decline. If a carrying capacity surplus is encountered, rapid population growth and/or quality of life improvements will take place" (Catton & Dunlap 1980, 43).

2 A "Steady State" economic system is defined as an "economy in which the total population and the total stock of wealth are maintained constant at some desired levels by a 'minimal' rate of maintenance throughput (i.e., by birth and death rates that are equal at the lowest feasible level, and by physical production and consumption rates that are equal at the lowest feasible level)" (Daly 1973, 152).
5 - Principle of Use Limits and Conservation of Resources

Community Sustainability strives for economic stability, selective growth and contraction, and resource use which considers the needs of future generations. In the short term, communities must encourage the use of renewable rather than non-renewable resources and limit exploitation of non-renewable resources at a rate equal to the creation of renewable substitutes. In the longer term, human interaction with the natural world must adjust to a level whereby society lives off the current yields from the photosynthesis process or "natural interest."

Principle of Regional Self-Reliance

The growth economic concept of "comparative advantage" encourages regions to specialize in products or services which can be produced most efficiently from a purely economic perspective. Initially, social and ecological impacts were excluded from consideration. As larger segments of society become disadvantaged and larger areas of the environment become ecologically degraded, social and environmental considerations are slowly, but begrudgingly, being included in economic deliberation. But the exchange of goods and services between regions continues to undermine and destroy diverse local business, and social and ecological systems.

In an era of a new economics, which assumes a balance between social and ecological needs and goods and services provision, a major consideration must be increasing community self-reliance. Sustainability economics implies moving away from the present heavy dependence on the larger economy towards a form of regional economics which relies heavily on the use of local resources. Gurstein and Curry (1993, 11) assert that the "importation of resources from outside a region should only take place when those resources, or suitable substitutes, cannot be found locally." Furthermore, if trade must take place the flow of resources between regions should be balanced (Bailey 1990, 49).

6 - Principle of Regional Self-Reliance (selective interregional trade)

Community Sustainability signifies a movement towards regional self-reliance, which includes more active use of local resources and the importation of resources from outside a region only when those resources, or suitable substitutes, cannot be found locally. This limited level of trade must take place in a manner which insures a balanced flow of resources between regions.
Principle of a Hierarchy of Desirable Transportation Modes

Throughout history the location of human settlements, and their subsequent growth and prosperity, has been greatly influenced by their role as transportation nodes. Communities remained relatively small and compact until the development of the automobile at the turn of the century. The virtual unlimited mobility of the automobile created urban sprawl: a form of urban development which consumes large quantities of energy and land resources.³

Transportation is probably the most significant human activity impacting on the natural functioning of ecosystems. Intra-urban transportation systems cut through ecosystems impeding the movement of animal species and generating air and water-borne pollution. Presently, inner-urban automobile transportation is being constrained by "sink limits" (the accumulation of ozone gases, global warming and other forms of regional air and water pollution). In the future automobile transportation will be constrained by "source limits," or the depletion of fossil fuels and other minerals (Goodland & Daly 1992, 37).

Examining this situation from a logical, rational perspective, one can conclude that we have long passed the time when alternative and/or more energy efficient modes of transportation should have become dominant. Unfortunately, this is not the case. We still cling to the automobile, we underprice the resources on which they run, and we subsidize the roads on which they are driven.⁴

Van der Ryn and Calthorpe (1986) argue that the first step towards ecological efficiency must involve containment of the automobile and the creation of a diverse transportation system. A significant portion of the urban space appropriated by the automobile must be given back to public transit and bicycles and become pedestrian-oriented. Register (1990) suggests the following hierarchy of diverse transportation modes with the most desirable descending to the least desirable: pedestrians, bicycles, ferries, buses, trains and finally automobiles.

³ In many ways society did not have a choice in the process. According to Hanson (1986, 394), the automobile industry forced the shutting down of a number of urban transit systems in the first half of the century through lobby action and outright purchase and closure. The only option for people was to purchase a car or be left behind by a rapidly changing society.

⁴ In the Vancouver region, a recent report carried out by Peat, Marwick, Stevenson and Kellogg concludes that each motorist receives a $2,600 per year subsidy for the use of the regional road network (Simpson 1993).
One significant factor contributing to the continued use of the automobile is the difficulty in moving around our urban regions using other forms of transit. Our cities have been built for the automobile. In large areas, public transit, bicycle and pedestrian movement is an after-thought, if considered at all. Car-free zones and pedestrian malls and corridors must become integral components of urban transportation networks.

Community planning principles must be re-oriented from separation to integration of land uses. Register (1990) states that "Transportation is what you have to do to get to places inconveniently located." Designing diversity into the community can result in the reduction of people and goods movement, allowing other modes of transportation to flourish (Gurstein & Curry 1993).

7 - Principle of a Hierarchy of Desirable Transportation Modes
Community Sustainability recognizes the need for automobile containment and the creation of a diverse transportation system focused on pedestrians and bicycles, then ferries, buses and trains, and finally automobiles. Community design must encourage the integration of human activities thus reducing the distance humans and goods are required to move.

Principle of Rehabilitation/Regeneration
The impact of humankind on the natural functioning of the ecosphere has been discussed in earlier sections. Human activity needs to be reoriented away from growth economic activities, and landscapes and ecosystems which have been degraded by human activity need to be rehabilitated. Degraded ecosystems must be decontaminated and then regenerated and maintained through careful management of soils and nutrient cycles, and through reforestation, respeciation and other actions (Register 1990). As the Royal Commission on the Future of the Toronto Waterfront states: "we view regeneration as a healing process that restores and maintains environmental health, as well as anticipating and preventing future harm" (Crombie 1992, 56).

Principle Seven of the Rio Declaration on Environment and Development (United Nations 1992) calls for global community cooperation in undertaking this regenerational process. The Rio Declaration (Earth Charter) acknowledges the major contribution of the rich nations in creating ecological degradation and therefore gives these nation's responsibility for assisting in rehabilitational processes in both rich and poor nations. Designing with nature, rather than dominating nature, and involving the people most effected by development activities, are major goals of regenerational
planning.

Rehabilitation or regenerative techniques must be developed which incorporate concepts which 1) preserve in perpetuity significant and representative natural areas and interconnecting corridors, 2) limit the size of human settlements to a level defined by a region's carrying capacity, 3) increase the density of the built segment of human settlements, 4) integrate nature into the urban landscape, 5) support multifunctionality in urban buildings and landscapes, and 6) encourage the use of local renewable resources.

Strategies to assist in the movement towards these regenerativeal principles are numerous. A short list of strategies includes:

**Natural Area Preservational Strategies**
* Identify and preserve in perpetuity unique, representative ecosystems and linkages between these ecosystems (Noss 1992).

**Community Size Strategies**
* Land remaining after accommodating nature (Noss 1992) will be available for human activities.
* Include green belts, corridors and wedges influenced by the natural topography of a region (Howard 1902 & Geddes 1915). As Howard notes, these natural land areas will become an integral component of urban form, thus limiting the size and spread of cities.

**Densification Strategies**
* Use the concept of Transfer of Development Rights to encourage densification along public transportation corridors and at transportation nodes which, over time, will allow low density land to regenerate into natural landscapes (Register 1990).
* Develop semi-natural areas adjacent to the urban built landscape for the collection of energy; the cultivation of crops for food, fibre and energy; and for the recycling of wastes (Van der Ryn and Calthorpe 1986).
* Encourage infilling in low density neighbourhoods and use pedestrians, rather than automobiles to define neighbourhoods (Register 1990).
* Reduce the cost of infrastructure through the development of local systems for sewage disposal (aqua-biological processing), potable water (wells and water recycling) and energy production (solar panels and wind machines)(Gurstein and Curry 1993).
* Create unique and intimate indoor and outdoor community space for relaxation, recreation and the exchange of goods and services (Register 1990).
**Nature Integration Strategies**

* Integrate natural food systems into design and materiality of structures (Faralones Institute 1979).
* Establish a green plant hierarchy favouring native plant species and plants which contribute to the production of food, medicine, fuel and fibre over non-native exotic and ornamental species (Register 1990).
* Integrate agriculture into the urban fabric by providing areas for indoor and outdoor gardens and orchards (Register 1990).

**Multifunctionality Strategies**

* Ensure that each element of urban structures and landscapes fulfils several functions and that each function is carried out by multiple elements (Register 1990).
* Develop a responsive urban design process which can be open to new and changing influences (Gurstein & Curry 1993).
* Increase the number and diversity of ecological and social niches by constructing smaller multifaceted structures and landscapes (Register 1990).

**Local Resource Strategies**

* Use local building materials and other renewable resources in the construction and maintenance of urban systems (Gurstein & Curry 1993).

