

Overcoming Barriers to Sustainable Urban Development:

Toward Smart Growth in Calgary



A Discussion Paper Prepared for the Calgary Citizens' Forum

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Executive Summary

This report presents the principles of Smart Growth as a sustainable alternative to the current pattern of sprawling, automobile-dependent development in Calgary. Evidence collected from scholarly sources as well as interviews conducted with 18 leading Calgarians—representing a range of sectors including the development industry, social service agencies, the City and academia—indicates that the most significant threats posed by sprawl include:

- increasing greenhouse gas emissions contributing to climate change
- declining local air and water quality
- increasing rates of physical and mental illness
- diminished sense of community and increasing strain on social services
- lost productivity, increasing taxes and crumbling infrastructure

Considering public concerns regarding sprawl and the growing body of research validating these concerns, a focused effort by developers, aldermen and city officials to implement a more sustainable form of development in Calgary is needed. As of yet, however, no significant changes have materialized, mainly because the decades spent accommodating sprawling development have resulted in a path-dependent system of institutions, infrastructure, and practices.

Developers, public officials and citizens must take action to overcome the specific barriers that hinder change. This report presents ten recommended actions to accelerate the transition toward more sustainable forms of development:

- Promote Smart Growth with a public engagement and education campaign
- Reform planning policies, regulations and implementation procedures to remove barriers to Smart Growth
- Produce a range of sustainability-oriented alternative plans for new communities; mandate city-wide public participation in the planning of new communities
- Provide incentives that encourage developers to implement Smart Growth

- Plan land use densities to support the growth of an efficient public transit system
- Review provincial legislation that affects municipal growth in Alberta
- Plan functional communities that include schools, high quality public transit, employment centres and a mix of housing options
- Mandate affordable housing as an integral part of every new development
- Create a citizens' panel to review and reform Calgary's electoral process
- Monitor and report sustainability indicators as part of the planning process

This list of recommended actions is intended to catalyze debate about the adoption and facilitation of sustainable development in Calgary based on the principles of Smart Growth. The goal of this debate is to move toward policies and practices that distribute the benefits of development widely among all residents of the city and ultimately foster a caring, vibrant and healthy Calgary.



A Call for Sustainable Urban Development in Calgary

Since the mid-20th century, low-density, automobile-dependent development, often referred to as sprawl, has been the dominant form of development in North America. As cities have grown, however, it has become increasingly evident that sprawling development poses a serious threat to our environment, health, social networks and economy.

In response to these concerns, a set of urban planning and design principles known as Smart Growth were developed in the 1990s. These principles were developed to provide communities with a blueprint for sustainable urban development. They include planning and design concepts such as mixed-use zoning; increased/improved transportation options such as mass transit; walking and cycling; compact building and neighbourhood design; and a greater mixing of housing types. These principles focus on reducing the use of the private automobile, limiting the extent to which our cities need to expand and providing all residents greater access to economic and social opportunities. By changing the way cities are planned and built, advocates of Smart Growth contend that many of the threats posed by the continuation of sprawling development can be reduced significantly.

Calgary exemplifies the model of low-density automobile-dependent development. Most of its growth has occurred during the automobile era with only a small number of intact neighborhoods dating to the 1940s or earlier. Consequently, the city's growth has been largely based on the premise that Calgarians will use a car to travel about the city. Although this might have been a reasonable expectation (or aspiration) for city planners in the 1950s, this premise is no longer sustainable. Critics of sprawl point to the loss of agricultural land and wildlife habitat in and around cities, the degradation of air and water quality, the increasing social isolation and segregation of vulnerable groups, and the increasing cost of maintaining infrastructure and providing social services.

On the other hand, Calgary has all the elements necessary to become a leader in sustainable urban development. Its strengths

include a remarkably robust economy and a young, well-educated population with a pioneering, innovative spirit. Calgary also has the basic transit infrastructure required to make the transition from a sprawling, automobile-dependent city to one that promotes a compact, mixed-use form of transit-oriented development. These attributes put Calgary in a strong position to challenge the status quo and develop innovative ways to accommodate its rapidly growing population.

In fact, many Calgarians support the principles of Smart Growth. Citizens, planners, members of City Council and several developers have taken steps to support compact, mixed-use development, but to date these efforts have been insufficient to bring about tangible change. A range of physical, institutional and cultural barriers have become entrenched over several decades of automobile-focused development, making otherwise sensible alternative forms of development difficult to adopt. This "path-

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dependency" is reflected in patterns of infrastructure investment, municipal regulations, government policies and cost subsidies that facilitate sprawl while discouraging and often precluding compact, mixed-use, pedestrian and transit-oriented development. Low-density automobile-

oriented development, moreover, represents both a physical and cost barrier to a fast, efficient, city-wide public transit system, a key element of Smart Growth. Finally, a range of common myths associated with Smart Growth and higher-density urban environments represent a cultural barrier to change. These barriers, which we investigate throughout this paper, must be addressed and overcome if we are to achieve sustainable urban development in Calgary.

Definitions of Sprawl

There is no general agreement on what sprawl is, making debates over the phenomenon frustrating and counter-productive at times. Definitions range from those as simple as dispersed, low-density residential development (Speir & Stephenson, 2002) to more elaborate and quantitative definitions such as non-contiguous, subdivision-style residential development on 0.33 to 1 acre lots or non-residential development with floor-to-area ratios of 0.20 or less (Burchell & Mukherji, 2003). Sometimes density-linked descriptors are avoided, and instead sprawl is defined as unattractive, poorly planned growth that consumes valuable green space (Tregoning, Agyeman, & Shenot, 2002).

For our purposes, the term "sprawl" will refer to low-density, automobile-dependent development based on segregated land uses.

For our purposes, the term "sprawl" will refer to low-density, automobile-dependent development based on segregated land uses. This definition avoids arbitrary numerical definitions as well as characteristics, such as leapfrog development, that are far more widespread in the United States than in Canada. This definition captures the effects generally associated with sprawl: an imposed reliance on the private automobile for routine daily activities; discouragement of walking or cycling as alternative mobility options; residential densities that are too low to make mass transit economically feasible and convenient; the segregation of urban functions as well as socio-economic groups from one another; and the promotion of private space at the expense of public space. This definition identifies many of the challenges Calgarians face as a result of Calgary's development patterns.

This Report

Part 1 of this report explores and highlights many of the consequences of sprawling urban growth. Many of these concerns may be surprising to some because they extend well beyond the typical aesthetic and land conversion issues that are often the subject of debate. Recent literature concerning the impact of sprawl on climate change, public health and the economic competitiveness of cities is reviewed.

Part 2 describes the principles of Smart Growth in detail and illustrates the benefits that can be achieved through their implementation. We highlight and dispel a number of myths that have surfaced regarding the principles of Smart Growth, concluding with a review of the implementation of Smart Growth principles in a number of communities in North America, South America and Europe.

Part 3 investigates the origins of sprawling development by reviewing the government policies, business practices and social myths that have led to the proliferation of sprawl. The intent of this review is to challenge claims that sprawl is the logical result of consumer choice in a free market. This section also identifies the most significant barriers that stand in the way of implementing Smart Growth solutions in Calgary, including

- the underlying political and economic policies that continue to make sprawl the dominant form of development in North America;
- local development regulations that impede the implementation of innovative urban planning design; and
- public misperceptions that undermine the transition to Smart Growth.

Part 4 highlights ten important recommendations for overcoming the barriers that hinder Smart Growth initiatives. By addressing these barriers, the social, environmental and economic costs associated with sprawl can be mitigated and the benefits associated with urban development enhanced.

The information presented in this paper is derived from a variety of sources, including the urban planning literature, a number of specific case studies, government documents and in-depth interviews conducted with 18 representatives of influential organizations in Calgary including

- The City of Calgary, Land Use Planning and Policy
- The United Way of Calgary
- Calgary Health Region
- Architects and developers
- Calgary Homebuilders Association
- Child and Youth Friendly Calgary
- Developmental Disabilities Resource Centre
- Calgary Board of Education
- Calgary Technologies Inc.

Not everyone will agree with all of the ideas expressed and recommendations put forth in this paper. While different visions of Calgary's future development are to be expected, all Calgarians undoubtedly desire a caring, vibrant and healthy city. We hope that this paper will provide a framework for thoughtful, constructive and wide-ranging debate, contemplation and deliberation toward that end.



