RESEARCH REPORT

Vision of Life in a Sustainable 21st Century Canadian City

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SUSTAINABLE 21st CENTURY
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For :
The Centre for Future Studies in Housing and Living Environments

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EXECUTIVE SUMMARY

Public awareness of the impact of human activities on the environment has increased over the past twenty years. In many public opinion polls, Canadians have consistently listed the environment as a major concern. However, when one looks at how people translate this concern into concrete actions, the results are disappointing. Outside of composting, recycling, and other small initiatives people seem to be unsure of what else to do for the environment. The way we live, our urban form, and our relationship to the natural environment have not changed despite our concerns for the environment.

It is within this broad context that the Centre for Future Studies spearheaded a consultation process to examine the issues and possible characteristics of sustainable urban areas in a Canadian context. The consultation process brought together five experts in the field of sustainable urban development to brainstorm about future influences and to articulate, in individual thinkpieces, the characteristics of a sustainable Canadian city in the future. In addition, a non expert, in the academic or professional sense, was included in the group to inject a different perspective to the panel. The intent was to avoid a purely prescriptive view and determine what sustainability means in layman's terms. The Centre for Future Studies also prepared a paper which provides a more pessimistic view of sustainability in Canadian cities to juxtapose the potential reality with the more idealistic views provided in the other papers.

These papers show that the move to sustainability will be a difficult and arduous course. It will not be achieved overnight, but instead, requires small incremental steps. It will involve fundamental changes to our system of governance and, most important of all, changes in our values. Above all, these papers describe life in an idealized and sustainable 21st century city. By describing these possible futures, they give us an alternative from our current future and something to aspire to and plan for.

Sustaining a Healthy Greenville

by Trevor Hancock

The successful transformation of Greenville into a sustainable and healthy community attuned to the needs of its citizens and environment is described in a speech given by a former Mayor of Greenville.

Greenville's metamorphosis into a sustainable city was the direct result of the efforts of its citizens to develop a

vision and a set of related values. Two elements inspired this vision: the first inspiration came from the "Bramerton Code" for builders which recognized that, "once built, a town may exist for thousands of years and perhaps more than anyone else, builders and designers of a new town are accountable to future generations and their unspoken needs". The challenge was to implement a similar code to the Bramerton case in an already existing city.

The second driving force was to link sustainable development with the natural and built environment, economy, social systems, communities and well-being. This link was represented by the role of health, in terms of human, and local/ planetary ecosystems. Thus, sustainable communities are synonomous with healthy communities.

The community consultations which followed advanced six principles for a sustainable and a healthy community: sustainable, livable, convivial, viable, equitable, and prosperous. These principles, however, could not be integrated into a strategic plan for the city with a 1990s local government structure. Reforms to local government began with the formation of a series of task forces which coincided with the six key theme areas. A Sustaining Health Committee, chaired by the Mayor, and composed of one-third politicians and two-thirds civic leadership, was formed to address the cross cutting issues. Under the guidance of the Committee, the six standing task forces addressed issues under one of the six major themes. The six teams are managed by a Sustaining Health Secretariat.

In addition, city governments were decentralized politically to neighborhood management councils, and administratively to mini city halls. The new role for city council was to provide overall strategic direction for the activities of city government and to pass the necessary legislation to achieve those objectives. This function was executed in consultation with the Sustaining Health Committee while the city commissioners provided the corporate and departmental strategic planning and necessary expertise to the mini city halls.

As a result of these developments the fictional city of Greenville is a much more sustainable, viable, livable, convivial, equitable, and prosperous community than it was 28 years ago.

Towards Sustainable Cities

by Robert Paehlke

Robert Paehlke's scenario asserts that sustainability is composed of 2 complex dimensions: impacts and inputs. Inputs

to human economic and social activities involve both energy and materials, and impacts are the ways in which human activities impose themselves upon natural systems, upon the habitat of all non-human creatures and upon human health. Sustainability demands that inputs are reduced while, at the same time, impacts are lessened. This must be achieved without any significant losses in amenity, social equity, and the quality of human life.

Paehlke contends that compact cities are sustainable cities, where compact is synonymous with higher densities. Increased densities promote many energy efficient qualities like decreased automobile use, increased number of multiple dwelling units, and reduced energy and materials requirements for roads and infrastructure. However, higher densities alone are not sustainable. Increased densities must incorporate proximate diversity, sharp edges (a clear delineation between city and countryside) and wilderness corridors, and new designs for urban management.

Proximate diversity, or mixed use planning and design is an attempt to incorporate a variety of land uses within a single region where residences are in proximity to commercial, commerce, and public transit corridors. This is a radical departure from current planning processes which has tended to promote the segregation of land uses.

The principle of sharp edges and wilderness corridors has two mutually supportive objectives. One objective is to ensure the compact dimension of the city, and the other is reintroducing the natural environment to the city. The latter principle recognizes that a clear delineation between the city and countryside is not possible unless the desire among urban residents for open and wilderness spaces is satiated. Wilderness corridors traversing from the edges of the city to the core can be established using abandoned railway lines, and are invaluable for their recreational opportunity, and promotion of non-motorized travel routes.

The last prerequisite, urban management, reflects the need to understand the contradictory attitudes exhibited in cities. Why do 80% of Canadians opt for some form of urban living, but at selected time intervals there is a mass out-migration of people from these areas? The immediate cause is the affordability of land, the immediate goals of those who live in suburban communities are varied. The challenge is to lure people out of the suburban/ commuter lifestyle. To break the cycle, the ambivalence shown towards urban life should be understood and ameliorated. Compact cities should be designed to maximize personal and family safety, improve access to open wild spaces, and minimize and control noise levels.

Compact cities present a great opportunity towards promoting a more sustainable form of living. To achieve a truly

sustainable city requires the cooperative efforts of government (at all levels), business, and individuals.

A Day in the Life of Sam Richmond

by Jeb Brugmann and Marshall Spriggs

The story unfolds with the discovery of an environmental crisis (rising levels of toxic contaminants in the Great Lakes system), and describes how the ecosystem approach is put into operation to solve this crisis at the level of senior municipal manager.

This scenario provides the reader with a look at sustainable development from a technocratic perspective. In 2020, Greater Toronto has undergone major reforms in its legal boundaries, internal structure and management approach. Now known as the Greater Toronto Urban System, the region has adopted an ecosystem approach to urban development and management which is guided by nine management principles for an ecosystems approach to urban systems management (integration, elegance, recycling, functionality, adaptability, diversity, synergy and negative feedback principles).

The Greater Toronto Urban System is made up of two main components: the System Management Departments (of which there are twelve) and the Urban System Council of elected officials. The major decision making body for the Toronto Urban System is the Ecosystem Management Roundtable (EMR) whose members are from the Urban System Council and System Management Departments. The EMR's goals are: to develop consensus on environmental and developmental issues within the region, and to coordinate long term planning strategies and the day to day decision making responsibilities held by the elected officials. Furthermore, the EMR is responsible for the 5 year Environment budget which establishes the targets for the system's imports of natural resources and its exports of resources and wastes.

Imbalances to the Bioregional Ecosystem, such as the toxic contaminants levels in the Great Lakes, are addressed as compensation issues, where local urban systems are challenged by the Bioregional Council to reduce discharges from their urban system. Compensation issues were often a cause for dispute as some urban systems resisted the strong compensation measures imposed on them. However, a Provincial legislation granting urban systems the authority to expend municipal resources on investments in other urban systems quelled this dispute. This was only possible provided that these investments had a higher marginal utility in meeting Bioregional targets than investments made within their own jurisdiction. This provincial legislation effectively created a more conciliatory and cooperative approach to compensation

issues among the urban systems. In the case of the toxic contaminant levels, a compromise was struck between urban systems, where a cross-System housing subsidy was offered for dramatic compensation measures.

This scenario reinforces the need for local actions to be commensurate with regional, national, continental and world actions. Targets must be set at these levels and the local impacts of these targets must be thoroughly studied to enlighten local actors of the commitments that must be ultimately made by them (urban systems).

Observation and Ideas from a Community Dweller

by Eileen Morand

From her daily observations, Eileen Morand notes that the majority of cities, as they presently exist, are not sustainable. This is a reflection of how people live and interact with the environment and others; in short, people are too consumer oriented.

Morand notes that there are some positive examples of urban form which minimize the human impact on the environment. For example, in her visit to New York City, Morand observes that some neighborhoods show a diversity and vibrancy lacking in many suburban neighborhoods. In these neighborhoods, people shopped at the corner store, or on the neighborhood commercial street within a short walking distance. These neighborhoods showed a very real and general sense of community. However, these areas, as in many large urban areas, are afflicted with a social malaise represented by the large number of homeless people.

Morand stresses that an important element for the design of a city is a guiding principle or general rule governing how people live. A guiding principle should reflect a more balanced form of living, one which would promote and recognize a symbiotic relationship between human activity and the environment or "balanced living". On this basis, elements of the city such as the immediate environment, architectural design, size of the city, and transportation should be evaluated based on its compliance to a principle promoting balanced living.

The structure of the city, in Morand's view, should aspire to the following configuration: the city should have a distinct business core of light industry, government offices, conference centres and supporting services. Surrounding this business area would be a fast and efficient means of public transportation with a ring of parking spaces. The public transit ring will act as a transition area, where people will drive from their homes to these parking areas, and take the

public transit to their workplaces located in the business
core. Along the outer ring of parking spaces would be large
multi level super markets, department stores, garages,
day-care centre and some business offices. Further out would
be the living communities offering a variety of small services
to meet every day needs. These will be serene villages with
market squares, small central parks, sidewalk cafes,
boutiques, libraries, and small grocery stores.

Morand concludes with the thought that although there is a
great deal of uncertainty associated with our future, it
should not discourage our obligation to attempt to plan for
the future.

Montréal 2042... Apres 50 Ans de Développement Viable

by Gérard Divay

Gérard Divay presents us with a vision of Montréal in 2042
after 50 years of working towards sustainable development.
Through a retrospective of the evolution of the sustainable
development of the city over that time period he presents us
with a view of what Montréal looks like after having completed
its metamorphosis toward sustainability.

Contrary to today's projections, Montréal's population has
grown to 10 million as a result of massive immigration. On
the other hand, its surface area has only increased by 25 per
cent and the car has been supplanted by an array of
transportation modes. While the boundaries of the city remain
somewhat undefined, its landscape has experienced major
changes with more medium height buildings. The relative
importance of the CBD has declined while 50 autonomous sectors
with their own local administration have emerged.

A change toward a more ecological mindset for the city was
necessary before changes to city form. This change included
the recognition of the carrying capacity of the ecosystems
linked to the city. Cities are now more autonomous in energy
and are symbiotic with nature. Contrary to current single use
and form practices, diversity is cherished in the sustainable
city.

Major efforts are made to foster community integration. A new
form of social solidarity has emerged which places less
emphasis on the state and more emphasis on the individual, the
community and social justice. New community-based
institutional forms also emerged. Technological improvement
in monitoring means that many responsibilities of the state
can be devolved to the community or privatized without harm to
the public good.

In the built environment, there has been increasing concern on the reversibility of initiatives. Modular forms are more common in order to provide more flexibility and facilitate transformation. The metamorphosis of the built form and functions has also acted as a generator for economic renewal and served as a new employment base. Activities such as energy control, waste product utilization, and waste water treatment have been decentralized and require many more employees than in the previous centralized and capital-intensive facilities.

Changes in the behaviour of Montrealers have facilitated this shift. The savings which were generated from their more frugal consumption patterns were redirected to fund much of the urban renewal. In addition, the institutional framework has evolved to provide the right incentives for sustainability. Upon the sale of land or properties, the added value is no longer exclusive to the seller but must now be shared with environmental groups and government. Finally, green taxes on the emission of pollutants or wastes are now common.

In conclusion, the transformation of Montréal to a sustainable city did not occur overnight but occurred over 50 years with periods of turmoil and soul-searching, of innovation and experimentation and finally real restructuring.

Sustainable Canadian City in the Year 2021: A Voluntary History of Willmore and Calgary

by William T. Perks and David Van Vliet

The setting for this scenario is the city of Calgary, and the principle characters are Dwellnow, a long time community resident and original participant-builder of the new Calgary, and her teenage nephew, Robin. The primary theme of this scenario is restructuring of cities and biotic regimes, societal institutions and the dominant paradigm of decision making.

Perks and Van Vliet assert that human societies, instead of growing in a biological way by splitting, replicating and multiplying, have instead grown in a cancerous way of expansion and integration. Society needs a more ecological approach to city design and development based on the ideas of partnership and self-reliance, and inward rather than outward growth.

The scenario unfolds in the conversations between Dwellnow and Robin. It is in these conversations where the reader sees examples of the restructuring in the city of Calgary. For example, Calgary's municipal Corporation was downsized and the political economy restructured into four administrative

Boroughs, each one representing the historical street system quadrant. The Boroughs were sized to accommodate an ideal population between 150,000 to 200,000 with an equitable distribution of employment opportunities in each Borough.

Other examples of restructuring include: the Community Design and Restructuring Incentives Program which effectively changed the internal composition of the city by encouraging the integration of work and home locations. Mixed purpose communities were created from exclusively residential communities. This restructuring was assisted by the establishment of the Community Enterprise by-law which allowed Boroughs and their smaller scaled eco-villages and neighborhoods to generate investment funds for partnership projects that can bring new enterprises to communities that are either newly forming or beginning to restructure.

Moreover, the Green Region Policy agreement between the province and city of Calgary recognized and restored the symbiosis between city and countryside, and the City wide EcoHab Projects physically restructured existing suburbs built in the 1970s to 1990s into sustainable communities built on choice and diversity and self-determination.

The home building industry was also restructured. Prompted by new demands and the realization that housing is much more than bricks and mortar, building permits for housing were now tied to local enterprise, where one unit of housing would be accumulated for each unit of employment brought along with it. Builders no longer specialized in housing "delivery", but an amalgam of other service provisions. The building process was now a user participant planning and design process. The principles for planning were community design and service oriented, localized enterprise generation, and biomass and food productivity linked to human settlement needs and human development.

As a result of these changes Calgary has become a city which is sensitive to the needs of its people.

The Urban Environmental Imperative in Canada, 30 Years of Inactivity

by Dick Leong

In sharp contrast to the extemely positive outlook put forward by the other authors, Leong takes a more pragmatic and pessimistic view of the potential for cities to adopt the tenets of sustainable development.

While many initiatives, recommendations, and plans for sustainable communities were made in the late 20th century, few of them were brought to fruition by 2020. The case of

Rupertville exemplifies this failure. The two-part study, <u>The Key to Our Existence</u> was released in 1991, with the first part "A Rationale for Success" recommending urban concentration as necessary to ensure a healthy environment in concert with policies of land use mix and environmentally benign transportation. "A Plan for Action" further developed this idea and proposed an alternative urban form for Rupertville. It was suggested that the city adopt a nodal configuration, with the city being organized into communities of approximately 23,000 people with essential community services available in each node, with an efficient transit network linking the nodes. A "30 minute walking distance principle" would govern the amount of urban sprawl in each community. "Rupertville would grow like a jigsaw puzzle with additional self-sustaining communites systematically added to the existing city."

Despite a well-articulated plan, implementation of the recommendations was difficult. Marginal improvements occurred in the first 10-20 years, but the achievement of long-term change has been limited.

The most powerful barriers to change are identified as strong economic growth through the early 20th century, population growth, the impact of technology, physical and perceptual barriers, and institutional barriers. Despite concern for environmental issues, the main focus of individuals within our society remains consumer-oriented self interest. The mindset which causes adherence to 1950's style urban form has proven to be impossible to overcome. As a result, society continues to be faced with the same difficulties and environmental problems today as existed in 1990.

BIOGRAPHICAL NOTES

James E. Brugmann is the founder and acting chief executive of a worldwide environmental agency of local government (International Council for Local Environmental Initiatives). Prior to this, Jeb served as the Director of the first U.N. hosted international conference on the role of local governments in global environmental protection efforts otherwise known as the World Congress of Local Governments for a Sustainable Future.

Trevor Hancock is a public health consultant with an extensive background in every aspect of health promotion and environment. Trevor has held a number of academic and professional positions with the World Health Organization, York University and University of Toronto and was the consultant for the Canadian Healthy Communities Project. Trevor is the author of an extensive list of books and articles dealing with a variety of aspects related to health promotion.

Robert Paehlke is a professor from the Department of Political Studies and Environmental and Resource Studies Program at Trent University. In addition to his membership on the Ontario Round Table on Environment and Economy, Robert is the Chairman of the Mayor's Committee on Sustainable Development (Peterborough). Robert has written extensively on the topic of the environment and is the author of <u>Environmentalism and the Future of Progressive Politics</u>.

William Perks is a professor of Planning and Urbanism at the University of Calgary. William has over 30 years of professional practice and research in various community planning projects with an emphasis on strategic planning and its applications in community development and sustainability. Currently, he is the project director for the Affordable-Sustainable Community Project: Research and Design in Calgary.

Gérard Divay is the Director of Planning for the Montreal Urban Community overseeing the administration and review of the urban plan, the study of MUC-related issues, and the acquisition, development and management of regional parks. Between 1982 – 1989 Gérard held a number of senior positions within the Quebec Provincial Government, most notably the Policies and Programs sector of the Assistant Deputy Minister's office and the Quebec Ministry of Housing and Consumer Affairs. In 1984, he was the Director of the Planning and Environmental Evaluation sector, responsible for environmental assessment of large-scale projects, intergovernmental relations, and paving the way for environmental management.

Eileen Morand served as the administrative secretary for the Centre for Future Studies. Prior to this Eileen had taught elementary school children and managed a restaurant. Although originally from England, Eileen has lived most of her life in Ottawa. As a mother and grandmother, Eileen has a vested interest in the future of our planet, cities and future generations.

Dick Leong is a Policy Analyst at the Centre for Future Studies in Housing and Living Environments at CMHC. His work encompasses a broad range of futures-oriented research and analysis.

Preface

Cities have always been considered an important component of civilization acting as a focus for cultural pursuits, social interaction and trade and commerce. In the last few decades it has become apparent that cities are also sources for environmental degradation. The squalid environmental conditions in Katowice, Mexico City and Jakarta are prime examples of urban environmental decay.[1]

However, the developed world, and more specifically North American cities, can not be absolved from all responsibility. Despite our advanced technology, economies and wealth, some environmentalists point to the developed world as a principle source of environmental degradation. From their perspective the North American urban form, among other factors, is not sustainable; it contributes to and promotes the accumulation of greenhouse gases, depletion of natural resources, and pollutes the earth's water systems.

Specific components of our urban form have been criticized as not being sustainable, in particular, the dominance of the detached single family home and the proliferation of the automobile. Indeed, the invention and acceptance of the automobile as the principle mode for travel had a compelling and powerful influence on the creation of present urban form. Its widespread adoption promoted and sustained dispersed and decentralized urban development and in the process promoted the over consumption of an enormous quantity of resources such as energy and land. The automobile and the accompanying dispersed development have been cited as a principle reason for the accumulation of greenhouse gases, decreased accessibility to social services and employment, and destruction of human values and interaction. However, the perceived solutions or alternatives to this type of development are varied. They include centralization (increased densities), a combination of centralizations/ decentralization (pedestrian pockets) and selective decentralization (nodal development).

It is within this broad context that the Centre for Future Studies spearheaded a consultation process to examine the issues and possible characteristics of sustainable urban areas in a Canadian context. The consultation process brought together five experts in the field of sustainable urban development to brainstorm about future influences and to articulate, in individual thinkpieces, the characteristics of a sustainable Canadian city in the future. In addition, a non expert, in the academic or professional sense,

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[1]   Patricia L. McCarney. World Cities and the Environment: 5 Cities Consultation Project. 1992.

was included in the group to inject a different perspective to the panel. The intent was to avoid a purely prescriptive view and determine what sustainability means in layman's terms.

The result is an interesting and thought-provoking collection of different perspectives. Some authors such as Gérard Divay, William Perks and James Brugmann elected to write about the experiences of specific urban areas. Others such as Trevor Hancock, Eileen Morand and Robert Paehlke chose to write about cities in a more generic sense.

Despite the approach favoured by each author, there are many similarities between each vision. For example, intensification, new government systems, community empowerment and urban greenspace are themes which figure prominently in a sustainable city of the future. Perhaps, the most striking similarity is the optimistic view of the future. In particular, Divay, Hancock, Brugmann and Perks all portray life in 2020 (or in the case of Divay, 2042) in terms of a sustainable society. The source of this optimism can be traced to the assumption that societal values have changed; and the values of a consumer society are rejected in favour of the principles of a sustainable society. This is a critical assumption and raises the question of how the urban form influences lifestyle and whether form is the root cause of environmental degradation.

Although, the authors have successfully articulated an ideal situation which encourages the elements of sustainable urban development, one cannot help but to question whether these pre-requisites will in fact be realized. For example, can we expect societal values to shift on a voluntary basis; what would happen if only some urban areas became sustainable while others continued to develop based on present trends - would this be sustainable in the long term? Can we really expect zero population growth in our urban areas and if not how do we accommodate growth in a sustainable way? Can we realistically expect to make any real changes in the relatively short time we have, or for that matter is it a case of too little too late? These questions are addressed in the last scenario by the Centre, which portrays a less optimistic outlook in an attempt to challenge complacency.

In any event these papers show that the move to sustainability is a difficult and arduous course. It will not be achieved overnight, but instead, requires small incremental steps. It will involve fundamental changes to our system of governing and, most important of all, changes in our values. Above all, these papers describe life in an idealized and sustainable 21st century city. By describing life, they give us an alternative from our current future and something to aspire to and plan for.

Since the publication of the Brundtland Commission report, a
great deal of time has been devoted to identifying what is not
sustainable. It is now time to identify what is sustainable
and what we need to do as a society in order to articulate a
direction that will lead toward increased sustainability.
This is the value of these visions as they identify a number
of what if situations. What happens next is our decision.

Sustaining a Healthy Greenville:
Remarks by Former Mayor Amicomunde on the 25th
Anniversary of the Greenville Ecocity Project

by Trevor Hancock

EARTH DAY 2020

It is a great privilege and an honour to be here today, both
to celebrate our achievements and to recall the path by which
we got to where we are today, a more sustainable and healthier
community - although we still have a long way to go, we are
barely half-way along the path of transition.

It was almost 28 years ago, in November 1992, that I was first
elected to City Council - a vastly different City Council, and
a different city to the one we see today. I was motivated to
run for Council on a "green" ticket because of my own concerns
about the state of our planet and the state of our city,
coupled with a firm conviction that only by acting locally
could we solve global problems. In that respect, my views
have not changed in the intervening 28 years. My election was
made possible not by any outstanding characteristics that I
may have had but by the surge of public interest in
sustainable development that resulted from the landmark UN
Conference on Environment and Development in Brazil that year.

The next three years were some of the best as well as some of
the worst of our times. They were the worst because the
actuality of our global problems began to be felt, but they
were the best because we began to respond to them in a
positive manner.

It is useful to recall from our vantage point in 2020 how bad
things were becoming, which is not to say that they are
perfect yet - far from it! But in 1992, we were unprepared
for the rapidity of global change that was to threaten us. We

had become lulled into a belief that global change would be slow and steady and had paid too little attention to some of the implications of chaos theory; the potential for systems, once destabilized, to change very rapidly, and the implications of the "butterfly effect" -- that very small changes, such as a butterfly beating its wings in Shanghai, can be amplified through complex systems into very large changes, such as thunderstorms in Kansas.

The southward deflection of the gulf stream, occasioned by the shutdown of the gulf stream "pump" off southern Greenland (itself occasioned by a build up of fresh cold water from the Arctic as a result of Arctic icemelt occasioned by the greenhouse effect), resulted in the mini ice age that still has much of northern and central Europe in its grip. The ramification of this climate shift, and the resulting decline in industrial and agricultural output triggered a worldwide depression, hyperinflation and the loss of a major market for our raw materials. The decline in productivity of the North American bread basket occasioned by the climate shift and a viral infection that devastated our monoculture-based system has had not only local but global ramifications, including widespread famine and continuing political instability in many parts of the world. And while we in North America have effective vaccines against "AIDS-3", they have come too late to help much of Africa and Asia. Globally, then, things remain grim - Europe in trouble still, African and Asia devastated, North America still severely dislocated.

Of course, not all of this took place between 1992 and 1995, but enough was already happening to trigger widespread concern among our citizens. Our response to these threats was a positive one, and I was fortunate to be able to work with a group of highly motivated citizens, City Hall staff and my fellow politicians to develop a proposal both for managing decline and, more positively, for making Greenville a

sustainable and healthy community. It is the adoption of that
plan by City Council in 1995 that we are celebrating today, as
well as our pride in being the first recipient of the Governor
General's award for sustainable development in 2001 and our
recognition we have retained at every five year review,
including the one conducted this year. But most of all, I
think we can all take pride in having built here in Greenville
a sustainable, liveable, convivial, viable, equitable and
relatively prosperous city. We may not have the material
wealth we once had, but I believe we are psychologically,
socially and spiritually wealthier, healthier and incomparably
better off than much of the rest of the world.

1. From There to Here

I sometimes wonder what someone who left Greenville in 1995
would see that is different about our city if they were to
return today.

I think one of the things that would surprise them is that
although our population has increased from 310,000 to 386,000
in the intervening 25 years, this has been accomplished with
no net increase in the urbanized area, not net loss of
farmland in our surrounding region and even an increase in the
percentage of our land that is greenspace. Given that the
common view back then was that the choice was between "Los
Angelization" and "Manhattanization", they would be equally
surprised to see that we had accomplished all this not only
without building highrise residential towers, but in fact by
demolishing a number of them. I like to think that our height
bylaw, decreeing that no one should live higher than the top
of a tree, would impress them.

Another thing they would find startling would be the relative
absence of cars, particularly in our community core areas.

But again, I think they would be impressed by our pedestrian and bicycle paths, our comprehensive public transit system, our fleet of cheap, fuel cell powered taxis and our rent-a-bike systems. The extent to which commuting has been abolished would also surprise them, coming as they would from a time when land use was widely separated and people had to have a car to get around. They would recognize that the intensification and diversification of our suburbs to create a series of community cores was the key to our success.

But those are the obvious differences. There are many other differences that, while not apparent at first glance, are equally important. They would find us a centre of regional government, a service oriented community with a vibrant and diverse economy based on green industries and services, a university and health service centre with an active cultural life. But would they see and understand the changes in our ways of governing ourselves - our governance - and would they understand the vast and integrated range of policies that we have developed. Would they understand our philosophy of social entrepreneurship - the making of public or social profit - based as it is on a completely different system of accounting that assesses net human benefit rather than GNP? In time, perhaps they would. But what they would have missed, and what I wanted to recall, is the process that we embarked upon in 1995, a process of co-determining our future.

2. Managing Decline

Our first step, and it was a constructive one, was to anticipate the looming eco-crisis, to recognize that a degree of ecological - and thus economic and social - decline was inevitable and to begin to plan for it. We recognized that it is just as unhealthy for a community as it is for an individual to pretend that problems don't exist, to bury it's

collective head in the sand and hope problems will go away. It is healthy to recognize and address problems in a mature and thoughtful way, which is what we did.

We thus presented our response not as an act of fear and desperation, but as a positive and constructive approach. We proposed that since what we faced was essentially a long, slow disaster, we should address it as such, utilizing our existing disaster planning structures and processes. We tried to anticipate what problems might arise as a result of the eco-crisis and what steps we should take locally to prevent or mitigate those problems, or to live with them if we must. We conducted this process in as open and public a manner as possible, using the media and public consultation processes to educate our citizens about the challenges and the needed responses. We stressed the need to ensure a more secure future for our children. We reasoned, correctly, that if people understood both the challenges and the role they could play, they would respond in a positive manner. And so they did, both in terms of their personal actions and in terms of supporting (and indeed pushing) City Council and other levels of government to act.

3.   2020 Foresight

Thus we began to react to the bad news. But we recognized that we had to go beyond that, important as it was, and create a more positive vision of what we wanted to be as a community. In fact, I think the most important thing we did was to develop the vision and set of values and principles that have guided the community ever since. We recognized that people will only own the process and the vision if it is their own process, their own vision.

We began with a recognition that sustainable development is not only about the natural environment and the economy, but also about our built environment, our social systems, our communities and our wellbeing. Recognizing that there was no ideal definition of sustainable development, we chose to use the one proposed by the Centre for Human Settlements at the University of British Columbia:

> "Sustainable development is positive
> socioeconomic change that does not undermine the
> ecological and social systems upon which
> communities and society are dependent."

We recognized that we needed to address health, not merely in terms of human health but also in terms of the health of our local and ultimately planetary ecosystem. We realized that health is a concept which is broad, all-encompassing and, most important, very personal in its meaning. And we recognized the reciprocal relationship between human and ecosystem health. We thus sought to link the concepts of sustainable communities and healthy communities, recognizing that they are but two sides of the same coin.

We are inspired by the Bamberton Code, adopted in 1991 by the builders of Bamberton, B.C. Recognizing that "once built, a town may exist for thousands of years (and that) perhaps more than anyone else, builders and designers of a new town are accountable to future generations and their unspoken needs" they had enunciated the following intentions:

1. That Bamberton represents a way of living which seeks to serve the needs of our own generation and generations to come.

2. Bamberton represents a new possibility for the way people co-exist with nature, upholding the ideal of responsible stewardship, and seeking to be ecologically sustainable in the use of natural resources such as water, soil, habitat, energy and raw materials.

3. That Bamberton represents a rediscovery of traditional virtues of community, being conducive to social interaction, care and mutual support, encouraging of responsibility in the pursuit of shared goals, and supportive of cultural and artistic richness.

4. That Bamberton represents a new possibility for the building of a self reliant, local community economy, emphasizing enterprise and initiative; the contribution of labour; mutual economic support; innovation, research and development; personal, social and global responsibility; and long term ecological sustainability.

5. That Bamberton represents a positive opportunity for all to call Bamberton home, being encouraging or creativity, learning and growth, and nurturing of a deep appreciation of the gift of life.

We thought this was a good place to begin, the challenge of course being to implement such a code in an already existing city of 310,000 people - a greater challenge, in our view, than creating such a community from scratch.

And so we went out to our citizens, organizing an extensive series of consultations and vision workshops. By training facilitators who then fanned out into the community, we were able to actively involve some 35,000 people - over 10 percent of the population - in the process. What we did was very simple, very powerful and sometimes very moving. We asked people in all walks of life and all age groups to participate in a brief guided imagery in which they saw Greenville some decades in the future as a sustainable and healthy community. Using a variety of techniques, but principally through group drawings, we had people describe this preferable future community and identify the common themes. The videos we made then of people describing their pictures make fascinating viewing today - they show us both how far we have come and how far we still have to go.

What people told us they wanted was the following:

- a clean, green, quite and healthy environment;

- a commitment to caring for the urban ecosystem
  through appropriate community technology;
- a human scale, integrated, mixed use, accessible
  neighbourhoods;
- appropriate and affordable housing for all;
- an accessible, people oriented transportation system
  for a totally accessible city;
- high civic consciousness and community
  participation;
- a caring and sharing community, family to each
  other;
- food, shelter, work and other basic needs for all;
- a peaceful and non-violent community, a safe city;
- work as a source of health, flexible work
  scheduling, meaningful work, a high quality of
  worklife and a healthy and humane work environment;
- learning opportunities throughout life, developing
  full human potential;
- support for a healthy and well balanced lifestyle;
- healthy food readily available;
- both active and relaxing recreation activities,
  greenspace and beauty;
- a wellness system including health promotion and
  high quality, community-based sick care;
- a high quality of life for young and old.

In fact, when we looked at the drawings, what people described, in effect, was something like a 21st century version of a 19th century European market town. This prompted us to look very carefully at that model and adapt it to our own purposes.

From all of this we distilled a model with three interacting elements - environment, economy and community. This gave us six qualities for a sustainable and healthy community. Greenville, we said, should be sustainable, liveable, convivial, viable, equitable and prosperous.
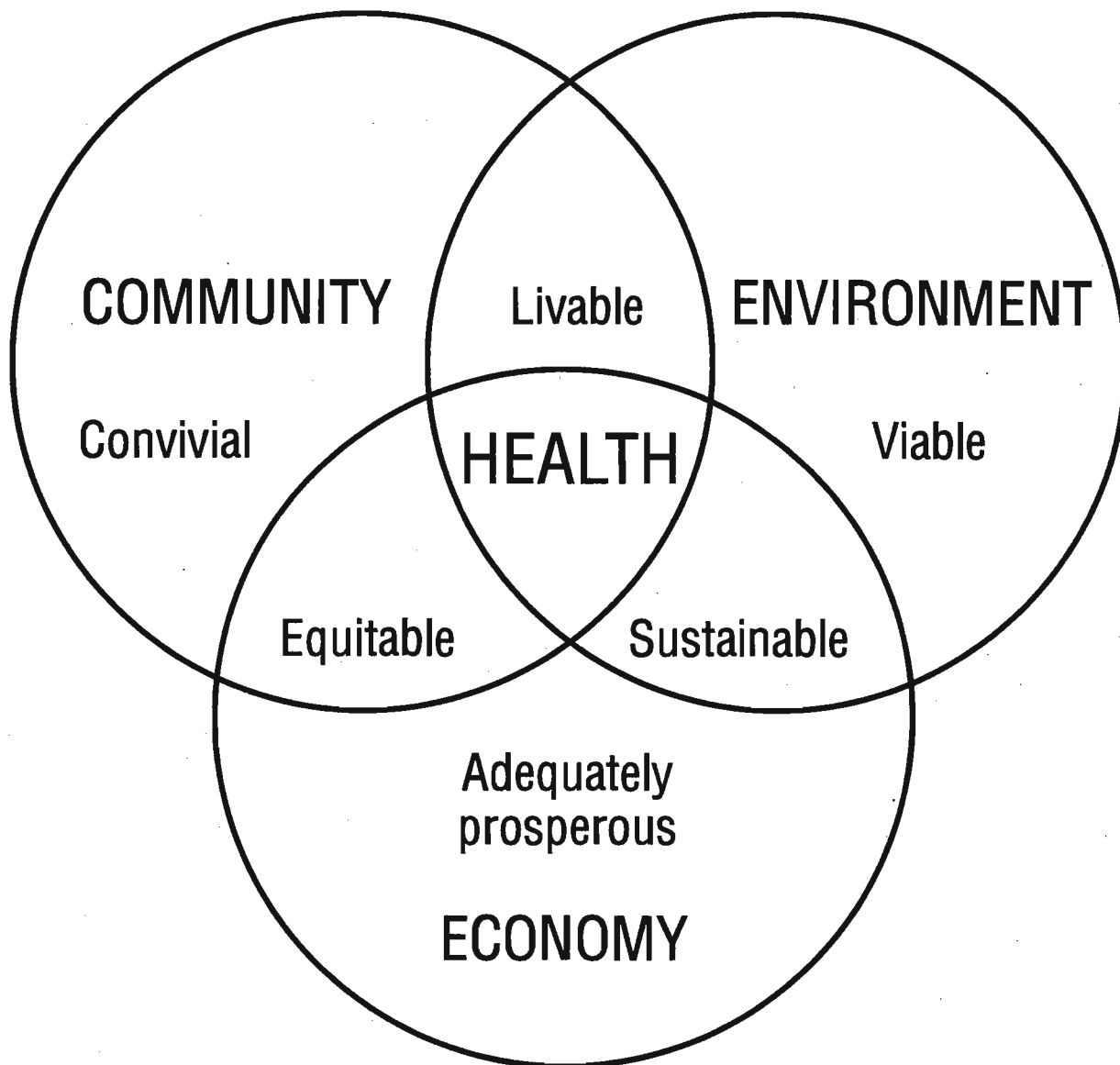
This process took us almost two years; in 1994, we began the work of turning these values, principles, elements and models into a strategic plan for the city. This was not to be a plan just for City Council and city government, but for the whole community - business, labour, churches, the voluntary sector, residents groups, nongovernmental organizations of all

stripes. It quickly became apparent that this new way of
thinking about the city required new government structures,
new styles and new processes. We could not address 21st
century problems with 19th century institutions and ways of
working. Thus the plan adopted in 1995 not only set out goals
for Greenville but laid out a new government structure as
well. It is one that has stood us in good stead and that has
been adopted by many other cities and towns since then.

We should never forget that it was this change in process that
enabled us to achieve so many of our goals, that ensured for
us an ongoing process - and one that continues today - that is
flexible and responsive. Because we realized then, as we
realize now, that creating sustainable healthy communities was
something we would have to work at all our lives, something
our descendants would have to work at all their lives and so
on.

Nor should we forget that while we in Greenville were in many
respects leaders in this area, there were others who were
innovating as well, from whom we learned a great deal.
Ultimately, the development by the national and provincial
governments of a strategic planning framework with national
targets, but with their achievement left to local authorities
has been a big help, and one we worked hard to achieve. It
has also been a big help, in that same spirit, to move from
cumbersome and inflexible prescriptive building codes and
planning requirements to normative codes that specify the
desired result but allow for creativity, flexibility and
innovation for their attainment.