The dominant form of modern city planning, particularly since the second world war has focused on the separation of land uses, the standardization of planning practice, and the redesigning the cities to accommodate the automobile. Cities are the major contributors to environmental pollution. New and more refined strategies must continue to be developed to make cities less heavily reliant on renewable and non-renewable resources for their continued operation.

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**8 - Principle of Rehabilitation/Regeneration**

Community Sustainability involves minimizing ecological and cultural disruption during new construction or redevelopment, by designing with nature, and by involving the people most effected by development activities. Regenerational development must be viewed as a healing process that uses nature to restore environmental health and anticipates and prevents future harm to natural systems.

This set of principles gives structure and substance to a vision of community sustainability. What is also needed are techniques and processes which can assist communities in moving towards this vision.
APPENDIX C
Summary of Principles of Community Sustainability

1 - Principle of Integration
Sustainable community development views human activity as limited by and integrated with underlying ecosystems. The all encompassing function of the natural world in sustaining life is acknowledged through the constant search for methods to integrate nature into the fabric of communities.

2 - Principle of Ecosystem Integrity
Humankind’s dependence on nature for the maintenance of the earth’s life support systems implies that the basic planning unit must be the ecosystem. The basic goal of planning must be to insure the maintenance of ecosystem integrity. Human activity must be maintained at a level which is within each ecosystem’s carrying capacity.

3 - Principle of Diversity
Diversity plays an essential role in maximizing flexibility and contributing to the stability of systems and processes. Sustainable Community Development acknowledges ecological and cultural diversity by supporting the unique characteristics and expressed needs of each region.

4 - Principle of Ethical Allocation of Resources
Sustainable Community Development views resources as an irreplaceable heritage to be allocated by ethical as much as by economic decisions. To move towards sustainability, communities must achieve a minimum level of equity which includes consideration of the needs of future generations.

5 - Principle of Use Limits and Conservation of Resources
Sustainable Community Development strives for economic stability, selective growth and contraction, and resource use which considers the needs of future generations. In the short term, communities must encourage the use of renewable rather than non-renewable resources and limit exploitation of non-renewable resources at a rate equal to the creation of renewable substitutes. In the longer term, human interaction with the natural world must adjust to a level whereby society lives off the current yields from the photosynthesis process or "natural interest."
6 - Principle of Regional Self-Reliance (selective interregional trade)
Sustainable Community Development signifies a movement towards regional self-reliance, which includes more active use of local resources and the importation of resources from outside a region only when those resources, or suitable substitutes, cannot be found locally. This limited level of trade must take place in a manner which insures a balanced flow of resources between regions.

7 - Principle of a Hierarchy of Desirable Transportation Modes
Sustainable Community Development recognizes the need for automobile containment and the creation of a diverse transportation system focused on pedestrians and bicycles, then ferries, busses and trains, and finally automobiles. Community design must encourage the integration of human activities thus reducing the distance humans and goods are required to move.

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Sustainable Community Development involves minimizing ecological and cultural disruption during new construction or redevelopment, by designing with nature, and by involving the people most effected by development activities. Regenerational development must be viewed as a healing process that uses nature to restore environmental health and anticipates and prevents future harm to natural systems.
APPENDIX D
Ecologically Sustainable Urban Transportation Systems

The concept of "ecologically sustainable urban transportation systems" provides a direction to move towards within the context of an overall strategy of community sustainability. As Lowe (1992, 120) states:

"the way cities physically evolve -- and the way their development is planned -- has profound impacts on human and planetary well-being. Their future growth can either recognize the limits of the natural environment or it can destroy the resources on which current and future societies depend."

Transportation has become one of a number of significant factors in drawing down "natural capital." The challenge of future planning efforts is to find ways to dramatically improve the ecological efficiency of transportation systems and ultimately to convert natural capital resource consumption to natural interest consumption.

Efforts are underway in Britain to develop guidelines for moving towards transportation sustainability. The Association of County Councils (1991) published a report entitled Towards a Sustainable Transport Policy which outlined a process to move away from automobile use and return to reliance on rail transportation. Hall (1993, 8) commends these types of efforts but also notes the overwhelming continued investment in automobile infrastructure.

Based on current available information, a possible transformation process towards a sustainable transportation system can be envisioned. This process is summarized in Table D.1.
### TABLE D.1
A Possible Transformation Process Towards a Sustainable Urban Transportation System

<table>
<thead>
<tr>
<th>Stage One - Ultra-Weak Sustainability (1990-2005)</th>
<th>Policy</th>
<th>Transportation and Urban Form</th>
<th>Modal Split</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lip service to policy integration. Organizational cultures unchanged.</td>
<td>Automobile continues to dominate urban form. Human settlements continue to spread outward. About 80% of airborne pollution comes from the auto. Detached housing continues to represent close to 50% of new dwelling construction. Experimentation in alternative transport modes misfund or underfunded.</td>
<td>Auto: 83% Transit: 9% Other: 8%</td>
<td></td>
</tr>
</tbody>
</table>

| Stage Two - Weak Sustainability (2000-2020) | Formal policy integration at federal, provincial, regional, & municipal levels. Deliverable targets. Organizational values begin slow process of redefinition. | Automobile continues to dominate urban form, although tinkering with system (demand management) results in more people per auto during peak traffic periods. Improved pollution abatement devices temporarily lower pollution, but increasing numbers of autos result in 15-20% increase in air pollution. Multi-unit housing represents about 60% of new dwelling construction. Densification projects increase along urban transit corridors. Pedestrian and bicycle pathway systems expand within municipalities. Technologically-proven bus & light-rail transit systems expand slowly. | Auto: 70% Transit: 15% Other: 15% |

| Stage Three - Strong Sustainability (2015-20??) | Binding policy integration. Increasingly definitive deliverable targets. Rapid redefinition of organizational values to ensure survival. | As the urban form is transformed, urban corridors become dominant mode of people movement. Dedicated bus lanes are transformed into street-level light-rail transit where demand warrants. Pedestrian way & bike path space is recovered from auto. Certain high density town centres become auto-free zones. Auto-derived air pollution is cut to about 50% of maximum previous levels. Urban containment regulations encourage densification. All new development & redevelopment are at, or above, densities (17 units/ha) which support transit. Multi-unit housing represents over 80% of all new construction. The auto, although still revered, is used for special occasions & for trips into countryside. | Auto: 35% Transit: 30% Other: 35% |

Ultra-Weak Sustainability Stage

The ultra-weak sustainability stage is envisioned to last from ten to fifteen years. The developed world is now part way through this stage. During this time period, problems of ecological degradation and increasing pollution levels will heighten public concern and calls for action will increase in frequency. Environmentalists will document the impact of the automobile on urban form and on social and ecological livability. Organizations and professions responsible for urban form and transportation will develop plans to address these livability problems. Due to the complexity of problems, entrenched organizational cultures, and outmoded management systems, however, this action will appear illusionary.

The automobile will continue to dominate the vertical and horizontal infrastructure, defining home, work, shopping, and recreational building choices and locations. Communities will continue to spread outward. For example, in the Greater Vancouver Regional District, existing densities (1991) of approximately nine dwelling units per hectare will increase only slightly. Smaller first world communities, such as Prince George, British Columbia, with densities of less than one dwelling per hectare (British Columbia Round Table on the Environment and the Economy [BCRT] 1994, 45), will encounter difficulty in densification due to initially high conversion costs.

Pollution will continue to degrade urban livability. Automobiles will persist in being the major contributor to urban air, noise, and vibration pollution. Existing technologies will be tinkered with to reduce pollution from the internal combustion engine. Alternative modes of propulsion, such as electric engines, will be experimented with. The reluctance of large automobile corporations to begin commercial manufacturing will ensure that these lower
polluting alternatives remain financially unreachable for the vast majority of the automobile-buying public.

Land developers, unencumbered by community plans which incorporate sustainability principles (including integration of public transit into the urban form), will continue to construct large numbers of single family dwellings. Multi-unit developments and their adjacent land uses will persist in being poorly designed. They will continue to be concentrated in higher density zones rather than dispersed throughout the urban landscape along transit corridors clustered adjacent to, or with easy access to, natural areas, parks, and recreational facilities.

Experimentation in alternative modes of transportation will be limited. Where these alternative public transportation systems do take place, they will receive insufficient capital funding to allow for the construction of comprehensive, integrated systems. Furthermore, these systems will receive insufficient operating funds. Their advertising and promotion programs will be no match for the privately sponsored programs which promote the automobile. In addition, while automobile infrastructure will be funded from general revenue, public systems will be funded through debt financing (greatly increasing the cost of these forms of mobility).

The transportation modal split will remain heavily skewed towards the automobile. The modal split of 83% automobile, 9% transit, and 8% other (Predominantly bicycle and pedestrian) represent the transportation choice for residents of the Greater Vancouver Regional District in 1992 (GVRD & Province of BC 1993a, 5). Projections indicate that, in the short term, automobile use will increase before it begins to decline.