Part 1

Sprawl: An Unsustainable Form of Development

Early criticism of sprawl often focused on the issues of its unattractive appearance and the loss of agricultural land and green space. However, the interviews conducted for this study indicate that Calgarians are concerned with a much wider range of consequences. Interviewees expressed concern with the effects sprawl is having on our environment, the health of our citizens and the social equity of our city. A large body of research suggests their concerns are well founded.

For example, sprawl has been identified as having a significant environmental impact both locally, through the degradation of water and air quality, and globally, through the emission of greenhouse gases that contribute to climate change. A number of medical associations have identified sprawl as a key factor in the proliferation of several illnesses including obesity-related diseases such as diabetes, high blood pressure and stroke, as well as several respiratory conditions. Even depression has been linked to the impersonal character of sprawling neighbourhoods, which several researchers link to reduced community bonds. Together, these conditions combine to pose a serious threat to our economic well-being: increasing healthcare costs, lost productivity due to illness and traffic congestion, and crumbling public infrastructure resulting in rising taxes and diminished economic competitiveness.

Thus, the impact of sprawl extends well beyond concerns over aesthetics and access to open space. It is vital that Calgarians understand the full range of sprawl's consequences if progress is to be made toward a more sustainable model of development. The next eight sections review the impacts of sprawl.

Interview Responses - The Costs of Sprawl in Calgary

During the interview process, individuals were asked to identify any challenges Calgarians face that may be caused by current development practices. Respondents expressed concern that sprawl causes a range of problems in and around Calgary including

- loss of local wildlife habitat
- overuse of water resources
- damage to rivers from excessive storm water runoff
- less effective public services such as transit and social support
- socio-economic segregation by neighbourhood

Concern over excessive conversion of land for development and resultant habitat loss was mentioned in several interviews. Individuals expressed the opinion that land (and infrastructure) is being used inefficiently, largely because new developments are less dense than they should be. Some expressed concern that the integrity of wilderness areas such as Fish Creek Provincial Park and the Weaselhead Natural Area will be eroded as development pressures supersede conservation efforts.

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Management of Calgary's water resources was another area of concern. Respondents expressed concern over the use of water for aesthetic purposes, such as lawn watering, which has resulted in occasional water use restrictions.

Some individuals also felt that the extent of land covered by impermeable surfaces, such as asphalt, concrete and buildings, is causing damage to the river system in and around Calgary.

Our attitude toward automobiles was one of the most consistently mentioned concerns. Acknowledged consequences of our auto-dependent urban environment included

- degradation of the natural environment in and around Calgary
- diminished air quality leading to poorer health for residents
- higher cost of living
- less access to economic and social opportunities for low-income residents
- decreased opportunity for social interaction
- unpleasant pedestrian environments that reinforce automobile-dependency

Respondents, particularly those affiliated with the City, social service agencies and non-profit groups, indicated that sprawl has made it exceedingly difficult for them to provide adequate levels of public services and support programs. Because Calgary's population is spreading out over an ever broader area, everything from transit services to schools and libraries to community programs has become more expensive to provide. Cutbacks in services often have a pronounced impact on the poorest members of society, representing yet another social equity challenge.

Interviewees also expressed concern about the socio-economic segregation of citizens. Most people recognize that there is diversity among neighbourhoods, but that there is little variety in the size and price of dwellings within neighbourhoods. This leads to neighbourhoods of people with similar economic circumstances. As well, it excludes individuals of limited economic means from living in areas that may be most convenient for them to access employment opportunities and social services.

Imposed Reliance on Fossil Fuels and Its Impact on Climate

Climate change is considered by many to be the greatest challenge that humanity will face this century. A highly regarded United Nations report warns that a rise in mean global temperatures, precipitated by high levels of greenhouse gas (GHG) emissions resulting from human use of fossil fuels, will have far reaching impacts on both ecological and economic systems around the world (Intergovernmental Panel on Climate Change, 2001).

For example, the increased melting of polar ice caps is expected to cause a rise in sea levels and, consequently, the displacement of hundreds of thousands of people (Natural Resources Canada, 2002). Of particular concern to Calgarians, an increase in local temperatures will place our sources of fresh water at risk as glaciers in the Rocky Mountains shrink and eventually disappear, causing more frequent and intense drought conditions in the region (Bow River Basin Council, 2005). Stabilization of GHG concentrations in the atmosphere is expected to require massive reductions in emissions (Bow River Basin Council, 2005), substantially in excess of Kyoto accord targets.

Automobile exhaust is a significant source of GHG emissions (Frumkin, 2002; Newman & Kenworthy, 1998). According to Climate Change Central (2005), transportation (not including fossil fuel production) is responsible for more than 27% of the GHG emissions in Canada with a similar percentage reported for the United States (Frumkin, 2002). According to a National Round Table on the Environment and Economy, transportation energy use in Canada grew by 21.5% between 1990 and 2000, with 60% of this increase attributable to automobile passenger traffic. In 2003, Albertans traveled 34 billion vehicle kilometres (VKT) consuming 4.1 billion litres of fuel in the process. The province ranked third to only Ontario (107 billion VKT) and Quebec (60 billion VKT) in absolute VKT (Transportation Canada, 2004b). On a per capita basis, however, Albertans traveled considerably more than residents of other provinces.

Several researchers draw a direct link between urban form and transportation energy use, indicating that sprawling development patterns foster a car-dependent attitude amongst residents (Carruthers & Gundmundur, 2004; Khisty & Cemal, 2003; Porter, 1998; Schmidt, 1998). A study that used data collected from a number of cities in the U.S., Europe and Asia found that as population densities decreased, transportation energy use increased (Newman et al., 1998), demonstrating a strong link between sprawl and increased energy use. Furthermore, sprawl contributes to traffic congestion by decreasing the convenience of other transportation options such as bus-based mass transit (TD Bank Financial Group, 2003) thereby intensifying the use of fossil fuels and exacerbating GHG emissions. These studies reflect the serious environmental threat posed by the sprawl-automobile link.

A Canadian report also indicates that the dispersion of suburban employment, unaccompanied by transit service, leads to more and lengthier automobile commuting and therefore a rise in emissions (Statistics Canada, 2005). The report also noted that workers employed in city centres across Canada were much more likely to commute using public transit than those employed in suburban areas. For example, in Calgary, the study indicated that 19% of those employed in the city centre took transit as compared to less than 10% for those employed more than five kilometres from the city centre. In short, the increased automobile use is likely due to the poor transit service often provided in suburban areas. These findings highlight the need for mixed-use zoning, more convenient public transit options, and increased density in the vicinity of transit stops throughout the city.

Another significant source of GHG emissions is the energy used to heat, cool and power buildings and appliances. Housing type has a direct impact on emissions because larger, detached buildings, typically found in low-density developments, use more energy than compact multi-unit buildings, such as townhouses and apartment units, that share walls and ceilings/floors (Friedman, 2004b; National Round Table on the Environment and Economy, 2003).

It is also important to note that the extraction, refinement and transportation of fossil fuels also contribute significantly to GHG emissions. Therefore, any strategy that reduces the use of fossil fuels, whether through reduced automobile use or improved home heating and cooling efficiency, carries extra GHG savings.

Loss of Wildlife Habitat and Green Space

Habitat loss is another substantial environmental issue facing cities in Western Canada (Gillham, 2002). The outright loss of habitat by its conversion to developed land is not the only manner in which sprawl can contribute to habitat loss. For example, fragmentation of formerly contiguous landscapes that causes disturbance to breeding grounds or reduces resources to inadequate levels can damage habitat just as much as outright conversion (Miistakis Institute for the Rockies, 2003; Peck, 1998). Research conducted by the Miistakis Institute for the Rockies indicates that residential expansion

contributes significantly to the fragmentation and degradation of formerly viable wildlife habitat in southwestern Alberta.

Calgary is located in a particularly important ecological area at the confluence of three major waterways: the Bow River, the Elbow River and Fish Creek. Sightings of bear, coyote, elk and deer near these waterways within the city limits indicate that Calgary is located on the remnants of significant migratory routes and feeding grounds.

Local statistics gathered by the City of Calgary reinforce concerns over the spatial expansion of the city and indicate that our city has been expanding at a remarkable rate over the last two decades. In 1981, Calgary's built-up area (developed urban land) was approximately 273 km². In 1991, that figure had grown to 346 km², an increase of almost 27%. By 2001, Calgary had grown by another 26%, with built-up lands totalling approximately 435 km². In just 20 years, Calgary's built-up area expanded by more than 160 km² and consumed a significant amount of habitat now largely unavailable for wildlife.