Finally, of course, we cannot forget - how could we? - the
enormous importance of the bioregional monitoring and
management systems we now have in place. While we have not
attained the sophistication of the Greater Toronto Urban
System of which Sam Richmond is so proud, we are nonetheless

COMMUNITY   Livable   ENVIRONMENT

Convivial   HEALTH   Viable

Equitable   Sustainable

Adequately prosperous

ECONOMY

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part of that impressive global system, we play our part in
trying to preserve the greater ecosystem of which we are a
part. But nonetheless, I remain convinced that it was our own
local actions that were most important, and it is on those
that I wish to dwell today.

4. Reforming City Government

One of the problems we and many other cities faced in the
early 1990's was the tremendous proliferation of advisory
committees, task forces and other ad hoc mechanism to involve
the community in the issues of the day. We had over 100 of
them! In some respects, this was a positive sign; there was
clearly a great interest in people being involved and a great
need to involve them. On the other hand, this proliferation
of special purpose bodies indicated that our city structure
and organization was not able to respond adequately to the
needs of the day; we were attempting to address emerging 21st
century issues while still locked into an essentially 19th
century city government structure. Accordingly, we instituted
two major reforms. The first was to establish a series of
task forces related to our six key themes; these task forces
were designed to operate in a coordinated manner and to cut
across existing city departments. The second reform was to
decentralize city government both politically - to
neighbourhood management councils - and administratively - to
neighbourhood offices.

In order to address the "cross cutting" issues we were facing,
we established a Sustaining Health Committee. Chaired by the
Mayor, one third of its members are politicians, two thirds
are the "civic leadership" of the city, representing all major
sectors. Under the guidance of the committee, which provides
strategic policy and overall direction and links the major
civic organizations (including council) together, the six

standing task forces address our six major themes. Each task
force is staffed by three to five issue coordinators with a
team leader; the six teams are managed by the Sustaining
Health Secretariat.

As time has passed, the issues that each task force addresses
have changed somewhat, although the six themes remain the same
(perhaps it is time we also reconsidered them?). It is
salutory to recall the issues that the task forces addressed
when we began 25 years ago.

- sustainability (impact of the city on the global
    environment):
    - energy conservation;
    - food production;
    - resource conservation.
- viability (impact of the city on its local
    environment):
    - air and water emissions;
    - solid waste;
    - greening.
- liveability (impact of urban design on life):
    - intensification/mixed land use;
    - transportation;
    - healthy and environmentally friendly building
       design;
    - street life.
- conviviality (people living well together):
    - social support (formal and informal);
    - neighbourhood participation/local democracy;
    - safety/freedom from violence and fear;
    - culture and recreation.
- equity (equal opportunity for development of human
    potential):
    - basic needs (food, shelter, income, etc.);
    - employment/quality of work life;
    - education/literacy (includes civic skills);
    - human rights/social justice (includes
       minorities, seniors, disabled, women, etc.).
- prosperity:
    - green business/industry;
    - local community economic development;
    - innovative technologies.

When we first proposed this, there was great debate as to
whether we were simply creating another City Hall at "right
angles" to the existing one, another set of empires. However,

by insisting that the staff for the whole operation be no more
than 30, by seconding staff from existing departments for
rotating two year terms, by bringing in seconded staff from
other sectors of the city (such as business, voluntary sector,
residents' associations, etc.) and by adopting a management
philosophy that emphasized:

- power with rather than power over;
- negotiation rather than directives;
- process rather than structure;
- collegiality rather than hierarchy;
- collaboration rather than competition;
- holistic rather than sectoral approach;
- both/and rather than either/or;
- win-win rather than win-lose.

we were able to avoid many of the potential pitfalls. That is
not to say there were no problems, clearly there were, as
those of you who were part of the process in the years
immediately following 1995 will remember only too clearly.
But in the end, a shared purpose, a clear vision, and a
growing sense of trust helped us break down the old barriers
and overcome problems.

The second major reform was in many ways an easier one; after
all, we were not the first city to decentralize. Nonetheless,
the establishment of neighbourhood management councils,
initially advisory to but later directing our neighbourhood
offices was not without its teething problem. Some local
councillors, accustomed to representative rather then
participatory democracy, at first resented these locally
elected neighbourhood councils, particularly since it meant
that they had to work with a diverse mix of local residents,
and not merely depend upon their personal supporters. At the
same time, the Commissioners of our City Departments, already
threatened by the issue coordinators and theme task forces,
found it difficult to give up control over their staff, and to
see that control vested more at the local level. While most

successfully made the transition, some of the Commissioners, sadly, were unable to adjust and left the city.

The process we have now seems to work quite well. The role of city council, with advice from the Sustaining Health Committee, is to provide overall strategic direction for the activities of city government and to pass the necessary legislation to achieve those objectives. The role of the city Commissioners is to provide corporate and departmental strategic planning and to ensure the necessary expertise is available, on a conducting basis, to the neighbourhood offices. It is at that level where the frontline activity takes place, with teams of staff from different departments working together as necessary on particular projects or issues. Ten percent of our staff are now full time community development workers, working under the direction of the neighbourhood management councils to mobilize and help organize the various sectors and elements of the community to achieve the local objectives, within the strategic framework laid down by city council.

This reorganization of our local government is perhaps the principle reason why we have succeeded where others have failed. We have empowered our citizenry and our staff; we have provided a clear sense of strategic direction with a clear ability to respond to local issues and concerns; we have been able to mobilize all the resources of the city, not just city council, over a long period of time around a set of common objectives. As a result, we have made some remarkable changes in our city in the comparatively short period of 25 years. Let me briefly review what we have accomplished.

5. Sustainability

Perhaps the most significant decision we took was not to allow Greenville to expand beyond its current urbanized area. Of course, while there were some areas within the city limits not yet urbanized and for which we as a city council could take direct responsibility, this was a decision that did not lie solely within our jurisdiction. So I want to take the opportunity to pay tribute here to both the surrounding municipalities and the province for their support in this decision. The results have been quite dramatic; as a result of focusing on infilling and urban intensification, not only have we saved much valuable farmland, we have also reduced our CO_2 output by 70 percent from 1995 levels and created a more liveable and convivial city. Infilling and intensification has created a more compact and energy efficient urban form; coupled with provincial legislation on energy efficiency standards for housing, the federal government's energy conservation retrofitting program, tough federal standards for gas consumption in cars (together with the rising price of gasoline), our own aggressive public transportation program and substantial progress in the area of renewable energy - much of the latter sparked by the university's renewable energy research centre and the new industry that has spun off from that research - we have been above to achieve the target we set way back in 1995.

It is not just energy that we have conserved, our progress in the conservation of other resources has been just as dramatic. Our recycling and reprocessing industries have enabled us to reduce our solid waste to 10 percent of 1995 levels, while our waste reduction bylaws, such as the 20 cent tax on each layer of packaging, have become models for other municipalities.

A third key activity area has been our support for a shift to sustainable agriculture. There has been a major shift in our

dietary habits over the past 25 years, with most of us now
eating a low meat diet. Not only has our health improved
because of this low meat, high fruit, vegetable and grain
diet, so too has the health of our surrounding
agro-ecosystems. The low meat diet has meant that we could
produce less food per acre and still feed our population; this
in turn has meant a less intensive form of agriculture. Of
course, this has meant an increase in food prices, but as a
society we made the decision many years ago that we should pay
farmers the true cost of production in perpetuity was not
without its rewards. Equally remarkably, we now produce
almost 20 percent of the food we eat right here in the city,
not only through our community gardens and allotments but at
fishponds and greenhouses that use the heat that previously
went to waste from heating and other industrial plants all
over the city. In fact, the celebratory banquet we are about
to consume was grown entirely within the city limits!

6. Viability

There is no question that our air and water quality is
considerably improved compared to 25 years ago. As a city, we
committed ourselves in 1995 to the goal of zero discharge of
toxic chemicals by the year 2010, a goal that had the general
support of the business community. We backed up that support
with some pretty tough bylaws, which received a great deal
more attention after the first two or three corporate
executives were jailed for pollution offenses! Obviously, it
was easier to insist that new industries be clean than to
clean up old ones, hence the 15 year timeline. The
development of new processes and new products, while not
confined to Greenville, certainly received a lot of attention
here as part of our strategy of developing green industries.
Again, the university played a significant role, with funding
and support from provincial and federal governments and the

business sector.   This has enabled us to build up a thriving export trade in know-how and equipment.   But obviously, there were costs as well, since several of the oldest and dirtiest industries were forced ultimately to close or chose to relocate.   But overall, the economic benefits of our tough anti-pollution measures have outweighed the costs.

One of the key decisions was for the City Parks Department to set an example by moving within three years to an integrated pest management (IPM) approach and to emphasize organic/ecological practices.   The example set by the city has since spread to all corners of the community, until it is safe to say today that we are an IPM city, and those few pesticides that we do use, based as they are on biotechnology, are very species specific and have no demonstrable impact beyond their target organism.

Our approach to parks and greenspace has not been confined simply to a switch to IPM.   We have planted two million trees in the past 20 years, so that the city really resembles an urban forest; we have expanded the amount of space dedicated to parkland, and have created several notable urban wildernesses.   One of the most successful has been the replacement of the GM Ford Expressway with an urban greenway for pedestrians, bikes and light rail transit.   Truly, Greenville is green these days.

7. Liveability

Obviously, the steps we have taken to make the city sustainable and viable have contributed to the liveability of the community.   By intensifying land use and locating the new, environmentally friendly industries in residential areas, together with the huge service sector that is the major basis of our economy, we have made it possible for people to live,

work and play in their own neighbourhoods. The establishment
of core communities in what we used to call the suburbs has
meant that commuting has been reduced by 45 percent since the
turn of the century, although obviously a large number of
people still commute to the city centre. Their commuting,
however, is almost entirely by public transportation.

Nothing exemplifies the decline of the importance of the motor
car so much as the closing of the GM Ford Expressway, unless
it is the conversion of most of the parking lots of our three
major malls into housing. This re-creation of neighbourhood
has enabled us to re-animate the city's streets and to
recreate the squares, marketplaces, sidewalk cafes and other
centres of social life that were such a feature of the drawing
of our vision workshops. We have, in effect, created a series
of 19th century European market towns within the city. This
is undoubtedly assisted by the emphasis on low rise, clustered
housing which ensures a mixture of income groups, owners and
renters, age groups and so on. The reintegration of seniors
into the life of the community has been one of the most
pleasing side-effects of this approach. (needless to say,
this new housing form is more resource and energy efficient,
which contributes to a lowering of the cost of living, as does
the fact that few families own cars, and thus few families
suffer all the costs that go with owning a car.)

The demolition of some of the most disliked highrises in the
late 1990's was greeted with considerable satisfaction, not
least by the former inhabitants. The higher density, low rise
buildings that replaced them are much more amenable to a
convivial life, and have helped to reduce the sense of
alienation and isolation that contributes to fear and even to
violence. Moreover, our new housing designs, in addition to
being energy efficient and environmentally friendly, are also
healthier for the inhabitants thanks to much greater attention
to the materials, fabrics and furnishing that go into them.

Trevor Hancock

This too has been an area of economic growth based on good research.

Finally, as should be evident from walking around these new or revivified neighbourhoods, the aesthetic effect of the wide mix of housing designs, the careful attention to detail and the thoughtful analysis of the impact of design on social organization has resulted in much more liveable communities.

8. Conviviality

In part, our greater sense of community comes from the more liveable urban design we have created. But physical design alone does not make for a healthy or strong community. The social dimensions of a sustainable and healthy community are just as important as the environmental dimensions, as we correctly identified some 25 years ago.

One of the cornerstones for conviviality has been the much greater degree of citizen participation and local democracy resulting from our neighbourhood management councils. The extent of empowerment experienced by individuals and communities alike has been considerable, and with that empowerment has come a willingness to work together for shared aims and to work out our differences in a collaborative and non-confrontational approach. This in itself has served to lessen tensions between different groups in our communities, and has also contributed, along with better urban design, to a reduction in fear and violence. The mediation, participation and other citizenship skills that the Board of Education adopted as a core element of the curriculum in 1997 is another significant contributor to this greater sense of safety and conviviality.

Of course, our social networks and social support systems are also stronger. This is in part a result of the greater liveability and conviviality of our communities; people are more likely to know their neighbours, more likely to feel a part of the community and more likely to participate. Again, the Board of Education's inclusion of social action and voluntarism in the curriculum has meant that we now have a generation that has grown up understanding and accepting its role in community activity and social support.

Obviously, our human services reflect some of that same change, with a general shift in philosophy from a "hand out" mentality that protected people but at the same time disempowered them to a "hand up" approach that promotes wellbeing and enables people to exert more control over their lives.

9.   Equity

The change in philosophy in our human services has not meant the abandonment of our sense of social justice or our commitment to ensure that everyone's basic needs are met. Our 1995 requirement that 25 percent of housing be affordable was increased in 1999 to a level of 33 percent, and in 2006 to 50 percent. Moreover, the mixed land use and the social mix of our housing, together with more opportunities for small apartments and collective living means that no one in Greenville today need go homeless.

Nor need they go hungry is spite of the higher cost of food. Happily, the phenomenon of foodbanks that I recall from my early days on council are a distant memory; not only did the federal and provincial governments make a commitment to ensure that foodbanks would not be necessary, but our own urban food

production, particularly during the late 1990's, helped us to
address the urgent problem created by the depression.

The opportunity for employment created by our shift to a
sustainable community has been considerable. Admittedly,
there have been difficult times as industries have closed down
or relocated, but our emphasis on innovative technologies,
green business and community economic development at the local
level has paid off. Moreover, we no longer have
"unemployment" as that terms was understood in the 1990's.
The guaranteed annual income has removed the stigma from
"unemployment", allowing people to adopt a flexible working
schedule over their lives, incorporating sabbaticals,
continuing education and a flexible retirement age. Moreover,
those who wish to undertake community service, including the
raising of their own children, can do so without losing all
their income or all their social benefits.

10. Prosperity

While our per capita income may be less than it was 25 years
ago, we are immeasurably wealthier. In part, that is because
we no longer measure our wealth in mere economic or material
terms. We no longer use the grossly misleading concept of
GNP, but instead have adopted, both locally and nationally,
the measure of NHB (net human benefit) which subtracts harmful
effects from beneficial ones. Moreover, we use a battery of
indicators - reflecting environment, economy, health and
equity - that allow us to more accurately reflect our true
wealth. Also, the gradual adoption of a set of values more
consistent with sustainability has resulted in conservation
rather than consumption, frugality rather than waste, becoming
the measures of success.

Trevor Hancock

We do not have the dramatic differentials in income that were the norm then, with some people almost obscenely rich and others pathetically poor. This is not to say that there is no differential, of course there is; excellence and ability are still rewarded. But in a more socially oriented community, those rewards are less monetary then psychological. Over all, we consume less per capita than we used to, but there is still enough to go around. And of course, fewer material possessions (especially cars), greater energy efficiency and more local self-reliance has reduced the need for a cash income.

Local economic initiatives have blossomed, there is more exchange and bartering, and at the same time we have created new industries and developed innovative technologies appropriate to a more sustainable community. Our philosophy of social entrepreneurship, emphasizing the co-production of wealth, collaborative relationships between workers and employers and partnerships between government, business and community, has made a major difference.

There is a much greater degree of worker participation (including participation in ownership) and as a result far fewer industrial disputes; again, the mediation, participation and citizenship skills instilled from childhood have contributed to this changing social dimension.

11. Overall Impact ·

I can say without fear of contradiction that Greenville is a much more sustainable, viable, liveable, convivial, equitable and prosperous community than it was 28 years ago, when I was first elected to Council or even 22 years ago, when I became the first - though by no means the last - woman to be elected mayor. But while you have been kind today in your praise of

my efforts, I want you to know that it never was and never
could be a solitary effort. The changes we have made that
have made Greenville an outstanding example were made not by
City Council alone, nor by city government alone. It took the
combined and collaborative efforts of all sectors of our
community, the communities around us, and the support -
including legislative support where necessary - of the
provincial and federal governments. We may have railed
against them when their codes and legislation got in the way
of what we wanted to do - and we were right to do so - but in
the end, as they came to appreciate what it was we were trying
to do, so they became more supportive, although I must say
they never yet have caught up with us!

Some of the things we have done have become models for other
communities to follow; but at the same time, we have learned
much from other communities. Indeed, our effort was helped
enormously by our review of state of the art municipal bylaws
in 1994, an ongoing review which has become a municipal
bestseller!

So here we stand today, slowly emerging from the impact of our
brush with ecological, economic and social collapse. While we
are by no means out of the woods, the lessons we have learned
in Greenville and that we have shared with the world have been
an important contribution. Not only have we sustained the
health of Greenville, we have in the process helped to
sustain, even to restore, the health of the planet.

BIBLIOGRAPHY

Bamberton Code - South Island Development Cooperative, 550-2950 Douglas Street, Victoria, B.C. V8T 4N4.

Vision elements - from "Healthy Toronto 2000", a 1988 report of the Board of Health, City of Toronto.

Model - "Towards Health and Sustainable Communities" by Trevor Hancock, a paper presented at the Third Colloquium on Health and the Environment, Quebec City, November 1990.

Indicators for a sustainable society - Feasibility study for Health and Welfare Canada by Pierre Gosselin et al, Laval University, May 1991.

Towards Sustainable Cities

by Robert Paehlke

The ways in which societies are at present unsustainable frighten many people. Human numbers continue to grow at rates which threaten to outstrip the earth's capacity for producing food. Industrial societies are irretrievably based on energy use. But our most significant, most portable and cleanest energy sources will not be widely available a century, or even a half-century, from now. More than that, present rates of fossil fuel use threaten to alter the climate of the planet in fundamental ways. As well, the living space of every non-human creature is inexorably shrinking, even though biodiversity is essential to our own quality of life and probably our very existence. Finally, we simply do not understand the human health and ecosystem implications of altering the chemical make-up of the earth's waterways, airsheds and landforms.

1. What is Sustainability?

Sustainability is best understood as having two complex dimensions: impacts and inputs. Both must be minimized. Mercifully, reducing one typically reduces the other. Impacts are the ways in which human activities impose themselves upon natural systems, upon the habitat of all non-human creatures, and upon human health. The inputs to human economic and social activities involve both energy and materials. There are few, if any, ways to obtain more of either without some increase in impacts. Impacts per unit of input can vary enormously but the challenge of sustainability will increasingly require that we reduce inputs as well as ameliorate impacts. The challenge is to do so without

significant losses in amenity, social equity, and the quality
of human lives.

There is no single factor which determines absolutely that
inputs, as well as impacts, must be reduced. But the factor
which makes it difficult to imagine how we might proceed
otherwise is energy. At present industrial societies depend
on fossil fuels for 80-90% of their energy requirements.
Since there is a world market in energy, no energy rich nation
should imagine that its reserves will supply its future needs
while other industrial nations radically curtail their
consumption. Supply questions aside, prudence regarding
regional and global atmospheric factors (acid precipitation
and global warming) suggests that fossil fuel consumption
should be slowed in any case. The economics (let alone the
environmental impacts) of nuclear power suggest that no more
than a small proportion of total energy demand will be met
from this source. At present nuclear power supplies perhaps
3% of Canada's energy demand. Increasing the contribution of
nuclear to a very substantial share of total energy supply
would likely absorb more investment capital than could be
raised, even over a period of several decades.

This is not to say that nuclear power, or any other non-fossil
energy option, does not have a role to play. It is to say
that improving the energy and materials efficiency of
industrial society is both essential and urgent. Materials
efficiency is a part of the equation because all resource
extraction is energy intensive, including food production. As
well, environmental impacts are to a very great extent a
function of both energy and materials use. North Americans in
particular must understand how crucial a fact it is that the
Western European and Japanese economies are nearly twice as
energy efficient as is the North American economy and that
only a very small part of this difference is determined by
either climate or geography. The difference lies in industry

by industry energy efficiency, in the higher proportion of
recycling, in the more extensive use of cogeneration and
district heating and perhaps most significantly in the
relative energy (and materials) efficiency of European and
Japanese cities.

2. Compact Cities as Sustainable Cities

Several recent studies have shown that more compact cities are
more sustainable cities, that higher population densities are
a positive option. This view runs counter to many
environmentalist assertions of the 1970s. The most
significant single reason for this new perspective has to do
with patterns of automobile use. The extent to which people
use private passenger cars is a direct function of urban
density. Cities which are more compact are significantly less
dependent on automobiles, people choose non-automotive
transportation options more frequently. Residents of cities
in the Western United States use, on average, four times the
amount of gasoline that is used by a typical European urban
resident. To choose two cities of comparable grace and charm,
residents of San Francisco (in 1980) used 55,365 megajoules of
gasoline per capita and residents of Paris used 14,091. In
the San Francisco area there were (at the time) 16 people per
hectare; in Paris 48. The least dense, most automobile
intensive, cities frequently suffer serious air quality
problems (e.g., Los Angeles, Denver, Houston). The following
data illustrate the logic lying beyond this reality:

	Urban Density	% trips to work by public transit	% by walking and cycling
Los Angles	2,000	7.7	4.2
Chicago	1,750	18.3	6.2
Greater Toronto (GTA)	2,700	25.0	10.0
London (England)	5,630	39.0	23.0
Munich	5,690	42.0	20.0
Singapore	8,320	59.6	15.8
	(persons/km^2)		

On a worldwide basis choice of transportation mode varies directly with urban density. The more compact the city the more likely people are to opt for walking, cycling or public transit. More than that the less compact the metropolitan area the greater the distances involved in an average trip. Energy used per passenger mile is from two to four times greater in automobiles when compared with bus or rail.

The energy used in transportation systems is an important part of the claim that the most compact cities are the most sustainable cities, but there are many other reasons for this claim. The following are the most important:

* At any given size, multiple dwelling units are more energy and materials efficient per unit than are detached single family dwellings. Both operating energy and construction materials inputs are reduced because interior walls, floors and roof are shared. The impacts associated with energy and construction materials extraction and production are reduced proportionately.

* The smaller interior spaces typical of compact urban area are more energy and materials efficient. Land and other costs in urban cores drive up the price of interior on a per space per square foot. The fact that the average household space is smaller reduces the inputs and impacts associated with building and operating each household.

* More compact cities reduce the energy and materials used for infrastructure such as roads, sidewalks, sewers, water mains, telephone and cable lines, and energy utility conduits. One important material in infrastructure construction is concrete. Cement production is energy intensive and all energy use has significant impacts. Cement production also has a fairly high air pollution impact. The extraction of

aggregates as an input is at least temporarily disruptive of open space and local water quality.

* Enhanced recycling, re-use, and repair opportunities are inherent within the process of urban intensification. Population densities make recycling, repair and re-use more viable because the transportation distances associated with materials collection are reduced and proximate market size is expanded. The impacts of raw materials extraction and processing are almost always higher than the impacts associated with recycling and re-use. Forests as habitat are not disrupted to the extent that paper is made from used paper; acid mine leachate is avoided to the extent that the inputs to metal production are scrap metal. As well, energy inputs to production from used materials are almost always lower; 90% lower in the case of aluminum, for example.

* The protection of agricultural land at the urban fringe is easier when urban land use is intensified. Construction on prime agricultural land are the urban fringe removes land as a vital input to agricultural production. The impacts of suburban development on water run-off, on woodlot, wetlands, and wildlife habitat loss are usually significant.

* When food production is proximate to urban cores, the food system as a whole can be more energy and materials efficient. Food transported long distance requires more inputs by way of transportation energy, more packaging, and more preservatives. All of these additional inputs have impacts. In addition, more distant food production may well be less diverse and thereby require higher pesticide inputs.

* Compact cities are more compatible with the protection of forested areas, wetlands, wildlife habitat, and significant landscape features at the urban fringe. The impacts associated with the loss of such land uses are highly

significant in terms of both the number of wildlife and the diversity of plant and animal species.

* Declining urban core populations do not efficiently and effectively utilize existing facilities and services. Urban intensification assures that these services do not need to be replicated elsewhere (typically at the urban fringe). The efficient use of existing indoor spaces, roads, sewers, commercial developments, public amenities, and transportation systems reduces both impacts and inputs. For example, a full bus produces only a bit more than half the CO_2 that is produced by two buses each operating at half-capacity. The inputs necessary to manufacture the second bus are avoided.

* To the extent that public transit utilization is achieved, some urban lands devoted to automobiles can be freed for other uses. If those lands were used for urban core recreational space the impacts associated with transportation to more distant recreational opportunities would be diminished. If those lands were used to sort and recycle urban construction wastes the inputs associated with producing materials from new raw materials would be avoided.

Thus both impacts and inputs are reduced when urban residential densities are higher. What is implicit in this logic is a larger view that cities themselves, as distinct from other arrays of residential and commercial life, are the most sustainable form of human habitation. Rural living is sustainable only when daily commutation to non-proximate employment is avoided. Suburban living in its typical present form is unsustainable. It is inefficient in its use of energy, materials, and land. This is not to say that suburbs could not be more efficient than they are, but part of that enhanced efficiency would involve at least modest increases in density. More compact cities, however, need not necessarily be very large cities. The key variable would appear to be

distance, not scale. Smaller cities tend to be less compact because land costs are typically lower, but deliberately planned medium density, medium sized cities with moderate climates would allow for walking and cycling as the principle transportation forms. Such cities would also permit ease of access to agricultural and/or wilderness spaces.

Humans have always had a profound ambivalence about large urban conglomerations. The suburb, daily commutation to work, weekend commutation to cottages and the love of the automobile all reflect this ambivalence. We humans are both excited and repelled by both urban density and real wilderness. But it is increasingly clear that the collective achievement of lives which somehow avoid both, or achieve both simultaneously, are highly sustainable. Both suburbs and long-distance commuting are highly energy intensive. This is true whether the commuting is daily from rural or small town living into urban cores or weekend commutation from urban cores to a distant quasi-wilderness (usually a suburb on a lake). The commuting itself, whether by automobile (in traffic) or by public transit, frequently involves sufficient frustration to necessitate more and more of the quiet peace that has compelled the commutation in the first place. One escapes less the city than the escaping. We must find ways to re-configure our cities and our social and economic lives such that fewer travel hours and less energy are implicit in our daily living patterns. Central to this quest is a more compact urban form. But in itself the compact city is neither sufficient, nor a likely first choice of ambivalent humans. Urban planning and design must accommodate sustainability and ambivalence simultaneously and in new ways.

3. Proximate Diversity and Sustainability

Urban intensification is now widely accepted as an essential component of sustainability. It has been advocated recently by the Conservation Council of Ontario, the Ontario Environmental Network, the City of Vancouver Task Force on Atmospheric Change, Friends of the Earth (Great Britain), Sim Van der Ryn and Peter Calthorpe (in a leading U.S. sustainable design book), the Canadian Institute of Planners, the Canadian Urban Institute, the City of Toronto, the Worldwatch Institute (Washington, D.C.), numerous authors in Town and Country Planning (Britain) and the Ontario Round Table on Economy and Environment. But in itself increased density is not sufficient. Intensification must be seen as an opportunity to achieve another important characteristic of a more sustainable urban form: proximate diversity.

Proximate diversity is a particular kind of mixed land-use. Any mix will not achieve as effectively as possible the principal objective of proximate diversity: a reduction in the need for all forms of motorized transportation in an urban area. Proximate diversity is an attempt through planning and design to minimize that need. The suburb is based on the opposite design notion it seeks to separate residence from production and commerce and, given typical densities, virtually requires both automobile ownership and daily use. Historically the suburb is a reaction to slums and to the pre-automobile need to live near to the often horrid factory where one worked. It is arguable that in a post-industrial society there are few reasons why typical workplaces need be undesirable as neighbours. But even if residences were merely proximate to public transit corridors (and densely enough configured to make transit to work the norm) that would be a significant improvement. As well, and perhaps equally important, there are other amenities used on a daily basis which should be proximate to residences--schools, day care

centers, everyday commercial needs. Massive shopping malls and the "warehouse" supermarkets are opposite notions--they presume a willingness and an ability to travel considerable distances on a regular basis.

But proximate diversity, and sustainability itself, can only be achieved on an evolutionary basis. Neighborhoods and cities must evolve from what exists now. New structures should also be compatible with everything around them. More than this, buildings themselves and the infrastructure services which make them viable are themselves made up of valuable materials and "imbedded" energy. Sustainability requires that little or nothing be wasted. Achieving the density increases and the proximate diversity which more sustainable cities require is thus a subtle process. A recent study by the Canadian Urban Institute identified five processes for achieving urban intensification:

* Conversion - increasing the number of households within existing housing forms through renovations and additions,
* Infill - building new housing on vacant and underused land within existing residential developments,
* Adaptive re-use - changing the function of a site to residential,
* Suburban densification - changing the specifications governing subdivision developments (e.g. minimum frontages, setbacks) to allow for higher density development,
* Redevelopment - building new housing on serviced sites whose original function has diminished.

Adaptation is a watchword, so too is sensitivity to the scale and character of existing neighbourhoods.

Because cities typically evolve slowly and because density increases are most acceptable when executed with great care the process must be both cautious and deliberate. Because of

this in turn, if we are to have significantly more sustainable cities by the year 2020, the process must begin promptly. Even an accelerated and deliberate transformation will, and should, take decades to achieve.

Achieving proximate diversity can, however, be an exciting process. The challenge is to add what is missing as one achieves modest increases in both residential and employment density. Residential opportunities can be added near to downtown cores bringing those areas to life in the "other" 128 (non-working) hours of the week. Residential density can be significantly increased along major transportation corridors (as in Toronto's "main streets" redevelopment); public transit ridership will thereby likely be significantly increased. Infill residential projects can add density without disrupting the scale of existing neighbourhoods and those residential structures can incorporate commercial amenities missing from neighbourhoods. A sidewalk café, a neighbourhood pub, day care facilities, a library branch, public laundry facilities, or a bank machine can significantly reduce the need for many in the neighbourhood to travel so frequently. Indeed the process of gaining neighbourhood acceptance for density increases in new structures might well involve residents in the process of selecting the most important new amenities. Is it a senior citizens centre or a green grocer that most people would like to have nearby? Even radical changes are sometimes possible: there is now an architectural firm in the U.S. which specializes in converting underutilized shopping malls and their parking lots to "old-fashioned" downtown business streets which can include residential spaces. Older schools can be converted to affordable housing; some old factories to elegant condominiums. As well, employment opportunities need not be confined to distant industrial "parks". Indeed, what goes on in many of our employment locations should be more visible, not less. Many activities can add great interest and vitality to urban neighbourhoods. The opportunities for

creating more interesting cities inherent in the notion of proximate diversity are as broad as our imagination.

4. Sharp Edges and Wilderness Corridors

Medieval cities were often surrounded by walls. One advantage of this urban form is that open space, agriculture or wilderness, were always at hand for those urban residents who lived near to the city gate. The modern metropolitan area is surrounded by a suburban fringe and casts an extended shadow of exurbanites, land speculation, gravel pits, highways, landfills, auto wreckers, sod farms, and regional shopping malls. There is no longer a sharp edge between city and countryside. A sharper demarcation could be achieved with provincial protection of prime agricultural land, wetlands, and proximate wooded areas. Or provinces could simply stop approving serviced lands and providing ever wider and longer transportation corridors to the urban core. Such initiatives would require considerable political courage and conviction. Municipalities on the urban fringe typically favour growth--their economies are often based upon it. But drawing an outer boundary on urban sprawl is a necessary companion of intensification initiatives. Both are necessary if our cities are to become more sustainable. The objective should be a bounded city with a relatively sharp edge.

Extensive open space should surround the sustainable city. Agricultural produce should be available from nearby farms. Recreation, including wilderness recreation, should be available at modest distances and be accessible in some instances other than by automobile. A few options should exclude automobile access. Automobile access to outdoor experiences will, in the future, be less affordable and therefore social equity will require these measures. Outdoor recreation opportunities must be established nearer to urban

populations and be accessible by energy efficient transportation modes. Suitable spaces should be designated at what is now the urban fringe and protected in perpetuity. Ecosystems within these areas should be preserved or restored.

Ideally, wilderness and habitat corridors should reach into urban areas much as transportation corridors now reach out. Charles Little (1990) has called these corridors greenways and considers them as a new king of linear park--a park which is less a destination than a journey. These corridors should connect to larger spaces beyond the urban edge and would best follow river beds, ravines or other natural topographical features. Such corridors are superior to "contained" park spaces because inbreeding among trapped fauna will be far less common. Presently most urban parks are island, automobile-bounded prisons from the animals' perspective. "Wild" corridors could also serve as non-motorized travel routes for cyclists, cross-country skiers, hikers and joggers. They can be left relatively untended. These natural corridors could provide non-auto access to recreational opportunities (lakes, country inns, non-auto access camp sites) at the city's edge. One's weekend escape might begin, if one were well-located, a few hundred yards from one's urban home or office. Anyone who has experienced a four of five hour Friday afternoon auto trip from Toronto to a not-so-distant cottage will appreciate the difference. Few people cycle in and out of cities now because cycle routes and auto routes are co-mingled (or cycles are banned from the most direct routes).

In some cities there are at present some excellent opportunities to establish natural and/or non-motorized corridors: abandoned rail lines. These are not always wide enough, but they frequently reach right to the core of our cities. They could be widened into wilderness corridors at what is now the fringe of the city and narrow to cycling routes or hiking paths (with periodic picnic spaces) within

the city. Where rail lines are not available consideration should be given to converting selected roads or utilizing existing utility corridors (technologies may soon exist to allow the burying or more electrical transmission lines).

In addition to corridors nature need not be excluded even from more compact cities. Rooftop gardens are now proposed for many New York City buildings, achieved though a lightweight mixture of loam and recycled plastic foam pellets. Fifty per cent of the land area of Los Angeles, for example, is presently occupied by automobiles, not that much less is the norm in other urban areas. What would be possible if that proportion were significantly diminished? Gradually through time roads in our cities have been widened, sidewalks shrunk, and ancient trees along streets eliminated. These could be restored and sidewalk cafés added. Some parking lots can be parks, some streets gardens and cycle routes. Cities might establish targets of restoring 10 or even 20 per cent of the land presently dedicated to automobiles. Inefficient land use is perhaps the principle disadvantage of the automobile as an urban transportation option.

Urban open spaces, however achieved, should more often be "naturalized" spaces. Lawns must be tended--they require mowing which is both labour and energy intensive. They are frequently laced with herbicides and pesticides. Even if these chemicals are safe for occasional human exposures, they and the factories which produce them, impose other environmental impacts. As well, these chemicals are derived from fossil fuels--a non-sustainable resource. Naturalized landscapes require little or no tending. They are, once planted, wild. Bushes, non-grass groundcovers and trees can predominate. Plan species can be selected which maximize habitat and food production for birds, butterflies and small mammals. For humans, paths and resting points are emphasized rather than expanses of grassed space. Naturalized landscapes

are appropriate for many urban parks, waterfronts, manufacturing facilities, and residential yards. Maintenance costs are reduced, habitat is improved, rain water runoff is diminished and biodiversity is enhanced.

5. New Designs for "Urban Ambivalence"

Finding imaginative ways to bring nature into a more compact urban form is a means of coping with that human ambivalence regarding cities and wildness. Urban wilderness cannot be achieved; bears and wolves will not be re-introduced into Stanley Park (outside the zoo). But we need to better understand the appeal of the urban experience that has drawn nearly 80% of North Americans. We also need to better understand what is it about our urban cores that sends so many fleeing at 5:00 every evening and/or every available weekend? Why is the suburb the ideal of those who can and those who cannot afford it? Why is it some people spend up to 30 hours per week in traffic jams essentially just to sleep in a suburb? (There are now commuters from Eastern Pennsylvania into New York City and increasing commutation into Toronto from Peterborough, Barrie, Stoney Creek and Kitchener-Waterloo.)

The immediate cause is affordability. But the underlying goal is mixed: quiet, a few trees, a garden privacy, safety and security, and the assurance that few persons are nearby who are not as prosperous as oneself. Cities cannot always provide that combination for those who are not wealthy. But the present achievement of these objectives is not sustainable. The long commute is too energy, materials and land intensive. Moving employment and cultural opportunities to the suburbs can help when there is a good match of employment and residence. But such matches are difficult to achieve when two or more members of the same household are

employed, especially when employment locations change frequently. The better option is to add diverse residential forms near to employment opportunities, as well as greater functional diversity near to residential centres. As well, of course, both residential and employment densities should increase somewhat in the process. The challenge is to do these things in ways which will succeed in the marketplace, which will lure people out of a suburban/commuter life style. This will require, in turn, that the reasons for and advantages of intensification are widely understood and that future designs incorporate the privacy and security associated with suburbia into new medium-density urban developments. The objections to intensification, the ambivalence about urban life, should be understood and ameliorated to the maximum possible extent.

What undesirable aspects of urban life can be ameliorated? Families with young children want safe places where they can play outdoors within sight of a parent preparing a meal indoors. That cannot be achieved in a high rise apartment block. But it can be achieved in a four or five storey building with an enclosed internal courtyard, perhaps a covered courtyard which supplies passive solar heat to the building. The larger, family oriented, units could be on the first and second floors with direct access and sight lines to the courtyard. Or trusted older residents could be cooperatively employed to supervise the children one or two days per week in exchange for a rental subsidy. Such structures could achieve quite high densities, perhaps as high as taller buildings with parking lots and landscaped grounds. But very high densities are not necessary, only high enough to make public transit, walking and cycling the predominant transportation modes. Medium density structures of the sort described above could be mixed with town houses, stacked apartments with private outdoor spaces, and detached single family dwellings built on modest-sized lots.