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Weak Sustainability Stage

The weak sustainability stage is projected to last from fifteen to twenty years. During this time period, formal policy mandating sustainability will be developed and integrated within government organizations at the federal, provincial, regional, and municipal levels. Deliverable targets will be established, and formal sustainability indicators will be developed to monitor progress towards sustainability. Organizational beliefs, assumptions, and values will begin a redefinitional process with strong social and ecological values being incorporated into organizational cultures.

The automobile will continue to dominate the definition of urban form. Large financial resources will be invested in finding methods to improve the efficiency of the automobile in moving people about urban regions. For example, the use of demand management will result in a greater passenger load per automobile during peak traffic periods.

New technologies and improving inspection systems will temporarily reduce air pollution levels, but due to an increase in the total number of cars, air pollution levels will eventually peak to 15 to 20 percent above the 1990 level.

Multiple family dwelling units will increase to about 60% of new dwelling unit starts. This is still substantially below municipalities such as North Vancouver and New Westminster where multi-family attached dwelling units represent 73 percent and 72 percent respectively of all dwellings (BCRT 1994, 51). Families are beginning to prefer these types of dwellings due to innovative financing arrangements, more creative design elements, and siting on preferred urban locations. Sustainability principles and neo-traditional design
elements will be tested in a number of new urban villages.

Although urban transit corridors have been defined for over twenty years, municipal incentives have not supported their implementation. In the weak sustainability stage, community plans, land use regulations, and zoning bylaws will be developed to support the implementation of transit corridors. Densification will begin along selected major arterials. Financial incentives and technologically-proven bus and light-rail will be tested along these routes. Pedestrian paths and bicycle paths will be expanded and integrated into transit corridors.

The transportation modal split will begin a slow movement away from automobile domination. Of all people movement, automobile usage will drop to a level of 70 percent, while transit and pedestrian and bicycle transportation will both rise to 15 percent.

**Strong Sustainability Stage**

After a minimum of 20 to 25 years, the concern for sustainability will finally become entrenched as part of the basic human value of survival. Through social learning processes, society will realize that continued population and economic growth within a finite natural system will lead to the complete collapse of the ecosphere. Because government organizational cultures will be identified as major impediments to change towards sustainability, binding policy integration will be implemented. Organizational cultures will come to recognize that survival is dependent on change and a rapid redefinition of organizational values will take place.

As the urban landscape is transformed, transit corridors will become the dominant mode of people movement. Planners and transportation engineers will finally understand the
important relationship between land use and public transit. Dedicated bus lanes will be
instituted along all highways and arterials. Where demand warrants, urban bus lanes will be
transformed into street-level light-rail transit routes. Fewer cars will result in the removal
of street parking along arterials. This space will be used for recovering pedestrian space and
for providing bicycle lanes. Bicycle paths will extend to all levels of the city and inter-
municipal linkages will be completed.

Automobile-derived pollution will be cut to about 50 percent of maximum previous
levels. Electric automobiles will become the dominant urban people movers.

Urban containment legislation will further encourage densification while urban
development projects will be required to incorporate multi-use and multi-functionality into
their design. These new legislative and regulatory criteria will reverse the strong separation
of land use principle which has dominated land use development. The distance between
home, work, shopping, and recreational activities will be dramatically reduced and will be
serviced by public transit. All new construction or redevelopment schemes at densities
greater than 17 dwelling units per acre (a level which supports economically sustainable bus
systems). Densities of 25 dwelling units per hectare or greater will be enforced along
arterials to support self-sustaining light-rail transit systems (BCRT 1994, 63). Multi-unit
housing will represent over 80 percent of all new dwelling construction and 75 percent of all
dwellings (the current levels experienced in North Vancouver and New Westminster).

The automobile, although still considered a status symbol, will become too expensive
to operate on a daily basis, due to full-life and true-impact costing, and too difficult to
operate due to reduced urban road space dedicated to its use. Certain areas of the urban
region will be designated car-free zones, further adding to the difficulty of using the automobile. Therefore, the automobile will be used only for special events and for trips into the countryside.

The automobile, no longer dominant in the movement of people in urban regions, only represents 35 percent of all people movement. (Most of the automobile use will take place in suburban areas where low densities will still encourage auto use.) This level of use is comparable to automobile usage found today (but not thirty years hence when automobile usage may be further reduced) in European cities such as Copenhagen, Denmark (33%) and Hannover and Muenster, Germany (39% and 38% respectively). Public transit will be used for 30 percent of all daily trips. Quality and frequent service, brought about by land use development which supports transit, is now the norm. This level of transit use is experienced in cities such as Paris, London, Vienna, and Berlin (GVRD & Province of BC 1993a, 40).

Finally, integrated land use planning will result in 35 percent of daily trips being made by walking and bicycle. This level of self-propelled mobility is below levels experienced over the last decade in Germany, Austria, Sweden (refer to Table 2.5) and Davis, California (GVRD & Province of BC 1993a, 18).

Ideally, future urban transportation systems can only be considered sustainable when the ecological efficiency of these systems reach a level where resource consumption is only in the form of natural interest and recycled natural capital. For this to be achieved, human population may have to be reduced to 20 percent of current levels. Pimentel & Pimentel suggest that a period of 200 years of "careful planning and dedication to population control will be needed ... to achieve a world population of about one billion" (1994, 42). At this
level of population, all nations and individuals would have a relatively high standard of living with abundant food, a sustainable agriculture system, and a sustainable natural and human modified world.
APPENDIX E
Strengths and Weaknesses of Indepth Interviewing

Marshall and Rossman (1989, 102-04) developed a evaluative tool which examines the strengths and weaknesses of a data collection technique in accomplishing the goals of a research study. The strengths and weaknesses of the elite interview data collection technique are listed below:

**Strengths of Elite Interviewing**

* Obtains large amounts of expansive and contextual data quickly.
* Facilitates cooperation from research subject.
* Useful for discovering complex interconnections in social relationships.
* Data are collected in natural setting.
* Good for documenting major events, crises, social conflicts.
* Facilitates analysis, validity checks, and triangulation.
* Facilitates discovery of nuances in culture.
* Provides for flexibility in the formulation of hypotheses.
* Provides background context for more focus on activities, behaviours, and events.
* Great utility for uncovering the subjective side, the "native's perspective" of organizational processes.

**Weaknesses of Elite Interviewing**

* Data are open to misinterpretation due to cultural differences.
* Dependent upon the cooperation of a small group of key informants.
* Fraught with ethical dilemmas.
* Difficult to replicate; procedures are not always explicit or are dependent upon researcher's opportunity or characteristics.
* Data often subject to observer effects; obtrusive and reactive.
* Can cause danger or discomfort for researcher.
* Especially dependent upon the honesty of those providing the data.
* Highly dependent upon the ability of the researcher to be resourceful, systematic and honest to control bias.

These strengths and weaknesses should be considered throughout the research process, but particularly during the data collection stage.
APPENDIX F

Initial Letter of Contact

School of Community and Regional Planning
6333 Memorial Road
Vancouver, B.C. Canada V6T 1Z2
Tel: (604) 822-3276
Fax: (604) 822-3787

Letter of Initial Contact

To: Interview Participant of the Research Project entitled "Implementing Concepts of Community Sustainability: An Explanatory Case Study of the Process of Change in Vancouver, British Columbia"

From: John Curry, Researcher and Ph.D. Candidate
School of Community and Regional Planning
University of British Columbia
Office 822-5254
Home 224-2684

Date: February 10, 1994

Re: Letter of Initial Contact outlining the purpose of the study and procedures to insure the confidentiality of the individual Interview Participants.

The purpose of this research program is to examine efforts to implement concepts of sustainability at a community level, to describe and attempt to understand the change process, and offer suggestions to overcome any resistance or barriers to change which may be identified. This research is part of the dissertation research program of the UBC Planning School and is supervised by the Faculty Advisor, Professor Peter Boothroyd. If any questions arise concerning the research, Professor Boothroyd can be reached at 822-4155.

The data collection technique used today is called semi-structured interviews. The interview will involve the examination of basic themes related to how this organization, the City of Vancouver and the region is adapting to changes brought about by the increased awareness of environmental pollution and the need to conserve resources in relation to automobile transportation. This general area of research is called sustainable development and will be discussed in more detail as the interview unfolds.

Your identity will not be revealed in relation to this information. All information, in the form of audio-tapes and typed transcripts, will be available for use ONLY (1) by the Faculty Advisor, Professor Peter Boothroyd and myself. Pertinent sections related to you in the first draft of the report will be available to you for review to check accuracy and impingements on confidentiality. Written requests to remove information related to you and this interview will be honoured. Once the dissertation process is complete the audio-tapes and written transcripts will be destroyed. This interview will take from one to two hours. As noted above, the interview will be audio-taped and written transcripts will be made to assist in the process of analysis. You may ask to discontinue the interview at any time. A signed copy of this letter will be provided for your records.