Depletion and Degradation of Water Resources

Water is a precious resource in southern Alberta. Development affects our water resources in three main ways. First, development can alter the quality of our water by affecting the hydrological processes that provide us with the clean, reliable surface and subsurface water flows we depend on. Second, development can reduce the quantity of water we withdraw from these sources by increasing water consumption and reducing opportunities for groundwater recharge. Third, the way we use water and how we return it to the environment has a direct impact on downstream water quality.

The rate at which open space, whether wilderness or farmland, is being converted is causing substantial change to hydrological processes such as rainfall interception, infiltration and groundwater recharge (McCuen, 2003; Wilkie & Roach, 2004), seriously affecting downstream water quality (Southerland, 2004; Wilkie et al., 2004). Altering the hydrology of a region potentially alters ecosystem processes important to local wildlife populations (Peck, 1998) and, in the long term, can also produce a water supply crisis for human residents (Burchell et al., 2003; Gillham, 2002).

Burchell et al. (2003) produced long-term projections on water consumption rates by comparing the effects of a managed growth scenario with a conventional (sprawling) growth scenario across the U.S. Their findings indicate that by implementing managed growth practices, water demand in the U.S. could be reduced by as much as 150 million gallons (approximately 525 million litres) per day, mainly through a reduction in lawn watering. Results indicate that the greatest water savings would be realized in regions with limited water resources, such as the western and southwestern states.

According to a recent study released by the Bow River Basin Council (2005), 96% of the water licensed for withdrawal from the

Bow River was designated for municipal uses. This amounted to approximately 350 million cubic metres or 12% of the total annual flow. Since Calgary is by far the largest municipality (by population) along the Bow River, it is no doubt responsible for the lion's share of this withdrawal.

In Calgary, water use increases by an average of 50% during the spring and summer months, largely because of gardening and lawn care (City of Calgary, 2003); this was also the case in the study by Burchell et al. (2003). In general, the form of development (large single-family lots or compact multi-unit complexes) significantly affects water use. This conclusion is supported by Hammer (2004) who notes that larger residential properties with more expansive lawns and gardens use much more water than multi-unit dwellings. The development of homes on smaller lots and multi-unit dwellings can appreciably reduce water demand. As our population continues to grow and supplies of potable water in our region diminish, this will become an increasingly critical issue for Calgarians.

Premature Death, Increasing Disease and Rising Health Care Costs

A recently released report by the Ontario College of Family Physicians (2005a) states that "the interests of public health require interventions in urban planning and public transportation" to produce more compact, mixed-use neighbourhoods and enhanced multi-modal transportation options. The report identified four significant public health threats caused, in part or in whole, by sprawl:

- air pollution caused by automobile emissions
- obesity, linked to reduced daily exercise associated with automobile dependency and pedestrian-unfriendly neighbourhood design
- injuries and fatalities caused by automobile accidents
- social and mental health issues linked to long commutes to work, a weak sense of community and loss of green space

First, increases in vehicle kilometres traveled (VKT) have led to increases in automobile emissions. A study by the Ontario Medical Association (OMA), based on research conducted in Ontario since 2000, estimated that in 2005, air pollution would be responsible for as many as 60,000 emergency room cases. It also estimated that as many as 5,800 premature deaths would occur throughout Ontario in 2005 because of respiratory complications triggered by high levels of air pollution. In total, the OMA calculated that air pollution costs the province approximately one billion dollars annually in health care and lost productivity (Ontario Medical Association, 2005).

A number of other studies draw similar conclusions. A study prepared for the World Health Organization found that 6% of mortalities in Austria, France and Switzerland were attributable to inhalable particulate matter smaller than 10µm in diameter in outdoor air (Kunzli et al., 2000). The study also showed that private automobiles contribute as much as 58% of the inhalable particulate matter measured in urban centres. A study of more than 1,700

California youth (ages 10–18) found that exposure to air pollutants such as nitrogen dioxide, acid vapor, elemental carbon and inhalable particulate matter caused significantly decreased lung development (Gauderman et al., 2004). Vehicle emissions were identified as the primary source of these pollutants.

The second major health effect of sprawl is that activities such as walking and cycling have been widely rendered impractical or unsafe by the planning and design characteristics of most modern cities, particularly their suburban areas. Many newer neighbourhoods lack sidewalks, have wide road crossings that intimidate many pedestrians (Ewing, Schmid, Killingsworth, Zlot, & Raudenbush, 2003; Ontario College of Family Physicians, 2005b) and are located beyond what many people feel are reasonable walking and cycling distances from commercial areas, public facilities, and transit stops (Gillham, 2002). Furthermore, their street and circulation plans impede the free and easy flow of pedestrians through and between communities. Consequently, physical activity is no longer part of the daily routine of many North Americans.

In an address made at the Canadian Cardiovascular Congress held in Calgary in 2004, researchers for the Canadian Heart and Stroke Foundation blamed the poor planning and design of most suburbs for increasing rates of obesity, heart disease, stroke and diabetes (Friedman, 2004a). Specifically, they identified excessive reliance on automobiles, a general lack of well-designed multi-use pathways and sidewalks, and too little public park space as contributing to a range of serious public health problems. Similarly, Ewing et al. (2003) compared the degree of sprawl with the level of physical activity, such as walking, and weight of residents in 448 urban U.S. counties. They found that the level of routine walking and cycling to complete daily activities dropped and weight increased as the degree of sprawl increased. One study has estimated that as many as 25% of new obesity cases in the United States are attributable to the rise of sprawling, automobile-dependent development. Additional studies have shown a statistically significant relationship between the degree of sprawl and the prevalence of health issues including, but not limited to, diabetes, hypertension and obesity (Lopez, 2004; Sturm & Cohen, 2004).

Injuries and fatalities due to automobile accidents is the third public-health impact linked to sprawl (Ontario College of Family Physicians, 2005c). Once again, this is linked to the increased need to drive dictated by the land use and transportation characteristics of sprawl. As evidence of this link, the Ontario College of Family Physicians cite a study that found automobile accident fatality rate in the ten most sprawling cities to be five times higher than the rate in the ten least sprawling cities. Canadian automobile fatalities have ranged between approximately 2800 and 2900 per year for the years 1999 through 2003 (Transportation Canada, 2004a). Although Canadian automobile fatality rates have decreased over the last 20 years mainly due to technological advances in automobiles, the number of injuries has remained relatively steady at about 220,000 per year (Ontario College of Family Physicians, 2005c). It is

noteworthy that of the fatalities caused by automobiles, between 14% and 17% were either pedestrians or cyclists. This reinforces the claim that the planning and design characteristics of sprawling neighbourhoods compromise the safety of alternative transportation options, making them less attractive.

Traffic fatalities and injuries are cited as a factor contributing to the fourth public health consequence of sprawl: social and mental health problems (Ontario College of Family Physicians, 2005d). The College identified factors such as road rage associated with long

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congested commutes to work, a sense of isolation from other neighbourhood residents and the loss of green space as reasons for increasing rates of mental illness. In the next section, some of the underlying causes of these problems are explored in greater depth.

Increasing Social Inequity and the Loss of Community

In an in-depth account of the contemporary process of suburbanization in Canada, Harris (2004) highlights the significance of developer covenants and mortgage regulations in the creation of socially and economically homogeneous neighbourhoods. Although ethnic covenants have long since been abolished, more subtle forms of socio-economic segregation are still common. Concentration of poverty as well as segregation of social classes not only continues, but is becoming more severe in many places (Power, 2001; Smith, 1996). The report *Poverty by Postal Code* (United Way of Greater Toronto, 2005) highlights the growing geographic concentration of poverty in Toronto. Similarly, the United Way of Calgary and Area reports increased segregation by income in Calgary. In 2000, median household income in Calgary's most well-to-do neighbourhood was 3.6 times that of Calgary's poorest neighbourhood (Sustainable Calgary 2004).

This inequity has implications not only for residential choice but also for access to employment opportunities health care, education, social services and other public facilities. According to Litman (2000), strategies such as promoting mixed land uses, offering a full range of housing opportunities, and providing efficient reliable public transit show promise in providing greater access to economic opportunity for low-income citizens. These strategies lead to a greater degree of social equity than functionally segregated and automobile-dependent sprawl. Mixing residential and employment zones and providing efficient reliable public transit options can free many low-income individuals of the economic burden of automobile ownership.