A second design-for-ambivalence objective flows out of our earlier discussion of urban edges and natural corridors. Everyone should have easy (non-auto) access to nature or a mix of nature and urban outdoors: waterfront promenades, diverse park spaces, public garden lots, or farmer's markets. A third factor of great importance is noise abatement. Much of this can be dealt with in building codes--especially the quieting of noise generated within buildings. This may mean some increase in materials use, but it can also mean simultaneous improvements in the energy efficiency of the building. Reductions in vehicular traffic and radical controls on traffic speeds and types on residential streets also contribute to the reduction of total outdoor noise. A fourth concern that can be ameliorated (though not eliminated) through design is personal safety. Traffic safety can be improved by radically curtailing traffic on residential streets. In the Netherlands and elsewhere in Europe residential traffic is limited to 5 or 10 miles per hour. Personal safety (from criminal activities) can also be significantly enhanced by design: fewer isolated, out-of-sight spaces, electronic security systems, and so forth. But crime has deep social roots--poverty, insecurity, alienation, unemployment--which must be dealt with directly. It may be the case that sustainability (and the density it implies) can be achieved with some concurrent improvements in equity and social justice.

Given the relative anonymity of urban life it may be the case that crime rates will always be marginally higher in urban areas than in suburban or rural settings. But there are vastly greater differences in crime rates between Canada and the United States than between Canadian cities and Canadian suburbs. There are also greater differences between those who abuse drugs or alcohol and those who do not. The point is that there are possible objections to intensification which are real, and perhaps to some extent unavoidable, but greater

density is not, in itself, the primary cause of the problem.
The concerns are also to some extent unfounded concerns--there
are horrible crimes in rural areas, where there may not be a
neighbour at hand, or police nearby. The larger differences
in risk may not be related to modest increases in residential
density.

Human beings are wary creatures. There is no avoiding that
fact. Seeking safety and security is at the root of our fears
of isolation in the wilderness, living in urban areas, and
using public transit. The risk of being a crime victim is
considerably lower than that of suffering an auto accident
injury or death. But one has some control over the likelihood
of the latter (or at least the illusion thereof). Pretending
that these concerns are merely irrational fears is
insufficient. They are one important aspect of our present
choice of unsustainable urban forms. Sustainability will not
be achieved unless we can deal effectively both with these
concerns and with the other economic and social factors which
militate against the rapid development of more compact urban
forms.

Finally here, design can also enhance the positive aspects of
urban life: variety, activity, creativity, and excitement.
We ambivalent humans are not just repelled by urban realities.
We are, as well, drawn to them. City life at its best is
human life at its best: a specialty shop that just could not
survive if it did not have a potential market of hundreds of
thousands, the incredible ethnic diversity of urban culinary
and cultural offerings, the genuine excitement of an
unexpected outdoor concert in a park or a courtyard, a long
walk in a familiar neighbourhood, or the discovery of an
exciting new array of shops, or galleries, or events.
Building on that diversity and excitement, making it more
readily available to more and more people, is the best hope
that more people will opt for patterns of living that are also

more sustainable.   Homes, transportation systems, and urban
forms are the most important "green products". But they will
not be chosen by more and more people for that reason alone.
They must also be both affordable and highly desirable in any
case.

6. Designing and Building Sustainably

Others participating in this C.M.H.C. project will emphasize
this aspect of sustainable cities. It is therefore sufficient
to my purposes here to simply itemize some of the more
important sustainable design opportunities and objectives:

* Building should be designed to be as energy efficient as
  possible in terms of heating, cooling and lighting.
* Internal equipment should be energy and resource efficient:
  low-flow shower heads, water efficient toilets, high
  efficiency lighting fixtures and heating and cooling
  equipment. All individual residences should be individually
  metered for electricity, water, and if possible, heat energy.
* Consideration should be given to co-generation and/or
  district heating.
* Non-toxic building materials should be selected, including
  materials which are relatively non-toxic within their
  production processes.
* Research should be undertaken regarding the development of
  building materials created from recycled materials (glass,
  plastic, even paper for insulation).
* During construction rain water run-off should be retained
  on-site. After construction designs should be such as to
  have minimized run-off. (Rain water can be retained to water
  gardens, porous paving materials can be used, etc.).
* Buildings and individual units should be designed to
  facilitate recycling and composting.

* Both residential buildings and employment locations should
  be designed to include facilities appropriate to cycling as a
  transportation option.
* Automobile parking facilities should be limited (though not
  zero) and the full cost should be passed on to auto owners.
  These facilities should not be given utter pride of place
  (though personal safety considerations should also be
  relevant here).

7. Policies: Getting There From Here

Establishing more sustainable cities can only be a very
gradual process. Urban sustainability is more direction and
hope than precise end-point. But at present the shape and
structure of our cities, on the whole, is moving away from
greater sustainability. It is urgent that we reverse
directions, but we should have no illusions that
sustainability will be achieved with any finality within our
lifetimes. Buildings are built, but cities evolve. Because
the process is inevitably gradual, and because the alternative
reality is both stark and looming, steps must be taken now by
all sectors: individuals, corporations and other
organizations, and our municipal, provincial, and federal
governments. A few examples of what steps might be taken by
each of these sectors is offered by way of conclusion. These
are policies which would urge our cities toward
sustainability. They are a beginning point, a context within
which a process of evolution toward sustainability might be
possible.

Federal Government:

* The overall tax structure should gradually be shifted
  proportionately away from present sources (income, property,
  sales, etc.) and towards energy and new primary materials.

This could not be done in Canada without some harmonization with taxation patterns in the United States. Both nations should move to the energy taxation levels which exist in Europe and Japan.

* The federal government (or CMHC) should encourage and establish visible demonstration projects to showcase the variety of sustainable (and affordable) housing options.
* The federal government should support extensive research regarding new building materials (materials from recycled sources, for example) and regarding the relative environmental impacts of existing materials.

Provincial Governments:

* Building codes should be shifted towards maximum technically feasible efficiency of energy, materials, and water use.
* Protection of prime agricultural lands, wetlands, and near-urban forested lands should be greatly strengthened. Where few near-urban forested lands exist they should be re-established.
* Subsidies to automobile ownership and use should be phased out through a variety of means including toll roads, license fees which vary sharply with vehicle fuel efficiency, and even rebates (for a share of road and policing costs) to non-owners.

Municipal Governments:

* The municipal planning process should be revised sharply to slow urban sprawl. Approvals for infilling, conversions and mixed use should be more readily obtained than approvals for single-family tracts in greenfield locations.
* Innovative processes should be developed to encourage wider acceptance of these changes within existing neighbourhoods.
* Municipalities should visibly demonstrate a wide variety of sustainable practices and encourage corporations,

organizations, and individuals might adopt them as well. These should include naturalized landscapes, improved energy efficiency (including such things as transit passes for municipal employees parking charges at work locations), and environmentally sensitive procurement practices (recycled paper, low toxicity cleaning products, minimal packaging or purchased products, etc.).

Institutions and Corporations:

* Locations more proximate to residential areas and/or easily accessible by public transit should be considered.
* Employees should not be provided with free parking at the workplace. In Los Angeles it was found that if employees were denied this option up to 50% of them would find another means of getting to work even when public transit was not available. (Car pools were the predominant solution in this case.)
* Environmental audits should be adopted as a normal business practice and the impacts of processes and products continuously reduced. Proper environmental practices should be imposed on suppliers as well.

Individuals:

* Probably the most important single thing that individuals can do is to minimize their daily need for transportation. We must live near to our work and to those facilities and services we use most frequently. Choice of low energy transportation modes is a second-best option, but one worth taking.
* Individuals and families should explore how to live lives which are simultaneously comfortable and exciting without being energy and materials intensive.

* Some individuals and families should be prepared to reject social conventions regarding landscaping practices, transportation habits, and materialistic lifestyles.

BIBLIOGRAPHY

Brown, Lester R. and Jodi L. Jacobson. The Future of Urbanization: Facing the Ecological and Economic Constraints. Washington, D.C.: Worldwatch Institute, 1987.

Calthorpe, Peter. "The Urban Context." In Sim Van der Ryn and Peter Calthorpe, eds. Sustainable Communities: A New Design Synthesis for Cities, Suburbs, and Towns. San Francisco: Sierra Club, 1986, pp. 1-33.

Canadian Urban Institute. Housing Intensification: Policies, Constraints and Challenges. Toronto, 1990.

City of Vancouver. Clouds of Change, Final Report of the City of Vancouver Task Force on Atmospheric Change. Vancouver: City of Vancouver, 1990.

Conversion Council of Ontario. An Environmental Strategy for Ontario: Draft for Public Review. Toronto, 1990.

Deelstra, Tjeer, "Human Settlement and Sustainable Development in Western Europe." In Human Settlements and Sustainable Development. University of Toronto, Centre for Urban and Community Studies. Symposium held June 21-23, 1990.

Flanagan, Barbara. "A Massachusetts Mall is Just Disappeared", New York Time, (March 14, 1991), B5.

Goldstein, David B., John W. Holtzclaw and William B. Davis. Efficient Cars in Efficient Cities, Natural Resources Defense Council/Sierra Club: Testimony for the Conservation Report Hearing on Transportation Issues, State of California Energy Resources Conservation and Development Commission, April 23, 1990.

Gordon, David, ed., Green Cities: Ecologically Sound Approaches to Urban Space. Montreal: Block Rose Books, 1990.

Holtzclaw, John. Explaining Urban Density and Transit Impacts on Auto Use. Natural Resources Defense Council/Sierra Club: Study Presented to the State of California Energy Resources Conservation and Development Commission, January 15, 1991.

Little, Charles E. Greenways for America. Baltimore: John Hopkins University Press, 1990.

Lyman, Francesca. "Rethinking Our Transportation Future." E Magazine, 1 (September-October, 1990): 34-41.

Maynes, Clifford, ed. Sustainability As If We Mean It. Guelph: Ontario Environment Network, 1991.

Newman, Peter and Jeffrey Kenworthy. <u>Cities and Automobile Dependence: An International Sourcebook</u>. Hants, England: Gower Publishing, 1989.

Ontario Round Table on Environment and Economy. <u>Challenge Paper</u>. Toronto, 1990.

Polanyi, Margaret. "Double pace of core housing, planners urge." <u>Globe and Mail</u>, March 5, 1991, A7.

Preston, Barbara. "Home Zones - Child's Play for Inner Cities." <u>Town and Country Planning</u>, 59, 4 (April, 1990): 116-117.

Rybczynski, Witold. "Living Smaller". <u>Atlantic Monthly</u>, February 1991.

Taylor, M.A.P. and P.W. Newton. "Urban Design and Revitalization - An Australian Perspective", <u>Urban Ecology</u> 9 (1985): 1-23.

Tibbalds, Francis. "Future of Cities - (Another) 10 Commandments." <u>Town and Country Planning</u>, 59 (December 1990): 347.

Willson, Richard W. and Donald C. Shoup. "Parking Subsidies and Travel Choices: Assessing the Evidence." <u>Transportation: An International Journal Devoted to the Improvement of Transportation Planning and Practice</u>, 17, 2 (1190): 141-157.

by James E. Brugmann and Marshall T. Spriggs

This paper relates the story of Dr. Sam Richmond, Commissioner of Ecosystem Monitoring and Assessment, The Greater Toronto Urban System in the autumn, 2020. At this time,Greater Toronto has undergone major reforms in its legal boundaries, internal structure, and management approach to adopt an ecosystem-based approach to urban development and management. The following story describes how the ecosystem approach is put into operation at the level of a senior municipal manager.

Tuesday, September 5, 2020 at 7:17 am. On a quiet Tuesday, September 5, Sam Richmond, the Commissioner of Ecosystem Monitoring and Assessment for the Greater Toronto Urban System stepped out into the brightness of the hot morning sun. The light rail vehicle (LRV) that always picked him up on the corner next to his apartment building was right on time and this meant that he stood a better than even chance of getting to work with a few minutes to spare so that he could download the usual reports before the regular morning coordination meeting. He quickly grabbed a newspaper from the paper box as he hustled to board the vehicle.

The top story in the news was about the continued decline in Canadian agricultural production. The weather had been so variable over the last decade - moist and cold in some summers, dry and scorching heat in others - that farmers could no longer make informed choices about what to grow. In some growing seasons, a rainy June that barely passed 15°C would turn into a record-breaking, late summer drought with daily peak averages at 38°C.

The LRV let Sam off right in front of his waterfront administrative and research complex. As a dogged optimist, he was determined to turn his attention from the disruptions of a

challenging summer management season. Using an ambitious
stride to prod him, he plunged into the front doors of the
building and into the fall season of co-managing the Urban
System's and, the planet's environment.

7:55 am. Sam turned on his computer and told it to get his
schedule for the day. As it came up on the screen, he looked
over the collection of meetings and negotiations. In the
major meeting category, his schedule included a meeting at the
Finch Industrial Centre to make the final review and
determination on a drawn out industrial siting application.
Major developments required a formal carrying capacity
assessment[1], a process which was overseen by Sam's department.
Later, he had a meeting with colleagues at the Department of
Microclimate Management to plan the final stages of the Don
Valley Regeneration Scheme.

The "Scheme" as it was known in Greater Toronto, began in the
late 1990s with a grassroots campaign to remove a major
automobile parkway from the Don River Valley. The idea of
removing the parkway had been furiously resisted at the time
by the historic City of Toronto municipality. A lack of will
at all levels of government in Ontario had permitted urban
growth in Greater Toronto to sprawl, and new commercial
centres began to establish themselves nearby to the major
expressway on the urban periphery, where automobile access
between commercial centres, the airport and new residential
areas was most efficient. This growth trend towards the new
commercial centres was abetted by a series of decisions on the
part of the then Metropolitan Toronto government to respond to
short-term budgetary pressures by first reducing, and then
disinvesting from Metropolitan public transit services which
were designed to transport people from outlying residential
areas to the traditional Toronto downtown core. By the late
1990s, the Don Valley Parkway seemed like the one and only
efficient transport corridor into downtown Toronto.

However, with the major redefinition of municipal jurisdictions in the Municipalities Act of 2011, which amalgamated the traditional city jurisdictions into the Greater Toronto Urban Systems, competition for economic growth switched from the inter-municipal level to competition between commercial centers in the Urban System. In 2012, the business leadership of the weakened downtown Toronto commercial center formed an alliance with their counterparts in the newer Don Mills commercial center and the leadership of Toronto's two major universities. The Don Mills centre rested on the bluff above the confluence of the West and East Forks of the Don River about 8 kilometers from downtown Toronto. The vision of the business interests was to create the pre-eminent Great Lakes international business and urban ecological center by linking the two centers economically, physically, and culturally. One major means by which to do this, they thought, was to replace the old expressway with an express light rail transit line that would run through an ecologically regenerated Don River valley. The lightrail line connected with the high speed rail station in the downtown center and the new hydrofoil commuter port in the Toronto Harbor, which now rapidly transported passengers between the lakeshore Urban Systems, including the Rochester and Buffalo-Niagara systems in the United States. As a result of the Regeneration Scheme, downtown Toronto had again become one of the most vital and popular commercial and research centers in North America.

Given the success of this project, Sam was looking forward to the meeting. The biggest decision he would be asked to make was the timetable for removing some of the monitoring stations that had been installed in the Valley prior to the final deconstruction of the Don Valley parkway and its replacement with the LRV.

Sam's schedule also indicated a handful of meetings to move more routine projects along. There was a follow-up meeting

with staff on two development proposals for which the carrying
capacity studies done by his department had made negative
indications. Sam needed to solidify a strategy with his
allies on the urban System's Ecosystem Management Roundtable
(EMR) for prevailing on these cases. The EMR was scheduled to
begin meeting again on Wednesday, and the System Employment
Council (SEC)[2] would meet on Thursday so staff preparation
today was essential for these meetings. (An organizational
chart of the government of the Greater Toronto Urban System
can be found in Exhibit A).

After getting a sense of the lay of the land for the day, he
then told the computer to begin the daily download of the
overnight ecosystem analysis reports. This, as always, was
accompanied by the routine, comforting chatter the engineers
had built into the interface. The reports were delivered in
their regular sequence; first the Local System reports
providing weekly trend analysis from 122 monitoring stations.
The Local reports provided data on all of the environmental
media; the microclimate; biotic population levels; energy,
materials, and waste flows through the Urban System and
between the Urban System and other parts of the world; and
social and economic indicators. These numbers were then
analyzed by the system's artificial intelligence sub-system
before being further evaluated by Sam's staff.

The Local reports were followed by a Regional report that
provided a trend analysis for the Golden Horseshoe Region
aggregated from Local System data. This analysis included
airshed analysis; balances of energy, transportations, people,
goods, capital and information flows between the Local Systems
in the Region; and the results of management and policy
deliberations in adjacent Local Systems. Since the Local
System reports were based upon careful scientific delineation
of ecosystems, the Local reports served as the actual
technical unit in the global monitoring system. Regional

reports were used largely to assist policy coordination among neighbouring Local Systems. Regional reports were followed by the Bio-regional report for the Great Lakes System, which was aggregated from trend data in the Local reports over the preceding one-, three-, six-, and twelve-month periods, and which presented an assessment of progress towards fulfilling Bio-regional management objectives under the present Bio-regional management Plan[3].

Finally, the UN Global Ecosystem Monitoring Report[4], aggregated from both Bio-regional reports cross-referenced with Local System data and satellite monitoring systems, presented data on global conditions, populations, flows and balances, and an assessment of progress in reaching global targets. These reports gave Sam, or anyone connected to the network for that matter, an analysis of what was happening in the Earth system. In the course of a few minutes, the user could review conditions in ones' hometown all the way to the planet as a whole. Many did this everyday. Fortunes in development, industry, agriculture, and commodities were won and lost everyday by reliance on the trend indicators.

As reports and data were downloaded, the system provided tone signals which indicated positive, neutral and negative trends. This allowed Sam to keep an ear cocked for a general assessment of conditions without having to go through all of the reports and data sets. A special series of tones were reserved for unusual events, positive or negative, to attract attention to the report. On a normal morning, the musical pattern of positive, neutral and negative trend tones provided Sam with a sort of start-up song for the day, which gave him a visceral sense of what the workday held in store. A song with too many negative tones would inevitably be followed by feedbacks from throughout the management system - a hectic day of phone calls, data transmission and satellite meetings to generate the appropriate response.

8:15 am.   This morning the song brought with it a certain dramatic deceit.   The Local and Regional reports sounded upbeat as Sam prepared his files and confirmed meetings.   The Bio-regional report started off on a somber note and then a piercing negative event signal was transmitted.   Sam got off the phone and went directly to his system screen.

The system announced that there was a sudden and dramatic increase in a list of half a dozen toxic contaminants in the mid-Lakes, particularly in the Chicago, Milwaukee, Greater Saginaw, Saint Clair, Maumee-Sandusky, and Buffalo-Niagara regions.   In a phenomenon that had become more and more frequent in recent years toward the end of the regular Midwestern drought summers, lower lake levels, increasing water temperatures, rising plant and algae populations, and changing deep water currents had this time combined to cause biochemical reactions in deposits of chemicals dumped into the Lakes during the last decades of the previous century.   Lack of successful implementation of the Remedial Action Plan established in the 1980s under the Great Lakes Water Quality Agreement meant that the system was now burdened by sudden accumulations of now increasingly familiar list of new toxins in the middle sections of the Great Lakes System.   In the Buffalo-Niagara Region, a mere 50 kilometers from the Toronto Urban System, this problem was compounded by the failure of United States agencies to clean-up a number of notorious hazardous waste dumps which continued to seep chemical into the Niagara River.   Sam knew immediately what the implications would be.

As the Secretariat for the Ecosystem Management Roundtable, his department had the authority to alter the agenda in the instance of emergency or special environmental events.   The meeting scheduled for September 20th would need to be devoted to the toxic event, as would undoubtedly the discussions of the next weeks if not months.   By now the other Commissioners

and Roundtable Members had probably received notice of the event and would be recasting their fall agendas in response. Sam sent notices about the EMR meeting over the network to fulfill the formalities.

Soon the Bio-regional Council would be sending a formal "Need for Local System Compensation" notice to all of the Local Systems in the Bio-region. The Great Lakes Bioregional Council had been established in 2008 by joint initiative of the United Nations Global Environmental Facility, the Canadian and U.S. governments, and the affected provinces and states. Little more than half of the local jurisdictions in the Bio-region had accepted the Bio-regional mandate and restructured into ecosystem-based Local Systems, or were known to take the Council's mandates seriously and make earnest efforts toward compensation. But the negotiating would begin soon, so Sam began calling his staff together to prepare the preliminary Greater Toronto position. It was a rough way to start the management season so immediately after the holiday.

As one of the major Urban Systems in the Great Lakes Basin, the Greater Toronto System would be called upon to reduce a variety of discharges into Lake Ontario over the next year as the overly contaminated waters from the Buffalo-Niagara Region dispersed into Lake Ontario. Ecologists, chemists and toxicologists did not fully understand the nature of the problem, as the generation of this particular group of toxins was still a recent occurrence. But a fragile scientific consensus was developing about the nature of the reactions that created the toxins, and a variety of compensatory measures had been tested.

Last autumn, implementation of these measures appeared to have had some positive effect. The measures had, however, created many bad feelings throughout the Bio-region. The compensation forced politicians to support temporary bans on the sale and

use of certain household products, causing particular
inconviences in both the household and retail sectors. The
compensation also forced the shutdown of the Toronto deep
water district cooling system, which had been constructed at
the turn of the century to provide ecological, low-cost
cooling to the skyscrapers in the traditional downtown core.
The system had been particularly justified as an
energy-conservation response to impending global climate
change. It drew cool water from the depths of Lake Ontario
and circulated this through the downtown buildings. Now,
however, the pumping of large volumes of water from the Lake
bottom to the shoreline surface was thought to exacerbate the
currents that helped catalyze the new toxic events. The
shutdown of the system would be resisted by business interests
during the now typical hot months of the fall season.

With the dramatic environmental changes over the last decades,
residents were reaching a limit in their capacity to make
changes in their daily behaviours and living patterns. The
situation was aggravated by the fact that some Urban Systems,
particularly across the border where the Systems had older
infrastructure and had been more heavily industrialized
throughout the 20th century (thereby making a greater
contribution to the present problem), had failed to
participate at all in the compensation. Meanwhile,
immigrations from south of the border were severely stressing
social tolerance. Last summer's compensation had been
accompanied with outbreaks of gang violence against new
immigrants living in temporary housing.

This year, in anticipation of another toxic event, a variety
of scientists had been recruited to attempt to answer the
primary question of whether the compensation actions actually
had anything to do with the general readjustment in toxin
levels. The current argument was over whether the new
conditions within the ecosystem had also created new

counterbalancing mechanisms to absorb the toxins. Others argued that the toxins were quickly broken down by the increased levels of ultraviolet light during the winter months (as a result of reduced stratospheric ozone concentrations) so that most of the toxins were destroyed in an 8 month period. As a result of this typical lack of consensus in the scientific community, Sam knew he would have a harder time this year than last in presenting the case for an aggressive compensation on the part of the Greater Toronto System.

Decisions about compensation measures were under the authority of the Greater Toronto Ecosystem Management Roundtable. The Roundtable had evolved out of an experiment with voluntary, multi-sectoral planning groups that first appeared in Canada in the late 1980s. Originally, representatives of the city government, business, academia, and community organizations met together to develop greater consensus on environmental and development issues. These groups, which eventually were established in each of the individual municipalities, were already being granted long-term planning authority in many municipalities by the late 1990s. Even before the Municipalities Act of 2011 adopted the approach of the Bio-regional Council and restructured local government into ecosystems jurisdictions, the Roundtables were being granted effective day-to-day coordination and some of the decision-making responsibilities traditionally held by the elected governing Councils. (The make-up and structure of the EMR can be found in Exhibit B).

At the heart of the Roundtable process was the establishment of a local five-year Environmental Budget. The budget established targets for the System's imports of natural resources and its exports of resources and wastes, and was prepared by the EMR and submitted to the elected System Council for approval. Since preparing the Environmental Budget required so much data about the ecosystem and such

sophisticated monitoring to assure system-wide compliance, the staff work on budget preparation and compliance was a shared function of Sam's department and the Department of Budgeting and Finance, and was a constant source of bickering and reinterpretation between all of the Urban System's departments.

The 2020 budget had finally been completed in March and permitted a certain level of pollutants to be discharged into Lake Ontario. Despite the System's ability to live within this budget, Sam had been working hard with the Regional Watershed Commission an its head, Henry Fateless, to establish additional closed system water services districts in Greater Toronto, thereby greatly reducing the municipality's overall pollution exports into Lake Ontario. But the Commissioner of Built Environment, Peter Arnold, still from the old school, was using every means possible to block this infrastructure reform. It would eventually place the management of the System more into the hands of the district councils and their managers. The districts had been established by the System Council for both political and ecological reasons. District councils provided a measure of democracy back into a system that was driven by the complexity of integrated ecosystem management into a technocratic and managerial approach. They also established working units within the Urban System for the establishment of closed-system infrastructure for recycling waste water, waste heat, and organic wastes. The districts were fully allied with a decentralized ecosystems approach and were correctly perceived by Arnold to be robbing authority from the department that he himself had reorganized ten years ago into its current empire of housing, roads, water, sewerage, drainage, and district cooling functions.

To effectively implement a compensation plan in response to the present event, Sam would need the full cooperation of the Commissioner of Built Environment.

But he was getting ahead of himself. First, he had to negotiate a position with other Local Systems in the bio-region. The more compensation he could gain from other Systems, the less he would have to spend political capital with the Commissioner of Built Environment - capital that he would rather use to achieve his objectives in constructing the closed district systems. It was this investment, after all, that would provide a permanent solution to Greater Toronto's discharge problems. Sam's staff began arriving to his office to discuss strategy.

Wednesday, September 6, 2020 at 9:08 am. Sam arrived late to work, and found his staff playing rowdily with a new cybernetic agility game on the computer terminals in the staff meeting room. He was amazed at the joviality they could maintain in the midst of such chaos. After being teased for his tardiness, he called the morning staff meeting to order and Ying, the department's head of Policy Research, explained the unfolding politics of the situation the way that she saw it. In spite of the advanced efforts of the Greater Toronto System in reducing its toxin discharges and in remediating its port area, as a major System in the Bio-region, the Bio-regional Council was looking to Greater Toronto for a strong compensation. Ironically, Greater Toronto's record of compliance with the Bio-regional mandates - particularly in comparison with a number of other urban Systems in the Bio-region - only created further pressures upon Grater Toronto to take the lead when compensation was requested. The Bio-regional Council argued that, if Toronto failed to act, the other Urban Systems would immediately interpret that the compensation notice had no authority.

The Urban Systems whose past practices were now causing the toxic event were in a very difficult position. they would negotiate defensively, threatening all the time to act as a block in ignoring the compensation notice. First off, they

were legally blocked from taking further remediative actions
in their harbors and lake basins pending scientific reviews.
Then a self-perpetuating cycle of economic decline and
out-migration made it very difficult for them to enforce
behavioural changes on their populations or to invest in
expensive new infrastructure. As the mid-western U.S.
agricultural economy continued towards collapse, urban Systems
such as Chicago were loosing population by the hundreds of
thousands. These Systems would argue that the population
loss, and the consequent reduction in wastewater generation,
itself constituted effective compensation.

The Urban Systems on the St. Lawrence River had their own
problems. The Greater Montreal system, for instance, had
undertaken monumental efforts over the past decades to fully
complete remediation of industrial sites and port areas in
their System. The System had been barred from further
diversion projects to provide water supplies from the north,
and had therefore been forced to increase its usage of waters
from the St. Lawrence. For this reason, their concern was to
address the problem before it reached Greater Montreal, not
after. The Quebec Urban System to the north had little
incentive to take compensation measures, as in past years the
toxin levels had already disappeared by the time the
contaminated waters reached this point on the River.

Tracy, the head of the Monitoring Section, had already been in
contact with her colleagues to the south and west, and they
were bickering about the actual toxin levels. While System
Technical Directors at her level were usually very devoted to
the ecosystem management approach, political pressure forced
them to justify and closely analyze the data. Based upon the
data that she had reviewed, Tracy believed that there was
still some chance that the toxic event was not as bad as the
previous year, and that the Bio-Regional Council might have
over-estimated the need for compensation.

Ben, the head of Local Ecosystem Analysis, usually had little to say in discussions of political strategy an in this one it was clear that he was over his head. He was not cut-out for Bio-regional politics. He argued that the Greater Toronto System could use this occasion to further its commitment to construct the district closed systems, and should press the Bio-regional Council for recognition of these measures as compensation. Sam did not think this strategy was realistic and asked if he had any application of the Elegance Principle - one of the System's primary management principles (Exhibit C) - that would apply. Short of an application of the Recycling Principle via the closed systems, Ben said that the new wetlands now being completed along all three of the System's major rivers could be as effective in removing the necessary volume of compounds as direct behavioural modification. But he did not think that these ecosystems were well enough established to begin diversion of wastewater from the old treatment plants.

Reviewing the options and the remaining input from his staff, Sam provided Ying with some bargaining positions to press the compensation managers at the Bio-regional Council to use all powers available to force the Urban Systems up-System to implement adequate compensations.

"Don't fail to mention if you need to that Greater Toronto is a champion of the Council and must be treated fairly," he said. "And call the Toledo, Sandusky and Buffalo-Niagara Systems and give them encouragement. Offer them any technical help we can offer. I think that they are in a position to pick up slack this year."

Sam asked Ben to evaluate the present potential of the wetlands, asked Tracy to contact him if there was any good news in subsequent data, and called the meeting to a close. Bill, Sam's personal assistant, called the PPT (Personalized

Public Transit) for a ride to the industrial siting meeting at
10:45 am. Sam returned to his office to make a series of
calls to fellow Commissioners to support a strong Toronto
compensation position at the Ecosystem Management Roundtable
meeting that afternoon.

10:11 am. He first called Arlene Watiri, the Commissioner of
Microclimate, who he had consulted with at the Regeneration
Scheme meeting on Monday. Watiri was supportive of Sam's
position, as expected. She moved to microclimate when the
newly organized department replaced the old Parks and
Conservation Department, where she began the programme
responsible for the natural, social, economic and cultural
regeneration of the river valleys. In her new position as
Microclimate Commissioner, Watiri had responsibility over a
great deal of the environmental employment programmes in areas
such as resurfacing, building horticulture, and reforestation.
As a result, she was a very popular person with politicians.
Fortunately, for the ecosystem, she was also a long-time,
committed environmentalist who had gotten into local
government as a way to have an effect on what she saw as
deterioration of the city she knew when she grew up. She
urged Sam to get the Commissioner of Human Resources, Fred
Triano, on board to support the compensation action early on
so that industry representatives on the Roundtable would not
first convince Triano to stall action.

Sam now knew that he could count on support from the
Commissioners of Watershed and Microclimate. He mentally
assessed the positions of the other Commissioners before he
went any further:

* The Commissioner of Waste would be sympathetic to Sam's
positions, having fought many battles to change household
behaviour. Any slack created in the Environmental Budget by

the compensation action might be slack that he could use for his own purposes. He was a likely yes vote.

* The Commissioner of Transportation would look at Sam's proposals very carefully from the perspective of how this would effect goodwill with her colleagues in other Local Systems. Since system-wide, phone-directed PPT had come into effect, her major focus had turned to coordination of Regional and Extra-Regional transportation. She would probably favour a strong local compensation so that Toronto could avoid pressing other Systems too much on a non-transportation related issue.

* The Commissioner of Food would normally be an ally, but the bad news about the harvest would leave him looking for something in return. He was under extreme pressures to meet short-term needs, and was tired of hearing what seemed like starry-eyed proposals about increasing urban food production. These were being advocated strongly by the Commissioner of Energy, who was trying to apply excess generating capacity made available from a combination of changes, including the warming, the conservation programmes of the first decade, and the construction of the deep water cooling system. He might be turned by an argument that excess toxins in the Lake could setback efforts for reviving the Lake's fish stocks, making this potential source of food even more inaccessible in the short term.

* The Commissioner of Energy would generally join an alliance with Watershed and Monitoring these days, because the new closed systems could wrest some authority from Built Environment into her hands. she and Commissioner Arnold had become fast enemies over the past few months and Sam thought that this might give him just enough room to make a successful pitch. It did not hurt that the closed systems needed power to run and this was a good way of dealing with some of the excess generating capacity that she had.

* Sam thought that the Commissioner of Budget and Finance, in his accountant's sort of way, might resist any action that

would lead to pressures from other Commissioners to renegotiate the environmental budget. Sam worked closely with him, however, and thought that he could be brought on his side.

* The Commissioner of Information and his bureaucratic captains would resist anything that would create more work for them, and the information demands of the compensation action would make them sure opponents of local actions.

* The Commissioner of Health would normally be an ally, but she was still upset over the disruption caused to her public education efforts last fall by the small compensation taken then. She was a probable no just because she probably could not cope with the fallout of a yes vote.

* Built Environment, Human Resources and the business and industry representative (who had three votes) could form a block to whom these last two Commissioners could attach themselves.

Sam counted upon the one vote of the University representative, and knew he could also rely upon the votes of at least two of the System Council members serving on the EMR.

10:45 am. As Sam boarded the PPT van to attend the ongoing deliberations at the Finch Industrial Centre, he tallied up a partial vote of 11 for and 6 against with the 6 industry and community organization representatives holding the deciding vote. This brought him to the conclusion that the decision would effectively lie in the hands of the three community organization representatives. The responses of the community representatives were never predictable, as they were accountable to so many diverse interests. They were often under extreme pressure to articulate the positions of frustrated residents, even if they admittedly had no idea about what suggestions to make. But then again, after months of sometimes being chastised on the Roundtable for not offering solutions or for failing to lead the residents, they

would suddenly propose a solution to a seemingly intractable problem.

This in fact, was the basis of the genesis of the PPT system on which Sam was now riding. The rapid shifting of urban centre and neighbourhoods over the last decade, as well as the earlier decline of the old public transit system, had made the previous corridors of public transit inconvenient and insufficient. While the System government fruitlessly debated where to establish new LRV corridors, entrepreneurial citizens began to avoid private automobile freezes and bans by providing solar van pick-up services at streetside. These vans could effectively compete from a cost perspective with public transit systems and as a result began to sap their ridership. Just before the System government, under pressure from the Transit Authority, was about to take the outrageous position of adding solar van transportation to the automobile freeze, two of the community organization representatives appeared at a Roundtable meeting with a report on a pilot-tested, self-routing "Personalized Public Transit" system.

The PPT vehicles were networked on a system computer that was responsive to a phone code given to each household in the test system. When a resident wanted to schedule a vehicle for pick-up and delivery to a specific address, they would punch their code and tell the computer the time and addresses of delivery. This computer would then provide an ongoing route map to the PPT's solar van drivers. They proposed that the System government control the subscription to phone codes and cover management and road maintenance through this phone-linked billing system. People who did not have a phone could use a general access code from a pay phone and pay the driver of the van. Current van drivers would be required to become certified PPT vehicle operators by paying an annual medallion fee. These substantial fees were used to provide

loans and insurance incentives to Toronto Transit Authority employees to become private PPT operators themselves, thereby reducing negative employment effects of the new system.

Of course, that was a good example of the community representatives in action. The unpredictability of these people made Sam dread the meeting that he was about to attend. The community representatives were particularly indignant when important decisions were decided by close Roundtable votes. They claimed, and perhaps rightfully so, that while the historic impetus of the Roundtable had been to expand democratic participation in strategic decision-making, the present, institutionalized Roundtables were anti-democratic and dominated by unelected bureaucrats.

Sam had been appointed by the Roundtable to oversee new industrial site placements in the Finch Industrial Centre - a double case, in the minds of the community groups, of "eco-facism." According to Provincial law, review of industrial facilities siting requests required a plan on how closed system materials recovery targets would be attained by the industries being sited. Community groups in the North Valle district were opposing further encroachment of the Centre onto lands that they felt were needed to build new housing to replace the temporary dwellings set up for recent immigrants from the United States, Mexico and other drought countries. Sam knew that the business firm in question had done a remarkable job of meeting the provincial requirements. Today's decision in favour of the industry could alienate the community representatives on the Roundtable and lose him the compensation issue. Any decision other than in favour of the industry siting proposal would surely make the industry community feel that it was being treated unfairly and would surely swing their votes away from Sam.

11:10 am. Sam's worst fears came true when, arriving at the Centre gate, he saw the Commissioner of Health and a group of familiar community organization representatives waiting to greet him.

"The others are already beginning," said Health Commissioner Jeanne Ado as Sam approached the gate. "I guess the compensation mandate has gotten your season off to a bad start," she said. "May I introduce you to the neighbours?"

Sam ignored the taunting. He knew each of the community representatives well. They were each Community Council heavyweights, for which reason they had been selected by their sectoral colleagues to fill the Roundtable posts. They walked together into the industrial centre administration building.

"Let's get right to the point," Sam said while walking. "I agree with you that the effects of our unrooted immigrants are extremely costly in terms of social operations, long-term settlement structures, childhood investment, community ownership, you name it. You also know as well as I do that solving these problems relates to land values and the supply of infrastructure, transportation, food supply, energy, the health system, System microclimate balance ... it goes on and on. So why do we pretend that this one siting decision addresses all these problems?" Sam reminded himself not to appear locked into a position. "What can we do to really address your problem?" he asked the community representatives. "What should the Roundtable really be talking about for the long run?"