John Curry, Ph.D. Candidate

Name of Participant

Participant Signature

The School of Community and Regional Planning is affiliated with the Centre for Human Settlements and the Westwater Research Centre.
APPENDIX G
Interview Protocol

Researcher: John Curry
School of Community & Regional Planning
University of British Columbia

Please Note: The interview is a semi-structured design will allow for open-ended answers. Probes, which are detailed-oriented and elaborative in nature, are used to stimulate discussion only when required.

BEGINNING

Description of the research topic, the context within which the research is being undertaken, the use of the results of the inquiry, and a review and signing of the "letter of Initial Contact." The previous information is contained in the Letter of Initial Contact.

Question One
The term sustainable development is being used more frequently to describe a new way of planning and developing our communities. From your perspective, what does this term mean?

Question Two
Based on the present planning system, what will the transportation system for the movement of people in the City of Vancouver look like in the next 25 years?

Question Three
What do you think of these trends? (If required, Probe - Do you think this should happen?)

Question Four
What forces are in place which are promoting the shift from automobiles to other modes of people transportation? (Probe for examples)

Question Five
What forces are in place which are hindering the shift from automobiles to other modes of people transportation? (Probe for examples)

Question Six
Why are these hindering forces in place? Which are slowing the shift from automobile to other modes of people transportation?
Question Seven
How can these hindering forces be overcome?

Question Eight
What is the planner's role in overcoming these hindering forces?

Question Nine
In citizen surveys, Vancouver residents call for a cleaner environment and more transit, but they still desire high levels of mobility. Eighty percent of air-born pollution is caused by the automobile. Do people see this connection between increasing auto usage and increasing pollution levels?

Question Ten
How can we overcome this dilemma between the desire for a cleaner environment and the desire to drive automobiles?

Question Eleven
Is there any additional information which you feel is important to understanding the process towards transportation sustainable development in Vancouver?

Question Twelve
This final question will supply me with some background information about yourself.

a) What is your position title?
b) Briefly describe the responsibilities of your position.
c) How many years have you been in the position you presently occupy?
d) If you were asked to describe your career how would you define it? (ie. transportation planner, engineer, etc.)
e) How many years have you worked in this career?
### APPENDIX H

#### Coding Manuals A and B

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<td>SD - Sustainable Development Definition</td>
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<td>SDU - Definition, Urban Focus</td>
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<tr>
<td><strong>Question Two</strong></td>
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<tr>
<td>TS - Transportation System, 25 years hence</td>
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<tr>
<td>TSC - Congestion</td>
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<td>TSP - Peak/Off Peak, Spread of</td>
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<td>TST - Transit</td>
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<td>TSS - Super Highways</td>
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<td>TSL - Land Use/Urban Form</td>
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<td>TT - Transportation Trends, What do you think</td>
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<td>TTB - Buses/Transit</td>
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<td>TTN - Development of Mixed Neighbourhoods</td>
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<td><strong>Question Four</strong></td>
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<tr>
<td>PF - Factors Encouraging Change towards Sus.</td>
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<tr>
<td>PFC - Congestion</td>
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<td>PFL - Lifestyle shift</td>
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<td>PFT - Transit</td>
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<td>PFB - Bicycles</td>
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<td>PMI - Municipal Initiatives</td>
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<td>PFP - Public Initiatives</td>
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<td>NF - Factors Hindering Change towards Sus.</td>
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<td>NFE - Engineering Mindset</td>
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<td>NFT - Transit System Management, Cost Efficiencies</td>
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<td>NFR - Lack of Regional Authority</td>
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<td>NEH - Expansion of Hways/Suburb Rd Undercapacity</td>
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<td>NPS - Political/Institutional Structure</td>
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<td>NFF - Lack of Funds</td>
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<td>NFX - Lack of Personal Experience</td>
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<td>NFC - Change/Fear of Change</td>
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<td>NIP - Impression of Planning (by GVRD)</td>
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<td>NAS - Auto Subsidies</td>
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<td>PAC - Making Connections</td>
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<td>ODT - Technology</td>
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<td>ODG - Growth</td>
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<td>OCP - Planning</td>
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<tr>
<td>CC - Clouds of Change</td>
</tr>
<tr>
<td>ADL - Auto Domination, Lifestyle, Work</td>
</tr>
<tr>
<td>ADU - Auto Domination, Urban Form</td>
</tr>
<tr>
<td>MTM - Movement towards other modes</td>
</tr>
<tr>
<td>PT - Public Transit</td>
</tr>
<tr>
<td>BB - Bicycles</td>
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<tr>
<td>OC - Organizational Continuity</td>
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<td>CP - CityPlan Process</td>
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<td>ST - Skytrain</td>
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<td>VS - Value Shift</td>
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* Power of Values, Beliefs, and Assumptions  
* Societal Values, Beliefs, and Assumptions  
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* Assumptions and Beliefs Regarding the Environment  

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* Penalties on other transportation modes  

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* Competition for urban road space  
* Other problems  

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Inability to Plan  
* Complexities of planning  
* Impressions of planning  
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* Dilemma of planning work/home relationships  

Professional Planning Mindset  
* Idealism of planners  
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Professional Engineering Mindset  
* Education  
* Technocratic focus  
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* Implementing the informal plan  

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* Lack of cooperation  
* Impact on city planning  
* Impact on neighbourhood planning  

Lack of Regional Control  
* Defused responsibilities  
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* Need for a new regional government structure  

Forces Hindering Change - Second Order Level  
Values, Beliefs, and Assumptions  
* Power of Values, Beliefs, and Assumptions  
* Societal Values, Beliefs, and Assumptions  
* Belief in the Freedom of Movement  
* Assumptions and Beliefs Regarding the Environment
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<td>1-5 Means to Overcome Hindering Forces</td>
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<td>* Fear of Change</td>
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<td>* Processes of Subversion</td>
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Appendix I
Forces Promoting the Shift from Automobiles to other Modes of Transportation

These research findings did not directly address the primary research question and were therefore placed in this appendix for readers interested in positive factors contributing to the movement towards sustainability. The data will be used in a separate research paper which will examine positive factors assisting in the movement towards sustainability.

Subsidiary Research Question

"What factors, within the city's planning and implementation system, are assisting in the shift towards a sustainable transportation system in the City of Vancouver?"

This section examines what the interview participants felt were the positive forces promoting this shift. The question used in the interview protocol to encourage discussion is reproduced above.

Respondents had more difficulty identifying positive forces promoting the shift towards sustainable transportation than they did in identifying negative forces impeding the shift towards sustainable transportation (page count ratio of 1:4.2 respectively). Respondents' comments resulted in 54 pages of transcriptions. Discussion progressed well, with only an occasional probe required for clarification purposes.

Tables I.1 and I.2 summarize the important forces which interview participants identified as being integral to the process of developing a non-automotive transporta-
Existing Forces Promoting Change - First Order Level

This section will examine existing forces in Vancouver which are promoting change at a first order (systems level). The discussion is divided into five sub-sections: growth trends, growing community activism, growing community knowledge, municipal initiatives, and expanding use of bicycles. The discussion begins by examining forces which are causing change and then moves to the effects resulting from these causal forces.

Table I.1
Forces Promoting Change: First Order

1. Existing Forces Promoting Change
   * Growth trends
   * Growing community activism
   * Growing community knowledge
   * Municipal initiatives
   * Expanding use of bicycles

2. New Ideas/Initiatives Promoting Change
   * Facilitation of community activism
   * Control of the automobile
   * Enhancement of public transit

Growth Trends

Current growth in population is contributing to the congestion of the roads of Vancouver and the region. Two participants (a local politician and a transportation
engineer) provided the following observations:

"The growth in population is so great. This is LA in the 40s, still pretty much considered paradise. But the growth rate is overtaking the sustainability of the land base to continue to absorb that number in the traditional ways. So it has to be changed." (14-806-815)

"One thing that's going to be frustrating more and more people is just adding congestion. We're not building new roads. It's just not on. You look at the regional plan [Transport 2021 Report] for the next 25-30 years, it's insignificant the number of roads that are going to be built, especially compared to the tremendous growth of population and jobs" (08-535-540)

Interview participants felt that, due to traffic congestion driving is becoming more of a nuisance. Furthermore, people believed that car ownership is becoming more costly, and the future will bring lower car ownership and fewer cars.

The concept of "managing by congestion" was discussed:

"... they [transportation planners] talk about managing by congestion but Vancouver has done that for over 20 years now." (10-126-131)

"... because we've deferred major expenditures for so long it's just about impossible now to go in and introduce any new major transportation facilities to service the automobile." (14-710-721)

A transportation planner stated that, through lack of investment in automobile infrastructure, a "management by congestion" philosophy had been present in the region for a number of decades. A community activist noted that the price of land in the city has increased to a level where it is now prohibitively expensive to acquire new land for the expansion of transportation systems. This was considered a positive factor, as urban landscapes would not continue to be converted to automobile use.