A number of researchers have expressed the idea that social ties within communities suffer as a direct result of the automobile-dependent lifestyle created by sprawling, edge-of-city neighbourhoods (Ewing, 1997; Khisty et al., 2003). The notion is logically sound: an emphasis on private rather than public transportation and an emphasis on private rather than public space result in fewer social contacts and weaker social networks.

Although this notion has not been widely tested, it is well known that school-based neighbourhood social networks have changed significantly because of sprawl. According to the literature and reports from the Calgary Board of Education (CBE), suburban schools are increasingly being built to accommodate larger student populations, ostensibly to take advantage of economies of scale (Calgary Board of Education, 2005; Passmore, 2002). This means that students are drawn from ever greater distances in low-density suburbs, eliminating the possibility of walking to school for most students. Although the larger school structures may be cheaper to operate, there are other significant costs associated with large schools, such as increased busing, that diminish the gains achieved through site-specific economies of scale. For example, the CBE reports that each new bus required to transport students to school costs \$40,000 annually (Calgary Board of Education, 2005). Furthermore, the CBE indicates that some children spend almost two hours of each day in transit to and from school.

Studies also indicate that under conditions of "school sprawl," student grades are generally poorer, violence and vandalism increase, teacher satisfaction is lower and parents volunteer less (Passmore, 2002). This last point is found to be indicative of the diminished sense of community generated by large schools that draw students from a large area. Baum (2004) suggests that investment in smaller schools is a crucial component in developing stronger suburban communities. Clearly, higher densities are a prerequisite if community-based schools are to be viable.

The Infrastructure Gap and Diminished Social Services

One of the primary economic arguments against sprawl is that it makes inefficient use of space and infrastructure and consequently drives up the costs of providing public services (Burchell et al., 2003; Carruthers et al., 2004; Speir et al., 2002). The reason for this is quite simple: by increasing the spatial extent of development the capital costs of building roads, laying water and sewer systems and other public infrastructure dramatically increase, as do the long-term costs associated with maintenance of this infrastructure. Indeed, a variety of recent research supports the notion that inefficient infrastructure provision is a leading cause of rising municipal taxes.

For example, (Alexander & Tomalty, 2002) compared 26 municipalities in British Columbia and found that lower-density communities typically have more extensive road, water and sewer systems per capita than their higher-density counterparts. They also noted that

in the three most infrastructure-efficient municipalities studied, almost 60% of dwelling units were multi-family dwellings. Conversely, in the three least infrastructure-efficient municipalities, multi-family dwellings accounted for less than 1.5% of dwelling units.

To provide an idea of the cost implications of different forms of growth, Burchell and Mukherji (2003) projected the capital costs of infrastructure and public services in U.S. counties under both managed growth and conventional growth scenarios over a 25-year period. They concluded that managed growth practices could yield significant savings that would otherwise be lost to capital expenditures. These savings are estimated to be \$110 billion in road construction costs (11.8% saving over conventional costs), \$100 billion in public service costs (9.7% saving) and \$12 billion in water and sewerage costs (6.6% saving).

It is widely recognized that operating and maintenance costs increase because of sprawling development (TD Bank Financial Group, 2004) and represent "a plethora of hidden costs" that remain largely uncalculated (Leo, 1995). Operating costs can include services such as police and fire services, water and wastewater treatment, trash collection and provision of public transit. According to reports from the City of Calgary, services such as the Fire Department and Emergency Medical Services (EMS) have response time targets that can be met given a certain number of stations per unit area. The Fire Department's target of responding to 90% of its calls within six minutes can be achieved over an area of 64 km² (City of Calgary, 2004a). Therefore, the extent to which a city sprawls has a direct affect on the number of fire and EMS stations required to meet these areal targets and, in turn, the cost of providing services. For example, the annual operating costs associated with the new Saddleridge fire station is estimated to be \$1.6 million (City of Calgary, 2005); clearly the savings that can be achieved through more compact urban development are significant.

Furthermore, the long-term costs associated with the spatially extensive infrastructure required to support sprawling development are rapidly rising. The Federation of Canadian Municipalities (2005) estimates the backlog of unfunded infrastructure maintenance and replacement (commonly referred to as the infrastructure debt) at more than \$60 billion dollars. In Calgary alone the infrastructure debt is projected to grow by as much as \$1.4 billion over the 2004—2008 period (Vander Ploeg, 2004). According to the Canadian Society for Civil Engineering, the rapid increase in infrastructure maintenance and replacement costs is largely because 59% of the public infrastructure in Canada is now more than 40 years old, an age when maintenance costs typically begin to exceed the cost of replacement (Vander Ploeg, 2004). As cities continue to grow in a sprawling, infrastructure-intensive fashion, they lock themselves into further long-term cost increases. If the cost of infrastructure replacement is beyond the financial capabilities of local governments, then serious social and environmental impacts may result as service levels decline in order to maintain balanced budgets (TD Bank Financial Group, 2004).

Some research suggests that the cost of providing certain infrastructure and services such as parks, recreation centres and education, are generally based upon population regardless of its spatial distribution (Burchell, 1997; Dekel, 1995). It can also be argued, however, that by spreading public facilities over a larger area, they are both less accessible and less effective. The Calgary Board of Education (2005) provides an excellent example of this problem. The CBE states that although 40 new suburban communities are currently in development, providing Calgary with at least 10 years worth of growth capacity, more developments continue to be approved. Widely dispersed growth results in many communities without enough students to support the construction of new schools for many years. The CBE suggests that if the City reduced the number of new developments being approved and concentrated growth in fewer areas (though still producing the same number of new units), those areas would grow sufficiently to support new school construction sooner (Calgary Board of Education, 2005). This would improve student learning, satisfy parents' demands for new schools and save money for the CBE, the City and the Province. Similarly, transit authorities often struggle to provide adequate service in low-density areas where population is too widely dispersed to support efficient public transit (Carruthers et al., 2004; TD Bank Financial Group, 2004).

Urban Form and Economic Competitiveness

A report by the TD Bank Financial Group (2003) identified sprawl and the resulting infrastructure debt as two of the most significant factors impeding the economic competitiveness of Alberta. The report notes that although these factors may still be "tolerable," they could soon cost the regional economy hundreds of millions of dollars in lost productivity and trade. Furthermore, Transport Canada reports that traffic congestion costs the Canadian economy more than \$6 billion every year in lost productivity and wasted gasoline (McGran, 2005). This figure does not account for the significant costs associated with freight stuck in traffic. Similar concerns are addressed in reports from the National Roundtable on the Environment and Economy (2003) and the Organisation for Economic Cooperation and Development (Newman et al., 1998). The latter state that innovative cities will be the most successful cities in the global marketplace. Innovations include an emphasis on improved public transit and compact, pedestrian-friendly, mixed-use development rather than an emphasis on road building.

In contrast, Calgary's current City Council has embarked on an unprecedented campaign of road building in response to the city's growing traffic congestion. A significant body of research indicates that this strategy typically leads to higher maintenance and operating costs without a significant improvement in traffic flow. For example, a series of studies cited by Newman and Kenworthy (1998), including one by the World Bank, indicate that increasing traffic capacity simply produces more traffic that quickly matches or exceeds the new capacity. The result is a cycle that leads to greater and greater volumes of congested traffic that generate higher emissions and escalating infrastructure costs.

Furthermore, roads pose an additional financial challenge for municipalities compared to other forms of infrastructure such as water, wastewater and even transit. These other forms of municipal infrastructure recoup at least some of their operating expenses through user fees, but roads are entirely paid for through a variety of indirect taxes. This form of infrastructure provision often results in hidden cost subsidies that perpetuate unsustainable development practices.

Summary

A large body of research demonstrates a range of unaccounted costs associated with sprawl. These costs take two basic forms:

- Negative externalities (costs paid for by society as a whole rather than by those who generate the costs through their actions, e.g., health care costs brought on by excessive automobile use); and
- Deferment of costs to the future (e.g., long term infrastructure maintenance costs).

Greenhouse gas emissions, habitat destruction, unnecessary resource consumption, increased obesity, heart and lung disease, reduced accessibility to public services, higher capital and maintenance costs of infrastructure, and higher costs of providing public services all represent significant economic, social and environmental costs that find little reflection in the price of homes in sprawling new developments. In other words, sprawl is made artificially attractive through a variety of direct and indirect subsidies.