Sam could tell even before the response came out that the community representatives were not about to be conciliatory. "What we ought to do at the Roundtable is put it back into the hands of people looking for homes in our System and stop taking care of the whole bio-region," one of them answered.

"Sam, you know the Local System is what makes the difference. We're pushed to the limit here. You can't accept concessions from the States when they're shipping us all their problems." This sparked an idea in Sam: this year he might have to "ship out" the solution.

The siting review procedure was taking its normal arduous course. Sam was familiar with the case, the technology, the opposing position. He had been involved with the Finch Centre from the beginning. The industry representatives on the Roundtable had led the group through image after image of GIIS (Geographic Information and Industrial System) data and industrial process routings on the tabletop terminals. It was clear that the final vote on the Finch case would not be taken until the next week.

Thursday, September 14, 2020 at 11:15 am. While the closing statements on the Finch Centre siting case unfolded, Sam took the opportunity to log in onto the network for a report from his office on the compensation negotiations.

As hoped for, the Bio-regional Council had agreed to accept the initial complaint to the Greater Toronto system about the imbalance in last year's compensation, and had been exerting what pressure it could on the Lake Michigan, Huron, and Erie Systems. As expected, the response from many of these Systems was both defensive and aggressive. With so many people migrating northward, they did not have the revenues for new infrastructure. Short term compensation costs, they argued, would carry a higher marginal cost for them than in the Greater Toronto, Hamilton-Wentworth, and Greater Montreal systems, which had upgraded infrastructure at their disposal. This was beginning to infuriate Sam, remembering how the United States government had first agreed to, and then eliminated federal funding for bio-regional management programs.

Sam wondered to himself whether the Finch Industry Centre that they had created in Greater Toronto might not have been a bad move in the ecosystem management context. Had the Centre been developed, say, in the Cleveland System, this would have reduced discharges into Lake Erie from that system and it might have kept some of the immigrants there as well. Of course, this was all wishful thinking. He had been hoping that a better ecosystem monitoring package had been developed to more fully integrate economic factors, but large scale social responses to economic shifts had become wildly unpredictable over the past year making this sort of modelling unuseful.

Now that the migrations had gained major momentum in the Bio-region, it made little sense to expend energy opposing them. Instead, Sam thought, the migrations needed to be steered into settlements which could absorb and even make use of the new human resources. A trade-off might be possible. And if he could make two, or even one industry representative happy, he only needed two additional votes. He quickly told the terminal to send a memo to his staff regarding the negotiating position with a group of St. Lawrence Systems that had avoided compensation actions last year, and were facing strong pressure for action this year.

Sam also sent a message across the table to community housing advocate Stuart McCormack, asking if he could meet with him immediately after the meeting. McCormack nodded in the affirmative. He than called Peter Arnold, the Commissioner of Built Environment, and asked him to meet with him and McCormack before the full Roundtable meeting. Sensing that a deal was going to be made, Arnold quickly agreed.

When the vote was put for the approval of the industrial siting, Sam voted in favour, even though his vote did not turn out to be necessary for approval.

1:05 pm. When Sam arrived at the System Government Centre, he received a report that the St. Lawrence Systems were sending back positive signals. He entered the meeting room to find Peter Arnold and Stuart McCormack's discussion already in progress.

Sam told the two men that it was clear that, even under the present environmental budget, any large new housing construction in the system would have to be supported by closed system water services infrastructure. McCormack agreed, though warily. Sam then went on to tell them that he thought the ultimate solution to the housing problem was to encourage a more even distribution of migration. Even though they lacked the analytical tools to exactly evaluate the dynamics of the situation, he said that the momentum of the migration certainly would continue toward the further reaches of the St. Lawrence, and that any investment made in housing by the Greater Toronto System might actually be best directed to housing in the northward St. Lawrence Systems that were under less environmental strain to begin with.

Under new Provincial law, Systems had been granted authority to expend municipal resources on investments in other Systems if these investments could be demonstrated to have a higher marginal utility in meeting Bio-regional targets than investments made within their own jurisdiction. The housing that Greater Toronto would finance in the St.Lawrence System would, of course, need to have closed system services infrastructure to reduce inputs from those communities.

"Of course," Sam said to Peter Arnold, "we would need to count on you to tell us which Commissioners and companies you would want to be working with in the St. Lawrence area."

Peter Arnold leaned back in his chair and flashed a broad grin. "Sam," he said, " you're beginning to learn how things

work. Of course, residents in temporary dwellings in the North Valle district would have first stabs at the new housing, is that right, I mean people near the Finch Centre?"

"Well, that's what I was thinking", said Sam. "There's only one thing I would like you to do. Maybe you could talk with a few of your colleagues in the St. Lawrence area and see if they would accept this offer of housing help in exchange for strong compensation action on the current event. You can announce the results."

Friday, September 22, 2020 at 3:48 pm. After two full days of deliberations, data, and grandstanding, the vote on the compensation package was 10 for and 6 against, a remarkably quick decision. Peter Arnold had made the announcement - to the amazement and chagrin of most on the Roundtable - that he had made a proposal to three St. Lawrence Systems to undertake a quite dramatic compensation in exchange for a cross-System housing subsidy. This, of course, meant that the radio and television environmental feedback shows now circled around him, and assuming the final approval of the compensation by the System Council in early October, he would bask for an entire season in the ironic glory of being an ecosystem hero.

Sam had trepidations about having diluted Greater Toronto's compensation. He would have been more comfortable with the certainty of action where he could monitor day-to-day implementation. But then, he coached himself, this was how the System was supposed to work. It required letting go and waiting for the response.

4:20 pm. Sam walked back to his office. As he passed the lush, weed-covered buildings being managed for carbon sequester, he felt the ambivalent winner of the day's events. He normally did not walk from the Government Centre to his office. Although he loved the look of the tall green

buildings established under Watiri's Microclimate programme, the weeds would sometimes grow faster than they could be trimmed, and had become hiding places for muggers. With the crime rate continuing to post new highs, the practical risks in the social environment began now challenged the confidence which had led him to take this walk.

Reflecting on the month's events, he was uncertain as to whether the inconvenience and resources being put into the entire compensation action would actually address the Bio-regional problem. Would other Systems and municipalities actually implement the compensations that they had promised? Did anyone really understand the toxin problem sufficiently to know whether it was the same as the previous year, or whether the earlier compensation was actually what had led to a remediation of the problem? Sam loved the concrete quality of the data his department collected and evaluated, but whether their responses to this data were appropriate or not was totally uncertain.

Notes

1.   Municipalities first began undertaking carrying capacity
     assessments for local development projects in the early
     1990s. The first carrying capacity assessments involved a
     traditional ecological analysis of the ability of the
     non-human species and natural features (rivers, lakes, etc.)
     of a particular ecosystem to withstand human disruption. In
     the early 1990s, local watersheds were commonly the subject
     of such studies. By the late 1990s many municipalities in
     southern Ontario were already requiring carrying capacity
     studies as part of major development project proposals,
     such as large housing subdivisions. The carrying capacity
     studies now required under the new ecosystem-based
     jurisdictions applied an expanded concept of the ecosystem,
     to include assessments of the impact upon the human social
     and economic environment of the changes that would be
     brought on by a project. Required by regulation, the
     assessment process was used to assure the ecological design
     of the project.

2.   Since humans are the dominant species in urban ecosystems,
     the ecosystem management approach being applied in the Urban
     Systems gave emphasis to healthy social and economic
     conditions for the humans living in the System. Humans in
     the System were viewed as one of the primary energy
     resources that the System had to service its needs and to
     reduce its energy demands in the form of fuels and materials
     from other ecosystems. The cities of the previous century
     were seen to be unhealthy because they squandered their
     human resources and were forced, therefore, to replace this
     lost energy by consuming large volumes of energy and
     materials imported from other ecosystems. Emphasis was
     placed therefore upon the creative employment of local
     populations. The System Employment Council was a
     coordinating body among the various government departments,
     business organizations, and community and social welfare
     organizations. It developed strategies not only to create
     jobs, but to assure that job opportunities being developed
     in the Urban System maximized the potential contribution
     that an individual could make in their work. For this
     reason, the SEC managed a wide variety of both skills
     training and self-improvement courses in SEC centres
     throughout the Urban Systems.

3.   The Bio-regional Management Plan was the primary strategic
     planning document established by the Bio-regional Council.
     The Plan set targets both for remediation of local "hot
     spots" in the Great Lakes System and for overall ecosystem
     integrity of the Great Lakes Bio-region. A system of
     incentives was established to support Local System efforts
     to work towards Bio-regional objectives, and the complex
     monitoring and environmental data network was used to
     provide Local Systems with feedback as to local and

bio-regional progress.   The present Plan covered the period of 2011 to 2021.

4.   In the first decade of the 21st century, a variety of global environmental monitoring and data networks, largely managed under the United Nations' system, were integrated with an even larger number of local and bio-regional networks.   In particular, the partnership between the U.N. networks and the Local Environmental Initiatives Communications(LEICOMM) Network permitted a full-scale, top-to-bottom ecosystem monitoring and reporting system to be put into place.

EXHIBIT A

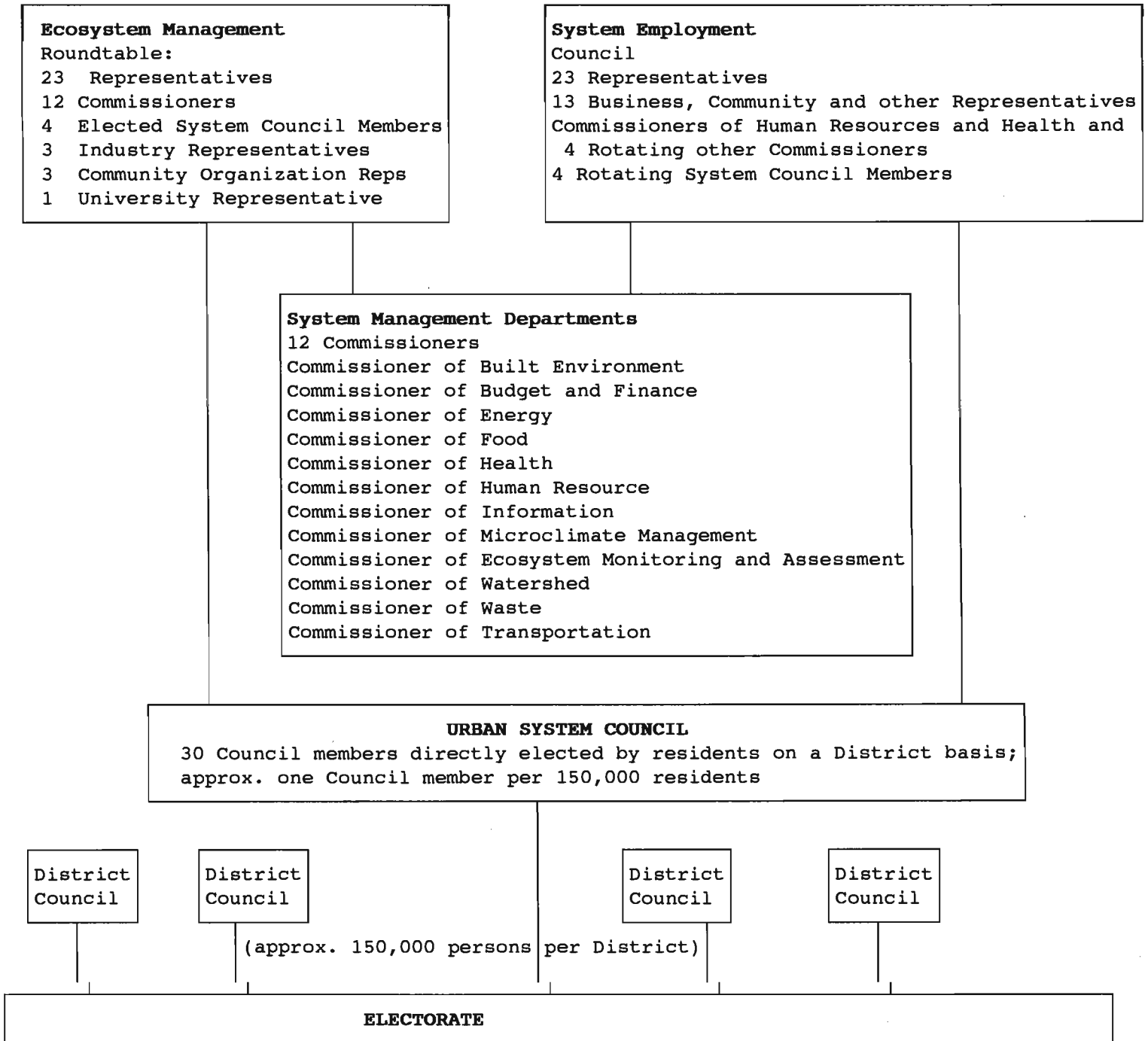**GOVERNANCE AND MANAGEMENT OF THE
GREATER TORONTO URBAN SYSTEM**

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┌─────────────────────────────────┐   ┌────────────────────────────────────────────┐
│ Ecosystem Management            │   │ System Employment                          │
│ Roundtable:                     │   │ Council                                    │
│ 23  Representatives             │   │ 23 Representatives                         │
│ 12 Commissioners                │   │ 13 Business, Community and other Representatives │
│  4  Elected System Council Members │ │ Commissioners of Human Resources and Health and │
│  3  Industry Representatives    │   │  4 Rotating other Commissioners            │
│  3  Community Organization Reps │   │ 4 Rotating System Council Members          │
│  1  University Representative   │   │                                            │
└─────────────────────────────────┘   └────────────────────────────────────────────┘

              ┌──────────────────────────────────────────────────────────┐
              │ System Management Departments                            │
              │ 12 Commissioners                                         │
              │ Commissioner of Built Environment                        │
              │ Commissioner of Budget and Finance                       │
              │ Commissioner of Energy                                   │
              │ Commissioner of Food                                     │
              │ Commissioner of Health                                   │
              │ Commissioner of Human Resource                           │
              │ Commissioner of Information                              │
              │ Commissioner of Microclimate Management                  │
              │ Commissioner of Ecosystem Monitoring and Assessment      │
              │ Commissioner of Watershed                                │
              │ Commissioner of Waste                                    │
              │ Commissioner of Transportation                           │
              └──────────────────────────────────────────────────────────┘

      ┌──────────────────────────────────────────────────────────────────┐
      │                    URBAN SYSTEM COUNCIL                           │
      │  30 Council members directly elected by residents on a District basis; │
      │  approx. one Council member per 150,000 residents                 │
      └──────────────────────────────────────────────────────────────────┘

┌──────────┐  ┌──────────┐              ┌──────────┐      ┌──────────┐
│ District │  │ District │              │ District │      │ District │
│ Council  │  │ Council  │              │ Council  │      │ Council  │
└──────────┘  └──────────┘              └──────────┘      └──────────┘
                    (approx. 150,000 persons per District)

┌──────────────────────────────────────────────────────────────────────┐
│                           ELECTORATE                                   │
└──────────────────────────────────────────────────────────────────────┘
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EXHIBIT B

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┌─────────────────────────────────────────┐
│ THE ECOSYSTEM MANAGEMENT ROUNDTABLE OF   │
│   THE GREATER TORONTO URBAN SYSTEM       │
│                23 MEMBERS                 │
└─────────────────────────────────────────┘
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┌────────────────────────────────────────────┐
│ 1 University representative selected by the │
│   Council of Research Institutions          │
└────────────────────────────────────────────┘
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┌──────────────────────────────────────────┐
│ 3 Industry and Business Representatives   │
│   selected by the Council of Business     │
│   Associations                            │
└──────────────────────────────────────────┘
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┌──────────────────────────────────────────┐
│ 4 Elected Council members selected by the │
│   Greater Toronto System Council          │
└──────────────────────────────────────────┘
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┌──────────────────────────────────────────┐
│ 3 Community Representatives selected by   │
│   Council of Community Organizations      │
└──────────────────────────────────────────┘
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┌──────────────────────────────────────────┐
│ 12 Commissioners from each of the major   │
│    Departments                            │
└──────────────────────────────────────────┘
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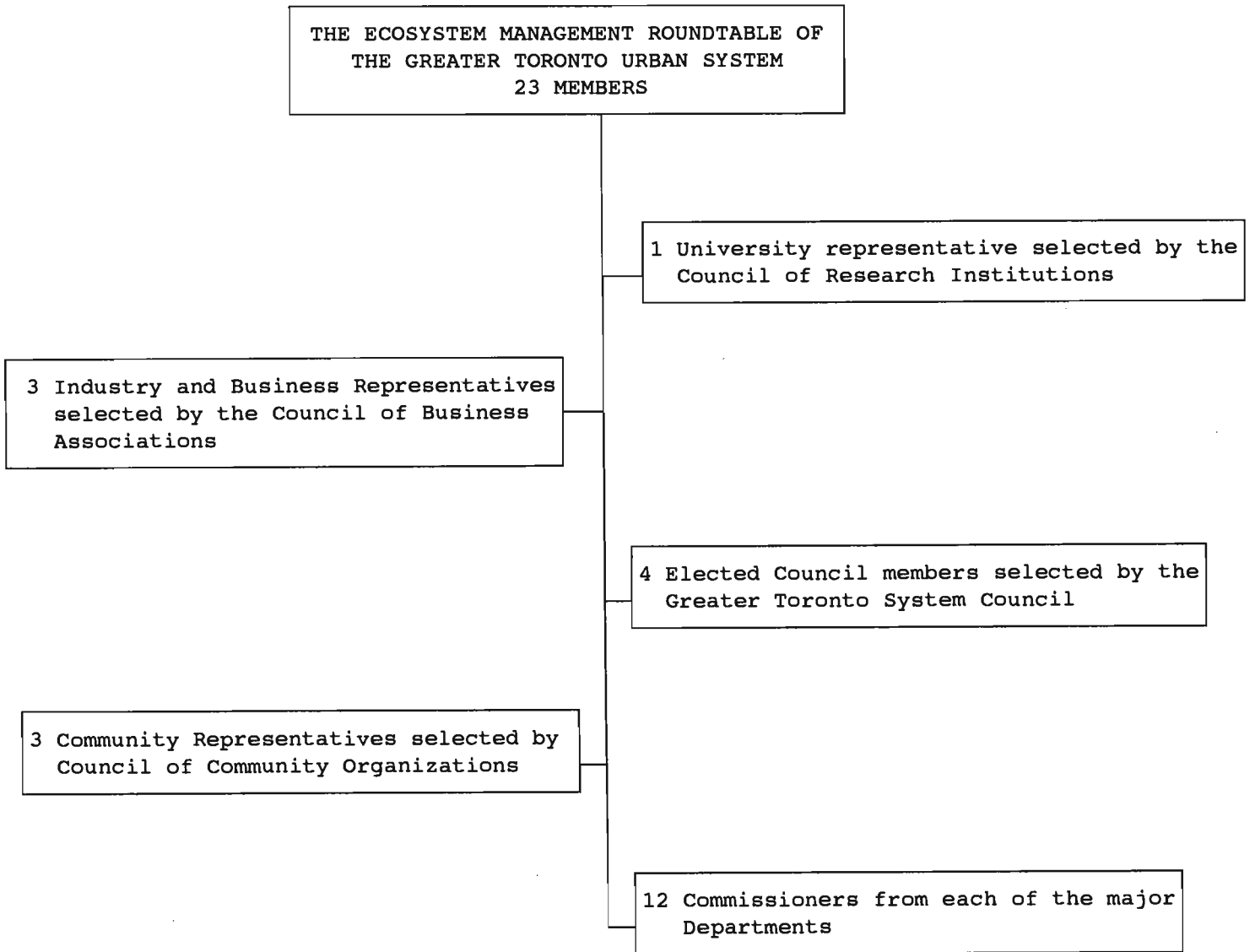
James E. Brugmann and Marshall Spriggs

EXHIBIT C

**Management Principles for an Ecosystems Approach
to Urban Systems Management**

*   **The Integration Principle:** maximizing the efficiency and productivity of systems and communities by integrating systems so that they serve each other.

*   **The Elegance Principle:** satisfying multiple needs or solving multiple problems through a single intervention.

*   **The Recycling Principle:** using by-products from one process as inputs into another process.

*   **The Functionality Principle:** giving priority to the most efficient and effective way to fulfill the function of a department or system over any specific product or service traditionally used to fulfill that function.

*   **The Adaptability Principle:** supporting and developing indigenous adaptations and solutions to urban ecosystems problems.

*   **The Diversity Principle:** encouraging both genetic and cultural diversity in urban ecosystems to establish greater resiliency.

*   **The Synergy Principle:** integrating incremental actions into a comprehensive plan that includes methods for monitoring and assessing impacts upon the whole.

*   **The Negative Feedback Principle:** establishing negative feedback mechanisms to regulate and control activities within the established constraints and carrying capacity of the overall system.

Observations and Ideas From a Community Dweller

by Eileen Morand

I put the phone down slowly. An article on the city of the
future! Where would I begin? Being a free lance writer in
conjunction with my regular office job often made life hectic,
but I enjoyed the assignments because I learned more about
life. Sometimes they were fun, like the one on senior
citizens' fashion, and when I wrote about the children's
science show I realized that today's children know more about
technology than I do. They're also very concerned about the
environment and their future. I had been amazed at their
innovative ideas and inventions. The medical articles which
I'd researched had been really interesting. Interviewing the
gentleman who had undergone the first operation of it's kind
in Canada for Parkinson's disease and witnessing the love and
devotion of his family had been particularly moving. You
don't often find nuclear families these days and I'd wondered
what would have happened if he hadn't had their support. I'd
learned a lot from researching palliative care and abortion
rights too, but they'd all been topics which I could research,
whereas this one - how could I research stuff for the future?

"My editor says he wants me to attend a small conference where
several experts are meeting to discuss the problems of
pollution, the growing population, traffic congestion and lack
of building space. Then he wants me to write an article on
how these problems might be solved in the city of the 21st
century," I told my husband Paul, as we ate breakfast. "I'll
have to take a day off work to attend and goodness knows what
I'm going to write about." "You'll come up with something,
you always do," he smiled. I rushed downstairs, patted Wag
and told him that Dad would take him for his walk soon. I
opened the door and realized it was quite cool, I dropped my

purse and briefcase on the chair and rushed back upstairs to
the bedroom, grabbed my sweater and as I ran round and round,
down and down our multi-level house I swore that we would move
into a bungalow soon. I couldn't see me running up and down
in twenty years' time. These homes were great for saving land
space but they were hard on my bad knee and back. I couldn't
have coped with all those stairs when the children were small,
and I'd have been worrying about them falling too.

I drove to the highway and soon we came to a complete
standstill. I hoped it wasn't an accident; probably the
construction crew were doing something different and everyone
was slowing down to see what it was. It always amazed me how
this kind of thing could cause backups for miles. I don't
think they'll ever finish this highway; they spend one summer
adding an extra lane in one area and then the next summer they
work on another area. Construction is the norm these days -
everywhere you look there's some bulldozer digging up the
ground for some new concrete structure or other. For two
years now they'd been blasting all around our community.
Sometimes our house shook and some fancy technological gizmo
in the court monitored the effects of all the vibrations.
Every time they blasted I wondered how many wild animals got
killed that time. The groups of protestors defending wild
life never seem to get very far, but I suppose they are making
more progress than they used to. The traffic began to move,
"Thank goodness, maybe I won't be too late for work."

"The panel at the conference was an interesting collection of
experts," I told my husband at supper the following week,
"they specialize in urban design, housing and the environment
and come from right across Canada. It was quite exhilarating
really and it's nice to know that some people care about the
important things in life instead of just money. I picked up
some brochures on a futures oriented thinktank and some
magazines about the futures. Maybe they'll help me to get

focused. There's a really interesting article in one of them about an architect called Malcolm Wells, who specializes in underground building. Apparently it's more energy efficient and the earth is an excellent sound barrier."

Greg, my son in law, phoned me at work the next day. My daughter Ann had just been admitted to the maternity ward. I'd made arrangements with my office to have some vacation at this time so that I could go and look after the family. I left early, went home and packed my bag. I told Wag that he couldn't come with me on this trip and tried to ignore the hurt look on his face. I'd phoned the bus depot to see if I could take a bus. Although the service ran fairly frequently to Toronto, I could only get a connection to Bolton, where they lived, north of the city, twice a day, so reluctantly I had to drive. My car would be idle during the next ten days as once I got there I would be driving my daughter's car with Emma's car seat in. I would have preferred to relax on a bus instead of driving for the next six hours. I drove fast as usual, but tonight I was keyed up trying to ignore the panicky feeling in my stomach. I reached Toronto in good time but was tired and hoped I'd be able to remember how to get to their new house. I'd only been there once before when they just moved out of the city a month ago. It was such a shame, they worked so hard on the old house which they'd had and were so proud of it, but they couldn't put up with the vandalism to their cars any more and they'd had their home broken into once already. Of all the things which had been stolen Ann was most devastated that her grandmother's engagement ring had been taken. The park opposite, which they'd thought would be perfect when they had a family, seemed to turn into a jungle of depravity at night. Just as I pulled into their driveway, Greg also drove up. He'd just come from the hospital. Ann was fine he assured me and I had a new grandson, Justin. I started to cry with relief and we went in and had a drink.

Ann came home the next day and Greg picked up Emma, my eighteen month old grand-daughter from their friends' home on the way.   I spent the next ten days enjoying my role of Grandma and one afternoon while holding Justin in my arms, I watched him open his tiny eyes to gaze at this wonderful world and then watched his little sister as she "discovered" the wonders of grass, butterflies and flowers ..., I realized the awesome responsibility of ensuring that our children (of the world) will have the basic necessities of life which we, as adults, have taken for granted.   Justin fell asleep and I put him into his cradle beside Ann, who was sleeping contentedly for a while, then I put Emma to bed for her nap, and started to think about my article. I got some paper and began to write some notes.   I was glad that people were worried about the environment and were trying to find solutions and I was glad that the experts were planning for the future.   I began to feel privileged that I might be able to make some contribution to that planning.

The responsibility of caring for our young is a deeply ingrained instinct in most animals.   There has always been the threat of early death through disease, famine and war, but not before the possibility of nuclear destruction was this threat universal.   We are now faced with the possible global extinction of all living things through pollution and mis-management of our natural resources.   Most of these threats are man-made or man-generated.   However, medical wonders to combat disease and prolong life are also man-made.   We provide help for victims of famine, we struggle for peace and we have almost removed the threat of nuclear war.   Our various achievements are numerous and great.   We must therefore believe that we can also overcome the current environmental problems and pass on the wonders of this world to future generations.

Eileen Morand

Without our sporty cars, dishwashers, clothes-dryers, televisions and all the other "must haves", life would be very different; without our basic needs, life would end. Without food we would survive for a few weeks, without water a few days, without warmth a few hours, without air a few minutes.

Given the four basic needs, we then need shelter for protection from the elements and our enemies. Humans, like so many animals, also need companionship. Another important point to consider is the innate desire for survival, which in modern society manifests itself as a love of challenge.

Well, at least I'd made a start. I didn't have time to write any more before I left for home. As I drove back I began to take more notice of things - the buildings, the parking lots, the traffic. The trucks which belched thick, black smoke annoyed me even more than usual. I decided not to drive as fast as I usually do, to conserve gas. Surely with all the knowledge that we have today, someone could come up with a different kind of fuel.

I decided that to understand the future maybe I'd better begin with history, after all I'd never really thought about cities before, why they were so large and kept on growing, what the specific problems were and besides I knew something about history. I got out my art history book and whenever I could find time I wrote some notes, hoping to find a pattern which would help me see the future.

The human species is gregarious and from pre-historic times the majority has lived in groups made up of smaller family units. 35,000 years ago paleolithic tribes, with only sticks for weapons, needed to hunt in groups in order to overcome their prey. It was a stable but

precarious balance of man and his environment. During
this phase of human evolution the human species learned
how to survive in a hostile environment. They lived in
the centre of their settlement, "worked" in the
surrounding area and walked back with their produce. The
pattern of primitive life was static rather than dynamic
and achievements were responses to threats of physical
extinction. In about 8,000 B.C. with the domestication
of animals and food grains the Neolithic Revolution was
born. People settled down in permanent village
communities and a new discipline and order entered their
lives. Hunting for food was replaced with new
occupations and goods were traded for money in the
central market square. New inventions appeared in
pottery, weaving, spinning and basic methods of
architectural structure in wood, brick and stone. The
human species had won a decisive victory in the battle
for survival in their environment.

With civilization came a new threat fuelled by greed.
The new threat was not nature but man himself. Man
responded to these threats with new achievements. The
hunting weapons were turned against fellow man and became
more sophisticated. Competition for grazing land led to
fortifications often on a monumental scale. Such
ambitious efforts required sustained and specialized
labour over long periods of time and tribes began banding
together forming larger, more disciplined social units.

With the beginning of written history, five thousand
years ago, the new age of communication was born. There
was a sudden increase in the speed of events and in the
kind of events. Conflicts between tribes became more
violent and pressure from these large scale conflicts
generated a new kind of society which was more complex
and very much more efficient than ever before.

Accomplishments, unlike those of the Neolithic Revolution which were spread over several centuries, became memorable - occurring within lifetimes. The struggle to cope with the human environment was (and still is) a far greater challenge than coping with nature.

In time the market-place became the hub of the settlements. Permanent commercial enterprises replaced the transient stalls and also supplied emerging services including banks and post offices. Inns were built for those coming to the market. Industrial nodules developed on the outskirts with the families who were employed by them, living in nearby cottages usually provided by the owners of these enterprises. The commercial people usually lived over their stores, with their employees close by. Some villages in strategic positions with a developing supply of commercial goods and good transportation routes, usually by water, grew in size and became cities. With the invention of the printing press more people became informed. With the industrial revolution, mass produced goods became available to the populace at a reasonable cost. Education became available to all classes and eventually included girls. Access to world news became a reality for everyone in the western world. Today, with our elaborate communications system we can watch events actually happening around the world as they unfold.

Various conflicts including wars and disease have continued to plague us, but we have risen to the challenge to find solutions. Hygiene now controls many diseases, vaccines prevent diseases, operations with anesthesia correct physical problems and of course weapons continue to become more deadly. The challenge of the hunt has evolved into the challenge of finding better ways to work. Machinery, steam engines, electricity,

automobiles, air travel and computers - one invention after the other has not only solved problems, but made life easier.

Until modern modes of transport became available most people never travelled further than they could walk. Extended families lived close together, even in the same house. Today there are a variety of different family structures. Extended families are a thing of the past, with people working in various parts of the country, even the world. Single parent families are an ever-increasing element in our society. Because there are no relatives nearby, day-care is needed for the children, and help for the sick and elderly is a modern necessity. Historically people followed in the footsteps of their forbears and often had no interest in the work which was chosen for them. Today people not only choose their own paths but often change direction several times in their lifetime. Women are educated for careers outside the home. The modern home is filled with time-saving high-tech appliances, but these require energy, some pollute, and disposal is a problem. Today fathers and mothers drive to work in different directions, older children often drive to high school and young children go to school on buses. Homes are usually chosen for the appeal of specific neighbourhoods not because they are adjacent to father's place of work as before. The automobile has become an important means of transportation for commuting, visiting and recreation.

Each settlement offers its individual attraction to people, industries and business. The nodules have grown in size and number until the larger cities are spread over several thousand hectares. Villages on the outskirts have become swallowed up in the huge metropolises. As the populace becomes more affluent,

cars become more attainable and traffic congestion worsens. Developers demolish a block of old stores, build a twenty storey office building, then another block is demolished for the erection of a high rise apartment building plus some intensified residential dwellings. The population of those two blocks has now increased by approximately three and a half thousand - two thousand office workers, one thousand spouses/mates working elsewhere and five hundred children who need schooling. Approximately half of these adults require transportation thereby increasing congestion and pollution. Cities are becoming so intensified that there is little building space left. Tall, narrow houses are being crammed into the yards of and in between older residences. Some people, tired of the ever-increasing problems of life in the city, migrate to the rural areas beyond the city. They then have to commute into the city centres for their work.

Driving to work each day through Ottawa is such a chore. It's so ridiculous that circumstances over the years have me living in the west end and working in the east and Paul in the middle! I hate all this time I waste. Still I do a lot of thinking while I drive. I began to realize that the city centre was multi-use, incorporating government, businesses, commercial enterprises, educational institutions, homes, places of entertainment, cultural centres, services ... necessitating huge numbers of people travelling in different directions. The road construction is ongoing in an endeavour to support the ever-increasing traffic. The cost of time wasted, stress, traffic accidents, security and crime is staggering. The small commuter communities which have sprung up around the larger cities, like Kanata where Paul and I live, include small industrial parks and mixed use development. The commercial strips are so impersonal. The large shopping malls with their huge parking lots are designed

for vehicle access only. Buses stop at them but if you don't
live near one of the key bus stops and if you don't travel at
peak hours, it can take a very long time. When I was a child
in England, my mother called in the grocery store with her
shopping list and everything would be delivered. Now, without
a car, it would be very difficult and expensive to have
everything delivered. Some of the people in Kanata work at
the industrial parks, but their spouses work elsewhere. Some
families do not work in their community at all; they chose
their homes for the schools, rural atmosphere or sports
facilities; I had wanted to live in Kanata because they had a
good theatre group. Every day cars travel into the city or to
other commuter communities. More ground is lost to the
expanding traffic network. When I worked down town I used to
go on the bus but I'd have to catch three buses to get to work
now and I hate waiting in between, especially in bad weather.
So I maneuvered my way along the highway and try to keep out
of trouble.

One morning I parked my car and as I walked across the large
parking lot toward my office building I stopped, turned around
and looked at the huge expanse of asphalt. Why don't they
have indoor parking or at least multi-level parking I
wondered. Later that morning I phoned the maintenance
department and asked them how big the parking lot was. The
next day someone called me back and told me that the ten
storey building occupies approximately 2,600 sq. metres of
land, while the employee parking lot occupies 16,900 sq.
metres of land. There are about one thousand employees in the
building, therefore each person occupies 2.7 sq. metres of
land for work and 17 sq. metres for parking! This land is
being used for approximately 22% of time! Indoor parking
would save a lot of land. Building indoor parking areas is
costly, he said, but outdoor parking is also costly, when one
considers the cost of purchase, taxes, road access, snow
removal and surveillance, I insisted. My car was broken into

Eileen Morand

last Christmas and the damage was so bad, the car was written off, so increases in insurance for everyone, due to such break-ins and vandalism, represents indirect expenses which affect everyone ultimately. Then there is the use of resources to repair the damage. And, most importantly, what about the cost of lost space in our world, the loss of oxygen giving plants and the damage to the environment by the asphalt? They'd done a lot of landscaping he countered and they'd thought of multi-level parking, but it's usually ugly to look at and it would have detracted from the architectural aspects of the building. Well, that's true, but they could plant trees around it and have vines and ivy and such growing over it. I had a picture in my mind of one such lot in Phoenix, where we'd lived for four years. Another thing, the guy on the other end of the phone said, if public transit improves and people stop using their cars in the future, we can always dig up the asphalt and build something else, or even plant grass again. That was an interesting point, but with in-house parking those levels could be converted to offices. Of course I avoid indoor public parking because I'm nervous of being attacked, but in one's place of work with good security, there shouldn't be a problem. I'm sure that better security measures could be provided for public indoor parking too if people demanded it. I thanked him for his time and interest and got back to my office work.

The next few weeks I was so busy that I didn't have time to sit and write my article, but I became keenly observant as I drove around Ottawa. I tried to get some ideas from conversations with people, not that it proved very helpful: they mainly said that public transit should be improved and we should clean up the pollution, but didn't offer much in the way of suggestions. At Thanksgiving we all went to my other daughter Carol's home. Since she and Roger had moved to the little village on Lake Ontario three years earlier, we had always gone there because it was so pretty in the Fall. They

are both naturalists and work in the nearby provincial park. They loved living in their old house in the village, the slower pace of life, knowing everyone (even though everyone regarded them as "newcomers") and not having to worry about locked doors and break-ins all the time. However, the villagers are concerned over the new subdivisions and large single houses which are being built for city commuters, retirees and those wishing to get away into the country. How long would it be before this historic farming community became another nodule?