The cost of investments in automobile infrastructure was perceived by a local
politician and a transportation planner as another factor assisting in the shift to non-
automobile forms of people transportation:

"... expenditures are so high whether it’s for bridges, tunnels, roads or for transit. And it’s just brutal. You can just see government ... just kind of numbed at the figures - $1,000 an inch for SkyTrain; $300, 400, 500 million for one bridge; one additional lane and you need 38 more [lanes] to deal with current growth. The numbers are so staggering that one of the reasons why I think we’re in a kind of decision gridlock is because we’re caught between what the public says they want, what we know they’re prepared to pay for, and what the limited choices are as a consequence." (14-310-327)

"We’re going to come to a point where, not only are we going to run out of land, we’re also just going to run out of money. When you look at the situation over the last decade, you see the futility of just trying to throw ... buy our way out of congestion. We built [the] Alex Fraser Bridge, the Richmond East West Freeway and Cassiar Connector, very significant transportation projects just in the last 7 years, and yet at the same time traffic congestion continues to grow. We just can’t build enough to get out of it. So we have to break that cycle. (15-112-116)

This cycle, continually responding to demand by providing more automobile capacity (supply) which results in more demand, thus requiring more capacity, has been cited in both the literature and the interviews many times as the prime reason to stop investing in automobile infrastructure. As one interview participant (a local politician) noted,

"City planners in London figured it out in about 1830 [horse transportation modes], which is gridlock is inevitable, that as long as you satisfy demand for space for cars, the number of cars will continue to increase and exceed the space supplied." (17-112-120)

But this "prime reason" doesn’t seem to be motivational enough.  

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5 An exhaustive study documenting the power of the United States highway lobby was undertaken by Helen Leavitt and published in the book entitled Superhighway - Superhoax.
One participant (a transportation planner) viewed the natural setting of Vancouver as a positive force which will allow the region to control the use of the automobile in the future:

"Basic geography, in the Lower Mainland ... particularly because of the river crossings and because of the mountains on one side and the border on the other ..." (18-385-388)

According to this respondent, the constraining nature of the mountains to the north, the US-Canadian border to the south, the ocean to the west and the river/ocean crossings throughout the region will allow the planning system to constrain the outward sprawl – an urban development pattern found on the fringes of most metropolitan regions in North America and increasingly becoming a standard form of urban expansion in many other metropolitan regions around the world.

Even though, the planning system in the Vancouver region has not succeeded in utilizing these natural features as automobile constraining factors, the river/ocean crossings were viewed by participants as opportunities to meter or control the flow of automobile traffic throughout the region. These crossings could be used to provide preferred access to non-auto modes of urban transportation between physically divided regions within the metropolitan area.

*Growing Community Activism*

One of the significant factors resulting from the rapid growth of the region is a

Leavitt concluded that once the flagrant manipulative techniques of the automobile/highway-building lobby were exposed, the road-building cycle would be broken. Leavitt's book was published in 1970.
flourishing awareness of city residents that a continual response to automobile demand through the expansion of auto infrastructure capacity is destroying the livability of the City of Vancouver. As one community activist noted,

"... people are becoming more environmentally conscious in varying degrees of understanding ... taking varying degrees of responsibility for changing." (13-178-181)

This questioning of the automobile's dominant role in the movement of people in Vancouver and a search for alternatives is being supported by a number of factors observed by a community planner and a community activist. These factors include:

"... having a couple of key energetic activists/advocates around." (09-398-399)

"... the people themselves. There's not one neighbourhood left in this city that hasn't fought back against the automobile." (12-77-78)

"... right people in the bureaucracy." (09-441-442)

These various forms of activism, within the city administration and within the larger community, are all considered positive forces.

**Growing Community Knowledge**

All respondents viewed Vancouver as a unique community which is taking positive strides in experimentation and discovery; new concepts are being tested and implemented which are contributing towards the creation of a sustainable community:

"... there's a very Vancouver kind of way of doing things. A developer comes in and there's not even any argument about whether the waterfront will be used as city land for pedestrians, bicycles." (14-865-869)

"... architects around here who can creatively provide dense development, very livable and interesting projects, we can use to show as examples ..." (10-388-391)
"... they're [neighbourhoods] beginning to be designed so that all of it [urban land uses] is in one place, like sort of village concept." (13-208-213)

According to participants (quotes are from a local politician, a transportation planner, and community activist) the private development industry has accepted new ideas related to the maintenance of public open space, and concessions are readily provided for the integration of pedestrian and cycling systems into new urban development schemes. Architects are cited as supplying creative solutions and enhancing the livability of urban spaces.

**Municipal Initiatives**

The City of Vancouver was commended for a number of initiatives which were assisting in the movement away from the automobile-dominated transportation system:

"... **Clouds of Change** ... made the city's transportation priorities number one pedestrian, number two cyclists, number three transit, number four goods movement, and number five the automobile." (04-212-216)

"The new intercity communities like Concord and Marathon, Downtown South, this is going to be a real God-send for walking. We're going to see very attractive streets created down there and very amenable to walk in. So I have nothing but optimism for the pedestrian in the city. I think that some of the urban landscape task force, greenways, public ways, work is going to foster pedestrian movement as well, all throughout the city, trying to make the city friendlier for pedestrians." (08-856-863)

"... the downtown parking policy. We've set a number of parking spaces in downtown development as only one parking space for every 4 employees, and that's still well below the demand we're observing right now. ..." (10-92-98)

"In the past, parking enforcement, the parking checkers [did] their enforcement in cars, and we have a pilot enforcement program where they're doing it on bicycles." (04-182-185)

The **Clouds of Change** report (City of Vancouver 1990) was cited by respondents
(this quote is from an environmental analyst) on a number of occasions as a report which legitimized a number of existing municipal initiatives and provided a focus for new initiatives which could move Vancouver towards a sustainable future. One community planner stated the efforts in community planning and in urban design are resulting in increased densities and the creation of pedestrian greenspaces.

A transportation planner explained that experimentation with parking standards is resulting in the reduction of downtown parking. He noted that, over time, reduced parking should ensure that non-automobile modes play a more dominant role in the movement of people in the city. An environmental analyst noted that the city is experimenting with using bicycles rather than cars in the enforcement of parking regulations. He felt that the change has resulted in less inner city congestion and apparent job enrichment for city parking checkers.

**Expanding Use of Bicycles**

Interview respondents felt significant initial steps are underway to transform the city into a bicycle friendly urban environment:

"We've also installed, in the last couple of years, additional shower facilities at City Hall to allow people to jog or cycle to work, and we've set up additional bike racks at city hall so they have places for their bikes." (04-173-177)

"... guidelines on bicycle facilities so that each new development has ... spaces where you can lock your bike in security and also have shower facilities available, so the opportunity exists for you to bicycle to work." (10-108-112)

The City of Vancouver is approaching the cyclization of the city on three fronts.

Participants discussed a bicycle network which is being constructed so cyclists can move
about the city on relatively safe (low auto-use) routes. Connections from this network are being developed to the bicycle networks of adjacent municipalities. One participant (an environmental analyst) noted that the city is encouraging its staff to cycle through the provision of cycling-related facilities at City Hall. Finally, a transportation planner stated that building standards are being enacted which will require the incorporation of bicycle facilities and amenities into new urban development projects.

The last two quotes (by a local politician and a community activist) in this section, summarize one participant's feelings towards living in a high density urban neighbourhood and using transit and a bicycle for urban transportation purposes. The individual claimed that both modes of transportation were less stressful, and offered a higher quality of life, than automobile commuting.

"I think I'm far more relaxed and I live in a more peaceful, less stressed environment than people who live in what they believe are bucolic suburban environments where they are protected by space and metal. And of course they're put under tremendous stress having to commute. They're exposed to a high degree of stimuli whereas ironically - the irony is so thick, [be]cause I'm in a very dense urban environment - I'm more skilled at actually shutting out stimuli and focusing." (14-391-407)

"I have a very different concept of this city. I'm absolutely astounded how small it is. It's, what, eight or nine miles across from UBC to Boundary Road. I can get anywhere on a bicycle and it is such a small city and it's a very interesting city because you're using secondary streets and you're going through neighbourhoods to stay away from the traffic. It's been enlightening to see how the people live in different communities and what their values are. And some of the really wonderful parts of the city and how peaceful they are. It's interesting. In a car you don't see anything." (12-435-443)

Resistance to bicycles as an component of the urban transportation system is becoming less of a barrier to sustainability; people are realizing the bicycle's potential as
a method to move around urban areas and vehicle drivers are becoming more accommodating to bicycles.