These impacts threaten to undermine the competitive advantage of the Calgary region because the cost of doing business in sprawling cities increases at a faster rate than in more compact urban centres. Furthermore, sprawl has been shown to compromise the quality of life of residents of sprawling neighbourhoods because it diminishes their physical, and possibly their mental health.

New development does not need to take the form of sprawl. The question that arises when confronted with the environmental, social and fiscal impacts of sprawl is what can be done to overcome these problems? Fortunately, there are a number of municipalities that are already looking at solving sprawl-related problems through the use of sustainable development initiatives. The following section provides a description of Smart Growth principles, a summary of myths that undermine Smart Growth and several case studies highlighting the successful application of Smart Growth principles in North America, South America and Europe.



Part 2

Smart Growth - A Key Component of Sustainable Urban Development

Smart Growth is a set of sustainable development principles that gained wide recognition in the mid-1990s (Knaap & Talen, 2005; Tregoning et al., 2002; Ye, Mandpe, & Meyer, 2005). Three initiatives contributed significantly to the term's rapid rise in the lexicon of North American planners. The first of these was a series of meetings organized by the Economic and Urban Development Department of the U.S. Environmental Protection Agency in 1996. These meetings brought together hundreds of citizens, government officials and non-governmental organizations to develop and disseminate information on effective land use planning to local officials, developers and planners (Tregoning et al., 2002). The second was a 1997 report produced by the American Planning Association entitled *Growing Smart Legislative Guidebook: Model Statutes for Planning and Management of Change* (Knaap et al., 2005). Also in 1997, the Natural Resource Defense Council and the Surface Transport Policy Project produced *The Toolkit for Smart Growth*. This report provided policy models for local governments to encourage compact, transit-oriented, mixed-use development (Knaap et al., 2005).

Other significant developments around the same time further entrenched the term Smart Growth in the planning vocabulary. In 1996, the Smart Growth Network organized a series of meetings among real estate interests, policy makers and advocacy groups, resulting in a set of 10 principles of Smart Growth (Tregoning et al., 2002). In 1997, the state government of Maryland passed the Smart Growth and Neighbourhood Conservation Initiative, encouraging a number of unconventional development goals including brownfield redevelopment, rural land preservation and mixed-use residential/employment centres (Geller, 2003; Tregoning et al., 2002).

In an introduction to a special Smart Growth edition of the journal *Local Environment*, Tregoning et al. (2002) provide insight as to why Smart Growth has gained such wide recognition and has garnered greater success than earlier similar initiatives. They contend that because Smart Growth advocates have wrapped the development debate in a quality-of-life framework, the "self-sacrifice" message that accompanied previous sustainability movements has changed to a message of "self-interest." For example, a recent

publication by the Pembina Institute indicates that conventional, low-density development is associated with problems such as higher taxes, longer commuting times, less time spent with family, lower air quality, poorer health, lower productivity as well as a number of more traditional environmental and land preservation issues (Winfield, 2003). Similar points are made in *The Smart Growth Toolkit* published by Smart Growth BC (LaRochelle, 2001). Taxes, traffic congestion and commuting time, health issues, and productivity are the types of issues that have brought together a wide range of individuals and organizations in support of Smart Growth initiatives. Furthermore, Smart Growth analyses identify tangible benefits to change in the present, as opposed to 10 years, 20 years or even generations from now, strengthening the Smart Growth message even more.

Principles of Smart Growth

Smart Growth employs a set of core principles that can be adapted to the specific conditions and circumstances of the location where they will be employed (Halligan, 2000). The original ten principles developed by the Smart Growth Network include:

- Mix land uses such as residential units and employment centres
- Take advantage of compact building design
- Create a range of housing opportunities and choices
- Create walkable communities
- Foster distinctive, attractive communities with a strong sense of place
- Preserve open space, farmland, natural beauty and critical environmental areas
- Strengthen and direct development toward existing communities
- Provide a variety of transport choices
- Make development decisions predictable, fair and cost-effective
- Encourage community and stakeholder collaboration in development decisions

(Tregoning et al., 2002)

Organizations such as the Pembina Institute, Smart Growth BC, Smart Growth America and the Sierra Club have modified these principles somewhat, and they vary even more in areas where governments have put them into practice. Ye et al. (2005) contend that in some cases the term Smart Growth is being used, often by governments, to promote initiatives inconsistent with and even contradictory to Smart Growth objectives. They compared the definitions of ten national organizations in the United States and identified six focal points of implementation common among all groups, as well as 25 more specific components that have been used to guide actions to achieve Smart Growth objectives. The six major focal points of Smart Growth implementation and their associated components are shown in the chart below.

It is apparent that most, if not all, of these components fall within the framework originally produced by the Smart Growth Network. A compilation of the Smart Growth principles defined by several North American advocacy groups has been included in Appendix A. For a more complete description of these focal points and specific components of Smart Growth planning, see Appendix B for excerpts of Ye et al. (2005).

Planning	Natural Resources Preservation
Comprehensive Planning	Farmland Preservation
Mixed Land Use	Subdivision Conservation
Increased Density	Easement Conservation
Street Connectivity	Transferable Development Rights Systems
Integration	Purchase of Development Rights
Alternative Infrastructure and Systems	Historical Preservation
Public Facilities Planning	Ecological Land Preservation
Economic Development	Housing
Neighbourhood Business	Multifamily Housing
Downtown Revitalization	Smaller Lots
Use Existing Infrastructure	Housing for Special Needs/Diversity
Community Development	Transportation
Encourage Popular Participation	Pedestrianisation
Recognize/Promote Unique Communities	Facilities for Bicycling, Public Transit Promotion

Myths and Facts about Smart Growth

According to the Urban Land Institute, Smart Growth is intended as a means of accommodating development in a way that enhances the economic, environmental and social quality of cities (O'Neill, Pawlukiewicz, & Dunphy, 1999). Despite this admirable goal, a number of common myths have developed. These myths, which are unsupported by credible research, have served to undermine Smart Growth initiatives. What follows is a list of common myths regarding Smart Growth and the facts, supported by research, that refute these unfounded myths.

Myth	Fact
Smart Growth is a code word for no growth.	Smart Growth recognizes that sustainable forms of development are beneficial.
Smart Growth is anti-suburb.	Smart Growth encourages development that meets multiple objectives in urban and suburban locations.
Smart Growth creates another layer of government regulations that slows the development process and increases project costs.	Regulatory reform and streamlined procedures that improve predictability and efficiency in the development process are needed to stimulate Smart Growth.
With so much undeveloped land, there is limited value in open-space preservation.	Smart Growth can enhance the protection of agricultural land and natural areas and provide greater access to recreational open-space.
Higher-density development overburdens public schools and other public services and requires more infrastructure support.	The compact nature of higher-density development requires less extensive infrastructure per capita and reduces public service costs such as public school transportation.
Higher-density developments lower property values in surrounding areas.	No discernable difference exists in the appreciation of property located near higher-density development. Some research even shows that higher-density development can increase property values.
Higher-density development creates more regional traffic congestion and parking problems than low-density development.	Higher-density development generates less traffic flow than low density development per unit; it makes public transit more feasible and efficient.
Higher-density development leads to higher crime rates.	Crime rates are related to poor social conditions, not density. Well-designed, higher-density development can produce a positive social environment that actually prevents crime.
Higher-density and mixed-income developments are unattractive and do not fit into low-density communities.	Local regulations for higher-density and mixed-income developments can promote attractive designs that fit local architectural contexts.
Mixed-income housing cannot work because high-income residents will oppose the introduction of housing that reduces local property values.	Mixed-income developments have been found to have no effect on the property values of adjacent residences.
The housing market can meet the demand for low and moderate-income housing.	The marketplace has not met the demand for affordable housing. Well-designed public policy is required to directly provide affordable housing and induce market supply.

Understanding Smart Growth principles and becoming familiar with the facts of its application are important first steps toward the implementation of Smart Growth in Calgary. The following sections describe the efforts of a number of cities around the world that have put into practice a number of sustainable development initiatives, including Smart Growth.