Ann was looking tired and I remembered how I used to feel looking after them when they were children. Justin had grown and laughed when I talked to him. Emma was into everything and Wag was never far away from her. I told them all about the article I was writing and tried to get some ideas. Greg suggested that a curfew be imposed every night in the parks. Being a city guy, he also said that he didn't know much about the country and was enjoying their new home. He thought it should be mandatory for people to become involved in some environmental work, say one day a month. That way they'd learn about things which you don't know when you live in a city. If things are really as bad as you say they are, the government ought to introduce new legislation and enforce that which is already there, because most people will continue to buy pesticides and other stuff if they're available in the stores. If they're really bad, they wouldn't be there, would they? That got Carol and Roger going. Governments do whatever is politically expedient, then there's always the almighty dollar. "They even charge people to recycle in some municipalities instead of charging the ones who don't recycle," Carol said. "People have to stop being so consumer mad," she continued. "I'm always concerned about all the wild animals that get killed during construction," I said. "I'm going to write that they should all be moved before construction begins." "That won't do any good," said Roger,

"as the new habitat wouldn't be able to support them." "You could move them to a park maybe," said Carol. "The best thing would be to get an environmental consultant to check out the area first to make sure that it was a low bio-diversity site and - "What does bio-diversity mean?" I asked. "It means that not many animals live there and not many different species. Then, you if you couldn't move the animals to a park, you might let Environment Canada go in and kill them humanely and the meat could be given to the poor." I made more notes and when we returned home I put them into my file, which was beginning to bulge. I couldn't go anywhere without thinking about the problems with cities and I was always scribbling thoughts down on scraps of paper. I wished I had a tape recorder hooked up to my brain to record them, as I was usually in my car and I worried that I'd forget something before I could write my notes.

> I noticed that buildings such as schools, light industrial/high-tech businesses, community centres, stores, shopping malls, restaurants and churches were generally never more than two storeys high. Shopping malls were already a conglomeration of commercial enterprises, so why do they have to occupy so much land instead of being multi-level? There is very little difference in taking an elevator up two floors or fifteen. Many office buildings today contain several businesses so why is this concept not incorporated in high-tech industries? There is no apparent reason why schools cannot be multi-level. Eating areas in malls are a great success and restaurants are usually found grouped together in certain areas, so why not a multi-level eating emporium? Elevators, which are impractical in homes, (boy would I love one in our home!) are easily utilized in commercial multi-level buildings. Again, in addition to using more space, energy in these single use buildings is also wasted. Services such as electricity,

communications, plumbing, security and alarm systems, not to mention parking, can't be cost efficient or environmentally sound. By intensifying these types of buildings, more space could be given to the residential areas. To supply the demand for detached housing, developers build houses just a few metres apart. The space between these houses is unusable and there would be little difference in appearance if they were built adjoining one another in groups. They would be far more energy efficient as well as taking up less land.

One evening I settled down and looked at the notes I'd collected in my file. Most of them seemed to be in the form of questions. I'd better start finding or thinking up some answers. To begin with, why do we suddenly have such a huge pollution problem? Back to one of my favourite subjects - history. After all pollution is not a new problem; it didn't arrive overnight and it isn't an act of terrorism.

Pollution is a fact of civilization. Ancient settlements often moved to other areas when the pile of bones grew too big and attracted too many flies. The bones were biodegradable though and only presented short term problems. The streets of medieval towns were open sewers and the nosegays which masked the stench did nothing to stem disease. It was not recognized as a serious problem until the connection was made between sickness and the specific elements of pollution. We learned to bury the sewage in pipes and to disinfect our water. As the world has always been thought of as large, people have been of the opinion that it could absorb the waste and in areas where it became too much of a problem they, usually the rich, could move away and start over in a clean area. North America only experienced the short term problems of pollution until the pioneers from Europe brought their manufactured, non biodegradable goods.

For thousands of years man was part of the cycle of nature. With the discovery of mixing various minerals, however, and the burning of fossil fuels to generate power, man created pollution. During the past hundred years - within living memory of one generation - we have seen inventions occurring with increasing speed until now they are a daily occurrence. We have become more and more consumer conscious. I remember as a child, elderly relatives living in homes which they'd furnished when they got married. Today we are pressured by aggressive marketing to keep pace with fashion, or our equipment becomes outdated and some of us move on to bigger and better lifestyles. Obsolescence is built into many of the goods we use, as a means of profit and employment. We are consumed with the need to succeed. The need to succeed in business, the need to accumulate wealth and goods, the need for speed of transportation, the need to compete - the constant need to be bigger and better in all things. And, as we continue in this lifestyle, we deplete our resources, we increase pollution through the manufacture and use of our must-haves, and eventually create problems with their disposal.

Recent concern for our environment has motivated people to Re-use, Reduce and Re-Cycle. It has also motivated many manufacturers to find ways to reduce pollution. By recycling, manufacturers are reducing the use of natural resources. However, solving the pollution problem is very complex. Without the whole picture it is almost impossible to know which decisions to make and much research is required to find the answers. Also by slowing the use of natural resources and by consuming less, we are creating unemployment in these fields. However, new environmental industries are beginning to surface.

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With the increased longevity of humans, the world population is increasing at an alarming rate. This creates three problems:

a)   more people require more goods, which creates more pollution in their manufacture and disposal;

b)   the world can no longer absorb the ever increasing amounts of waste, and;

c)   more people require more space. And space is running out.

Wow, this is heavy stuff! I'm getting depressed - better make some tea, clear my brain and start thinking positive.

Pollution has been created by man's inventions but now we are creating new inventions to solve pollution. Information and technology is exchanged world wide. Industries are beginning to introduce environmentally friendly commodities because

a)   there is mounting public pressure to produce them, and;

b)   it has become an excellent marketing tool and large profits can be made by those companies who win the race of time to find solutions.

Pollution is a conflict just like the conflicts of plague, war and famine. It is, however, the biggest conflict which the human race has ever faced and will require the people of the world to band together in the largest undertaking in history.

We marvel at the balance of nature, yet we seem to have forgotten how to achieve that balance in our own lives. Work balanced with play, lifestyles chosen in harmony with nature, long term effects compared with immediate gratification, and the basic give and take which should

be exercised in all things. We know the pleasure of giving gifts, we practice the etiquette of reciprocation, Hollywood celebrities give back to their public by means of charitable involvement, but in recent times most of us have lost the art of giving back to nature. We owe our very existence to nature, yet in recent times we have taken without thought for the consequences of our behaviour. We are so irresponsible in the disposal of garbage that we now have tons of garbage floating in outer space, and even on the moon. There are, however, some notable exceptions, for example the Butchart Gardens in Victoria, British Columbia. At the turn of the century, the wife of a quarry owner was so horrified by the scarring of the landscape, that she began to replant it. It has become a beautiful tourist attraction and also supplies plants and seeds.

By living in harmony with each other and with nature we must now learn to find solutions to the problems created by modern society.

That's enough thinking for one evening!

I was going to New York city in a week's time. It would be my first visit. I felt excited yet apprehensive, partly because I would be staying with a couple whom I had met on a train going across Canada nine years earlier. We'd exchanged Christmas cards and the odd note ever since, but I didn't really know them. I didn't know what to wear or what kind of gift to take. I drove to our nearest mall on the Saturday and spent twenty minutes driving around the three levels of parking before I found a spot. I couldn't believe the crowds, whatever would it be like at Christmas? I browsed through some of the stores and in one heard on the radio that a Californian company had introduced a microwave clothes dryer. That would save a great deal of energy, I thought, however, to

replace all our dryers would mean the disposal of millions of appliances. Still, I supposed, over time we replace them anyway and most people won't rush out and buy these immediately because they couldn't afford to.

I've seen many exciting changes over the last thirty years I mused while enjoying a coffee and muffin in the eating area. I cook with a microwave oven and I use high tech equipment at work. As a child I was scared of the huge steam-powered train that brought my grandparents for a visit. Today I can jet to England to visit my parents for a weekend. What kind of transportation will Emma and Justin use when they are adults? What inventions will occur during the next thirty years? It is difficult to envisage the community of the future, when we don't know what will be available, but we must plan for it. Achievements usually result from conflict, as I had realized from my notes on history. We know the problems which confront us today, therefore we can plan to solve them. Our plans for communities must be elastic so that they can incorporate a variety of scenarios. The basic needs of people today are the same as they were for the paleolithic people and they will continue to be the same in the future. I remembered that when my children were young I used to have one rule: they could do anything they wanted as long as it didn't interfere with anything else. They had to clean up after they'd used something, they mustn't hurt anything and they had to think of the consequences of their actions. It was a precept by which I lived. It should be the precept by which everyone lived really. We could keep our modern standard of living if we exercised this rule and always cleaned up what we have used, replaced what we used and where the latter is impossible, we made some form of reparation. If we always followed this rule we would not only be able to pass on to our future generations a world which is beautiful, but life itself. There can be no compromise: we must return the water which we use to its source in a clean condition, we must not allow

pollutants to dirty our air, and we must ensure that our food is not contaminated. Until we have discovered the technological innovations necessary to achieve these aims and continue in our modern lifestyle, we must adjust our lifestyle to minimize the ecological damage. The constant argument in modern society is cost and, we must have our "must haves"; however we must have air, water and food and no amount of money can buy or reproduce any of these once they have been destroyed! I fished some paper out of my purse and scribbled my thoughts. I was becoming obsessed with my article!

My weekend in New York was fantastic! It was also a real eye-opener for me. I am not a city-dweller; Ottawa is about as large as I want and we don't even live down town there, so I had been expecting a rather cold, impersonal atmosphere with people rushing everywhere with no time for anyone, and had been more than a little apprehensive about my safety. When we stepped out of the cab I was surprised to find myself on a quiet, tree-lined street in Brooklyn with tall row houses on either side. My friends told me that the homes were built in 1853. Their home was furnished with antiques, mostly picked up at Flea Markets around the city. They had a small garden at the back, actually it was larger than ours, they had two dogs and a cat. As I sat in their large kitchen while we chatted and drank tea (made in a pot I was happy to note, being from England) I could hardly believe that I was actually in the Big Apple. These people didn't have a dryer or a dishwasher because they wanted to conserve energy. No-one seemed to use pesticides there because the yards looked so much more natural than back in Kanata and wild plants and flowers were not seen as noxious weeds that had to be eradicated. When we went out to see the city, we walked and took public transit. I've never seen so many dogs being walked, outside of England. There were no huge shopping malls - I didn't even see any supermarkets. They did their shopping at the corner stores or on the neighbourhood commercial

street. There was a real feeling of neighbourliness in their area, which reminded me of when I was a child living in England. We drove to the theatre on Saturday evening and I didn't like to see so many homeless people living in their cardboard boxes and begging on the streets. When we went for a walk in the morning, my friend, Joan, gave money to all the beggars because she's so concerned for them. She thinks they should be taken care of, as most of them have psychological problems. She pointed out public housing highrises as Ted drove along and she agreed with me that people should receive mandatory education in life skills. This has been a strong conviction of mine for years, especially while I was teaching and had children in my classes who were neglected and sometimes abused. When we got near Broadway we parked in an elevator parking lot. I was very interested in this as I had "invented" this as a space-saving idea for my future city, but had then discarded it because I didn't think it would work and yet here it was! The next day we walked down Wall Street and as I gazed up at the towering buildings, I started to think how these buildings would sit empty on weekends and during the evenings, and the disused warehouses and sprawling factories. Is mixed use of city land a good thing, I wondered.

During the flight home I thought about all the notes that I had written, thought about the history of man and how cities had evolved and all the observations that I had made. I thought about other cities that I had visited or lived in or near. I closed my eyes and, taking the various components of cities in general, I tried to rearrange them to comply with future needs.

As the size and population of our cities grow, so do the problems. Therefore I believe that we should limit that growth and build new cities. The continual outward spread of the existing cities will take up more land therefore new cities should not take any more. With

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detailed planning the new cities would not recreate the problems of the old.

With modern means of transportation and communication cities can be built almost anywhere.

In choosing the site I would take into consideration the impact on the immediate environment. With any development it is unavoidable that damage will be done to the vegetation and animal life, but this should be kept to a minimum. Research would be undertaken to examine the habitat of the local "residents", taking into consideration their food and water supply, range and shelter. As an outsider moving in, I would wish to become a good neighbour. When my city was built I would make sure that all the roads and highways around it would have some means of stopping animals crossing them. I'd read about underground passes for frogs and hedgehogs in England and Europe, reflectors are also used there to stop deer from being killed, and my daughter Carol had told me that it was being tested in some areas here. I would choose an area which was not considered beautiful, as the city would spoil it, maybe I'd find a site which had been spoiled at an earlier time. Before deciding on a site, I would call in an environmental consultant like Carol had suggested. I would try to follow a rule to replace the plants which were dug up with plants in other places such as roofs etc. I'd also plant mainly native species of plants because they're more hardy and don't need as much watering in the summer, and I'd carry out diverse planting, like Carol mentioned, not monoculture.

When considering the architectural design of the city I would try to reflect the image of our land. Although we are becoming increasingly global, and it is advantageous to assimilate ideas from around the world, I believe it

is important to conserve a national identity and also to reflect the immediate environment. Pat and John Cowe, architects from Vancouver, were on a radio program a short while ago and they believed in "binding a building to its site". They sounded very successful with their projects on the West Coast.

The size of the city would be decided upon at inception and the city would be restricted to that size to prevent the congestion of today 's cities. Although it would take time for the population to reach the maximum, the city would be planned according to that figure.

We are unable to foresee the types of transportation of thirty years hence, but can assume that alternative fuel will be available and public transportation will be more efficient. Smart roads and super trains and mono-rails may be the norm. I would therefore take into consideration the concerns of people today and the inevitable decrease in the use of the automobile, together with the various travel requirements.

To avoid the congestion from commuting, I would design the city core as a place of employment: light industry, business and government. Services for the business sector, such as medical centres, conference centres, restaurants, selected stores, mail depots, etc. would also occupy this core. Surrounding this business area would be a fast, efficient means of public transport and, for the sake of convenience, I will refer to it as a mono-rail. In combination with the mono-rail will be a ring of parking space. Workers would either drive to this area in their environmentally friendly vehicles, or travel on an efficient network of public transport. At the present time public transportation is quite efficient for travelling between key points but the difficulty lies

with getting to and from these key points. If this difficulty has not been overcome, family members could drive in one car to the parking area most convenient for them and then each take the public transport around the outer ring to a key point. There, each would transfer to another vehicle such as a mini-bus, walk or use a bike rental (much like using a shopping cart) to reach their place of employment. No personal transportation would be allowed within this area, only the public transit and service vehicles. Service roads/rails would be the only access to this core with maybe a helicopter pad. With a security gate at these service entrances, unauthorized persons would be denied access. With no means of carrying articles except by hand, and with no personnel in this core during non-working hours, crime and thefts of large articles would be almost eliminated and with the exception of the gates, would not require extensive policing. Public transportation would link the airport to the business ring and there would be highway access for connection to other cities and areas. This is a new concept to grasp but it has been achieved at Disney parks and these are run at maximum efficiency. A company of statisticians organizes the traffic flow by computer thereby ensuring that people never have to wait long for transportation.

The buildings would -

a)   incorporate different styles for variety, (must go to the library and find some pictures)

b)   be high-rise, housing several companies, but generally not more than about ten storeys,

c)   incorporate innovative designs, e.g. inverted, thereby saving ground space, (must try and get some information on the municipal office in Tempe, near

Phoenix. That was an upside down cone if I remember rightly)

d) use roof-tops for sports, athletics, gardens, etc.,

e) stand in a communal park-like setting for employees to enjoy.

By placing all these businesses together in one huge industrial park, services such as energy sources, water, disposal, communication, courier etc. would all be in the same area, thereby cutting costs.

When people set up a business they will be required to pay a bond, according to the type of business, which in the event of the building being vacated or any environmental damage, would pay for the necessary attention. Today, ancient ruins notwithstanding, old bridge pylons sticking up out of rivers, water-logged logs floating on end in lakes, deserted factories, piles of garbage, old railway tracks, falling-down warehouses etc. are not only an eyesore but they waste space, they often pollute and they also present dangers. They also create hang-outs for criminals and juveniles.

Along the outer ring of parking space there would be large multi-level super-market/department stores, garages, day-care centres and business accommodation. The high-rise super-market/department stores would house many different companies so that they could supply groceries (warehouse style) for the employees going home, who could then transport them in their cars, and from the other levels sell the larger consumer goods which require more space to market. These larger articles would probably be purchased at the weekend or in the evening and the same parking space for employees would be utilized for shopping, thereby cutting the space and cost required for large mall parking. Children can be dropped off at

day-care, and cars could be left at the service station for repairs on the way to work. Instead of large hotels catering to all travellers, business accommodation could occupy a level of these super-markets thus being cost effective. Transportation and services would be right at hand.

Large sports and entertainment arenas would also be placed around this ring. Fans would drive to the same parking area and take public transportation to the arena, eliminating the need for large parking lots which are only used for special events. People would not all be driving to the same point, only to their nearest one from which they would catch the mono-rail so traffic bottlenecks would be eliminated.

Around this central business core would be living communities, each with its own identity. (According to the Residential Preferences of Canadians - The Big Picture 1990 - 38% of city dwellers would prefer to live in a rural community and 21% in the suburbs.) These communities would offer a combination of qualities. Serene villages with market squares offering a small central park, sidewalk cafes, boutiques, libraries and small grocery markets. The increasing popularity of market areas in North America is conspicuously evident in the numbers of people who throng to such places as the Byward Market in Ottawa, Fanheuil Market in Boston, Ghiradelli Square in San Francisco, Harbour Front and the Boardwalk in Toronto. People are also showing more interest in hand crafted items, natural materials and individual stores with more personal assistance. Because of our harsh winters, there would also be indoor areas as, for example, in the markets of Kitchener and Elmira, Ontario, the indoor shopping area of Hazelton Lanes in Toronto and of course in the many English markets. These

market centres would be built to offer warmth of atmosphere and reflect the mosaic cultures of Canada. Cities are exciting, but they can also be very lonely and with so many single people. Centres should be conducive to interaction and give a sense of belonging. The buildings would be of varying heights incorporating courtyard like levels with gardens and atria. I envisioned the old city square in Alberquerque and made a mental note to see if I had some photos in my album. I also like the small shopping area called The Courtyards of Caledon, in Bolton. Maybe Ann has a picture of that. Roof tops would provide gardens, tennis courts, glass enclosed health spas, swimming pools. I know some health clubs in Phoenix have running tracks on their roofs and my boss at work told me that the Japanese have practice golfing ranges on their roof tops. Many apartment building roofs are used for sunbathing and one sees the occasional small tree atop others. I would merely expand on these ideas. Each level would be accessible by elevators and escalators. Street musicians and entertainers would be encouraged along with arts and crafts stalls. The centre, with its park area could be of any shape - square, octagonal, circular or a series of joined areas and it would be pedestrian only. It would be accessible by foot or bike and there would be limited, multi-level, elevator parking around the outside for those who needed to go by car. These parking areas would be attractive in design and incorporate trees, plants and vines. With elevator parking, people don't park their own cars, so the fear component would be eliminated, as also vandalism.

All the smaller business transactions, such as banking, everyday shopping, professional services, would take place in these communities along with local sports and entertainment. Multi-level schools would provide for the

local children and high schools would have a smaller
enrollment to provide more personal contact with the
students. The Montessori approach of combining age
groups to reflect the family atmosphere could be tried
with a different grade on each level. Each community
would house a cultural centre: a museum, gallery,
theatre, college or university. The university could
have a different faculty in each community. Each
community would have its distinct personality the same as
different districts within today's cities. Hotels would
offer visitors a relaxed vacation but with all the normal
city sights.

If all the commercial land cost the same, the small
market stores would be able to compete on a more equal
footing with the large supermarkets. Many town/city
centres have decayed due in part to malls being built on
the outskirts on cheaper land with their huge lots
offering convenient parking, therefore enabling them to
offer lower prices. Maybe all land could be owned by the
city and rented, or owned jointly by city
residents/businesses - communal property. This would
also help to regulate developers who seem to own so much
land and have so much influence on suburban/urban
development.

These smaller village-like communities would be easier to
police. In our present cities there seems to be no place
for the youth so they just hang around. If clubs were
built for the young people giving them the opportunity to
become involved in activities and take responsibility for
the club, under supervision, it is my belief that it
would cost the taxpayers far less than the cost of damage
done by street gangs. The clubs could be open all night,
but I'd put a curfew in public areas. I'd like to think
that homelessness didn't exist in the 21st Century,

however, there is a small percentage of these people who do not wish to come inside. For these I would provide specific areas, open yet sheltered from the elements. Permanent divisions could be constructed which would end the use of cardboard boxes. Facilities would be available much like those in a camp ground. I believe such a project in Toronto, Street City, is very successful, with the residents having complete responsibility.

Residential areas would incorporate a variety of styles. Having saved land by intensifying industrial, educational and commercial buildings, intensification need not be so drastic in the residential area. Houses would be grouped in rows, apartment buildings would reflect the architectural concept of Habitat. Some of the newer buildings that I've seen around Ottawa are quite innovative in design compared with the impersonal box-like sky-scrapers. Improved construction would provide sound barriers, (noise being one of the main criticisms of modern, intensified living today); would incorporate energy saving materials, such as the specialized glass for windows which is already available; would use materials which do not cause allergic reactions (the doctors in Phoenix scared me silly when I had arrhythmia and I learned a couple of years later that it was due to the new house we had bought) and also be easily accessible for the elderly and disabled. If all doors were made wide enough for wheelchairs and stairs designed for incorporating a lift at some future date, and wall construction in bathrooms was such that safety rails could easily be attached, it would mean that homes would be accessible for all and people would not have to move when they became elderly or if they became disabled. Energy will most likely be solar and because houses will be adjoining one another, communal units could supply

each row. Water would be recirculated within each row unit, or apartment building, with central purifying systems. People have individual preferences regarding space and these should be catered to within reason. Mansion-like houses would not be available of course, nor large grounds, private tennis courts and swimming pools. Private outside areas, catering to people's needs, with access to communal areas would be available much like at our home. In many residential areas today the front lawn seems to have become a status symbol, drenched with pesticides, and they are not used as there is no privacy, so it's a waste of land and with homes set back so far from the street/road it's less neighbourly. I would therefore design the frontal space on a much smaller scale and I would re-introduce sidewalks.

Maybe I'd get that architect I saw on T.V. the other night, Duany I think his name was, and his partner, to help design the residential areas, as they seem to be very successful with their projects in Canada, and their project Seasides in Florida, U.S. is quite famous. I'd also invite Wells, the architect who designs underground buildings to submit some ideas. Because these residential areas are not linked with any particular industry, the village residents will consist of a mixture of workers. The areas surrounding these villages would be left in a natural state.

The Communication Revolution, which we are already experiencing, will increase the possibility of people working from their homes. Interpersonal relationships and the interchange of ideas may suffer by working solo, but visual communication will be more personal than that available today and regular meetings would provide a continuation of rapport. A company with five divisions of thirty people in each, requires one hundred and fifty

offices, whereas each division working at home could meet one day a week requiring only one meeting room. With no commuting time, there would be an increase in leisure time and a definite decrease in stress. Children would not return to empty homes after school, employees would not have to take time off to care for sick children and neighbours could use a rota system for child care. If working in the home is not practical, another possibility will be for people to work in generic buildings in local communities, with all the usual office technology being shared.

The design of the city and improved public transportation will decrease the use of the personal car. (Paul hates this idea as driving has always been a sport with him.) There will, however, be an increase in the use of mini-buses, cabs and car rentals at destinations. Maybe we will be able to put a credit card into a mini-car at a car stand, drive it for the necessary time period and then check it into another car stand, rather like using a shopping cart. Alternative fuels are being sought and Paul tells me that the automotive industry is improving the efficiency of modern engines, that car bodies are being built with recycled materials and that the latest air-conditioning doesn't harm the ozone. Smart roads are being designed which will eliminate the need for fuel while being moved along and the cars can be packed onto the roads much closer together, thereby saving space. There may be problems in operating these in non-temperate weather zones though. For long distance trips public transit should adapt to accommodate families. Travelling by public transit is fine for one person, but for families it is expensive, it is not easy to take a family of children on a bus and pets are not allowed. In England I used to take our dog on the bus all the time and I believe this is possible in Europe too.

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Although many people today show concern for our environment, there are also many who refuse to give up their accustomed lifestyle and habits. Education will play a key role in bringing about a change of attitude. Trying to teach children new ideas is useless if their parents continue with their current attitudes and actually prevent their children from acting as they have been taught at school. This could cause conflict within families and will have to be addressed in an innovative way. Parents must be kept informed of the new teachings and invited to become involved. Areas requiring a change in attitude include:

a)   increased awareness and total commitment of the 3 R's - Reduce, Re-use and Re-cycle;

b)   cessation of the use of non-biodegradable and/or non-recyclable and toxic materials;

c)   our relationship and acceptance of other species as fellow inhabitants of this planet;

d)   diversion from an economic society toward a sustainable one, and

e)   a change in values from accumulation of possessions to the appreciation of life.

Because it takes time for new attitudes to be formulated and because there will undeniably be a percentage of people who will refuse to change, direction must come from our governments. Legislation which is already in place must be enforced and where necessary, new legislation must be initiated.

Research has already shown that young people today are under great stress due to the uncertainty of their future. It is our obligation to relieve that stress by showing them that we are planning for their future. Can we risk the possibility of facing our children in a

barren world, gasping for our last breath and having to say, "It would have cost too much to change and anyway I accumulated all those possessions for you". We are accountable!

"I've got to write my article by the end of this week," I wailed over supper the next evening, "I'll have to write every evening this week!" "Why did you leave it so late?" asked Paul. "I didn't leave it till late really, I've been working on it all the time actually. I've made lots of notes and I've got a lot of stuff in my head - I've just got to put it together and write it." I went up the stairs to the spare room at the top and sat down in front of the computer. I turned it on and typed:

MY VISION OF A CANADIAN 21ST CENTURY SUSTAINABLE CITY

The aim of this paper is to make community planners and other experts in the field aware of the concerns of a community dweller. By focusing on the human element, the raison d'etre for houses and cities, I hope to offer some direction in the planning of our future communities.

This paper will be written from my personal perspective and from observations related to my experiences while living in Canada, England and in Arizona, U.S.A.

Montréal 2042 ...
After 50 Years of Sustainable Development

by Gérard Divay

Montreal, May 11, 2042. Mrs. Nguyen-Larose welcomed her colleagues from North America to the annual congress held by the Institute of Urban Planners in Montreal to mark the 400th anniversary of the founding of that city. Mrs. Nguyen-Larose had just been named the Administrative Officer responsible for the Urban Networks Co-ordination Committee, the only metropolitan-wide institution responsible for planning, financing and control of communication networks, transportation, environmental monitoring and the location of metropolitan utilities. The theme of the conference had a definite historical dimension: "Environment and Urban Planning: Cumulative Knowledge or the Back-to-Square-One Syndrome?".

Mrs. Nguyen-Larose then briefly presented the program for the opening day. Very traditional in nature: the morning session involved a multi-media slide presentation on the evolution of Greater Montreal including the latest archeo-ecological discoveries and then, an exposé by Mrs. Nguyen-Larose on the upsides and downsides of an old idea from the end-of-20th-century: sustainable urban development; in the afternoon, a sightseeing visit of Greater Montreal which is still qualified as a mobile workshop and, in the evening, the prestigious CAP (computer assisted planning) competition. That evening there was a two hour proposal on a plan to build a new headquarters for the Urban Networks Co-ordination Committee, with cost estimates and all the impacts incorporated in the presentation. The most imaginative and creative minds were competing, with lots of cash riding in the balance.

Here then are a few excerpts from the presentation made by Mrs. Nguyen-Larose during her exposé and during the visit to the city.

EXCERPT FROM THE "THE UPSIDES AND DOWNSIDES OF SUSTAINABLE DEVELOPMENT: THE CASE OF MONTREAL".

During the last decade of the 20th century, at a particularly arid moment in the evolution of urban reflection, our predecessors came up with a new slogan: sustainable urban development. As a rallying point for environmental aspirations which had been suppressed for decades, albeit a perfect example of a synthesis of contradictions, this slogan quickly became extremely popular. However, many urban planners, influenced in this by their predecessors, the urban reformers of the end of the 19th and early 20th century, decided to transform the slogan into what was to become the new art of creating cities and of living in them. The results of subsequent experiments were anything but conclusive.

Greater Montreal did not come off too badly, however. The changes were major and they occurred in the most unexpected situations. I would like to highlight the major events of this last fifty years under five headings: a summary of the major changes in Greater Montreal, already shown in the slide presentation, a reminder as to the basic concept involved in sustainable urban development, a list of its major principles, an explanation of the prerequisites for success and a identification and elaboration of the major stages in the transition towards sustainable development.

1. Back to the Future...

First of all, let me, as an exercise in humility for urban planners, point out a few flagrant errors in the predictions

made by our predecessors. In the middle of the 60s, urban planners in Montreal were developing plans for a city of 6,000,000 people by the year 2000. In fact, in the 90s, the population was only half this. Subsequently, wanting to avoid at all costs the exaggerated optimism of their predecessors, urban planners in the 90s put all their eggs in the low growth basket. Oh yes, "to err is indeed human": as of this month of May 2042, the population of Montreal has just exceeded 10 million.

A good number of planners in the 90s also prepared transportation plans based on the concept that the use of the automobile was practically written in stone, whereas over the past 30 years the relative use of the automobile has been steadily declining. This has, nevertheless, given us an excellent road transportation system to structure our urban transit.

The error in the demographic forecasts of the 90s is easily explained. Municipal officials at that time could not predict that during the first decade of the 21st century, as part of particularly difficult negotiations on international trade, third world countries with very strong demographic growth, in exchange for a liberalization of trade practices, would require that the industrialized countries significantly increase immigration quotas. They thereby expressed, in a more tangible manner, their support for the implementation of sustainable development on a world-wide scale. Subsequent to these agreements, which were indispensable for the economies of the industrialized countries who were not yet prepared for changes without growth, massive waves of immigrants arrived in the large cities in North America, Montreal included, despite her persistently "distinct" culture.

On the other hand, and this proves that the concept of sustainable development has profoundly changed the course of

urbanization, in spite of this surge in growth which tripled the population in fifty years, the urbanized perimeter of Montreal only grew by 25%, whereas during a period of much lower growth between the end of the Second World War and the 90s, the urban perimeter had more than doubled. This demographic growth, without any proportional growth in the peripheral area, profoundly changed the urban landscape, without however completely altering certain characteristics of Montreal's urban fabric at the end of the 20th century.

The spatial shape of Greater Montreal, when one looks at its outline on a map is still vague and very indented. It is still possible in the middle of the 21st century to find traces of what provoked the great master Hans Blumenfeld to declare in the middle of the 60s: "It appears impossible to give any order and shape to this continually sprawling mass". However, even if the dispersed spatial shape continues, the urban structure of the city as well as the urban landscape have undergone profound changes. The city core which we will visit this afternoon has seen its relative economic weight decrease substantially, while still remaining the main source of urban attraction. The various parts of Greater Montreal have become independent in terms of jobs, public utilities and services. The fifty some local municipal administrations, with an average of 200,000 residents each, are logical extensions of these independent sectors. However, the cohesion of Greater Montreal was reinforced. The very essence of urban life, the exchange and mobility which was formerly symbolized by the city core, has now permeated all of Greater Montreal. The multiplication of exchanges far exceeded the growth in mobility; but residents in Greater Montreal in this mid-point of the 21st century, are just as mobile as the residents of the city fifty years ago.

Moreover, the urban landscape has become more varied. The proportion of one-storey buildings, both residential as well as industrial and commercial, has decreased dramatically. However, Montreal has kept one of its characteristics: a large part of the housing stock is still of average height as high rises were not the main means of obtaining higher population density. In other forms, the "plex" universe (duplex, triplex, multiplex) has, to a certain extent, survived.

Globally, with its growth spatially contained, and for other reasons which will become obvious to you during the course of the day, one can say that Montreal in this year 2042, adequately respects the criteria of sustainable urban development. Moreover, according to a recent competition, it ranks among the ten best cities, a position which compares favourably to the rating obtained in the "quality of life" competition held fifty years ago. This performance may well be surprising, especially since in the 90s, certain urban planners where predicting that Montreal would fall far behind the rest. But thanks to the fact that all sectors of society accepted the sustainable urban development concept, adjustments were made.

Of course, suddenly at the end of the 20th century, no specific city plan was presented which met the criteria of sustainable urban development. Slowly and surely, however, by trial and error, in contexts which were sometime very difficult and which I shall mention later on, such a plan was developed. Since all the activities of this Congress are focussed on the history of urban planning, a comparison between now and then can be very helpful here. Towards the end of the 19th and during the 20th century, the garden city concept became a point of reference due, above all, to its precise spatial organization models. However, in practice, the models ended up in dormitory suburbs surrounded by lawns.

On the contrary, the proponents of sustainable urban development, at the beginning, often lacked imagination when it came time to physically imagine the city which this would produce. In spite of this, after fifty years of practice, the results are quite positive. Why? Due to the domino effect of cultural changes, some of which were more obvious than others, which have produced economic reorientations.

2. A Renewed Vision of the Urban World

First of all, sustainable urban development generated a new examination of the vision of the city, of the urban mindset. The city had to be rethought ecologically before being reshaped. The "dominant" city - that sometimes diffuse image of the city which inspired urban leaders from various milieus - was implicitly designed in the 20th century as a gigantic measure of emancipation from nature. In the city, attempts were made to deny or to camouflage natural processes. Basic elements such as water, soil, and vegetation existed to the extent that they were carefully covered, canalized, piped and pruned. In the "dominant" city natural cycles were destroyed or camouflaged as far as possible. Seasonal cycles were glossed over by an increase in the number of controlled atmosphere locations. Even daily cycles tended to be camouflaged with a proliferation of lighting. Life cycles, with the production and the decomposition of organic materials became almost invisible.

This gigantic attempt to free us from natural constraints received good support due to an improvement in urban comfort. But this success was based on a misconception. We were led to believe in our emancipation from certain natural constraints while, at the same time, counting on nature to eliminate all the waste products which we did not want and which we were unable to control.

The sustainable urban development concept raised the necessity of living in balance with the natural elements. To establish this, it was necessary to completely rid ourselves of the backward vision of urban blocks and small garden towns which are integrated in the country. We had to accept a paradox: a viable city, in balance with the natural elements, should be designed on a "space station" concept. There was nothing "natural" at all about the back to nature trend for cities. It was the result of a technological undertaking without any precedent. Moreover, the experiments in sustainable urban development were widely fueled by efforts to build space stations. Of course, a viable community with 10,000,000 residents cannot completely function in a closed circuit as it would in a space station. However, a community which is really in balance with its environment produces a quantity of discharge comparable in quantity and quality with its intake. To be successful, we had to rapidly rediscover our dependence vis-à-vis the natural elements, and to use the potential offered by those wonderful small economical "factories" represented by the various plant species, and to accept the virtues of natural cycles.

Past attempts at emancipation from nature had to be converted into undertakings which were compatible with nature. Urban culture thus ended up being renewed. The city remained a perfect example of cultural creativity. Sustainable development reinforced this tendency since it had as its ultimate objective the cultural and spiritual development of humanity. This renewed urban culture was profoundly conscious of its dependence on nature and thus ended up being more rooted in the reality of the human condition.

The generation of urban leaders at the end of the 20th century became increasingly taken up with this vision. The innovative principle of urban development resulting from the

concept of sustainable urban development thus became more easily acceptable and accepted.

3.   Innovative Principles of Urban Development

The concept of sustainable development became operational through a certain number of principles which were progressively refined and formed a framework for architectural and urbanistic creativity. An old formulation of its principles dating from the early 90s reads as follows:

*   **Respect for Support Capacity.** Urbanization must not reduce the support capacity of the ecosystems associated with the city, those which are located in the city, in the peripheral area around the city or even far from the cities, but which provide urban input. Formulated in this way, this principle underlines the impossibility of ecologically designing the city independent from its hinterland (the size of which could vary) which, based on certain supply dimensions, could extend to the total planet. In more concrete terms, this general principle is made up of two sub-principles.

First of all: no loss of natural productivity subsequent to urbanization. This sub principle presupposes an environmental orientation of the location of new developments and, if necessary, protection of the most fragile areas within the community itself such as wooded areas or waterways. A second possible specification is no discharge in the urban environment which perturbs the ecosystems in the peripheral areas. This second sub principle presupposes particular attention to the effects of diffuse pollution in the city's water and air.

The implementation of this major general principle under its two forms involves the mandatory execution of "compensation" projects to maintain natural productivity. This could be done by using very simple standards such as no additional cubic meter of concrete would be allowed in the city without a corresponding cubic meter of new vegetation. Since compensation measures can easily reach large proportions, the application of this principle presupposes very energetic reduction measures at the source of the perturbations.

* **Energy Autonomy Ideal.** A forest does not import any energy other than solar energy. A "sustainable development" community must ultimately tend towards autonomy on an energy level, in a global perspective. The energy which it imports in all forms should not exceed the energy which it exports as products or in other forms. This principle, the most radical of all when you consider Montreal's complete dependence on the exterior for energy at the end of the 20th century, also produced the greatest changes. This principle went further than promoting a concern for energy efficiency. It promoted the production of energy in the city, the collection of all sources of heat, and the tapping of solar energy in its vegetal or voltaic form. It was also the impetus for a renaissance of agriculture in urban areas.

o **The Importance of Diversity.** Diversity must be given priority in all urban matters. The strongest ecosystems are often the most diversified ones and the diversity of the species attests to the richness of a genetic heritage from which the human species can benefit. This principle of diversity can apply both to the selection of plant species in the city and to the composition of the built environment. It is expressed in the multiplicity of combinations of various elements of the landscape and of urban functions. The belief that urban order was based on perfect segregation was almost completely abandoned by the end of the 20th century. The

recognition of the value of diversity and of differences was, moreover, the first step towards respect for equity, which is an essential element in the sustainable development of the planet as a whole.