**New Ideas/Initiatives Promoting Change - First Order Level**

New ideas and initiatives at a first order level, which are promoting change towards a sustainable transportation system in Vancouver, are examined in this section. The research data is arranged in three sub-sections: facilitating community activism, controlling the automobile, and enhancing public transit.

**Controlling the Automobile**

As the next major section will illustrate, the major hindering factor in moving to other modes of people transportation in Vancouver is the freedom the automobile can provide (one participant aptly called it the "freedom machine"). As the following quotes suggest, factors which would promote a movement to other modes of people transportation would include methods which would impede the free movement of the automobile:

"there's a lot of new sticks that we can start whacking those cars with. I mean we could start road user fees, tolls, etc, road pricing as it's called. Making it more costly. We can bump up the gas tax. There's lots of levers that can be pulled associated with making the car more costly." (08-424-428)

"And that's one of the things that people most want out of their car is to be able to get to a destination in a particular amount of time. But the amount of time is relative. If you slowed down every car equally there would be considerable more inducement to use public transit." (17-299-311)

The first interview participant (a transportation engineer) offers suggestions which would make the automobile more costly to operate. Appendices B and C (Principle of a
Hierarchy of Desirable Transportation Modes) discusses the large subsidy society has provided to the automobile. In Vancouver, this auto subsidy is estimated to be $2600 per automobile per year. Implementation of automobile user fees may initially internalize (to the auto owner) the "true life costs" of the automobile.

A more important step in a new philosophy on road pricing would take place when automobile user fees are increased to a level which would cross-subsidize, and thus assist in the expansion of transit, cycling, and pedestrian transportation infrastructure. A non-auto urban transportation infrastructure (for example, dedicated transit and bicycle lanes) could be developed in such a way that the overall speed of automobiles would be slowed in urban regions, suggested a local politician.

_Enhancing Public Transit_

Chapter Four, Section 4.3 discusses Vancouver's low utilization of public transit. Vancouver's transit use is third lowest of the major urban metropolitan areas in Canada. Respondents gave a number of suggestions of methods which could be introduced into Vancouver's urban transportation system.

"...[mechanisms to support public transit are needed]—bus priority measures, things like queue jumpers and bus only lanes and HOV lanes and things like that where you can give an advantage for the transit rider. Certainly the biggest transit priority measure is a rapid transit line on an exclusive right-of-way—one with priority. That's a tremendous boost. You could use the Skytrain [for example]." (08-431-436)

This respondent (a transportation engineer) identified a number of techniques which could be used to modify the existing transportation system all focusing on moving infrastructure investment priority away from single occupancy vehicles (SOVs) and
redirecting public investments into methods which would allocate priority to public transportation systems. They noted that techniques, such as bus only lanes and "high occupancy vehicle" (HOV) lanes, have been implemented successfully in other urban regions.

**Existing Forces Promoting Change - Second Order Level**

This section examines changes at a second order or system transformation level. Table I.2 – Forces Promoting Change: Second Order – summarizes the second order forces for promoting change which participants discussed during the interviews. While first order change focuses on incremental changes to an established system, second order change encompasses a redefinition of the system itself through changes to basic values, beliefs and assumptions.

Four sub-sections - urban stress, community activism, community knowledge, and redefining community - are used to organize the responses of interviewees into a format for presentation.

**Table I.2**  
Forces Promoting Change: Second Order

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<th>Existing Forces Promoting Change</th>
<th>New Ideas/Initiatives Promoting Change</th>
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<td>1</td>
<td>* Urban stress</td>
<td>* System breakdown</td>
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<td></td>
<td>* Community activism</td>
<td>* Community change process</td>
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<td>* Community knowledge</td>
<td>* Change in beliefs and assumptions</td>
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<td></td>
<td>* Redefinition of community</td>
<td>* Negative organizational reactions to community-level change</td>
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Urban Stress

Vancouver has undergone significant redevelopment to accommodate the automobile. City residents have made, and continue to make, personal adjustments due to the intrusion of the automobile into the urban landscape. One respondent (a transportation engineer) had these comments to make about the stress and anxiety of urban living:

"Well the thing that really bothers me is the anxiety and stress level that having more and more cars on the streets is causing. It just seems like when I moved to Vancouver some 20 years ago, you could step off the curb and the cars would just come to a stop ... I couldn't get over how gracious and polite everybody was and unhurried. And now it just seems there's a tremendous level of angst and anxiety and stress out there on the streets, and people are frustrated, they're erratic, they do stupid things when they drive and dangerous things. And it's almost like the cars are taking over and the people you can talk to that will vouch for this the most are the cyclists. They have a war going on between themselves and cars." (08-728-740)

The increasing levels of stress and anxiety referred to by this participant have caused people to exceed mental thresholds of frustration. This frustration is causing people to question the desirability of continued automobile domination of the urban transportation system. As one participant notes, cyclists have started fighting for their rights to a safe and effective transportation system.

Community Activism

The last quote highlighted the general decline in urban livability in Vancouver and discussed the confrontational environment which exists between cyclists and car drivers. As the following quotes (from a transportation planner and a local politician) indicate,
segments of Vancouver's resident population have started questioning basic assumptions relating to how urban life should be defined:

"... it's the people who kind of lead the way, and when the politicians feel enough heat underneath them, they finally act and give more money to transit or put in the bike lanes that they've been talking about. Right now the City of Vancouver has a rather vocal bicycle lobby group." (07-160-170)

"... there'll be a constituency to prevent the automobile from dominating land use and roads the way it traditionally did." (14-168-173)

Respondents reported that the Vancouver bicycle lobby is seriously challenging many of the basic automobile transportation planning assumptions which have been considered unquestionable principles for a number of decades. They also reported that neighbourhood groups are beginning to connect with each other to share similar experiences in the fight against the automobile domination mindset.

Desire for Community Knowledge

According to respondents, coupled to increased levels of community activism is a desire to seek out new ways of planning. People sense that their urban environment is not functioning to meet the needs of community residents. They desire information which provides examples of elements of the urban environment needing change and how those changes can be brought about. The following quote, by a local politician, illustrates this desire for information and the effects this information is starting to have on the beliefs and assumptions of some people.

"I think it's also getting information that allows us to redefine what we mean by progress. I think we've been told for a very long time that progress means bigger and bigger cities, bigger and bigger buildings, more and more bedroom suburban communities, bigger and bigger freeways and a bigger, and a second car, and a third car and the camper, right, and that's
how we’ve defined progress. And I think that people are getting more information that allows them to come to a conclusion that that’s not progress, in fact it’s maybe relabelled as destruction and that there is this sort of different direction that we need to take.” (16-236-247)

Redefining Community

Part of questioning the current concept of progress, includes questioning how society has constructed cities over the past fifty years.

"I think that there is sense of, or desire for greater community, greater contact with others, greater social grouping ... [a need to] collect together in places where they don’t need cars for example. Where they can walk, they meet their neighbours on the street ... (13-195-197)

One respondent (a community activist) noted that the car has offered sanctity from the stress of urban life, but it has created many of the stresses humans try to avoid. The above quote questions how basic community building concepts have been interpreted through principles which have focused on the separation of land uses into efficient units of production (be it efficiency in living, recreation or commerce) connected by non-renewable energy consuming transportation linkages. This questioning of the basic values, beliefs and assumptions of land use planning is a first step in the redefinition of the city and its transportation system.

The difficult work environment in which planners operate did not escape the attention of one community activist participant.

"Planners try. Planners truly try, but they have to work within the confines of developers and engineers and people who are unwilling to change, so they’re very forward thinking outside of their work and I understand that they do what they can." (12-109-112)

The above participant acknowledged the valuable knowledge planners bring to the
movement towards community sustainability and the important roles they can play outside of their formal work environment lobbying for change. This final quotation acknowledges the difficult work environment which planners are subjected to. Most planners (at least until they succumb to the strong economic values of current community building) are taught a holistic vision of community building which includes social, ecological and economic values.

**New Ideas/Initiatives Promoting Change - Second Order Level**

This final section within the forces promoting change category focuses on the evolution of new values, beliefs and assumptions which could represent the fundamental or core building blocks of community sustainability. The section is divided into four sub-sections. The first three discuss the process of system breakdown, community change, and change in beliefs and assumptions. The final section gives an example of negative organizational reactions to community level change.

**System Breakdown**

Several community activists discussed steps in the process of organizational or community transformation which may take place as communities evolve towards a sustainable future. Understanding the process towards sustainability (how it will happen) is considered as important as visualizing the end state (what will happen).

"So the automobile, in a sense, begins to solve some problems, rather like the explosion of populations, you engender a system where it has to almost crash because it becomes untenable and is replaced by a system that's more capable to adapt to an environment." (14-740-744)
"... chaos theory begins to peak and the system begins to fail very quickly with just a small incremental increase. And its carrying capacity can produce unpredictable consequences ..." (14-710-721)

Although the above quotes of a local politician presented the concept of system "crash" or "chaos," none of the participants discussed an anticipatory planning process which would track the negative trends brought about by the automobile and take proactive action to reconstruct a sustainable people-based transportation system. These participant comments could be construed as a negative or hindering force. In actuality, the recognition of signs of system breakdown can bring about a search for a planning structure which would allow a movement towards a sustainable people-based transportation system.