Portland, Oregon

To many observers Portland is an outstanding example of using Smart Growth to overcome problems associated with conventional, low-density development. Efforts to manage growth in the Portland area began in the 1970s, long before the term Smart Growth gained prominence. Policy change was enabled through the creation of the Portland Metro council, first elected in 1979. This council coordinates policies regarding land use and transportation for 24 municipalities in three counties.

Perhaps the most well-known component of its growth management strategy is the Urban Growth Boundary (UGB), first established in 1979. Since that time, the metropolitan area has only expanded by about 11 square kilometres despite population growth of more than 25% between 1990 and 2000 alone. There has been criticism that this imposed boundary has driven up the price of housing throughout the region and created a shortage of affordable housing. This claim has been refuted, however, through analysis of the regional and national housing markets. Research shows that housing price increases in Portland have been modest and likely the result of market speculation rather than a supply shortage (Phillips and Goodstein, 2000).

Another major initiative in the area has been the development of a regional multi-modal transit network that includes buses, light rail transit and streetcars as well as 330 kilometres of pathways that encourage residents to walk and cycle to and from the downtown core (Geller, 2003). Local jurisdictions have also been required to plan for a 10% reduction in parking and driving per capita over the next 20 years.

Portland also has a well-organized community development program that has taken a leading role in supporting the rehabilitation of housing and infrastructure in older, inner-city communities, as well as maintaining low-income housing in areas that are being intensively re-developed (Gibson & Abbott, 2002b). In this way, Portland is integrating a level of social equity within the overall framework of sustainable urban development.

Sources: (Geller, 2003; Gibson & Abbott, 2002a; Phillips & Goodstein, 2000; Song, 2005)

Maple Ridge, British Columbia

Maple Ridge provides a Canadian example of a community embracing the principles of Smart Growth. On April 12, 2005, the Maple Ridge district council voted unanimously to support the principles of the "Smart Growth on the Ground Concept Plan."

Smart Growth on the Ground (SGOG) is a partnership between the University of British Columbia Sustainable Communities Program, Smart Growth BC and the Real Estate Institute of BC (REIBC), which is also working on a similar plan for the community of Squamish.

Public consultations were a major component of this project. The plan was developed through a series of public meetings that brought citizens together with planning and design experts. It calls for the adoption of a number of Smart Growth principles to revitalize the downtown area:

- allow mixed-use zoning to encourage flexible, live/work developments in which residents live within a five-minute walk of shops, services, recreation and cultural events
- provide an integrated transportation network that accommodates cars, pedestrians, bikes, transit and other modes of transportation
- offer a range of housing options such as secondary suites, ground-oriented townhouses and apartments, with higher density situated in the downtown area
- encourage greener building guidelines for energy and water efficiency and smarter road construction to allow water infiltration and improve water quality
- work with natural landscapes to enhance stream corridors and the Fraser River waterfront for recreation, habitat and aesthetics, while preserving river and mountain view corridors

These objectives ensure that the plan will improve the community's environmental and social sustainability. Furthermore, according to the market analysis performed by the REIBC, the plan is financially viable.

The next phase of the project will be to change the regulatory environment to facilitate new forms of development. This means identifying and amending municipal bylaws and departmental policies that might delay the plan's adoption as well as introducing new regulations where needed. SGOG will continue to assist the community as it moves through this implementation phase.

Sources: (Gilliard, 2004; Smart Growth on the Ground, 2005)

Curitiba, Brazil

Curitiba, the capital city of Parana, a mainly agricultural state in southern Brazil, is known as "the most sustainable city in the world" as a result of its strategic 40-year commitment to strong sustainable development that addresses social, environmental and economic needs. The population of Curitiba has tripled between 1970 and 1995 and is now more than 1.5 million. Despite this challenge, integration of land-use and transportation planning, traffic management, and housing in the 1970s allowed the city to meet strategic objectives including minimizing of downtown traffic, fostering social interaction through the provision of more leisure areas and pedestrian zones in the center of the city, and encouraging the use of public transport and cycling to achieve an environmentally healthy city.

There are more car owners per capita in Curitiba than anywhere in Brazil, yet auto traffic has declined 30% since 1974. This is mainly because the city's pioneering efforts to develop an all-bus transit network. This network features special bus-only avenues created along well-defined structural axes along which the city's growth is directed. The transit system is rapid, affordable and profitable and is being integrated with the rest of the metropolitan region. As a result, Curitiba has the highest public ridership of any Brazilian city (about 2.4 million passengers-trips per day) and it registers the country's lowest rates of ambient pollution and per capita gas consumption. In addition, 200 kilometers of bike paths throughout the city provide residents an alternative means of commuting. Much of the downtown is a vibrant pedestrian zone, showcased with the impressive "Street of Flowers."

The provision and maintenance of green space is another feature of Curitiba's commitment to environmental and social sustainability. In 1970, there was less than 1 square metre of green space per capita; by 2004 there were 52 square metres of green space for each person. In fact, nearly one-fifth of the city is now composed of parkland, including a network of 28 parks and wooded areas that play a significant role in controlling flood waters during heavy rains. Part of Curitiba's success in this area has come through providing tax breaks to builders who include substantial green space in their developments.

A strong commitment to values such as political transparency, strong leadership, social justice, poverty reduction and efficient resource management has led to Curitiba's impressive program of sustainable urban development.

Sources: (MacLeod, 2002; McKibbin, 1995)

Copenhagen, Denmark

Copenhagen, the capital of Denmark, is the centre of a metropolitan area of 1.7 million residents. Officials anticipate rapid population growth of 10,000 new residents per year over the next 20 years, translating to a demand for as many as 75,000 new housing units.

To manage growth within the framework of sustainable development, local authorities have planned development using the "proximity principle," which has led planners to develop Copenhagen's Five Fingers Plan. Under this plan, development occurs along five corridors radiating from the city centre. By concentrating higher density mixed-use development at transit nodes along these corridors, residents are assured access to transit infrastructure within walking or cycling distance of their homes. Furthermore, businesses and institutions that generate high traffic volumes are located no further than one kilometre from high-service rail stations. By planning development with traffic demand management in mind, city officials have succeeded in encouraging a high rate of transit usage. Over 200 million passenger trips were taken by bus and over six million passenger trips were taken by train in 2003. This commitment to integrated transportation and

land-use planning has resulted in reduced carbon dioxide emissions as well as reduced municipal infrastructure costs.

Another impressive result of the Five Fingers Plan is the amount of green space that has been preserved throughout the region: 42 square metres per person. Most of this is in the areas that separate the five growth corridors from one another. In fact, these areas are specifically designated by municipal policy for recreational purposes as a way of enhancing the quality of life for all residents of the region. Because the width of these corridors is restricted, substantial green space is in close proximity to almost all communities in the metropolitan region.

Sources: (Beatley, 2000; Greater Copenhagen Authority, 2004)

Freiburg, Germany

Nestled at the foot of mountains on the edge of Germany's Black Forest, Freiburg has earned a number of prestigious awards for its sustainable development practices. Arguably, the most significant of these focus on the integration of land-use planning and transportation management. Planners in Freiburg have managed to contain development along corridors separated by extensive green "fingers", similar to the Five Fingers Plan found in Copenhagen. Much of this green space has been left in its natural state, featuring long-grass fields and dense forests. Few areas of the city are more than a few hundred metres from these natural areas. A fine illustration of Freiburg's commitment to green space is the new suburban district of Reiselhof, which contains 70 hectares of residential development oriented toward a major tram line, adjacent to a 250-hectare nature reserve.

The overall transportation policy in the city has focused on achieving four main goals:

- Reduce automobile use in the city centre
- Give priority to environmentally friendly modes of transportation such as walking, cycling and public transit
- Promote traffic calming measures except on major roads
- Restrict parking in the city centre

To meet these goals, transit infrastructure in Freiburg is planned and built in conjunction with the development of new neighbourhoods, rather than afterwards. This has allowed planners to provide convenient tram service within 500 metres of most residences in the city. Furthermore, most trams run in their own designated lanes, separate from automobile traffic, making them a fast transportation option.

Although the public transit system is impressive, it is only one component of Freiburg's overall transportation strategy. There are more than 400 kilometres of bicycle lanes in the city, intended mainly as a means of commuting around the city (as opposed to recreational pathways). Many of these are grade separated from automobile lanes (providing a high level of safety for bicycle commuters) or run on streets with 30km/h speed limits. As a result

of the extensive bicycle-oriented infrastructure, 28% of all trips taken to the city centre are made by bicycle, up from 18% in the mid-seventies.