*   **Searching for Community Integration.** The concept of sustainable development reinstituted social solidarity as a value, in at least three converging avenues. First of all, the community has increasingly distanced itself from the public state. Individual responsibility for the condition of group situations was stressed. The basic principle of co-production by the state of collective goods was emphasized. For example, all collective goods as pertains to education or security, are first and foremost the result of the behaviour of citizens rather than the result of the intervention of specialized public agencies.

The second avenue, the sectorial experiences, can only be considered community goods to the extent that they are produced within a democratic integrative process. It follows then that functional specializations (education, health, re-adaptation, etc...) divide society into compartments and prevent it from living in harmony at the least possible cost.

The third avenue: social redistribution which has overshadowed the second part of the 20th century must not hide the basic underlying phenomenon, social compensation. This does not mean taking from some to give to others. This involves recognizing that belonging to a society means a mandatory respect for this society vis-à-vis each of its members, and that the dynamics of "give and take" come into play: society provides something for you if you give something back to the society.

The increasing difficulties involved in supporting the elderly, towards the end of the 20th century, together with

the persistent scandalous situation where society failed to incorporate young adults in the labour force, progressively gave rise to a maturation of these principles. This, in turn, produced a large number of new unprecedented institutional formulae, all with one common characteristic: the increased importance granted to community initiatives and mistrust for public bureaucracy. The principle of social equity, inherent in sustainable development, was the most difficult for the public to accept. In fact this acceptance was only possible through a renewal of the concept of social solidarity in a community integration perspective.

*   **The Concern for Reversibility.** Possibilities of flexibility, adaptability and reversibility must be kept in any project. This principle at first glance seems out of place in the more urban areas. All urban planners have dreamed of building something durable, maybe not as durable as the pyramids, but at least something that could last a couple of hundred years. The concept of sustainable urban development led urban planners to think of the city in terms of continual adaptability. The extensions to the city, the major infrastructure work, as well as certain building units were increasingly designed in a modular fashion. Reversibility means convertibility and this principle thus generated concerns vis-à-vis our urban heritage. The concern for conserving our residential heritage became increasingly independent of the desire of the various neighborhoods to defend their own particular social standing.

By becoming a set of criteria for evaluating various experiments, these principles became clearer as a result of professional controversy and democratic discussions. Since they were in the main accepted, they continued to have a major impact on the evolution of the city; but even if they did have such an influence, this is due to a whole series of

conditions produced in the wake of a string of historical circumstances.

4. Conditions of Viability

Besides the international and demographic context which has already been mentioned, these conditions were of a technological, economical, socio-cultural and institutional nature.

* **Technological Evolution.** The technological evolution gave rise to a whole series of innovations which were incorporated in the urban framework, whether this be as it pertains to buildings, infrastructures, or means of transportation. But one sector of innovation, undoubtedly less visible, seems to have been particularly decisive, for it promoted certain socio-institutional tendencies and contributed to product renewal: the monitoring sector. Sensors of all types, of all levels of complexity and intelligence proliferated and began to examine in great detail the city as a whole and the effect produced by its residents' activities.

The first electronic panels showing the quality of outside air installed in the 80s really look like specimens from the ice age now that each road has its own panels showing the quality of the air at regular intervals and, at the entrance to each building, the quality of the interior air is regularly analyzed and posted. Individuals are now just as interested in energy consumption in all its forms, the composition and the level of pollution as they are in having their vital organs checked and controlling their intellectual activities and detecting problematic security situations. This proliferation of monitoring systems has made it possible to individualize a certain number of collective functions, to

privatize them or to have community groups take responsibility for them without any corresponding decrease in security and public welfare.

* **How the City Operates: Stimulus to Economic Renewal and a Job Base.** As the 21st century advances, the economies of industrialized countries are running low on oxygen. The strategies used at the end of the 20th century, which focused on exports, are running out of steam at about the same rate as industrialization in third world countries was blocking the potential full growth of industrialized countries and companies. Without systematically looking for means of growth, new frontiers and new outlets must be found for the manufacturing sector especially since the "able bodied" population is increasing through immigration and due to the postponement of the effective retirement age.

The renewal of the built environment provides one of these new frontiers to the same extent as space, the former being all the more important in that buildings and neighborhood units are becoming more independent, in terms of energy control, sewage treatment, and making use of the waste products. Centralized treatment units require a few hundred employees; decentralized units hire several thousand. In a context where the maintenance of employment becomes more important than searching for growth, the relation between capital and work in certain sectors of economic activities, including manufacturing and city maintenance, has evolved.

High capital intensive and low labour intensive activities are not systematically given priority. On the contrary, activities requiring more labour but with monitoring systems and ultra sophisticated equipment are favored. This tendency is an incentive for the renewal of the whole urban built environment.

*   **Conversion of Behaviours.** During the 90s, the values of the consumer society were torpedoed. The awakening of our environmental conscience, a difficult economic situation and new institutional systems, were factors which promoted a certain frugal behaviour. This reserve as pertains to consumption, which increased the households' capacity to save, also facilitated the financing of the renewal of the urban built environment.

Parallel, and complimenting the increase in specialized skill requirements on the labour market, was the greater respect given to intellectual values. Systematic continual training became more commonplace. The models for people who were in good shape were no longer joggers but rather those participating in all sorts of intellectual competitions. The popularity of the "dicté" during the 90s was only one sign of this change in attitude concerning intellectual work, even those categories of the labour force in sectors other than information. Jogging was replaced by intellectual training.

*   **A Motivating Institutional Framework.** The impact of the preceding conditions on the rate of conversion of the urban framework was further amplified by the implementation of an institutional framework which was more favourable to sustainable development initiatives. This is seen less in structural changes in the institutions than in the multiplication of incentive/disincentive mechanisms in relation to sustainable development orientation between the sectors.

Thus, due to the refusal of strong spatial and demographic growth, the price of urban lots became even more crucial than in the past. The systematic sharing of increases in appreciated values among the homeowner, the environmental milieu and the government, made it possible to lower the financing required to renew the built environment.

Fees were charged for all uses of collective public property
(use of roads, water consumption, energy consumption, ...).
Even "Nimby" ended up being taxed. Areas which refused
certain changes must compensate the community for the loss in
revenue which their community is forced to incur due to their
refusal.

All of these changes were put in place progressively, as
allowed by economic circumstances and political debates which
were all the more bitter in that these modifications affected
the relationship between people and society. In this
respect, the last half century may be divided into three
major phases.

5. Transition Phases Towards Sustainable Development

Considering the scope of the capital investment involved in
the built environment, remodeling the urban community in
accordance with sustainable development took several decades.

* The 90s: The First Steps in an Inevitable Change.

In the 90s, at a time when no one knew whether sustainable
urban development was a popular slogan or a revolutionary
concept, there was some hesitation. On one hand, numerous
initiatives to protect the environment were taken to reduce
the consumption of resources in the cities: generalization
of the collection and recycling of waste material, massive
energy efficiency programs, reduction in water consumption,
major increase in green spaces in certain areas.

These initiatives promoted the definition of new, more
environmental, products and made possible the creation of
numerous new companies and thousands of jobs. But although
they were effective in relation to their objectives, one has

to admit that these environmental initiatives did not really change the city in a substantial way. They modified people's behaviour and improved the city's environmental performance but had only marginal repercussions on the city itself.

However, the decade produced more profound changes as a result of the deteriorating fiscal situation of the municipalities. At a time when the financing needs for renewing the infrastructures were greatest, municipalities faced a transfer of more government expenses. The municipalities became embroiled in financial problems and effectively put off investment in infrastructure. Given this situation, the municipalities and government prepared the major elements for fiscal and institutional reform which systematically established a fee for the use of resources, and introduced the real cost of development.

However, the addition to the housing stock continued to occur for the most part in the peripheral area, with units which individually offered better performance on an energy level, but which were built in accordance with sub-division methods which remain similar to those in the preceding decades. The concept of sustainable development, in the absence of numerous examples, had scarcely any effect on the officials responsible for the production of the urban environment. Consequently, in spite of marginal but significant improvement, the quality of the urban community scarcely improved.

° **The First Decade of the 21st Century: New Cells in the Urban Fabric.**

The upturn in demographic growth and the creative contribution of many professionals during the preceding decade led to the execution of more innovative development projects. The numerous vacant lots in the city core were put

to good use. "Intelligent" buildings created in the preceding decade tended to become "living" buildings. In addition to their multiple sensors to ensure an economic operation, they became increasingly independent on an energy level; they also benefited from numerous biotechnological developments to ensure the quality of interior air and to process their waste materials.

Parallel to these new cells in a sustainable urban fabric, the old core areas, populated mainly by duplexes and triplexes, became much less compact to promote the implementation of green corridors and pedestrian cycle paths. As for the zones which had been contaminated by the initial phases of industrialization, clean-up work on the latter was just finished. The attraction of the core areas is starting to counter-balance the attraction of the peripheral sector, especially since the fiscal incentives which were put in place are beginning to bear fruit.

* **Second Decade of the 21st Century: the Metropolitan Metamorphosis.**

Sustainable urban development was no longer an experimental matter limited to a few projects. It has become responsible for veritable restructurizations. Numerous old sectors, in particular single family houses dating from the 60s and 70s, were completely replaced. The densification of land use, in spite of everything, brought about an intensification of the biomass. New types of urban transportation thus appeared and new locations were found for infrastructures. (For example, expressways along the river).

Urban planning, really in three dimensions, became increasingly popular. Height was no longer limited only by the impact on the street or by reference to the general profile of urban landscape. This urban planning system took

into account landscapes at various levels and made an attempt
to provide maximum sunshine, used micro-climatic phenomena,
and maximized green growth terraces. The urban framework was
renewed by the progressive implementation of a series of
projects with living buildings.

In brief, as of today, May 11, 2042, the metamorphosis is is
being completed. However, it has taken fifty years of work
inspired by a new urban vision to correct the environmental
mistakes of the second half of the 20th century. But had it
not been for favourable conditions and unpredictable changes
in the demographic context, the transition to sustainable
development could have been much longer and much more
difficult. Certain scenarios studied during the 90s painted
a clear picture of this; but I do not have the time to go
into these in details this morning.

AFTERNOON, VISIT TO THE URBAN COMMUNITY

A visit to Greater Montreal will make it possible for you to
go across, in succession, the town core, the industrial zones
which were installed early in the 20th century, the old
peripheral areas of the city core, and old sectors made up of
single family houses. Our group will end up using many types
of transportation, such as underground metro and light rail
transit along the major axes which structure the urban
agglomeration. In addition to these major axes, which are
the only one's to be taken under the wing of the metropolitan
organization, there is a wide diversity of types of
transportation, promoted by healthy competition between the
municipal governments: walking, cycling, collective taxis in
the core areas, while further out there are electric or
hydrogen buses and a branch of the L.R.T. Whatever the type
of urban transit chosen, you can rest assured that it will

be, if not quicker, at least much less stressful than a rental car.

First of All, Lets Take a Glance at the City Core ...

In relation to the images at the end of the 20th century which you saw this morning in the slide presentation, the landscape of most central areas in Greater Montreal, in the mid 21st century is quite different. The relief is no longer profusely rectangular. Two changes in points of view contributed to this modification. First of all, the base element of these zones is no longer the buildings, but blocks with ever-changing outlines. Subsequently, the design of these blocks has systematically added to the "view from the street" perspective, and a second perspective, a "view from the air". Henceforth, the relief of these new blocks is much more similar to gently sloping rice fields on the side of hills than escarpments and precipices. In these areas, the city has been successful in operating and in living at several different levels.

Moreover, the high-rises which remain are representative of a heritage from the second half of the 20th century. After the first decade of the 21st century, it was rare to see new buildings which exceeded twelve floors. The attempt to install greater harmony between the interior and the exterior contributed to this trend. The large buildings are no longer glass bubbles with centrally controlled atmospheres which control temperature and air exchange with the exterior with each level tending to be independent. Windows which can open have become the general rule once again while the design and management on a level/storey basis have made it possible to maximize the storage of solar energy, to better use the surface water and to maximize the development of vegetation. The building envelopes alternate between biomass and storage system for solar and wind energy.

In some of the more recent buildings, the envelopes breath in
a fashion similar to certain outer garments. However, the
increasingly higher requirements for the certification of new
building materials has the effect of delaying their
marketing; their effects on health and their recycling
capacity must also be as carefully examined.

On a functional level, these core areas have also undergone
remarkable changes. In compliance with the intentions of
Montreal planners at the end of the 20th century, the
residential function underwent intense development, often
combined with office buildings. But the most important
change of the last three decades is that of the increasing
role of university campuses in the core areas.

In spite of a considerable increase in student numbers
subsequent to the growth in population, it was wisely decided
not to create any major campus in the peripheral area around
the urban centre. The very high "grey matter" density in the
centre core is a part of Montreal's international image. The
new university buildings, due to their quality and sometimes
to their avant-gardiste style, have now become a symbol of
the city core just as the office buildings were at the end of
the 20th century. They demonstrate a new informational
society. The university presence, interspersed among head
offices, financial institutions and large consulting firms,
has made it possible for Greater Montreal, due to the
vitality of its core areas, to become and to remain over the
past few decades a renowned innovative milieu. This
phenomenon has had a great effect on the evolution of the old
industrial zones in the peripheral area around the core.

In this remodeling of the city core, the selection of
heritage buildings among the total production of office
buildings in the second half of the 20th century, became very
controversial. You can observe this yourself in the

newspapers. As we approach the 100th anniversary of Place Ville-Marie, the debate has become stronger between the two options: rehabilitate this project, the heritage interest of which is undeniable and which has marked the evolution of the core areas, or convert this site which is currently in a very deteriorated state into a large public square, providing a warm welcome to the many visitors arriving in Montreal by the T.G.V.

The Manufacturing Incubation Ring

The old industrial zones which formed a belt around practically the whole central core while stretching out along the Lachine Canal, to the south, the shunting stations to the west, the rail line linking this railway zone to the harbour area on the north and east side, were in a very precarious position at the end of the 20th century as their future was uncertain. Their designation as a new industry zone, a decision which was very risky at the time, proved to be successful fifty years later once the problems generated by decontamination and the acceleration of the replacement of old structures were solved. Innovative small and mid size industries are present in large numbers in their first development stage. Like the coiling of a dynamo, this manufacturing ring around the core area has contributed greatly to the economic recovery of Greater Montreal.

The Areas in the Periphery Around the Core

The "plex" universe, typical of the first wave of suburbs in the 20th century around the city core, experienced quite different types of both physical and functional evolutions, depending on their vocation. The residential vocation remains the predominant one, but the number of jobs created here as well as the social heterogeneity increased. Certain sectors became real "souks" (markets) buzzing with activity.

On a physical level, certain projects with a heritage value
were very carefully preserved. Other projects were rebuilt,
especially in areas immediately adjacent to subway stations.
Certain modifications were more remarkable than others. On a
functional level, these areas, like all the other sectors in
Greater Montreal function more independently as pertains to
numerous services including waste management.

On a physical level, vegetation has become very evident in
all these sectors. Not only has the density of the
vegetation increased, but in these areas the residents are
provided with the possibility of direct contact with urban
agriculture. This has been done by sacrificing certain
buildings to the wrecker's ball. These demolitions, far from
decreasing the population of the area, merely reinforced
their capacity to attract people. Over time, these sectors
have been successful in respecting a standard set in the
first decade of the 21st century: one square meter of arable
land per person. (And yes, in spite of the enormous
monitoring possibilities for urban management by performance,
urban planners in some circumstances have continued to
produce reference standards; in this case, much more of an
objective/ standard or a slogan/standard, which mobilizes
numerous experiences.)

Subsequently, at the end of the 20th century and the
beginning of the 21st century, community life in each sector
was gradually reorganized around a new community
identification and animation facility: the training centres.
Spatially grouping numerous institutions, schools, community
groups or companies dedicated to education and training, each
with its management independence, these training complexes
serve young as well as adult or elderly client groups. Since
example is the best instrument to motivate and to teach, this
mix of client groups has greatly contributed to reducing the

school dropout problem which was experienced at the end of
the 20th century.

Over time, these training centres, provided disorganized
areas with a new physical identity. Moreover, they became
multi-functional premises providing services, the central
nervous system for numerous community development and support
initiatives and a rallying point for all citizens not
included in the multiple informal exchange networks which
accompany the intra urban communication systems.

The Shores, a Barometer of Sustainable Urban Development

As we leave the core areas to study the old dormitory suburbs
which have now become complete cities, you can take a look at
the banks of the river. Last week a very special event was
organized: the last private parcel of land along the shore
was acquired. It has taken fifty years of systematic and
stubborn efforts to provide public access to all the shores
and to restore them to their natural state, outside of the
numerous beach areas.

One of the most eloquent components of Montreal's
international image is this proximity to, and profusion of
water, a characteristic which is all the more eloquent in
that water has become a limiting and constraining factor in
the operation of many large urban centres. Montreal, a
metropolis with 10,000,000 residents, is proud to claim that
it can offer at least one meter of shore for every ten
people.

However, debates periodically occur between Montreal and
other large metropolitan areas further up the river
concerning questions of flow as well as of quality. To
ensure its credibility in these debates, Montreal has led by

example by the very high quality of its waste products and by the very small strain it is putting on its water table.

Glorified Bungalows, But They are Now in a Minority Position

Now we arrive on the South Shore in areas which, at the beginning of the century, were covered with bungalows. At that time, in the opinion of certain people, they were the symbol "par excellence" of the non- sustainable nature of urban development at the end of the 20th century, as attests the triology/slogan which existed at that time "bungalow-job-auto" which symbolized, in a very trivial way, life in the suburbs. They were reproached for their unending energy consumption and their poor pollution control rating, due essentially to one ubiquitous characteristic: two or three cars in every driveway. These sectors composed of bungalows went through very different evolutions. Two factors can explain this. First of all, the municipalities in the peripheral areas, having as their only tax base, houses occupied by households with average incomes or slightly less, ended up in an unprecedented tax crisis when they had to participate in the cost of major infrastructure work in the metropolitan area; they were thus encouraged to convert their physical environment to increase their tax base.

Moreover, on an individual level, the introduction of new fiscal incentives introduced surtaxes on all consumption of housing resources above average. In a context of demographic growth which we have already pointed out, two things occurred.

Certain sectors of bungalows, thanks to all sorts of marginal adaptations, were able to comply with the principle of sustainable development: recovery of surface water for watering lawns, improvement of energy efficiency with the

addition of solar energy, composting, small scale horticultural and market garden production... These residential sectors still remain very popular, although they require, by their residents, a major environmental investment, both in time and in money.

However, most of these sectors were completely converted, very slowly however. In fact, it took at least two decades to have accepted the idea that quality of life in urban communities meant changes in which, in the eyes of the owners of bungalows, appeared as the very basis of this quality of life: lawn to stretch out on and asphalt to drive on.

These changes which were executed in a context of mistrust and great democratic vigilance, are apparent in all sorts of forms, with however common characteristics: greater density, mixed uses, maintenance of high density of vegetation. Row homes, renewed plexes, projects with four to ten storeys, all this means the production of "living" and higher performing buildings on an environmental level, even if, in numerous cases, this means changing the existing street grid which was a disincentive to pedestrian circulation or to bicycles and which made urban transit service difficult.

The first generation of urban planners coming out of university with a sustainable development vision, were more than eager to take on this challenge at the end of the 90s ...

Sustainable Canadian City in the Year 2020: A History of Beginnings at Willmore and Calgary

by William T. Perks and David R. Van Vliet

PROLOGUE

Sustainability:
ecological performance and economic performance,
identify and place,
the global economy and a place economy,
environment and quality of life,
city development and urban ecosystem,
re-structuring,
affordability and choice, house and community,
new values and retrieval of values,
self-reliance,
acting locally, with direct participation.

These are some of the preoccupations stitched into the mindweb of beliefs and desires of the people of Calgary as they journeyed from the late 20th century into the 21st.

In this small story the people of Calgary look about them, at Willmore and at ErinGrove Subdivision. This story affords us a glimpse of a sustainable city. It depicts these two places and recalls some of the key events and motivations of the actors.

Willmore was built "a-fresh". The other place, ErinGrove, is a dormitory suburb in the process of re-making itself. Not one trend but a multiplicity of forces have given rise to the restructuring of the city described here. On this particular pathway to a sustainable city there have been no dramatic inventions in the art of city-building.

This "contemporary history" of Willmore and Calgary is mainly about retrievals. One might say there has been a retrieval of the partnerships and the ecologies of earlier times. The

"smallnesses" of community and urban political arrangements
and the civic virtues of earlier times are likewise retrieved.

In this matter of urbanism and sustainability the people of
Calgary are re-learning the interconnections of the many
elements that make up a city. Urban institutions, the
development industry and the methods of house building have
been re-structured. And those who figure prominently in the
story have been re-making the vocabulary of city planning and
urban development -- a necessary beginning, and one of the
crucial instruments for the work of a sustainable city.

. . . . .

My name is Dwellnow. I am a 70-year old resident of Willmore-- a
village you might say, a part of Borough Three, one of Calgary's
re-structured, local government entities created in 1998. As for
Willmore itself, it has been "growing into" the city over the past
fifteen years.

I'm not retired, mind you -- jut retire-ing. I started a pasta-making
business here. At the same time, I was also a participant-designer of
my own house, and a participant-builder of two communities here in
Calgary. Helped to start up Ingleforth, then a little later, Willmore.
Most of us living here at Willmore were participant community-builders.
Come to think of it, we still are.

> The house is a small city
> and the city a large house.
> - Leon Battista Alberti

> The Affordable-Sustainable Community
> (ASC) Project aims at demonstrating how
> we can design, build and market a prototype
> residential community in Calgary.
> - ASC Project Prospectus
> August 1991

> Everything old is new again. The first
> "innovation" is an open road grid ... instead
> of the crazy-quilt of residential crescents
> closed off behind berms beside arterial roads
> and strip developments.
> - William Thorsell
> Globe and Mail
> 1992-03-21

> The past was peopled with figures of
> transition "wandering between two worlds,
> one dead, the other powerless to be born."
> It was such thinking that led an imaginative
> student to describe Dante (1265-1321) as"
> the Italian poet who had one foot in the
> Middle Ages, and with the other saluted
> the rising star of the Renaissance."
> - Daniel J Boorstin

It is evening ... year 2020, September 21. The residents of Willmore have gathered for the Harvest 15 Celebration. Dwellnow is there and so is Robin, one of her teenage grandchildren. Robin has come all the way from suburban West Island for a two-week student exchange visit. He will be returning home in a few days time.

Tomorrow, Robin intends to finish up an essay on "Civics and Sustainability" he has been writing for his Society and Environment class at school.

Half or more of Willmore's twenty-seven hundred residents have come out for the Harvest 15. Friends and relatives who live in the ErinGrove and Brisebois Subdivisions nearby have strolled over to join in the celebration. The Willmore Community Refectory -- a community dining and meeting place -- has a seating capacity for only 360 persons. Most of the celebrants are therefore seated outdoors in the Campo, a place laid out in the very first days of the community when the Refectory was built. This place is for play and repose, leisure and public gatherings, and casual commerce. School classes are sometimes held here, and the annual Community Personality Theater production is performed on the Campo.

The soft light of this autumn evening filters through the yellowing aspen leaves that form a whispering canopy over the Campo. The glass panels of the Refectory are drawn open. Children and teens move in and out in search of chums and goodies and encounters. The celebrants have all brought their

own portable, lightweight-high-technology fold-up travel tables and their pack-sized sets of machine-crafted cutlery.

Dwellnow, Robin, young Pipestem and a couple of other teenagers from the Design Programme at the Borough Three Academy have been going about the Campo selling these and other locally-made products. They are renewing friendships and seeking out new ones as they go about their work. Work and celebration -- and learning -- go hand in hand quite regularly in the context of community life at Willmore. These "dining-out" utensils (and other artifacts) are all produced and retailed directly from Kirby's ID-Too industrial design studio and manufacturing enterprise.

ID-Too is a community co-op enterprise, in which Kirby holds a substantial share. The business is located in the big house on the far side of the Campo, a four-storey building that some of the locals call "The Palazzo". They call it the Palazzo because this single 4-storey building combines not only family housing and apartments for singles, but a design studio, Kirby's production hall, and a tele-marketing and customized-orders office as well. In the old days before the EcoHab program and before the Ecological Restructuring Policy was brought in during the 1990s, the municipal regulations would not have permitted a "mixed use" of land and a "mixed occupancy" building such this. So it is that the concept of sustainability has caused us to rethink the vocabulary and the doctrines of city planning and urban design.

From the southeast corner of the Campo one can look along Willmore Mainstreet and catch a glimpse of a walled garden, and next to it, the storage sheds of Dwellnow's original Dry Pasta Productions. The business now belongs to her son and daughter. This was the first enterprise established at Willmore. A few years ago, it underwent expansion in

partnership with the City of Calgary's Community Enterprise Program.

The festive supper is ending now. Some of the tables have already been folded up and tucked back into shoulder bags. Dwellnow, the Mayor of Calgary, and a couple of the City Senators have taken their positions on the top of a stack of skating-rink boards that lie to one side of the Campo. Dwellnow gives a short welcome address, then the Mayor introduces the honoured guest: Daniel Boorstin who takes a place next to Dwellnow and begins,

> **Among the crucial features of our human experience, then, we must count not only the vast range of events and achievements that make up a contemporary life, but the accessibility of the events and achievements of one place to people living elsewhere. Contemporaneity -- as a quality not of the calendar but of living human experience -- is a relative and variable term. It depends not only on what happens when and where, but on who knows what, when, where. . . .**

As Boorstin speaks, Dwellnow glances first out to the gathering in the Campo, up Willmore Main and over to ErinGrove and the Calgary Tower beyond. In a single view Dwellnow can see it: a wholeness, a retrieval, the old made new again. Not entirely that, but certainly a city in the process of restructuring. Perhaps, she thinks, the world that fits is not so powerless to be born. Dwellnow gives a one-foot salute in the direction of the sustainable city.

She begins to reflect on those fifteen years past, and on Boorstin's words, words that might just as easily have been spoken back then in the early 1990s when the Affordable-Sustainable Community Project had its beginnings in Calgary:

> **In the most recent times we can begin to take it for granted that dominant events and achievements which occur in a particular year enter the experience of larger and larger numbers of people in that very year, or even on the very day of their occurrence ...**

Something just like that seemed to happen here in Calgary, Dwellnow is thinking. Willmore is only a small place in the larger scheme of things in Calgary. It is a modern urban village, a contemporary place, one might say. It is a whole community nested in the Borough, with the Borough nested in the city -- one way of living, one form of authentic community designed and built as workplace and learningplace, and not simply a place for residency. A wholeness nested within a whole life and a wholeness of city -- the house and the city thing that Alberti spoke about in the 15th century.

To think of Willmore as a village is something of a paradox. But is this paradox of an urban village nested in a city more or less implausible than the paradox of an industrial society nested in a global framework for sustainability?

To the people who began Willmore, the idea of a village community as an organizing principle for planning, creating and managing the sustainable city seemed to be a good fit with the Brundtland Commission ideas of "acting locally, thinking globally".

Boorstin is reaching the end of his speech:

> From their search for house, the partners in Willmore's birth and development have retrieved dwelling. Dwelling came to be seen as more than a roof over one's head. It became a place ... a place to meet and dialogue, a place where consensus and mutual interdependence could happen, a place for the exchange of ideas and feelings and the products of one's work. In the making of it, Willmore had become a diversity and a multitude of possibilities to be realized where we actually live.
>
> One of the obvious features of the experience that fills our lives every day is that we never know what will flow out of it.

.....

The celebrations are over. Dwellnow and Boorstin have strolled down Mainstreet. As they take a place on the belvedere seating wall, Robin approaches. He has been up in the observatory atop the community care building, taking in a farewell view of Calgary.

The conversation turns to what it means to have sustainable development. They speculate on whether this bold, 30-year old idea from the Brundtland Commission is not a contradiction of modernity and an impossible enterprise of restructuring within the framework of the contemporary industrial city. They recollect the beginnings of that kind of speculation years ago.

Their conversation turns to Christopher Alexander's and A.K. Bierman's ideas about building a place by small steps, of making wholenesses that eventually add up to a community wholeness within the wholeness of the greater city. Dwellnow says they had something of this in mind when they began the Ingleforth housing project in 1992, and then the Willmore community project in 2005.

> Every building must create coherent and
> well-shaped public space next to it
> ...Every building increment must help
> to form at least one larger whole in
> the city ...Christopher Alexander

> ....and in considering the nesting
> relation, I was laying hands on
> the very structure in which the
> new you will come into existence,
> Mishkin. ...In drawing blueprints
> of your city, we are also drawing
> blueprints of you ...A K Bierman

Dwellnow explains how she had come to realize that this ideal of wholeness was not just an idea about city planning. Wholeness flowed as much from, and in concert with, a steadily-augmenting, self-reliant stewardship of the place, and from a participatory consensus about the what and the how

of the urban community.   That is what happened at Willmore, she thinks.

Throughout the 1970s and 80s, Pierre Dansereau, the great Canadian ecologist-philosopher, and Dwellnow and countless other ordinary Canadians like herself had been contemporaries in a struggle to bring environment and a sane city-building onto the agendas of governments.   It was Dansereau, Dwellnow explains to Boorstin and Robin, who had spoken vigorously on this matter of re-structuring.   A comprehensive re-structuring of cities and biotic regimes, of societal institutions, and re-making   the   paradigm   of   economic   decision-making. Dansereau's "formula" went like this:

* More self-reliance of the individual and of the household.
* A heightened consciousness of the identity and capacity of living and non-living objects.
* The necessity of more order in daily life and a greater variety of plans.
* Reading, listening, viewing and discussing will produce real knowledge.
*   Decision-making...less   arbitrary   and   more   satisfying decisions made jointly with others of similar condition who likewise accept their consequences.

Bierman's, Alexander's and Pierre Dansereau's five-part proposition were the beginnings for Dwellnow and her partners at Willmore -- the beginnings of an ecological approach -- to city design, to urban development practices, to house-building and marketing, and to the creation of an authentic community.

> What our situations seems to call for
> is a complex, many-levelled struggle,
> intellectual, spiritual, and political
> ...where the issues of enframing technology
> are being lived through in concrete form
> ...But to engage effectively in this
> many-faceted debate, one has to see what
> is great in the culture of modernity,

as well as what is shallow or dangerous.
- Charles Taylor

And how much of Willmore was invention and innovation? -- new "enframing technology", as Charles Taylor had called for. How much of it was retrieval of traditional human values and a restoration of modernity? How much of it was owed to the ecological and institutional re-structuring policies and programmes of the Calgary municipal corporation? How much of what occurred at Willmore was accidental and fortuitous as distinct from conscious "struggle"? Dwellnow would never be able to reckon it. She knew only that these many, many things and events were all of a piece. She turns to Robin,

> I tell you, Robin, one can never be sure when it is that things start up. Beginnings are much easier to talk about.
>
> As for the connecting up of things, who can say? I do think, though, that the richness and the full possibilities of connected ideas here at Willmore had something to do with how we used to speak with each other of opportunities and experimentation, and not always of "issues", problems and analyses. Be sure to put that into the essay you're writing.

*

> When [a] custom house builder
> bought 14 walk-out lots in Signal
> Hill, they decided to stick with
> the area's estate feel. The
> result is a 3,500-square foot
> design with a lot of unusual
> features ...Show home price
> is $379,000.
> - Calgary Herald.
> March 21, 1992

> Contemporaneity is a relative and variable term.
> - Daniel J. Boorstin.

> Meanwhile, a recent national
> survey of 60,000 real estate
> transactions [in Canada]...
> found that high prices were
> keeping people under the age
> of 30 out of the Vancouver market.
> - [Canadian Studies section]
> April 27, 1992

Dwellnow could remember reading the Homes section in the daily newspaper, in the 1980s and 90s. There was the usual quarterly reporting of housing starts and house prices. But nothing about the building of affordable housing or about meaningful housing choices. Housing -- "homes" they preferred to call it in the market place -- housing in those days was still located in some sort of illusionary zone of "consumer choice" that somehow would not yield to the newer economic doctrines. Doctrines like The Primacy of Service, Total Quality Management, and Mass Customization, for example. And city administrations were unyielding on the matter of cadillac standards for infrastructure, subdivision planning and site development regulations that seemingly combined to keep the costs of housing beyond the reach of many families and households.

. . . . .

It is September 11, ten days before the Harvest 15 event at Willmore, a workday and nearing dusk. Dwellnow is out for a walk with Robin. The distant Petro Canada tower is in full view, then disappears from view as they turn about and ascend a gentle slope.

Across the slope stretch the terraced vegetable and floral gardens of Willmore. The remnant stalks and vines in the community allotments shuffle and whisper in the autumn breeze. Dwellnow and Robin pause to observe the pattern of 1.5-metre high, L-shaped carragana shelter hedges, and the boardwalk aisles terminated by tiny gateways of varying colours.

Thigh-high fescue grass sweeps the outer edges of the terrace revetments. The "first" of these grasses were obtained some 10 years ago from Revel's Retrieval Plantation located up on NoseHill in Borough Two. It was planted by community volunteers. The fescue extends like a waving carpet across

much of the land between the Willmore allotments and further
out.

There is where the ErinGrove Subdivision begins, stretching
itself out at a yawning pace of four (4) housing units per
acre. According to the official plan drawn up in the late
1980s, the City had planned ErinGrove to be five or six units
per acre! By comparison, the little neighbourhoods at
Willmore are three and four times that density. Robin has
already remarked on the visible difference between the two
places. He is saying that Willmore seems sort of "crowded" by
comparison.

The Dictionary of Contemporary Urbanism (2nd ed., 2018)
defines "Housing Density" as an old and now seldom-used ratio
that measures the intensity of occupancy of land by houses or
people or households; in the time of suburbs and subdivisions,
before sustainable development, one's quality of life was
erroneously thought to rise exponentially in inverse
proportion to density until an optimal ratio of 0.25 person
per acre was reached. Dwellnow has been explaining this
concept of density and urban planning to Robin:

> What the politicians and the planners began to see some thirty years
> ago was that optimal quality of life had little or nothing to do with
> single family homes and low density planning. They began to see it
> had to do with Community and community-building. So, for example,
> what we tend to focus on at Willmore is, we keep track of how the
> Biotopes are doing. We don't fuss much about the number of housing
> units per hectare, except to say that housing should be affordable and
> fitting to the urban village concept.
>
> Here at Willmore we measure our qualities of life -- every two years
> -- by something called summum bonum -- the "sum of the good things in
> life" that one can enjoy after you have paid for the necessities of
> house, decent food and community supports.
>
> This summum bonum thing has no hard measure. We just get a feel of it
> at the annual meeting of the Co-Op. People get up and tell about the
> nicest things that happened to them outside of the home but right here
> in Willmore -- like when they're out bird watching in the Habitat
> Restoration garden, or down here at the co-generation house tinkering

with a new production item, or doing business in the Campo, or out there studying plant succession in the fescue grasses with the kids from school on one of their designated half-days for PEP (that's "Parents Educational Participation").

In a way, Robin, this crowding thing you have on your mind depends on what you choose to measure, doesn't it? If you can live and work and recreate in a place that has environment diversity, that says something for Quality, doesn't it? And if you can live close enough together so that there are opportunities for as much human interaction as you care to have within walking or shouting distance, then you don't put much stock into how big your house is, or how much private yard space you have, or how close you are to your neighbours. Especially if it costs you less to acquire and maintain a house.

Besides, this urban village, because it's a close-knit fabric of housing and other things, it consumes less land, and each of us consumes less energy. And, we partner with each other, or with Community CoOp, to provide many things that we all need in common.

Pick what you want, it will all add up to sustainability. By the way, I'll have to show you the latest report on "Community Quality" measures at Willmore. this is a report done by the City every few years -- makes for some good reading.

How about this for your essay on Civics and Sustainability? -- When you look for a house, better to start by counting up the Qualities of Life you don't have when you're living at 5 units per acre than by calculating your index of private space. That's what those people were doing when they decided to move out to Penturbia in the 1990s:

Penturbia:
Small Towns Lure the Disenchanted: [Jack
Lessinger] contents that major cities,
which were designed for times of prosperity
and conspicuous consumption, are not well
suited to changing economic conditions requiring
less consumption and conservation.
- Globe and Mail
1992-04-27

. . . . .

Dwellnow and Robin continue on their walk. Just ahead of them a small group of adults, youth and children are at work. They are replacing some translucent panels on a greenhouse next to the Willmore Co-Op Co-Generation House. Others are busy readying things for winter, attending to the connections for energy, water and waste recycling, and an electronically supervised nutrient feed system. As they pass, Dwellnow

raises one foot in salute. (This habit of community recognition has been long with her).

Then they pause and scan the landscape of the city. Out there, about 600 metres away to the southeast, where the fescue grass ends at ErinGrove Boulevard, they see the 3,000-square foot houses built in the year "Before Sustainability" -- the BS era, as Dwellnow likes to call that period a generation and more ago.

Dwellnow and Robin can observe that all around these houses there are large, burntumber lawns. On their borders are dangling clusters of long-dead perennial exotics. The summer had been exceptionally hot. The customary spring and summer replenishments at Glenmore Reservoir had not materialized. Household water metering, together with the City's sliding-scale water charges -- introduced in 2010 after four decades of recurrent plebiscites -- appear to have ensured that irrigation in the ErinGrove Subdivision was severely restrained this year.