Community Change

Buckley and Perkins (1984, 480) and Carnall (1990, 40) describe stages or steps in the transformation process (refer to Chapter Two, Section 2.5.6 and Figure 2.3). Two participants (a transportation planner and a local politician), although probably not aware of these models, discussed their feelings about the community change process.

"I think that the bureaucrats and the politicians don't really give the public enough credit. I think people are ready for change and are willing to put up with a lot of stuff. As long as things are explained clearly ..." (01-529-533)

"... citizens are saying, 'We don't want a representative democracy anymore, we want a participatory democracy ... real involvement in making decisions that can control the environment around us.'" (16-262-275)

These comments imply that the citizens of Vancouver are in the "reordering" or "discarding" stage of the change/ transformation process.
Some participants (a transportation planner and a local politician) noted that people are starting to make different lifestyle choices:

"I talk to more and more people who don't want to move out to the suburbs because they don't want to be car-dependent. They don't agree with that type of life-style." (07-234-239)

"... as more and more people move into those [higher density] neighbourhoods their interests begin to shift because they have alternatives, a greater range of choice, less relying on the automobile and more pissed-off with the intrusion of the automobile into their communities." (14164-168)

As the first participant (who had a high level of contact with the public) conveyed, greater numbers of people are questioning suburban car dependency and the demeaning daily commute to work. More people (many raised in the suburbs over the past two to three generations) are moving into higher density urban neighbourhoods and are experiencing car independency for the first time in their lives. As the second participant relates, once the automobile becomes a frivolous excess, people become annoyed with the intrusion of this form of transportation into their communities.
APPENDIX J

Correspondence Pertaining to the
Freedom of Information and Protection of Privacy Act
November 30, 1994

Mr. Ken Dobell, City Manager
City of Vancouver
453 West 12th Ave.
Vancouver, BC
V5Y 1V4

Dear Mr. Dobell,

Re: Freedom of Information Request

I am currently conducting research in the area of barriers to change towards community sustainability. I have been examining how the City of Vancouver and the Greater Vancouver Regional District plan and implement transportation infrastructure.

This past summer, I was directed by a number of local politicians, community residents, and local and regional government employees to your engineering department to inquire about what they (the politicians, residents, and government employees) referred to as an "informal transportation plan." The people I interviewed described this plan as a map, and other forms of information, which identifies all streets proposed for widening in the city.

Upon further investigation, a street construction engineer, a street design engineer, and staff at the zoning counter of the Planning Department stated that a building line survey map existed which identifies all streets proposed for widening.

When I attempted to obtain this information an employee at the engineering counter and a city surveyor refused to provide me with any transportation plans for the city. I found my interview with the city surveyor very interesting. Various maps which appeared on the walls of the surveyor's office demonstrated that such information does exist. In addition, the surveyor's comments at the end of my interview reinforced the existence of this transportation plan. He stated (I was accompanied by a research associate who can collaborate this discussion) "you might be able to get a copy of the map, but if someone else gives it to you, I'll have problems with that."

On November 3, 1994 The "Freedom of Information and Protection of Privacy Act" was extended to local public bodies. As I was denied access to information by the staff of the City, I request under this Act:
a) copies of all information in various forms, including maps, written documents, and electronically stored material, which has described, over the past ten years, the long term plan for the expansion of streets and highways in Vancouver.

b) copies of all information in various forms, including maps, written documents, and electronically stored material, which describe the current long-term future plan for the expansion of streets and highways in Vancouver.

c) a description of electronically stored information and access to this information through computer programs in city offices, if site licensing program agreements do not permit the copying and viewing of electronically stored information.

d) any other information not covered by a), b) and c) which would be of importance to this research.

e) access to original material after the review of copied information.

Under the Act, this information should be provided to me no later than 30 days after this request is received.

Thank you.

John A. Curry  
Associate Professor

Phone: 960-5837  
Fax: 960-5538  
e-Mail curryj@unbc.edu
Mr. John A. Curry  
Associate Professor  
Faculty of Natural Resources and Environmental Studies  
University of Northern British Columbia  
P.O. Box 1950, Station A  
Prince George, B.C. V2L 5P2  

Dear Dr. Curry:

I wish to acknowledge your request for access to records of the City of Vancouver, under the Freedom of Information and Protection of Privacy Act, (the Act), which was received by our office on December 6, 1994.

I wish to thank you for the opportunity to review this matter with you today. Staff will make every effort to provide any information available to you under the Act as quickly as possible. However, your application sets out an extremely broad request, both in terms of the number of records requested and the time period covered.

As we discussed today, we will commence processing your application by first providing a ten-year chronology of building setback maps and appropriate background material or reports on the topic of transportation planning by the City. We will also research the topic of a separate map or computer data base that provides information on plans for the long-term expansion of streets in Vancouver.

I hope these first records can be quickly located and provided to you, and they assist you in further specifying other records that will be of importance to your research.

I trust this course of action will meet with your approval. If you have any questions, or if I can be of any further assistance, please write or contact me at 873-7999, as soon as is convenient.

Yours truly,

Steve Kautz  
City Clerk's Office
January 3, 1995

Mr. John A. Curry
Associate Professor
Faculty of Natural Resources and Environmental Studies
University of Northern British Columbia
P.O. Bag 1950, Station A
Prince George, B.C. V2L 5P2

Dear Dr. Curry:

I am writing to you regarding the status of your request for access to records of the City of Vancouver, under the Freedom of Information and Protection of Privacy Act, (the Act), which was received by our office on December 6, 1994.

Staff have been requested to prepare material responding to your request, including a ten-year chronology of building setback maps and appropriate background material or reports on the topic of transportation planning by the City. They have also been directed to research the topic of a separate map or computer data base that provides information on plans for the long-term expansion of streets in Vancouver.

I am hopeful these records can be forwarded to you within the next two weeks. Unfortunately, it seems unlikely they can be prepared by January 5, 1995, which is the statutory deadline for responding to your request. Section 10 of the Act provides that a public body may, in limited circumstances, take a 30-day extension to respond to an application. Particularly, Section 10 (1) (a) states: "the applicant does not give enough detail to enable the public body to identify a requested record." The City, therefore, will furnish a response by February 7, 1995, or sooner, if possible.
If you feel this time extension is unjustified, you may ask the Information and Privacy Commissioner to review this matter. You have 30 days from receipt of this letter to request a review by writing to:

Information and Privacy Commissioner  
4th Floor, 1675 Douglas Street  
Victoria, British Columbia, V8V 1X4  
Tel. (604) 387-5629 Fax (604) 387-1696

If you wish to request a review, please provide the Commissioner's Office with:

1) Your name, address, and telephone number;
2) the request number assigned to your request (file # 1150-4);
3) a copy of your request;
4) a copy of this correspondence; and
5) the reasons or grounds upon which you are requesting the review.

I hope you understand the reasons for this extension. Staff are attempting to produce the records we have discussed and we will be forwarding them to you as soon as possible. I trust that when you receive them, they will assist you in further specifying other records that will be of importance to your research.

I trust this course of action will meet with your approval. If you have any questions, or if I can be of any further assistance, please write or contact me at 873-7999, as soon as is convenient.

Yours truly,

Steve Kautz  
City Clerk's Office
February 6, 1995

Dr. John A. Curry
Associate Professor
Faculty of Natural Resources and Environmental Studies
University of Northern British Columbia
P.O. Bag 1950, Station A
Prince George, B.C. V2L 5P2

Dear Dr. Curry:

I wish to reply to your application for records of the City of Vancouver under The Freedom of Information and Protection of Privacy Act (the Act).

Staff in the Engineering Department have furnished the enclosed documents in response to your request for information the City received on December 6, 1994. Please find enclosed the following:

- Schedule 'E' to the Zoning and Development Bylaw No. 3575, describing the Building Lines in the City;
- A description of building lines in the City, giving the dates of their enactment, described as LB 155;
- The City of Vancouver 1994-1996 Capital Plan;
- The Transport 2021 Report 'Long-Range Transportation Plan for Greater Vancouver'; and
Schedule 'E' to the Zoning and Development Bylaw No. 3575 and the description of the building lines will provide you with all relevant information regarding building lines for the City. Staff have noted that building lines are secured not only for the purposes of road widening, but also for sidewalk allowances and to secure views.

Your application referred to an 'informal transportation plan' described as a map, database and other forms of information that identifies all streets in the City proposed for widening. Staff report that no informal transportation plan exists. The enclosed materials provide a history and future plans for transportation in the City of Vancouver.