In addition to its commitment to managing transportation and land-use planning, Freiburg has also taken major strides toward reducing the energy consumption of new developments. Freiburg's newest suburban development, Vauban, won a United Nations-Habitat award for Best Practices to Improve the Living Environment. Vauban provides over 2000 residential units in a pedestrian friendly environment, oriented toward a major new tram line. Residential and commercial units have been built to meet low-energy, passive-house (energy neutral) or even plus-energy (feeding renewable energy into the grid) standards. Many buildings are designed to provide passive solar space heating and solar water heating. District heating and most electricity is generated by a neighbourhood natural gas/wood-chip-powered cogeneration plant. Plus-energy houses have their own photovoltaic arrays, feeding excess solar electricity into the grid.

Sources: (Beatley, 2000)

Summary

Comparing development in Calgary to best practices in sustainable urban development around the world, it is apparent that Calgary has made strides toward sustainable development, but that much more can be done. For example, Calgary's density is higher than Portland's, but not nearly as high as Freiburg's, Copenhagen's or Curitiba's. As a result, Calgary's public transit system is neither as convenient nor as cost effective as those found in these three cities. Although Calgary has extensive natural areas within the city, they are not as easily accessible as in many European cities because the barriers posed by automobile-focused infrastructure. European cities in particular show what can be accomplished with coordinated planning programs that integrate land-use and transportation management, reduce automobile dependence and thereby providing desirable alternatives, decreasing overall energy use and protecting natural areas. These are among the goals Calgary must strive for if it is to become truly sustainable.



Part 3

Barriers to Smart Growth in Calgary

Despite significant public concern regarding the environmental, social and economic costs of sprawl, alternative forms of development such as Smart Growth have failed to displace sprawl as the typical form of growth in Calgary. This inevitably leads to the questions: Why? What stands in the way of sustainable forms of urban development?

Path-dependency is largely responsible for the lack of meaningful change in Calgary's development processes. The current model of sprawling development has become so deeply entrenched in Calgary—both in terms of institutional practices and the physical form of the built environment—that it actually stands in the way of alternative development paradigms. Although path-dependency may seem to be an insurmountable obstacle, it is not. However, it requires a significant and focused effort to address most, if not all, of the barriers that thwart change. Moreover, because path-dependency grows stronger as it evolves and develops, it is critically important that change begin as soon as possible. The longer we wait to address the institutional, physical and cultural barriers to change, the more difficult change will be.

Interview Responses

Interviews with representatives of the local development industry, the City of Calgary, and local social service agencies identified characteristics of the local development process as primary causes of Calgary's sprawl. Several interviewees expressed the view that local land and housing markets are regulated in a way that provides "perverse subsidies" favouring low-density automobile-dependent growth, while simultaneously penalising innovative Smart development that deviates from conventional development practices.

Some respondents observed that sprawl provides a reliably profitable investment for builders, developers, and landowners. Because sprawling development is highly profitable, they contend, the development industry is reluctant to support changes to

development standards and requirements. Some respondents also expressed concern that developers have too much influence with local politicians because the dominant role developers play in financing municipal electoral campaigns. Consequently, they argue, development interests have greater access to political

decision makers who are, in turn, reluctant to initiate changes that the development industry might oppose. For example, some respondents felt that development standards regarding the provision of affordable housing and public schools are not as extensive in Calgary as they are in municipalities in other provinces. Conversely, a City of Calgary alderman

insisted that political contributions made by development interests do not play a significant role in local political decisions.

Both developers and City of Calgary staff acknowledged that Calgary's regulatory framework limits the ability of developers to promote innovative Smart design in new communities. Explanations given for this situation included:

- over-politicization of development policy
- narrow and limited local media coverage of growth and development issues and options
- lack of alternative standards for compact, mixed-use development
- public fear of unfamiliar new forms of development

Among those most directly involved in local development issues, the lack of a clear and consistent message from the City was mentioned as a major problem. Specifically, respondents expressed frustration with politicians and city administrators who say they support the idea of compact, transit-oriented development but fail to back such statements with enforceable policy and allocation of resources. The history of North American and specifically Canadian urban development policy suggests a serious disconnect between public policies and strategic sustainable urban development goals.

Early Suburban Growth

Since the mid-20th century, suburbanisation has been the most common form of development in North American cities. According to Fishman (1987), the origins of the modern suburb date back to mid-18th century in London, England. In his account, suburbs originated in a desire to isolate one's family from the squalid conditions and social ills typical of large urban centres in the early industrial period. The growing wealth of the merchant class and skilled tradesmen stimulated suburban flight.

The first Canadian suburbs began to appear around the city of Toronto in the 1880s (Harris, 2004). Harris suggests that class elitism as well as concern over sanitation and social decay fuelled some of this development; the availability of inexpensive land and manufacturing jobs on the suburban fringe was also a stimulus. These early suburbs bore little resemblance to the planned, uniform, corporate suburbs of today. They were often a collection of mismatched, unserved buildings accommodating a mix of commercial and residential uses. Neighbourhoods commonly housed a range of different ethnicities, social classes and land uses. This began to change in the 1930s with the introduction of federal urban housing policies in both Canada and the United States.

Stabilizing the Post-Depression Economy through Suburban Development

A series of housing policy reforms were introduced in Canada in 1935 under the Dominion Housing Act (DHA) (Harris, 2004). This act reformed the system of home finance by providing more capital for mortgages, introducing amortized mortgages and generally reducing the risk to institutions involved in offering home mortgages (Harris, 2004). In the United States, the administration of Franklin Roosevelt had introduced similar reforms just a few years earlier (Jackson, 1985), providing a blueprint for Canadian housing policy. These reforms, in effect, constituted a massive affordable housing initiative that remains a major economic priority of the U.S. government (Department of Housing and Urban Development, 2005); they play a similar role in Canada.

The ultimate aim of Depression era housing policy was to make home ownership more affordable for the working class and to stimulate and stabilize the economy. By making home mortgages more accessible, housing demand swelled, thereby reinvigorating the construction industry and putting thousands of unemployed tradesmen to work (Harris, 2004). Furthermore, economists expected that homebuyers would fill their new homes with the latest in household goods, thus boosting the manufacturing sector of the economy. Initially the impact of these policies was limited, especially in Canada, but after World War II a housing boom began that carried the economy for several decades (Jackson, 1985). Although this policy-backed initiative accomplished many of the goals it set out to achieve, the continuing trend of suburban expansion has clearly produced a number of consequences that were unforeseen 70 years ago.

The Role of Finance Policy in the Proliferation of Sprawl

Although government policies such as the DHA explain the proliferation of housing in general, one must look at the conditions of financing as specified by such policies to understand why the construction of suburban, single-family detached homes outpaced denser, inner-city reinvestment. To protect lenders from investing in poorly constructed dwellings, the DHA (and later the National Housing Act) only guaranteed loans for homes in neighbourhoods that met certain construction specifications related to basic service provision, street widths, building setbacks and structural performance (Harris, 2004). Because most inner-city neighbourhoods of the time did not meet these specifications, the program all but excluded reinvestment in urban neighbourhoods. Instead, government policy directed the vast majority of investment toward new developments on the edge of cities, rather than to the rehabilitation and upgrading of existing neighbourhoods.

This geographically biased investment policy created qualitative differences between inner-city and suburban-built environments. As a consequence, many middle- and upper-class residents, who could secure mortgage financing, migrated in droves from inner-city neighbourhoods to new suburban developments, leaving behind a concentration of low-income and visible minority residents in many urban cores (Jackson, 1985; Power, 2001). Although most inner-city neighbourhoods now meet required standards and are eligible for mortgage financing and investment, the image of inner cities as less desirable places for the middle classes had been established. In many cities, segregation continues. In some cities, however, the undesirable image of the urban core has been shed. Older rundown areas are being bought up by developers and converted to upscale neighbourhoods bringing, on the one hand, much needed new investment, but on the other hand, displacing most, if not all, of their traditional residents (Smith, 1996).

Some may argue that issues of socio-economic segregation are not as pronounced in Canada as in the U.S. and Britain. The United Way of Greater Toronto, however, reports otherwise (United Way of Greater Toronto, 2005). It indicates that average household income and economic opportunities are distributed unevenly across the metropolitan area, with distinctly affluent areas segregated from distinctly poor ones. One can find similar patterns of socio-economic segregation in Calgary, as well as processes of disinvestment and decline followed by reinvestment that displaces traditional residents, e.g., the East Village (now known as The Rivers) and Victoria Park (now part of The Beltline).