Robin makes another mental note for his essay: irrigation at Willmore is done mainly from collected rainwater and re-cycled grey waters. Water at Willmore is stored mainly for food crops, and there are very few lawns to water in grandmother's village. What Robin has observed at Willmore are grassland biotomes interspersed between the dwellings and in the three habitat restoration gardens that give unique expression to a symbiosis of nature's place and the community's place.

At ErinGrove, family cars are angled up to double garage doors. Garages form the streetfronts of these BS era "homes". Along the subdivision collector roads and the 15-metre residential streets there is silence, and very little on-street parking. No pedestrian movement is to be seen along the one-metre wide sidewalks.

At one end of ErinGrove Boulevard, where it connects up to a 6-lane divided arterial road, Dwellnow and Robin can see some activity in the roadway. A municipal workcrew, assigned to the EcoHab Project 23, is tearing up the paving on all three of the westside lanes of the boulevard. Slabs of asphalt are cast into a mobile rendering plant; the concrete curb castings are being lifted, crushed and sifted; the boulevard subcourse is being worked with a cultivator and fertilized from one of the Borough's mobile compost-sludge dispensers.

A second crew is working along behind the first, forming the ground and greening the carriageway as de-construction is completed. A third crew is foresting the grassy reserve of land along the eastern extremity of the right-of-way. There is a bit of a lull in activity at the borough Community Design and Development Services Office these days, so some of the Borough Service administration officials have joined the crews and are doing one of their prescribed 5 days-a-month "team service in the field" (TeaSiF, as it is referred to in the union agreement). A fire department pumper is seen returning from its fill-up at the Bow River; here and there, other pumpers are irrigating the plantations and filing a cistern.

When this road retrieval and greening operation is completed in a few weeks time, cars and the electric-powered Borough buses entering and leaving ErinGrove will be moving slower but still steadily, now in the eastside lanes only. The resulting increase in trip time at peak hours of the day will be 2-1/2 minutes -- for those who live at the far side of ErinGrove and work downtown!

Farther down the boulevard, also along the west half of the expansive road right-of-way, clusters of busy people can be seen. With the collaboration of teenagers from the Borough Youth Academy and a few adults from the ErinGrove Subdivision, a fourth EcoHab 23 crew can be seen preparing the grounds, and

putting up fencing and small buildings for the egg and poultry
enterprise that will be inaugurated next month. Some people
are already calling the Boulevard, "The HenWay". Two small
houses for the community entrepreneurs are already erected on
the site. One of the entrepreneurs is Dwellnow's nephew,
Versateal. Robin is curious about these re-construction and
retrieval activities at ErinGrove Subdivision. Dwellnow
responds,

> Oh, that's not easily explained, Robin ... at least not in a few
> sentences. Let's see now:
>
> EcoHab 23 got going 23 years ago -- the same time the City of Calgary
> got split up into four, semi-autonomous city boroughs. Every year
> they add a digit to the EcoHab Project, and they'll go on doing that
> until all the Subdivisions built in the 1970s to 1990s that want it
> are developed into more Sustainable Communities. Over at the Borough
> offices they are calling it a "retrieval" programme. It's an
> opportunity programme, not a planning regulation.
>
> There's maybe 8 or 10 Subdivisions left in Calgary that haven't joined
> into this ecological restructuring-retrieval business. Which is OK
> ... after all, not everything can be done overnight. Besides, as
> Pierre Dansereau said back in the 1970s, sustainable urbanism is about
> choice and diversity and self-determination; people will make up their
> own minds about when they are ready to make communities instead of
> just inhabiting residential subdivisions.
>
> Well, you can see over there, Robin: ErinGrove is remaking, restoring
> and restructuring, all in one -- traffic downsizing, co-op enterprise,
> greening and food production, job and enterprise partnering,
> pro-active municipal service. That's what we started out to do with
> the design and building of Willmore years ago.
>
> And look. They are even trying to get "crowded". Have a look over
> there ...you can see them working on Versateal's old house. (Well,
> not exactly old -- built around 1990, from the look of it).

Versateal's "old" house sits on a 1/4-acre pie-shaped lot
located a few streets beyond the boulevard. The house is
being expanded into the backyard and at the front, right up to
the street line. The Versateals are retrofitting to provide
one additional family unit and an office suite for their
business. A rainwater cistern for irrigation supply is being
installed underground at the street side of the lot. It will
be connected eventually with 15 of the neighbouring houses on

the block.   A few teenagers are hard at work on the
Versateal's house re-structuring.   These young adults are
doing one of their practicums for the Community Technologies
course at the Borough Academy.

A deal has been struck between the ErinGrove Community
Enterprise Corporation (CEC) and the Borough.   Versateal's
business partnership gets a lease from the Borough on the
HenWay lands.   In return, and under a tri-lateral agreement
between the CEC, the Borough and the City, the CEC takes an
equity position in the retrofitted house, thereby placing two
dwelling units for the Borough's Assisted Housing Placement
programme.   The CEC takes over management of this "new" rental
unit on the Borough's behalf.

Community Enterprise Corporations like the one at ErinGrove
are fairly common about the city nowadays.   Willmore's Co-Op
Community Enterprise was one of the first to be established.

Robin has been asking to hear the rest of the story about the
EcoHab business.   Dwellnow backtracks ...

> To make sure those new Community Design Service teams I mentioned
> earlier would get the collaboration they needed from developers and
> builders when they launched EcoHab, the City disconnected all their
> infrastructure feeds to Greenfield sites where new Subdivisions were
> underway or Area Structure Plans were being worked on.
>
> That was in 1995, after the City had given notice in 1993 that their
> Ecological Re-structuring Policy was coming into effect.
>
> They then invited developers and builders to enter competitive bids to
> obtain a Community Development Permit on the lands they had in
> readiness.
>
> The developers' bids were judged against three performance standards.
> They called it the "A, B, Cs" of Affordable-Sustainable Community:
>
> A -- what would the developer's plan do to advance ecological criteria
>   for both community life and environment restoration.
> B -- what elements of the plan would ensure that, over time,
>   opportunities for food production at the community level and
>   provision for close-to-home employment would be offered.

C -- what proportion of housing would be designed with the houseseekers participating in the design, and what percentage of this housing was going to be affordable.

The bidders who scored highest on all three areas of "performance" won the right to develop their land. They were the ones, by the way, who went out and marketed not "homes" but rather, community-making.

> Starts are very volatile. In the
> late 1970s there were 200,000
> housing starts a year. The 1982
> recession cut that figure to
> 126,000. By 1987 another boom had
> sent the figure up to 246,000.
> Then four years of declines reduced
> it to a mere 156,000 in 1991...
> In the first quarter of 1991, ...95,000.
> - The Globe and Mail
> March, 28, 1992

Dwellnow had lived through the economic prosperity of the 1970s as well as the recessions of the 80s and 90s. There was recurrent talk about affordable housing, but talk too was cyclical, and affordability never came onto the agenda of Calgary's City Council until the early 1990s. And even so, there seemed to be an exceptional faith among politicians and city officials in the magic of industry solutions -- in "market housing". Meanwhile, 75% of tenant households in Calgary could not financially qualify under 30 percent-of income affordability criterion for a home purchase. Twenty-four percent of tenant households in Calgary were paying more than 30 percent of income for housing. And even many of those who owned their homes could not keep their principal, interest and maintenance payments under the 30% of income index.

I remember, too, how there was occasional talk about changing family-life values and an aging demographic profile. Today, 25% of Canadians are over the age of sixty-five. But you know, few if any builders on the market side of Housing seemed to have thought much -- back then in the nineties -- that our profile was fast aging, and within a decade or so the next wave of "empty-nesters" was going to be the senior wanting to unload their 3,000-square foot houses and find a smaller dwelling and a place to live where there were good community supports.

> Around the turn of the century we stopped talking about the housing delivery system and housing starts ... and land use plans, those administrative conveniences of a routine and unimaginative urbanism.
>
> Over time, the builders discovered a new way of planning and designing, and marketing and building their product. Eventually the industry just evolved into a practice of collaborative community-building, with user-participant design and mass-customization of housing as the basics of a marketing strategy.
>
> And Housing Affordability, you ask? Well, it certainly made a difference to have the City's pro-active "A, B, C" program brought in.

As at Ingleforth -- the place where Dwellnow first participated in a pilot project for community-building around 1992 -- belief at the Willmore urban village is in the retrieval of human values and innovations in the direction of conserving more and consuming less, re-cycling and biomass production. There is certainly a fluidity of individual and family aims, but these always consonant our man-made and natural environments just as we nurture the home.

Belief at Willmore is in voluntary modesty -- some would say voluntary simplicity; yet simplicity infused with technological acumen. Stewardship has largely replaced consumption as measures of community success and individual satisfactions. Unstructured time goes hand in hand with mutual independence and associated individualism.

These attributes of the sustainable lifeway are attributes of the act of creating place and community in a congenial way. These are not the sort of things that can be produced by conventional land use and subdivision planning, and environmental impact assessments. In reality, Willmore is an act of creating and re-creating urban ecosystems. Robin asks Dwellnow if Willmore came about through the EcoHab program.

> No it didn't. Willmore was something quite different and original. Willmore was always our place, ours to begin, something that a small group of homeseekers conceived and desired to build.

It wasn't only the pasta-making business that brought me here, Robin.
It was also the pull of opportunity -- an opportunity to participate
in a somewhat broader and deeper experience of contemporary life as we
saw it unfolding in those first few years after the Ingleforth
Affordable Housing project got built.

Back then in the nineties we began to see that people -- well, a good
number of them anyway -- wanted affordable houses, and decent
communities that meant you didn't have to spend 15 to 25 percent of
the work day in an automobile. And I think I told you, didn't I? --
about the market research done in 1991 into housing preferences of
middle class people in Calgary -- how 20% of them could be classified
as "Greens".

Many people seemed to want a role in opening up better lifeways for
their kids. They didn't want to be just consumers -- consumers of
"housing" and daily road travellers! They seemed to be looking for
lifeways that meant something different than 30 hours of television
and 30 hours of closeted school a week, a 13-hour per week driving
back and forth to the dance school, the figure skating club or the
hockey arena and all that.

It kind of dawned on us that maybe Community meant -- or could mean --
something more than simply a decently planned environment with decent
housing. We began to see that community-building and the goals of
sustainability were connected ideas.

We saw these two things coming together -- as a more fully-engaging
lifeway. What we meant was lifeway in the sense of work and
productive enterprise that could go on in the same place where our
dwellings were. This would mean walking or cycling to work, and to
school, and for most of our shopping needs. It would mean cultivating
all the possible media of social life and leisure.

> Half of the respondents said
> that life was worse than it was
> 20 years earlier. Only 40 percent
> said they were "very satisfied"
> with their community as a place to
> live, and 11 percent were
> dissatisfied, to one degree or another.
> - Globe and Mail-CBC
> News/Canada-wide Poll
> November, 1991

Dwellnow has recalled how certain "discoveries" in a 1991 Poll
had affected the group she was working with then on the
planning and designing of Affordable-Sustainable Housing. She
digresses momentarily from her story about Willmore. She
begins to tell Robin about the first project she participated
in:

That first project at Ingleforth drew 100 "homeseekers" from a 15-minute spot on the CBC Eye Opener one morning and a single advertisement in the community newspapers.

Thirty of us were selected at first. We met with a team of architects and planners, a sociologist and a business management expert, and we all worked together in a kind of on-going workshop on "user-participant design" of the houses we wanted to build. Wasn't a new idea I'm told; seems they had been doing it in England and in Scandinavia years before us -- "Co-Design" and "Community Architecture" I think it was called over there.

Anyway, it all started as an "Affordable Housing project", then grew into a community design, and eventually into a community -- us -- talking, listening, drawing, making, decisions for ourselves, and getting a new perspective on what work and community enterprise could be. The City of Calgary was collaborating. They had a piece of land, they were eager to try out some new approaches, and they wanted to get some assisted housing built.

A good portion of the first units we put up were market-housing. Some of these were a bit classy, but most of the other units were really modest in size and looks -- almost like the houses that had been sitting right there next door in East Inglewood for about 60 or 70 years. They were efficient and comfortable houses. We even managed to work-in the community buildings we thought we needed -- much like you see here at Willmore, only not as many.

We were certainly helped along by the Inglewood Community Association, and by the involvement of a few small builders with lots of smarts and a spirit of adventure. They got drawn into the project at the user-participant design stages. What the building industry afterward learned from it was that there was a market niche out there waiting to be served. By the time we finished getting things built, the industry was calling it "Mass Customization" -- you know, the same sort of thing when you want a car today.

As things went along, we homeseekers started noticing a lot of talk about sustainable development by the professionals, and academics on that team of designers I mentioned. Kind of a new language they were trying out, we thought at first. But it got us thinking. Maybe we didn't need to depend so heavily on the City for taking care of our neighbourhood environments -- maybe we could share that role with the municipality and gain some financial resources in return that we could put into our community services and building projects.

So we ended up designing and putting in those "Habitat Restoration" niches -- the Biotopes -- you've seen at Ingleforth. There were three distinctive biotopes planted-in along the riverside where the lands had long ago been disturbed. This was the first experiment in Calgary in actually creating an ecosystem.

Dwellnow and her family lived at Ingleforth for five years before they decided to join the Willmore project.   Dwellnow has returned to the subject of Willmore.   Winding up the conversation, she says to Robin,

Gradually, we realized that bringing things together this way would mean a tightly-laid out, village type of community. We would have to trade off private space in and around our homes for public spaces. We would trade off privates space for areas to grow food and to create habitat restorations, and to make many of these "common" areas and opportunities for regaining a large share of our children's lives that had been delegated to schooling.

I guess you could say it was all just part of the re-structuring that went on in our minds, and in the ways that the City is organized, designed and managed ...

                              * *

                    Eight out ten Canadians
                  disagreed with the statement,
               "families these days are happier".
                  - Globe and Mail-CBC News poll
                         November 1991

... community policing, hailed as the wave of the future
                     - Globe and Mail
                       1992-05-09

                 The Axe has fallen at Petro
                 Canada, chopping 18 percent
              of the former Crown Corporation's
               staff over the next two years.
                     - Globe and Mail.
                       1992-04-24

            Time more crucial than money for
                  Reichmann restructuring
                    - The Globe and Mail
                 (Headline, Report on Business)
                       1992-03-26

               Another 57,000 jobs lost last
            month, but labour force shrinking
               even faster. ... Officials at
               Statistics Canada admit to be
            being perplexed, ... Statscan says
             44 percent of the increase in the
            number of people not in the labour
             force lost heir jobs in the last
                       five years.

Nation's employment shifts toward
smaller companies.
- Calgary Herald
1992-03-20

In fact, however, social institutions and changes
are seldom consciously planned, constructed, or
controlled by man. Institutions generally change
or mutate or disappear without the stir of a single
forethought.
- A K Bierman

Change and mutation ... restructuring. A key driving force of
the nineties. A pathway to retrieval as well as survival? It
seems to Dwellnow as she explains it to Robin that this was
another of the pathways that led to a sustainable city.

In the closing years of the 1980s and well on into mid-1990s,
newspaper and magazine reports were constantly about change
and   mutation; about   globalization   and   corporate
re-structuring,   de-centralization,   "dis-employment"   and
"outplacement"; about work retraining and the restructuring of
industrial jobs; about the flight of retail tenants from
shopping   centres   and   the   return   of   retail   street
environments; about   steadily-shrinking   real   incomes   and
declining   households   budgets; about   job   and   factory
meltdowns; about workers becoming partners in the ownership
and management of failing industries; and more and more about
smaller companies.

The vocabulary of business debt and Total Quality Management
slid over into the discussion about the huge size of public
institutions, about quality and values and equities in the
management and delivery of public services. So it happened
that by 1995, the "solutions" to government deficits were
everywhere linked to government restructuring. The cost
crunch in health care, welfare, in schooling and in policing
would now be linked to propositions about Total Quality
Management.

> ... rapid expansion in government ... The problem is
> structural. So it is that governments are beginning to place
> institutional restraints on Leviathan.
> - Globe and Mail
> 1992-05-02

And restructuring would come to mean smaller and leaner, and
more innovative and creative units of management and
governance. These new and reformed institutions would be
nourished by the principles of stewardship and self-reliance.
There would be small-scaled partnerships, between workers and
owners, between workers and workers, between residents in a
community and their neighbours, and between public agencies
and community-based enterprises. The making of communities
would be seen as enterprise, not the incidental outcome of
city planning rules and regulation.

> Workers back Algoma Restructuring: "Work groups
> would be jointly responsible for completion of tasks,
> planning, scheduling, budgeting and administration ...
> we need to tap into the intelligence and know-how of our
> workers".
> - Taking Control of our Future
> Globe and Mail
> 1992-04-16

If it happened at Algoma, would it happen in Calgary's urban
communities? Dwellnow reflected on this question and noted
that save for rising property taxes and dramatically fewer
provincial grants for new roads and social services the media,
in the early nineties, hardly spoke to matters of municipal
institutional restructuring.

In the mid-20th century, Calgary had adopted the "Uni-City"
concept of government: a boundless, urbanizing territory that
could be annexed in discrete portions as time went on. The
territory -- the Calgary community -- could then be
administered by a single corporate entity -- 13,000 employees
in 1991, the single largest employer in Calgary.

Each arithmetic increase in the size of the city, each outward extension tended to produce a geometric increase in the magnitude and number of the community's problems. Expanding municipal budgets and administrative enlargement took care of these through the boom times of the 1970s and into the eighties -- or so it seemed. But by the time the fiscal crunch of the decade of the nineties arrived, the City could no longer furnish a corresponding increase in technological facilities and administrative talent to keep up. Leopold Kohr's maximum about urban growth began to sink in:

> Not even an Oxford or Harvard education can compensate for the pace at which, beyond a given social development stage, problems began to out race their solutions.

Dwellnow could remember it well; she could also remember other discussions about global environment crisis, pollution and destruction of habitat and landscapes, and about urban ecological re-structuring and community development. The connecting of these things with the public fiscal crunch, expanding city and centralized administration, rising local taxes became more apparent. Especially when one started with the premise "quality of life" and began tracing that idea all the way back to the litmus test of "affordability". Dwellnow is explaining to Robin how the Affordable-Sustainable Housing and Community projects began to emerge:

> It began when people started thinking through this concept of "sustainable development". We wanted to figure out what it would mean for cities and communities as well as national economies.

> If we were really going to "act locally" and if we were going to have "direct participation" and greater self-reliance at the level of local communities, then sustainability had to mean creating a different kind of community. It would have to be a community in which the people who were gong to live there could participate with land developers and builders in the design of it altogether. We called it "user-participating designing" in those days.

> Total Quality Managements focuses
> on processes, rather than results
> and products. ...Customers now
> count for everything. You have

> to keep going back to the customer
> to check what they want from you."
> - Globe and Mail
> 1992-04-25

These days, the development industry and homebuilders call it "customized community design and marketing".

The new system worked like this: People who were looking for a house would get together in small groups of say 20 or 30 people. Then they would meet with the builders and the architects and planners and together work out the kinds of houses each of the families or the individual homeseekers needed. At the same time, they would work out the layout and sizes of streets and the public places and community buildings, and the common buildings for the children and the adults.

In this way, they determined the whole community design, including the preservation of natural environments and the creation of new biotopes or habitat restorations. And what kind of small industries and commerce and retail services would be appropriate in the community.

And in the process of doing this designing and plan-making, these "new" community groups would work out with the developers and the City administration how they were going to look after their community environments and public spaces. This was the stewardship role that the community residents would jointly have to play with the municipal authorities.

And so you see in all this, sustainability had to mean a re-structuring of urban institutions.

Right up to the 1990s, planners and municipal officials preferred a language that spoke of the public interest, of economies of scale, and of aggregate consumption. In their tracking of economies, government officials and academics measured aggregate consumption, not the individual's summum bonum or the qualities of community life.

Another thing: our tendency was to believe that consumers made choices. Perhaps they did. But in housing, that could not explain why so great a number of them would seek to choose what they could not afford.

But as we entered the 1990s, economies of scale in public and private sector organizations began to appear illusory. Almost certainly, "scalar efficiencies" had not increased the individual summum bonum of Canadians living in cities.

> ... human societies, instead of
> growing in the biological way by
> splitting, replicating and
> multiplying, have long begun to
> grow in the cancerous way of
> expansion and integration.
> - Leopold Kohr

> Gradually, in everything in the decade of the nineties, it seemed, the
> biological way, the way of splitting, multiplication and replication
> -- as opposed to integration and centralization, consolidation and
> expansionism -- this way was one of the pathways to sustainability.

Some say it began in earnest in 1991, the year a newly-
appointed Chairman of Alcoa Corporation stripped away seven
layers of management. He made the managers of Alcoa's far
flung centres of operations communicate directly with him. He
granted them increased financial authority in the order of ten
times what they had previously enjoyed. He didn't call it
"cost-saving contraction", as Leopold Kohr had recommended
some 25 years earlier. But that's what it was.

Already in 1991, Calgary's energy companies were also
re-structuring to meet the exigencies of a "global economy".
The impulse was "survival". Employment in the Canadian oil
and gas industry fell by 80 000 between the early eighties and
the mid-nineties. By the year 2000, none of the oil and gas
companies in Calgary headquartered more than 200 people. Many
were now firms of 20, 50 and 75 employees. Operating in small
teams, in "natural work units" was everywhere.

As this corporate re-structuring proceeded, financial
analyses, geotechnical and engineering, research and
exploration, accounting and provisioning services were
increasingly obtained from the grouping of small service
industries and consultants as the major energy companies
re-structured.

Many of these small consultancies and service industries
operate today from places like Willmore and Ingleforth in
Calgary. Others set themselves up in smalltown settings -- in
Penturbia -- in communities like Stettler and Vulcan. These
were now tele-communicating enterprises.

As with private industry, Calgary's municipal corporation found itself downsizing and re-structuring throughout the 1990s. The first forces in this direction were fiscal -- impacting on property-taxpaying households as well as on senior governments. Another face to the affordability question could now be seen.

A public call for "relevancy" and "effectiveness" in municipal administration also played a part in downsizing and restructuring. It is said that the City Commissioners awoke one morning in 1992 to read in the Globe and Mail that the survivors in the oil patch downtown were companies like Renaissance who liked to point to their low overhead costs and flexible operating plans, and to their corporate strategy of focusing on small but significant, high pay-off targets. Perhaps relevancy in municipal services might be construed in similar terms?

So it was in 1997 that the City began to focus on the most significant needs and satisfactions in peoples' lives and on re-structuring: first, a flattening of the municipal organization, then a re-structuring of the political-community economy of the City. As a result, four administrative Boroughs were created, each corresponding, more or less, to the City's historical quadrants.

The Boroughs were sized between 150 000 and 200 000 population. Initially, two of the Boroughs had more industrial and employment-centre activity than the others, but with the introduction of the Community Design and Re-Structuring Incentives Program, and the devolution of authority and power to the Boroughs progressed and older industrial buildings were de-commissioned, redistribution of employment began to take effect. Slowly but perceptibly, work and home were knitted more closely together. Residential subdivisions gradually became "mixed-purpose" communities

--ecologically re-structured places where all of the essential facets of urban life and natural habitats found expression.

Then in 2005, the City and the province of Alberta jointly drafted a statute enabling the formation of Community Enterprise Corporations (CEC's --like the one we saw at work on Versateal's house in ErinGrove). The CEC arrangement permitted Borough councils and the smaller-scaled urban villages or neighbourhoods to generate investment funds for partnership projects. These partnerships brought new enterprises to newly forming communities or restructuring communities. Deals for land and services, and for loans and grants to new enterprises are tied to the provision of housing; and housing followed performance standards for ecological design.

The Boroughs began with, more or less, all of the powers of a municipality as they were then constituted. Twice a year, the Borough councillors went to the old "downtown" to perform their senatorial roles of budgeting and bargaining. On these occasions, they decided the city-wide, one-of-a kind projects, and they settled coordination issues. Since 2005 the City Senate has been constitutionally required to maintain a balanced budget, and the apportionment of resources to the Boroughs follows pretty well a 5-year, formula-based allocation.

And today? Most of what the Big-M Municipality used to take care of in the way of local recreation services, land maintenance, and building development permissions were placed in the hand of community-based organizations. Which is to say, they were left to community stewardship.

Robin has been writing an essay for the Civics class back at West Island High School, and he wants to know why and how it all came about. Dwellnow explains,

In a kind of natural way, like Bierman says it happens without all that long range planning, strain of foresight, analyzing and reporting and waiting only to find that grand ideas get shrivelled in the hot house of large bureaucracy. It was all· more of a graduated responsiveness to what Calgary people were beginning to feel and think and express about how a city should feel and be expressed in its communities. Remember what I said the other day about that guy, Alberti who lived in the 14th century? How Alberti had written, " A house is a small city, and the city a large house.

So, about 1995 it must have been -- before the Boroughs came into being -- they broke up the Planning and Community Services department, the Transportation and the Engineering departments, and they re-organized the managers and first line professionals into Community Design and Development Service teams. The Parks and Recreation department was re-organized into Urban Greening and Agro Enterprise Service teams.

They re-grouped all of the managers and frontline professionals into these Service teams and sent them out to work in offices located in the four quadrants of the City. With all of those city people out there serving in the Boroughs, there were lots of face to face decision-making and focus on what people needed and wanted, not just on making plans for the convenience of city administration.

So, you can see, Robin, there was lots of space vacated in the downtown Calgary Administration Building. Well, they retrofitted the upper five floors of that building for housing and accommodations.

And then they looked out the window at the old "East Village". You know, that site across the street from the City Hall which had long since been ravaged by 1960s urban renewal and indecisive land development politics. Here were 200·hectares out of productive use for over twenty years. So the city senators decided to forest the whole thing -- "greening" we called it. The greening at East Village was a first strategic gesture -- equally symbolic and ecologically-functional.

The city employees sent out to the Boroughs were given six months training in "Urban Ecology", in "Citizen-Participant Planning and Design Techniques for Ecological Community-Making", "Organization and Management of the Community Enterprise", "Education Programming for Local Environment Awareness and Management", and even some "Assertiveness Training". Made quite a national stir, I remember, because that six-month training was 50% funded by CMHC, and before long every big municipality in Canada wanted the same thing.

To accommodate these new "Quad Squads" (as we used to call them), they retrofitted a few of those abandoned warehouses and service depots still sitting there in the earliest of the industrial parks. Matter of fact, that's about when they dropped industrial parks from the planning lexicon ... along with open spaces area structure plans, undeveloped-developed lands, and development control. Come to think

of it, they dropped most of the traditional planning language from the administration's whole lexicon. That sure helped in making possible the demonstration-experimental community-building projects we got going -- first at Ingleforth, then at Willmore.

As this re-structuring of the City government and administration proceeded, the Province and Calgary worked out the Green Region Policy. The central thrust of this policy was to recognize and to restore the symbiosis between "city" and "countryside". The GRP encouraged the retrieval of the family and farm, and sustainable agriculture in the rural region in conjunction with the livability and fullness of rural small towns. The GRP also put an end to Calgary's policy of growth planning and city-building by progressive annexations.

Ecologically-sustainable agricultural production figured prominently in the Farming and Urban Food Production Incentives Program that soon followed the adoption of the GRP. Forestation and agricultural production in selected areas of the re-structuring city were embraced by this visionary program. Dwellnow is winding up her story for Robin:

> The way I see it now as I look back, those first EcoHab projects, like the one out there in ErinGrove that you saw going on ... those first projects were a turning point. Residents of Calgary began to see that there could be choice and a genuine participation in the life of community.
>
> And they could see a new repertory of ideas in the planning and design of communities, and in technological innovations that could serve well the fulfillment of environmental reconciliation and autonomous food production right here in the city. It all seems to add up to sustainability, don't you think?
>
> This business of reaching out into the countryside with the Green Region Policy wasn't like the old-fashioned urban expansion-land annexation-and-control strategy that Calgary followed for decades before then. It was a more profound gesture of belief, of faith if you like -- not a new one, by the way -- that the City was not one thing but many things in one just like what Alberti said, and like Bierman and Leopold Kohr and Pierre Dansereau had been reminding us since.

The city planners of the day took to labelling this turning point as the beginning of "Sustainable Planning". My inclination is to call it Civic Planning. Will you be putting that in your essay, Robin?

* * *

Old ties are broken down ...city dwelling
is transformed by the immense
concentrations of population of the
modern metropolis ...this involves
much more impersonal and casual
contact ...our technocratic, bureaucratic
society gives more and more importance
to instrumental reason ...it induces us
to see our communities, like so much
else, in an instrumental perspective.
- Charles Taylor
(1991 Massey Lectures)

...collaboration is indeed essential for
rapid progress ...If the social power
of large groups is to be rendered potent,
it must itself first be broken up until
the size of its working unit is adjusted
to the objectives to which it is applies.
- Leopold Kohr

Dwellnow and Robin are continuing their stroll this September day. They have turned their attention away from ErinGrove Subdivision and the EcoHab 23 work going on there. Dwellnow is thinking about the manner of life and work and collaborative enterprise at Willmore.

At Willmore, causality and contextuality are matters of regular discussion at the Willmore Civico, the meeting house built next door to the Community Refectory. And, over refreshments at the Reading room, as much community work and environment stewardship is worked out there as decisions are made in the regular participant-design meetings at the Civico. The idea that the residents of Willmore themselves should "control" what happens to their environment gives life to the principle of context and causality that has been operative since the beginnings of the community.

For example, building permits for housing are tied to creating local jobs or local enterprise within a (cycling) distance of two kilometers and within Borough Three -- one unit of housing accumulates for each unit of employment brought along with it. Or one housing unit can be permitted for one family of seniors or one household of siblings who have relative here in Willmore. In this way, the Willmore community is no one's instrument for development of property speculation. The home-building industry in Calgary continues to thrive; the only significant difference is that development is now a negotiating process that occurs in context and with a richer set of human values in view.

Nothing is built at Willmore without a user-participant planning and design process. Land use has been dropped from the Borough's planning lexicon. The essential principle for planning is now community design and service. And this is wedded to the criteria of ecological performance in development and building. Ecological performance is gauged according to localized enterprise generation, to modesty in energy consumption, and to biomass and food productivity. Each of these, in turn, are consciously linked to the community's goals of sustainability and self-reliance.

Another example of this nesting of ends and means, and the causality-contextuality principle of community stewardship, is the method of childhood education. Half the curriculum at the elementary Learning Centre -- and almost as much again at the Borough Youth Academy -- is dedicated to Place-Centred Learning (P-CL): learning from the measures, the rhythms and the many activities of Willmore and Borough Three. The other half of the curriculum bridges to P-CL: reading, writing and listening arts, math and science, and the visualization and design curriculum introduced near the turn of the last century. There is learning from parents as much as from teachers, and from the participation of children and youth in

the activities that make up the lifeways, celebrations, local situation and productive work at Willmore itself. Many of the parents teach and facilitate regularly in the classroom. Thus, learning is nested within theory and daily experience nested within a wholeness of the urban village life.

. . . . .

Dwellnow and Robin pass by the Willmore Co-Generation House and terraced gardens. At the top of the path, they reach one of the edges of the urban village, a seating wall sheltered by a pergola. The wall and pergola arc about 160 degrees to form the village Belvedere. The view inward embraces a kind of micro chaos of artifacts and modestly-built "housing" -- a pond, composting rows, a brick kiln, a potting shed, a tool shed, another housing that shelters a two-bay, vehicle maintenance shop (electric, woodgas, solar and diesel). Two wind turbines, some solar panels, wood pellet silos and a straw hopper protrude from the heating plant and glassmaking studio that Dwellnow's son-in-law operates. Adjacent to this is the solar aquatics-wastewater treatment greenhouse and a reed zone pond.

The Dwellnow's Dry Pasta Productions building can be seen on the far side of the Belvedere area. A shed structure, it houses custom milling, processing and drying. Dwellnow and her partners got the idea many years ago that the Calgary air and humidity were similar to the Abruzzi where all that "hard Canadian" wheat was exported to be transformed into first class pasta and imported back here. They researched the Italian technology and set themselves up in business with the Willmore Co-Op. They now do a tele-marketing, mail-order business with 7,000 customers from Summerside to Sechelt, from Chicoutimi to San Diego.

Beyond the Belvedere, in the direction of Willmore Mainstreet, some of the residences are visible. Housing units are varied in colouring and in their modest architectural details, giving identity and orientation to each "quarter" of the village. The quarter can be perceived as a unity, and its overall form finds expression as much in the interwoven landscape elements as in the architectural forms.

Overall, the streets and neighbourhoods form a dense pattern of residential development. An integration of community and business activities results from spaces for home, places for work, shopping and recreation located in proximity to each other.

One end of the Belvedere seating wall unites with Community Care, a building that houses a small collection of spaces for childcare and kindergarten, the Willmore Elementary Learning Centre, and the medical practitioners' accommodations. There are apartment condominiums for singles on the second and third storeys. One corner of the building is formed by a glassed-in observatory, a gallery and a planted roof terrace. Here, the children and other residents go for lessons in "seeing and sustainability", much like the citizens of Edinburgh went to the Outlook Tower with Patrick Geddes over a century ago. The Community Care building was financed and built by the Willmore CoOp six years after the beginnings of the project.

At the other end of the Belvedere, the seating wall unfolds upwards to form an arched gateway. The gateway announces a passageway into the orchard and bird habitat, one of the four Biotope Restorations and Creations (BRC's) initiated by the Borough Three Community Design and Services team when Willmore was in the initial planning stage. Prior to commencement of building constructions in 2005, the orchard-habitat was laid in and planted by the then-homeseekers at Willmore working in collaboration with the City's EcoHab project. It covers 2.5

hectares.   Funding support came from the federal government's
Environmental Partners programme.   The buildings around the
Orchard-Habitat have been designed in height and mass such as
to support and enhance the environmental gradients necessary
for this particular habitat regime.

Beyond the gateway is a small bowling green and installations
for petancle and horseshoes. Willmore Street begins here.
The street proceeds along a slightly rheumatic axis in a
northwesterly direction, for 350 metres until it meets the
Campo. Housing entranceways and intermittent retail outlets
flank both sides.   Here and there, sitting ledges protrude
from the lowest reaches of the buildings.

Dwellnow and Robin have made their way up Mainstreet and
arrive at the Campo.   The Campo is an irregular trapezoid,
about 60 metres in the longest direction and 30 metres across
at the west side.   Built fully across the west side is the
Civico and Community Refectory, a curious yet not unharmonious
amalgam of attached buildings erected over several years.   The
space is formed by shade trees planted three deep on three
sides of the Campo.   Along the outer treeline and all around
the Campo, a channel has been cut into the narrow roadway.
The channel carries grey waters; it follows a course down one
side of Willmore Mainstreet, making its way to irrigation
cisterns and the pond located at the Belvedere.

The Civico amalgam houses the Community Workshop-Share Hall, a
privately-run languages and cultures school, the Village
Affairs Hall, big enough for small concerts and meetings, the
Community Refectory, and a small Telecomm Services and Reading
Room.

People are moving in and out of the Campo, placing chairs in
small clusters across the expanse of the Campo and putting up
the lanterns and banners for the Harvest 15 festivities.   A

platform of skating rink boards has been set up. From here, Dwellnow, the Mayor and Daniel Boorstin will address the Harvest 15 gathering in a few days time. Next to the platform, in preparation for the bi-annual Campo Theatricals, are the bleachers and the tenting fitments that will make up a theatre installation.

> Oh yes, they'll be staging the usual Community Personality History in the Campo this year. Although I hear that a new script has been written, one that's much less "political" than past years. More bonhomie in it this time, more ...what should I say? --contented? in tone.

> You know of course, Robin ...all that play-acting about the community's and Calgary's history and personalities has more than an entertainment and cultural value: You have to have acted at least twice in the annual Campo Theatricals before you are eligible for election to the Willmore Cooperative Management Board. Doesn't matter how bad your performance had been, as long as you know the Play ...your history.

Borough ThreeWay leads out from the west side of the Campo. It is one of the old collector roads, now reduced to about half its former width. The retrieved half has been re-constructed to form a cycling and footpath Allee planted with blossom trees. You can make your way west from Willmore on Borough ThreeWay by foot, private motor or public mini taxi, or by bicycle. Located at the end of the ThreeWay are the Borough Theatre, the City Services Quad Three building, the Borough Youth Academy, two Auto-Ped Marts, a Telecommunications Service House, the Odex Cinema, many other commercial, entertainment and retail establishments, and several low density condominiums.

There is no Borough Three "centre". There is no urban square there. Instead, a two-block area is covered by aspens, shimmering yellow now in late September.

Located on one of the edges of the Borough Aspen Grove is the old LRT station. Across from the station is the old Sunray Shopping Centre (circa 1985) and the Borough Quad offices.

The shopping centre has been re-structured and retrofitted for multiple uses that include the Theater Three and dwellings with rooftop gardens. Some of the then-existing, warehousing-distribution and industrial services buildings in the area (dating to the 1980s) were torn down for residential infill. Others were retrofitted for the Borough Quad offices, and for multiple use structures that house commercial offices and apartment dwellings.