The material that has been supplied to you is routinely available from staff in the Engineering Department. I'm sorry that your previous visit to City offices did not result in you receiving the information that you needed for your research. If a review of the enclosed documents leads you to further avenues of inquiry, please do not hesitate to call me and I will endeavour to provide you the material that you require.

Under Section 52 of the Act, you may ask the Information and Privacy Commissioner to review the City of Vancouver's response to your request. You have thirty days from receipt of this response to request a review by writing to:

Information and Privacy Commissioner  
4th Floor, 1675 Douglas Street  
Victoria, British Columbia, V8V 1X4  
Tel. (604) 387-5629 Fax (604) 387-1696

If you wish to request a review, please provide the Commissioner's office with:

1) the request number assigned to your request (1150-4);  
2) a copy of this correspondence;  
3) a copy of your original request for information that you sent to the City of Vancouver; and  
4) the reasons or grounds upon which you are requesting a review.

If you have any questions, please do not hesitate to contact me at 873-7999.

Yours truly,

Steve Kautz  
City Clerk's Office

Information and Privacy Commissioner
4th Floor, 1675 Douglas Street
Victoria, British Columbia
V8V 1X4

Dear Commissioner:

In December 1994 I requested information on an "Informal Transportation Plan" from the City of Vancouver. Please see the attached letter dated December 6, 1994. This plan was discussed, during in-depth interviews used for the data collection phase of my doctoral research at the School of Community and Regional Planning at the University of British Columbia, by a number of key people involved in transportation planning in Vancouver.

On February 6, 1995, Steve Kautz of the Vancouver City Clerk's Office wrote, in a letter to me, that "staff report that no informal transportation plan exists." Based on the above-mentioned interview comments, I find this very difficult to believe. For example, Michael G. Thomson, Assistant City Surveyor with the City of Vancouver's Engineering Department was interviewed by myself and my assistant on July 26, 1994. The following narrative, developed from notes from the meeting, describes what happened during the interview.

Upon entering Michael Thomson's office, a map with a number of major arterial streets highlighted, was observed prominently displayed on one wall. When asked if this was the building line map (map indicating where the city Engineering Department have widened or propose to widen roads/arterials in the city), the surveyor stated that no such map existed and that the map on the wall was not for public use. What ensued over the next one-half hour was a rhetorical battle, with the surveyor attempting to deflect the researcher's attention from the wall map. He stated that the wall map was produced in 1987 (the only markings on the map were the words "City of Vancouver," the date "11/1987," and the code "L415"), that it was changing all the time, that it was no longer accurate, and therefore that it was not relevant to the public. Its prominent

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1 As only a number of arterials appeared on the wall map, I concluded that this was not the building line map, but it probably contained components or elements of the city-wide building line map.
location in his office, however, suggests that the map has some relevance to the Engineering Department.

When the surveyor attempted to deflect attention to the city by-laws, which he said contained all the existing building lines, the researcher stressed that it was the Engineering Department's long-term plan for the expansion of streets in the city that was of interest.

After numerous attempts to obtain a copy of the wall map, or any map which defined long-term street expansion plans, the researcher suggested that the British Columbia Freedom of Information Act could be used to obtain a copy of the long-term transportation plan. At this point, the surveyor made the following statement: "You might be able to get a copy of the map, but if someone else gives it to you, I'll have problems with that." Why he said this is unclear, but the statement does indicate that the map has some significance in the Engineering Department.

Based on research evidence, I feel a long-term transportation plan/map (informal transportation plan) exists for the city of Vancouver. I would like a copy of this long-term transportation plan/map and a copy of the 1987 map which was on Michael Thomson's wall (dated 11/1987, with the code L415). Evidence indicates that this information exists, but I have been denied access to it by employees of the City of Vancouver.

Yours truly

John A. Curry
Associate Professor
March 21, 1995  

Mr. John A. Curry, Associate Professor  
c/o The University of Northern British Columbia  
Faculty of Natural Resources and Environmental Studies  
P.O. Bag 1950, Station A  
Prince George, B.C. V2L 5P2  

Dear Mr. Curry:  

FREEDOM OF INFORMATION REQUEST  
TRANSPORTATION INFRASTRUCTURE  

Enclosed are copies of our plans ZE 34, YB 58, and L-415, as requested in your recent letter to the Information and Privacy Commissioner.  

We do not have an "Informal Transportation Plan" as referred to in your November 30, 1994 letter. Plans ZE 34 and YB 58 represent a compilation of Council actions over the years with regard to the roadway system. Further, the plans may not be up to date, or complete with regard to Council’s actions.  

Plan L-415 is a general information plan of building lines and widening lines in the City of Vancouver. This is the map that is directly referred to in your November 30, 1994 request.  

We note that plan L-415 is not an official record of the City of Vancouver. It has not been revised or updated since November 1987, and does not reflect subsequent changes made to Schedule "E" of the Zoning and Development By-law. Schedule "E" is the official record of building lines within the City, and you are advised to refer to it when questions as to future road widenings arise.  

Plan L-415 was prepared as an administrative tool for City staff to be able to quickly identify roads that may be the subject of a building line. It does not represent City policy or future plans. It is simply a tool that allows staff to quickly glance at the plan to determine if more research is needed, in Schedule "E", to determine if a building line exists and its defined dimensions.  

Yours truly,  

D.H. Rudberg, P.Eng.  
General Manager of Engineering Services  

MGT/kc  
Attach: /ez1309-4.cov  
cc: Steve Kautz, City Clerks Office  

Please refer: M.G. Thomson  
File #H911-5
April 10, 1995

Information and Privacy Commissioner
4th Floor, 1675 Douglas Street
Victoria, British Columbia
V8V 1X4

Dear Commissioner,

In response to my letter to your office on February 28, 1995, Mr. D.H. Rudberg, Vancouver Chief Engineer provided me with a number of plans and maps (see attachment). Although this information is helpful in my research, his information response still does not provide me with the information I seek.

A map, described by Mr. Rudberg as Plan L-415 (11/1987), is not the map which I observed during a visit to a city surveyor's office in July 1994. The map observed at that time contained one segment of the city with "a number of major arterial streets highlighted" rather than all the city streets which Mr. Rudberg's Plan L-415 (11/1987) illustrates. Without access to the appropriate map, I can't complete my research.

A significant observation resulting from Chief Engineer Rudberg's letter is that he stated "Plan L-415 (dated 1987) was prepared as an administrative tool for City staff to be able to quickly identify roads that may be the subject of building lines." If urgency in decision-making is required, the researcher questions why more up-to-date maps (post 1987) have not been compiled. If more up-to-date maps do exist, the researcher questions why the City has not send more current maps, as Mr. Kautz stated they would ("commence processing your application by providing a ten-year chronology of building setback maps ...") in his letter of December 13, 1994 (see attachment).

The final significant observation is I perceive that I am being denied access to current transportation planning documents and current ongoing transportation planning process information. Detailed information is provided by the City of Vancouver only when specifically requested. Therefore, I again request the surveyor's working map (as described above), building line maps from 1988 to present, and the information requested in the original November 30, 1994 letter to the City Manager of Vancouver (see attachment).
In addition this letter expressed concern at the difficult process of accessing what is perceived as public information from this local public institution.

Yours truly

John A. Curry
Associate Professor

Attachments:

Rudberg - Mar 21/95
Kautz - Dec 13/94
Dobell - Nov 30/94
APPENDIX K
Hermeneutic Dialectic Research Process

The hermeneutic dialectic process of research creates an environment which allows for the mutual exploration of views by a number of parties. This process, which is achieved through comparing and contrasting individual views, may result in a consensus upon a higher-level synthesis of views.

Guba and Lincoln (1989, 149-155) describe a five step reiterative process (refer to figure K-1) which repeats itself as it moves towards mutual understanding. Step One involves the selection of an interviewee (R1) by the researcher based on a convenient or salient reason. An open-ended interview is conducted to develop a construction of what is being investigated. The Second Step begins by the researcher asking the first interviewee to suggest a second person (R2) who would have a significantly different (divergent) construction of the topic under investigation.

FIGURE K-I
The Hermeneutic Dialectic Circle

Source: Guba and Lincoln 1989, 152.
Step Three involves an in-depth analysis of the elements of R₁'s construction (C₁) using the constant comparative method (Lincoln & Guba 1985). In Step Four, the second respondent (R₂) is interviewed using the open-ended interview approach. After the initial expression of R₂'s construction is concluded, the analysis of R₁'s comments are introduced and R₂ is asked to comment.

In Step Five, R₂ is asked to identify another potential interviewee (R₃) with divergent opinions on the common subject under investigation. Step Six repeats Step Three, this time producing a construction (C₂) which is made up of the constructions from both R₁ and R₂. This process continues until information redundancy is reached or the information being received from interviewees fall into a number of constructions which remain divergent.