> That Aspen Grove over at the LRT station? That's right, no square there. The idea was that only the Urban Villages would have campos and local theatre-history. The big Three Theatre is where you get more cosmopolitan and international works performed, and of course, for bigger audiences.
>
> The Aspen Grove kind of symbolizes how Greening became woven into the City's scheme for administrative re-structuring and the Eco Hab project. Greening replaced urban development in the planners' lexicon. Or maybe I should say that urban development got to be nested in the idea of greening.
>
> The aspens were planted a few year before urban ecological re-structuring became city "planning" policy, which occurred around the Year 2000 ...the beginnings, you know; one can't really say when things "start", can you?

. . . . .

Sitting in the Campo, Dwellnow and Robin together watch the sun descend and the sky fire up to pink and mauve. Dwellnow's mind turns to the welcome speech she will have to give at the Harvest 15 festivities. She turns to Robin, and thinking out loud, she says to him:

> You see, somewhere back there in the eighties and nineties, everything seemed to be in turbulence. Couldn't quite put our finger on it, so we called it "globalization". We inspired the constitutional crisis and we took the plunge into free trade. And we worried immensely about a failing sense of purpose and future among the young generation, about the quality of our schools, the technological transformations in industry, and unemployment. Those things kept us preoccupied for a long time, I can tell you -- up to the turn of the century. But you know how all that turned out, Robin.
>
> Oh! and I shouldn't forget the global environmental crisis either, should I?

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> But I'll say this. For a time, conventional wisdom held that the only
> way to overcome globalization and crisis was to give our attention and
> our loyalties, our money, our energies and our intelligence to the
> modern idea of nation-building. But the undercurrents of loyalty --
> and attention, such as we could muster it then -- were neighbourhood,
> region and something we called community but had not yet built.

Suddenly it occurs to Dwellnow that what she once thought were
"new ideas" for Community and Affordability and
Sustainability, arriving together; what was a singularly
"decisive" moment was hardly that at all. They were many
moments and events, all seemingly unconnected.

To be sure, governments and municipalities had many strategies
in the 1990s like The Green Plan, and Calgary's Vision 2020.
But now, in retrospect, Dwellnow is beginning to think that
these strategies did not amount to much. They were no more
than narratives that fitted nicely with the way government
budgets and public programmes were structured and classified
in those days.

She is thinking now that the small choices, and the desires
and beliefs weaving together in the minds of people who could
feel they had to retrieve community and authenticity, identify
and ownwork; and then the little happenings like the small
housing project at Ingleforth; followed by a little bigger
ambition at Willmore; that these gestures just seemed to be
made. And all the while, restructuring was going on all
around us, in every walk of life, shaping and impelling this
voluntary future we have made.

Dwellnow reaches into her shoulder bag and removes a sheet of
paper. A report of some kind.

> Thought you might like to look this over. For your essay, you know.
> It's one of those "check ups" by the Department of Quality Assurance
> Statistics at the City. They do one every few years.

She hands the Report to Robin.

EPILOGUE

The Report on "Community Qualities" that Dwellnow has shown to Robin:

City of Calgary ° Borough Three
Department: Quality Assurance Statistics
Annual Community Checkup: Social, Ecological, Technical Specifications

For details see Report File: **Name of Community:** Willmore
2115.02626 SET WE data

For quality of life indicators   **Date:** 2017, March 20
see Report File: 2115.02821 QL1

	description	data entry
Social--		
Households	-senior (over65) 650	-400 units
	-adults with children 1000	-400 units
	-couples w/o children 680	-340 units
	-singles (all ages) 370	-370 units=total 1510 units
Civico and	Community Workshop and Share Hall	
Refectory -	-Languages and culture school	-86% enrollment in Borough Three
	-Village Affairs Hall	-26 development permits since 2012 audit
	-Teleservice and reading room	-11% increase
	-Arts and recreation Campo theatricals	-68% favourable reviews, 2016 productions
Community	-child care centres,	
Care	kindergarten	
	-elementary learning centre,	Place Centred learning,
	medical offices	community stewardship
	-counselling and services for immigrants	
	-legal aid centre, condo housing	
	-observatory - gallery	
Employment	-community work at	-0.72 jobs per households
Base	home and in local offices	--0.68 @ 2112 audit
	-workshop, studios, and work-in-lieu-of-taxes	
Ecological --		
Created,	-Stewardship Programme:	-environmental maintenace and
Enhanced,	- Biotope restorations	restoration - annual City stewardship
Restored,	fescues plantations,	grant=$53 per resident -- decrease
Maintained	forestation, public spaces	12% since 2012 audit, 23% since
	and recreation areas, grey	2005 start date.
	waters and irrigation.	

Waste and Reuse	-dwellings, source sorting by enclave and area	-89% kitchen composting -- conversions at annual rate 5%.
	-yard composting back gardens or neighbourhood compost equipment	-yard waste - 100% -79% local sort
	-reuse yards (cooperative) repair and redistribution and sale	-revenue $270,000 (see W2015Re-Tax reduction)
Food Production	-food production and advisory service for farming	-32% of "produce" & poultry products consumed was produced locally
	-habitat restoration and preservation	-12.5 ac.; additional 2 in preparation
	-farm animals	-increased 6% see file Ag. W 1972
	-species diversity promotions	-flora increase of 14 species, fauna 2 new species, overall + 35 ratings see Report W. S.D.45021
	-growing areas	-expanded 14% since 2012
	-ecological demonstration area	-rated .86 (Cdn. eco d. 261 scale)
Buildings	-see - "Bldg Performance and Bldg Design Competition" detailing, placement, form, context	-Electromagnetic radiation- clearance scale 91

Technical & Parametric--

Community area=220	-housing=120 ac.	-37% of total site
	-housing footprint= 82 ac.	--increase 13%/2012
	-road and public ways, 22%	-26 ac.
	-other built space, commerce workshops, small industry, cultural educational institutions, community care services etc.	-30 ac.
	-biotopes, productive open space, greenhouse/cogeneration, public squares, parks, forestation, allotment gardens, recycle centres.	-70 acres
Energy	-co-generation, gas powered (electricity and district heating at low temperature)	-37% from renewables -income steam from sale to power grid. -73% all buildings-- community

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	--Greenhouse -use of passive solar energy	rating .85
Water Conservation	-controlled tests for local wasterwater cleaning -cistern collection of rainwater -grey water channelling & storage -- irrigation	-test results wastewater treatment process #28 - see Report 2012
Traffic Roads	-transportation energy -public electric minibus service, Willmore Coop startup 2016	-decrease by 4% from 2012, service performance improvement 3%, env. rating .56 (.87 overall) -road permeability rating .56 (.87 overall)

BIBLIOGRAPHY

Alexander, Christopher. 1987. A New Theory of Urban Design; New York Oxford University Press

Bierman A.K. 1973. The Philosophy of Urban Existence; Ohio University Press

Boorstin, Daniel J. 1982. "Foreword", in The Timetables of History; N.Y.: Simmon and Schuster, First Touchstone edition

Cadman, David and Geoffrey Payne. 1990. The Living City: Towards a Sustainable Future; N.Y.: Routledge.

Dansereau, Pierre. 1973. Harmony and disorder in the Canadian Environment: Ottawa: Canadian Environmental Advisory Council.

Ekins, Paul (ed). 1986. The Living Economy -- a new economics in the making; N.Y.: Routledge and Kegan Paul.

Elkin, Tim and D. McLaren. 1991, Reviving the City; London: Friends of the Earth.

Kohr, Leopold. 1957. The Breakdown of Nations; London: Routledge and Kegan Paul

    1973. Development Without Aid: The Translucent Society; pub by Christopher Davies, Wales.

Robertson, James. 1985. Future Work; Aldershot: Gower/Maurice Temple Smith.

Taylor, Charles. 1991. The Malaise of Modernity; Toronto: Anansi.

The Urban Environmental Imperative In Canada, 30 Years of Inactivity

by Dick Leong

1.   Introduction

In celebration of thirty years of publication, <u>Cities and People</u> magazine released a special anniversary issue July 29, 2020 which chronicles, through a series of articles and photographic essays, thirty years of Canadian city development and social interaction. It is an honest account of Canadian urban history which relives the worst of times and the very best of times. The contributors to the special anniversary issue included urban theorists, sociologists, former and current mayors, and community activists. Their articles provide a glimpse at the past, present and future of Canadian cities and their inhabitants.

One of the more interesting articles, titled "What has Changed in Thirty Years?" by Duncan Campbell, is a recollection of the past in comparison to the present. Campbell's goal is to compare people's attitudes and perceptions of the city in 2020 to people's attitudes and perceptions of cities in 1990. This is done by duplicating a survey of eight Canadian cities (Calgary, Halifax, Ottawa, Edmonton, Vancouver, Winnipeg, Toronto, and Montreal) conducted in 1990 by Angus Reid. As in the original survey, Campbell interviewed 500 residents and asked them to rate their city along 12 dimensions. While not the most rigorous assessment of people's values and perceptions, the survey does afford insight into how much people's concerns and perceptions about their city have changed in thirty years.

One of the more notable results is that the environment remains the major concern of Canadians, and for good

reason. Average temperatures in cities have increased by two degrees, the level of pollution has increased, and the hole in the ozone continues to grow. Although it is assuring that people express a genuine feeling of concern for the environment, it is perplexing that the environment remains a critical issue after the warnings, public enlightenment, research and promise of the late 20th century. For anyone raised in the late 20th century it was almost incomprehensible to think that the environment could get any worse. Yet this is precisely what has happened.

How could society have steered so far away from our vision of a sustainable city and why were we unable to make the transition to sustainable urban development? These two questions will be investigated.

2. What is Sustainable Development?

Sustainable development gained global prominence in 1987 with the publication of Our Common Future by the World Commission on the Environment and Economy. Spearheaded by Gro Brundtland, the Prime Minister of Norway at the time, the Commission was a collection of experts and political leaders from all over the world. Their mandate was to propose solutions to the environmental problems of the world.

Prior to the Brundtland Commission, the debate was polarized: you were either pro-environment and anti-growth or anti-environment and pro-growth. There was no middle ground. Brundtland, however, re-oriented this dialectic by articulating the inextricable linkage between environment and economy. Decisions related to the environment or the economy cannot be made in isolation. Natural resources are the building blocks for economic development while the depletion of resources reduces society's ability to be economically

productive. Brundtland quelled the debate between the environment and economy by juxtaposing sustainability with development into one term, 'sustainable development', a term which refers to "development that meets the needs of the present without compromising the ability of future generations to meet their own needs".

In the years following the release of <u>Our Common Future</u>, researchers focused on the local implications of sustainable development and the best way to achieve it. In the Canadian context it was evident that sustainable development must be achieved in our urban areas. In the 1990s approximately 80 percent of the Canadian population lived in urban centres. However, Canadians realized that specific attributes of our economic activity were not sustainable and these attributes were magnified in our cities. In short, the way we chose to live in cities was not sustainable. As individuals living in cities, we needed to pollute less, cut down fewer trees, conserve more energy and make less waste. As a society we needed to ensure there is a commitment to the principles of sustainable development.

3. Planning for Sustainable Development

Initially, all levels of government responded positively to the challenge presented by sustainable development. The legacy is a wealth of documents from the national, provincial and municipal levels of government which identified the imperative of environmental stewardship, appropriate strategies for action, as well as qualities and components of sustainable urban development. The most prominent document at the national level was the Government of Canada's Green Plan. Proclaimed in 1991, the Green Plan provided the federal government with a framework for preserving the environment by establishing an overall objective: "to secure for current and

future generations a safe and healthy environment, and a sound
and prosperous economy". To meet this objective, the
Government of Canada set the following goals:

* clean air, water, and land;
* sustainable use of renewable resources;
* protection of our special spaces and species;
* preserving the integrity of our north;
* global environmental security;
* environmentally responsible decision-making at all levels
  of society; and
* minimizing the impacts of environmental emergencies.

At the provincial level, Round Tables on the environment were
established to challenge people and sectors to work
cooperatively in creating a long term strategy for sustainable
development, a strategy which would identify new ways that
would support a vigorous economy and healthy environment.
These Round Tables arose from an awareness that the
traditional top-down model of decision making was not only
out-dated, but proved to be an inappropriate vehicle to
implement the principles of sustainable development. The
environment affected everyone and any decisions related to the
environment were to be made cooperatively.

Round Tables at the provincial level moved away from the more
traditional model of decision making to one which incorporated
perspectives from environmental organizations, industry,
labour, agriculture, aboriginal groups and government. The
Ontario Round Table initiated a process of debate by issuing a
Challenge Paper articulating six guiding principles for
sustainable development. These principles were used as a
basis for consultation with Ontarians to determine the actions
needed to create a sustainable, healthy environment and
economy. Similarly, The Premier's Round Table on the
Environment and Economy in New Brunswick was formed in 1988 to

prepare a sustainable development strategy for the province. The result was "A Plan for Action", the outcome of a three year process involving the public, members of thirteen sectoral groups, and the Round Table itself. The Plan set the stage for future actions as well as recommending those issues which required quick and decisive action immediately in order to keep all future options open. Provincial Round Tables continued to advance the debate and dialogue between sectoral groups, and in the process created appropriate province-wide strategies. The provinces and federal government provided a framework for more comprehensive reports.

The reports and studies originating at the municipal level were more detailed and comprehensive. Some examples included: Clouds of Change: Final Report of the City of Vancouver on Atmospheric Change; Evaluating the Role of the Automobile: A Municipal Strategy by the City of Toronto; and The Greater Toronto Area - The Challenge of Our Future. These reports were hailed as progressive studies which successfully articulated the negative environmental implications caused by urban form, housing and the way people lived in cities; and they set plans and strategies to create more sustainable cities. Many of the conclusions and recommendations from these reports were similar and identified problems such as the untenability of further urban sprawl, the need for more concentrated development, a better balance between housing and employment in close proximity to each other, increased use of public transportation, and the need for more urban greenspace. Perhaps the most extensive and detailed study was the two part study on the future development for the city of Rupertville entitled, The Key to Our Existence, released in 1991. The first part of the study, subtitled, "A Rationale for Success" examined the problems of current urban form and possible alternatives from the perspective of sustainable development. The second part, "A Plan for Action", provided a detailed plan for Rupertville to support more sustainable lifestyles.

In 1987, when <u>Our Common Future</u> was published, Rupertville had a population of 80,000 people. The city embodied and became famous for its small town qualities such as modestly sized buildings, sense of community, and pedestrian orientation. It was these qualities which attracted many new residents to the city. Fortunately, planners at the time anticipated high levels of population growth from the migration from other cities. Their projections showed that by the year 2000 the population would grow to 100,000 people. By 2010 it would increase to 135,000 and in 2020 Rupertville's population would stand at 180,000. Today, we are astounded at the accuracy of these figures. The challenge was very clear to planners: they had to ensure that the city retain its more traditional values while the population continued to grow exponentially. Moreover, planners had to accommodate growth while at the same time minimizing the impact on the environment.

The central recommendation from <u>The Key to Our Existence</u> was that urban concentration in a planned and controlled fashion was necessary to ensure a healthy environment. Urban concentration would provide and encourage opportunities for high and medium density housing, support transit use, and provide economies of scale for waste management, sewage treatment and other physical infrastructure. However, urban concentration alone would not ensure a more sustainable urban environment. Urban concentration policies must be balanced with policies which promoted urban greenspace and land use mix throughout the urban area and support alternative, more environmentally benign modes of transportation. For example, energy conservation and the use of public transit, bicycle, and foot travel were promoted by multiple use of land at suitable residential densities. The planning document also described a variety of environmentally positive features that could be designed into intensified urban areas such as roof top gardens and green areas which could be preserved, linked and supplemented by extensive tree planting on public lands, and

private sites. The most pervasive conclusion from this document was that the city could exist in harmony with the environment. Intelligent urban planning and enlightened use of technology could do a great deal not only to mitigate the undesirable environmental characteristics of the city, but to greatly enhance the positive elements.

The second part of the study, "A Plan for Action", proposed an alternative urban form for the city of Rupertville. Based on the recommendations from the first part of this study, and the conclusions from an independent study on the possibilities for reconfiguring Rupertville, the document proposed that Rupertville adopt a nodal pattern to urban growth. In this nodal approach, the city would be organized into smaller communities of approximately 23,000 people. Each community would be organized around essential community services such as schools, retail outlets, public transportation nodes and medical offices. The physical size of each community would be governed by a 30 minute walking distance principle. That is, the outer edges of the community would be no further than a 30 minute walk to the centre. Around the outer edges of each community is a strip of wilderness or forest which provides a physical separation between communities. This nodal form of development would accommodate growth and promote the efficient use of urban land within a defined and compact area. Once existing communities could no longer accommodate further growth, new communities would be built adjacent to existing communities with these new communities built on the same principle of relative autonomy. Thus, Rupertville would grow like a jig-saw puzzle with additional communities systematically added to the existing city. "A Plan for Action" was hailed by many as a detailed plan which addressed community and site planning, transportation, and housing issues from the perspective of sustainable development.

By advocating a nodal form of development, "A Plan for Action" attempted to operationalize two important components identified in the first study: density and land use mix.

The 30 minute walking distance principle combined with the overall population size of each community created a more compact and intensified urban area without the use of high rise buildings. In order to accommodate 23,000 people within a defined urban area, the plan incorporated more multiple-type dwelling units. However, increased densities would be achieved in a manner which did not significantly reduce the amount of private space people enjoyed. Detached single family homes still existed, only in this plan they did not dominate the landscape. In addition, this plan allowed for flexible zoning to encourage and create an even distribution between employment and housing within each community. An equitable distribution of housing and employment in proximity to each other would reduce the need to travel long distances to work, and hence the reliance on the automobile. Automobile travel would be further reduced by making other transportation alternatives more accessible. Specifically, the nodal pattern of development was seen as being more conducive for the planning and construction of an efficient public transportation network. Each community would be linked physically by public transportation to other communities via their community centres. Accessibility to transportation nodes in each community was ensured by increasing residential densities within 400 metres around each transit node. By creating an efficient and cost effective public transportation system and encouraging other forms of transportation, the Plan would reduce the dependence on the automobile. "A Plan for Action" represented a vision for the people of Rupertville to strive for, where a strong sense of community, environment stewardship, and personal and community development were principal goals.

The legacy of information and visions of the future is an explicit example of public concern for the environment. There was no shortage of information on what it meant to be sustainable. The next challenge was getting people to accept and implement the recommendations.

4. Initial Successes

It is evident as illustrated by this exercise in Rupertville that the implications for urban sustainable development and the way we live were carefully examined, and researched in Canada. An abundance of research reports clearly articulated the character of sustainable urban form. Yet, despite this wealth of research and information, Canadian urban areas today are essentially in the same situation as in 1990.

Certainly, some marginal improvements were made during the late 1990s and early 2000s, as evidenced by Statistics Canada's biennial Sustainability Index for Urban Areas (SIUA). This statistic, a composite index of social, environment, and economic statistics for all urban areas in Canada, permits a trend analysis of urban areas over the 25 years since its inception. The general trend shows that Canadian cities began to make some improvements in consuming less resources and producing less waste while maintaining a high degree of quality of life in the late 1990s and early 2000s. But, after 2005 there was a gradual and continual decline in the SIUA statistic. Eventually, this decline negated the gains achieved at the turn of the century.

Many of these improvements achieved at the turn of the century were the result of technological innovations developed in the mid 1980s and 1990s. Innovations were largely precipitated by the increased environmental enlightenment and awareness of the Canadian population during the 1980s and 90s. Global

environmental catastrophes such as the Exxon Valdez oil spill, the Chernobyl nuclear accident, the greenhouse effect, acid rain, and the measurement of the hole in the ozone layer sensitized people to the harsh realities of human activity and the negative consequences for the environment. Prior to this, environmental concerns were limited primarily to environmentalists and researchers. The 1972 Club of Rome report, Limits to Growth, introduced a new urgency into humanity's relationship with the natural environment by stressing that the capacity of the world's environment to continue to sustain human life as we know it was the most immediate limit to continued economic and demographic growth. This warning went unheeded by the general public until the mid-1970s when OPEC (Oil Producing and Exporting Countries) induced an oil shortage. People did not respond to environmental warnings unless there was a tangible threat to their established behaviours and lifestyles. Global environmental catastrophes in the 1980s represented such a threat, which increased and focused research and development activity into finding ways to minimize the impact of human activity on the environment. In the latter 1980s, societal values shifted away from rampant consumerism as slow economic growth combined with changing demographics forced a reassessment of lifestyles. As a result, the 1980s and 1990s were characterized by a wave of technological innovations which made it possible for every Canadian to make some improvements in terms of consuming less resources and producing less waste at the turn of the century. In the process individuals, cities and the global environment became the main benefactors of these technological improvements.

Technological innovation in the automotive and housing sector proved to be especially beneficial. The greenhouse effect, acid rain, and the depletion of the ozone layer were caused in part by the production and consumption of energy in all its forms, particularly the combustion of fossil fuels. In 1990,

energy consumption in the home represented almost 20 percent of the country's total energy consumption. The automotive industry was also a large consumer of energy, particularly of fossil fuels. Any gains in these sectors would benefit cities and society.

Housing was recognized as a major consumer of resources in both its construction and operation. Any type of reduction in resource consumption in these areas would yield significant benefits for the environment. Government departments at the federal and provincial level, private developers, business groups and NGOs spent a great deal of research time and money improving the design and operation of homes. The results of these research efforts produced a wave of experimental, innovative, and environmentally safe housing units incorporating the most advanced technology. As a result, the construction of homes became more efficient.

It was possible to recycle and reuse materials: insulation was fabricated from recycled newsprint and cardboard, drain tiles and carpeting were manufactured from recycled plastics, drywall was created from recycled board stock, and manufactured wood products were created from waste wood. Moreover, computer software packages enabled builders to select the least environmentally harmful products for construction. The OPTIMIZE 3 software version of the original OPTIMIZE model allowed builders to determine the embodied energy of building materials (that amount of energy required to manufacture, transport and install materials used in home construction) as well as the energy savings gained over the lifetime of a structure given the selection of construction materials. This enabled builders and consumers to weigh the options for resource and energy savings from the perspective of immediate and later environmental gains. The result was a better built home whose environmental impact through construction was minimized.

Since homes are built to last for many years, their operation in terms of energy and water consumption has a significant impact on the environment. On a per capita basis, Canadians in 1990 were the largest per capita users of water in the world, with each Canadian using, on average, 360 litres of water per day. Estimates show that 80 litres of water per person per day was sufficient. The bathroom accounted for 75 percent of water used in the home (toilet flushing - 40 percent and showers and bath - 35 percent). Technological innovations and changes to water using hardware improved the efficiency of water use. Low volume toilets at 6 litres per flush yielded a 35 percent reduction, low flow showerheads at 10 litres per minute as opposed to 20, and low flow aerators reduced faucet flow by 50 percent cut residential water use in half, by 1995, with no attendant effect on lifestyle.

In 1990, energy consumption in Canada was the highest of any country accounting for almost 20 percent of Canada's total energy consumption. On average, two thirds of home energy use was consumed by heating and cooling our homes. The operation of lights and appliances accounted for approximately 15 percent. Energy efficiency in housing was maximized by the following strategies based on reducing the demand for total and peak energy:

- improving the thermal envelope of the building;
- improving the performance of heating, cooling and
  climate control systems; and
- minimizing the energy consumed in the operation of
  lights, appliances, fans and domestic hot water.

Reducing the demand for energy in our houses also increased the viability of renewable energy sources - enhancing the potential for solar space and water heating and allowing for consideration of electrical generation based on renewable

sources such as solar powered photovoltaics and wind powered generation.

During the 1980s and 1990s there was also a great deal of concern about the level of pollutants emitted and the amount of fossil fuel consumed by the automobile. Mexico City and Los Angeles were choking on the exhaust from their cars. American states such as California, Massachusetts and New York created laws which required that by 2010, 10 percent of cars sold in these states emit no exhaust fumes. In California alone this accounted for approximately 3 million automobiles. The automobile industry responded by researching ways to make cars more efficient in use and construction. For example, a breakthrough in plastic composite enabled plastics to be recycled upwards of five times for use in automobile frames.

Smart cars and highways were developed using geographic visual infrastructure and street address databases. In these systems optimal routes were chosen prior to travel in order to avoid congestion and unnecessary idling of cars. Perhaps the most significant innovation from an environmental perspective was in the field of alternative fuelled vehicles which did not produce harmful emissions. Vehicles such as the smokeless diesel engine, ethanol- and battery-powered cars were created and successfully marketed.

Although society made some substantial progress at the turn of the century, in retrospect it was nowhere near enough to make a difference. Despite all the technological innovations which made us a more efficient society, we still cannot lay claim to achieving a sustainable society. Some of the same environmental issues from the late 20th century still persist. Continuing concerns include global and local air pollution, the over-crowding of cities, the decreasing quality of life,

the rising level of water pollution and consumption, and
municipal waste generation and energy use.

5.   The Barriers to Sustainable Development

The critical question is "what were the barriers which
prevented Canadian society from adopting many of the
recommendations made in these studies?" A number of obstacles
can be identified: strong economic growth, population growth,
technology, physical and perceptual barriers, and
institutional barriers. However, the most powerful and
pervasive barrier appears to have been societal and personal
values. People did not adopt sustainable development as an
overall principle to guide them in how they interacted and
related to others and the environment.

° Strong Economic Growth

The period of strong economic growth which occurred from
2010 to 2020 perpetuated the values of a consumer society,
defined as "the possession and use of an increasing number
and variety of goods and services as the principle cultural
aspiration and the surest perceived route to personal
happiness, social status, and national success". This was
not sustainable as it promoted the consumption of goods and
services as the surest way to personal satisfaction and
happiness. Over the past ten years, Canadian society has
experienced a period of sustained and strong economic
growth. Key economic indicators such as the Gross National
Product (GNP), housing construction starts, employment
levels and average annual income provide conclusive
evidence that Canadian society has enjoyed almost a decade
of economic prosperity similar in scale to the economic

prosperity of the 1950s. As a result, economic growth has pushed Canadian society back to the values of consumerism.

This is in contrast to the behaviour exhibited by individuals, particularly during the prolonged economic recession of the 1990s and early 2000s. During the recession consumer values were mitigated by economic reality. People were limited in the number of goods and services that they were able to consume. Consequently, this created a value shift away from consumerism towards values which were consistent with sustainable development --"development that meets the needs of the present generation without jeopardizing the ability of future generations to meet their own needs". This definition implies a commitment to environmental stewardship and frugal behaviour. These were the qualities households adopted during the economic recession of the 1990s and early 2000s.

It was no surprise that frugal behaviour and environmental stewardship created more sustainable urban areas. This was demonstrated in the homebuilding industry where the economic recession triggered the construction of more sustainable homes and communities. Builders found that in a climate of economic recession, affordability is a key factor in home buying. To ensure that home prices were affordable, homes were built more modestly in size. Homes over 2000 square feet were rarely built as the majority of homes were built in the 1000 square foot range or under. To further minimize building costs, and hence home prices, builders constructed more multiple type dwelling units instead of single detached homes. Furthermore, affordability was not the only consideration which influenced the decision to buy a home; a sense of community and quality were also very big priorities. All three

factors, affordability, quality and community, became
strong marketing tools for the homebuilding industry.
Society valued frugality over consumerism and quality over
quantity. By promoting and marketing smaller and more
modest priced dwellings at affordable prices, the home
building industry was indirectly promoting sustainability
in housing construction and urban form. It is no
coincidence that some of the most innovative progress in
sustainable urban form was made at this time.

The renewed economic growth and widespread prosperity has
sparked a reversal of this trend. Once again the
consumption of goods and services has become the principle
route to perceived personal satisfaction and happiness.
The recession created a pent up demand for bigger homes.
Today, people are trading up for new and bigger homes. The
return to consumer values has virtually torpedoed all the
progress achieved in the home building industry and urban
form during a period of economic recession.

° **Population Growth**

Related to this economic growth was the resurgence in
population growth in Canada as a result of increased
immigration levels. The prolonged economic recession that
endured for all of the 1990s and the early part of 2000s
was the result of two factors: fundamental restructuring of
the Canadian economy from an industrial to an information
society, and very low levels of population growth. The
restructuring of Canadian society involved changes to every
aspect of Canadian business from employment skills to the
demands for knowledge products and services, business
structures and global economic markets. Such fundamental
restructuring took time and prolonged the recession.

At the same time the number of Canadians of working age continued to decline. This additional strain inhibited the recovery of an already weak Canadian economy. In particular, as the 'baby boom' generation aged, a large proportion of the Canadian population reached retirement age, placing enormous pressure on Canada's health care system and other government benefits paid to the elderly. By the year 2000, almost 20 percent of Canadian adults were 65 or over, while the number of Canadians of working age continued to decline, further weakening the economy. For Canada to recover from the economic recession and promote economic growth, it was necessary for Canada to augment its working age population. This was done through increased immigration.

Overall global population growth became the push factor promoting greater immigration into Canada. In 1990, the world population was approximately 5 billion people, in 2000 it rose to 7 billion and today the global population is 10 billion. Most of this growth occurred in developing countries, seriously hindering the ability of weak third world governments and their economies to meet the needs of their inhabitants. Moreover, the levels of population growth in these countries deteriorated the economic systems and depleted the natural resourcess. The need to redistribute the population became a major push factor leading to a global redistribution of population from over-populated regions (developing countries) to low growth regions (developed countries). Canada was a favourite destination for many immigrants.

However, it soon became obvious that increased population growth created problems for Canadian sustainable development efforts. The uneven distribution of immigrants to preferred urban areas such as Montreal, Toronto, Vancouver, Ottawa, and Rupertville endangered the

sustainable development efforts of these cities. Population growth from immigration was so great that it overwhelmed the ability of these cities to plan and control growth in a sustainable way. As the urban population of these cities continued to increase at a phenomenal rate, the opportunities for housing supply became limited in the existing urban areas. Specifically, urban population growth conflicted with policies to constrain growth to existing, compact areas. Yet existing areas could not accommodate more housing units. The price of housing in existing areas consequently increased, pushing prospective buyers into fringe areas where land and housing was cheaper. Thus urban sprawl was sustained via the search for affordable housing.

The original appeal of sustainable development was the idea that urban development could occur symbiotically with the environment. However, even the Club of Rome report of some 50 years ago identified real limits to growth. Development does have its limits and development, no matter how carefully planned, does not necessarily go hand in hand with the environment. We must recognize the sociological and ecological constraints on economic expectations.

º **The Impact of Technology**

Technology is another area which has impeded the transition of society to sustainable forms of development. This perspective is in conflict with the views from the 20th Century which often cited the important role of technology in sustainable development. It is true that technology is accountable for many positive improvements to the environment; however, technology has not solved all the environmental problems. Instead, it bought us time to grow by making society more efficient and by shifting our

dependency from one resource to another. However, the resulting gains were, in reality, illusionary and short term.

For example, concerns about global warming moved the automobile industry to develop vehicles which did not emit harmful pollutants into the atmosphere. Battery powered vehicles were developed which minimized harmful atmospheric pollution. However, this technological innovation was only shifting our ecological dependency, or in this case ecological impact, from one resource to another. Instead of emitting harmful air pollutants, the battery powered cars created a waste disposal problem: many landfill sites which are now contaminated with the lead-acid composition of batteries. The proliferation of battery powered cars and the disposal of the battery created problems for water quality that should have been anticipated.

In short, technological innovation has created a false sense of real progress. For example, the widespread ownership and use of the automobile during the 1950s and 1960s increased the consumption of fossil fuels. In the 1970s, Oil Producing and Exporting Countries (OPEC) deliberately over-rode market signals for the price of oil and created an inflationary spiral in oil prices. The immediate response by the population was not to curb consumption, but rather to minimize the human impact without altering consumption habits. One perceived appropriate solution was to create more fuel efficient automobiles that could squeeze more miles of driving per litre of gasoline. Without a complimentary shift in attitudes and behaviour, technology is only a short term solution.

When confronted with a problem, it is human nature to adopt the easiest, though not necessarily best solution. Rather

than modify values and individual behaviour to be more sustainable, it was easier to develop and adopt technological innovations. This created a certain amount of complacency among the population; it seemed possible to solve all environmental problems with technology. Technology does not curb our consumption habits nor influence them. Technology does, to a certain extent, minimize the impact of human activity. In order to become sustainable we need to make adjustments and changes to our value system and lifestyles. Without a change in consumption habits, the problem still remains; there is nothing to prevent us from reaching the same consumption levels prior to the adoption of technological innovations.

o **Physical and Perceptual Barriers**

Much of our present urban areas were developed in the 1950s and 1960s at a time when the environment was not a concern among the general population. Consequently, urban areas were planned without any consideration for sustainable development. Items which received more attention in planning urban areas included automobile accessibility, land-use segregation, and maximization of personal/ private space. However, this legacy of urban planning remains even to this day, although it is generally agreed that this urban form is no longer tenable. Traditional 1950s urban form still exercises a powerful influence on the mindset of many people.

Altering this reality has proven to be somewhat difficult due to a number of physical and related perceptual barriers. It has been very difficult to retrofit the prevailing urban form. For example, the curvilinear street patterns, which are so characteristic of suburban areas of the 1950s, make it very difficult to implement an efficient public transportation network without tearing up the

existing streets. A curvilinear street pattern is not sustainable as it necessitates the paving of acres of land for very low volume of local traffic. Yet tearing it up to place a more efficient road network favourable for public transportation is expensive in terms of money and built resources, and is perceived as highly disruptive by residents. The present urban form that has been in existence for almost seventy years is deeply entrenched.

Furthermore, there were some firmly entrenched community perceptions of sustainable urban form. For example, in Rupertville the NIMBY syndrome (Not In My BackYard) prevented efforts to implement some of the more sustainable urban design principles identified in the planning document, The Key to Our Existence. Proposals to increase residential densities in selected neighborhoods in Rupertville were met by community opposition created by the perception that low density is good and high density is bad. In fact, there is no evidence to support this claim. The attraction of low density development and the lure of increased private space clouded people's sense of logic and resulted in the perpetuation of low density development.

A popular slogan during the 1990s was "Think globally, Act locally". In general, people did think globally by expressing their concerns for such environmental issues such as the greenhouse effect, endangered wildlife species, water pollution, and land pollution. And, to a certain degree, individual households acted locally by recycling and composting their waste. But as a community they also acted locally in resisting change to their neighborhoods in order to preserve the status quo. By doing so, people failed to recognize the broader impacts of local decision as their resistance to change blocked sustainable development. Few people stopped to think about the internal contradiction of their actions; that by rejecting

change in local neighborhoods, they were fueling suburban growth and contributing to the environmental problems that they were, ostensibly, so concerned about.

° **Institutional Barriers**

The structure of our institutions inhibited the adoption and implementation of sustainable development. Most 20th century institutions were modelled on a hierarchical structure with specific vertical demarcation of responsibilities. Such was the case at all levels of government, from local city halls to the federal government. At the municipal level, the present and past organization of municipal administrations into departments such as planning, land-use, health, parks and police is not relevant to the challenges presented by sustainable development. Such a hierarchical, decentralized approach to organization and problem solving separated problems into constituent parts dealing with these in relative isolation. Municipal organizations did not adopt other forms of organizations which would promote a systematic, comprehensive approach as this organization was extremely entrenched.

In the 1990s we became increasingly aware of the complex inter-relationships between the environment, economy, and society. This was reflected in attempts such as the Crombie Commission, to promote ecologically based planning and the principle rationale for the organization of provincial Round Tables. There were many attempts to approach the problem in a more comprehensive and holistic way, yet the old structures prevailed, and in the process inhibited any attempts to put into place more ecologically based planning.

6. Conclusion

In 1990, there was a great deal of effort put into creating a vision of a sustainable city. At the time, many experts predicted that Canadian society had a minimum of thirty years to make any real progress to sustainable development. Here we are in 2020 and we are still no closer to sustainability than in 1990. Unfortunately, people were not prepared to take "visions" to the next step into reality, thereby rendering all the research efforts futile. Despite initial gains, we as a society are still faced with the same environmental problems as in 1990, while our options to address them have become more limited. Who can say how much time we still have to undo the damage we have done, if we still have time at all?

BIBLIOGRAPHY

CMHC's Healthy Housing Design Competition: Guide and Technical Requirements. Canada Mortgage and Housing Corporation, 1991.

D'Amour, David. Sustainable Development and Housing. Research Paper No. 1. Canada Mortgage and Housing Corporation. January, 1991.

Green Car Journal. Volume 1, number 8. Green Car Media. August 1992.

Government of Canada. The State of Canada's Environment. Minister of Supply and Services Canada, 1991.

Government of Canada. Canada's Green Plan for a Healthy Environment. Minister of Supply and Services Canada, 1990

Hodge, Gerald. Planning Canadian Communities. Nelson Canada: Scarborough, 1989.

Ontario Round Table on the Environment and Economy. Challenge Paper, 1991.

Premier's Round Table on Environment and Economy. Towards Sustainable Development in New Brunswick: A Plan for Action.

Premier's Round Table on Environment and Economy. Sustainable Development in New Brunswick, Because We Want to Stay.

REIC Ltd. Earth Energy Systems: A Guide to the Technology. Research Division. Canada Mortgage and Housing Corporation, August, 1990.

Royal Commission on the Future of the Toronto Waterfront. Watershed: Interim Report. August 1990.