Corporate Suburbs and the Influence of International Capital

The need to meet increasingly stringent construction codes also led to the decline of the self-built home in favour of homes built by large home construction corporations (Harris, 2004). Professional

Local development companies, often owned by larger multinational corporations, tend to work closely with local government officials. The result: development decisions that favour strong returns to investors over the values of local residents.

builders rationalized the construction process, which lowered the cost of homes, but the rise of these "corporate suburbs" led to cookie-cutter neighbourhoods and stricter segregation of land uses (Harris, 2004). Furthermore, some researchers have concluded that the frequently high profits associated with land development have fostered the growth of large, international development companies that can significantly influence the decisions of municipal governments (Leo, 1995; Logan, 1993). They assert that local development companies, often owned by larger multinational corporations, tend to work closely with local government officials. The result: development decisions that favour strong returns to investors over the values of local residents (Logan, 1993). Unrestricted growth is presented to the public as synonymous with prosperity and the public good, while negative externalities and long-term fiscal implications are downplayed or ignored (Logan & Molotch, 1987).

Although the extent of its influence may be debated, there can be no doubt about the involvement of the development industry in the affairs of Calgary's local government. Records from the 2004 municipal election campaign show that the incumbent mayor, who successfully ran for re-election, raised at least one-third of his campaign contributions, i.e., more than \$200,000, from businesses and individuals involved in the development industry. One of the largest contributors, Walton International, specializes in real estate investments for "very wealthy individuals and large real estate development corporations." Recently, Walton International was accused of improperly influencing local elected officials in an effort to secure the development of land it owns near Calgary (Myers, 2005). Representatives for the company and politicians implicated in court documents deny allegations of conflict of interest.

Low Density, Use-Segregated Land Use Planning and the Decline of Public Transit

Although the form and design of modern suburbs have been widely criticized as soulless and uninspired (Fishman, 1987; Tregoning et al., 2002), the segregation of land uses in contemporary cities has created problems far greater than aesthetics. The segregation of residential property from industrial, retail and business zones has created an environment in which most individuals require an automobile to go about their daily routines (Harris, 2004; Leo, 1995).

The advent of the automobile has meant that many people can live at a distance from their place of work or their preferred grocer,

recreation facility or shopping centre. Those without access to an automobile, however, such as many elderly citizens, youth, poor and disabled citizens have far fewer economic and social options from which to choose.

Arguably, the mobility needs of many people could be accommodated in a cost-effective and socially equitable manner with compact, mixed-use development and greater investment in mass transit. In the United States, such an approach was precluded in the 1950s when several large American automobile, tire and oil corporations successfully lobbied the U.S. federal government to create a massive taxpayer-funded highway construction program that enabled the widespread growth of low-density, use-segregated, automobile-dependent suburbs (Goddard 1994). While massive government-funded highway programs has no clear parallel in Canada, American suburbs created a template for low-density sprawl across North America. More directly relevant to the Canadian context is the fact that new low density suburbs place

The segregation of residential property from industrial, retail and business zones has created an environment in which most individuals require an automobile to go about their daily routines

most of their residents too far away from public transit for it to be convenient. As a result, transit ridership has steadily dropped since the 1950s, changing the fiscal status of public transit from self-sustaining (based on farebox revenue), to viable only with public subsidies. This sprawl-induced subsidy requirement has led cities to de-emphasize investment in public transit, leading to even poorer transit service and, in turn, even greater automobile dependence. The crucial link between land-use planning (compact, mixed-use, dense, pedestrian-oriented) and viable efficient public transit was broken with the proliferation of low density and segregated land-use suburbs. This planning failure helped secure the dominant role of the automobile in North American cities and create an automobile-dependent way of life in the sprawling new landscape (Litman, 2000).

Subsidising Sprawl

Several sources indicate that most municipal governments in North America have encouraged sprawl by using general tax revenue to subsidise the cost of infrastructure and service provision (Gillham, 2002; Knapp & Talen, 2003; TD Bank Financial Group, 2004). A number of scholars suggest that infrastructure and select services, such as transit, should be paid for by the developers of new neighbourhoods (Knapp et al., 2003; Tomalty & Skaburskis, 2003), thereby incorporating these costs into the price of new housing. Under such an approach, the costs of growth would be paid for by those associated with and benefiting from growth. Instead, under current fiscal arrangements, some of the

Local governments in Canada are, with few exceptions, creations of provincial governments (Leo, 1995) and as such are limited in their ability to implement taxes and development levies as a means of influencing the extent and form of development.

costs of growth are paid for by all municipal taxpayers through their property taxes. Moreover, average-cost pricing of development charges allows developers to externalize many of the costs of inefficient growth and ensures that the per-unit price of low-density property remains artificially low (Brueckner, 2000; Carruthers et al., 2004). Consequently, economic incentives that could encourage the most cost-efficient development locations and designs for new neighbourhoods are eliminated, distorting the decisions of both developers and new home buyers (Bird & Slack, 1993; Carruthers et al., 2004; Gillham, 2002; Tomalty et al., 2003).

Developer levies (cash payments) and contributions (construction of assets such as roads and sewers paid by the developer then donated to the municipality) can be an effective tools to diminish average-cost pricing subsidies (Evans-Cowley & Lawhon, 2003; Ihlanfeldt & Shaughnessy, 2004; Mathur, Waddell, & Blanco, 2004). However, local governments in Canada are, with few exceptions, creations of provincial governments (Leo, 1995) and as such are limited in their ability to implement taxes and development levies as a means of influencing the extent and form of development (City of Calgary, 2004b; Tomalty et al., 2003). For example, in Alberta the Municipal Government Act (MGA) stipulates that municipalities can only assess levies or require developer contributions for infrastructure within the boundaries of a new development project. This effectively limits developer levies and contributions to cover infrastructure such as local roads, sewers, water supply and parks infrastructure, while leaving major connector roads and water mains as well as crucial infrastructure for transit, protective services, and libraries underfunded (City of Calgary, 2004b).

To its credit, the City of Calgary has negotiated a Standard Development Agreement (SDA) with local land developers that actually exceeds the specifications set out in the MGA. For example, developers now contribute a substantial amount of money to help fund the construction of major roads (those that are not specific to one community) in the city. Although this is a positive step toward diminishing development subsidies, there are two significant shortcomings the City needs to address.

First, recent reports by the City indicate that the levies being assessed still fall short of covering the municipal costs associated with new development by as much as \$2,500 per new dwelling unit constructed (City of Calgary, 2004c). This clearly indicates that the average-cost subsidy is still playing a part in the choices

consumers are making regarding housing in Calgary. Second, while a portion of the development contribution goes toward the construction of major roads, it fails to address the fiscal realities the municipality faces in providing transit services to new communities. This major infrastructure shortcoming, coupled with the continuing expansion of low-density neighbourhoods, means that most Calgarians will remain highly dependent on the private automobile for their transportation needs.

Officials for the City have also been lobbying the provincial government for greater revenue generation powers. A number of studies support the proposition that municipalities should have a wide variety of revenue generation mechanisms such as income tax, sales tax and hotel/motel occupancy tax in order to strengthen and stabilize their fiscal position (Gibbons, Berdahl, & Vander Ploeg, 2004; Kitchen & Slack, 2003; TD Bank Financial Group, 2004). It appears, however, that little thought has been given to the way new taxation policy can be used to encourage more fiscally, socially and environmentally sustainable forms of development.

Regulatory and Cultural Barriers to Innovation

Building code and neighbourhood planning and design standards (such as building densities, road widths and service provision requirements) were originally introduced through federal government housing initiatives. Today they are largely enforced by local governments (Harris, 2004). A number of these codes and standards restrict the ability of developers to provide higher-density and more pedestrian-friendly forms of development that could support efficient transit service and pedestrian-based social interaction (Bolstad, 2005; Levine & Inam, 2004; Talen & Knaap, 2003).

Calgary's regulatory framework has proven exceedingly difficult for developers who want to develop Smart, mixed-use, pedestrian friendly neighbourhoods (Boddy, 2003). Like most North American cities, Calgary's planning and design standards were created with the facilitation of automobile movement as a primary objective. Developments planned with different objectives in mind require different planning and design standards, but Calgary offers no such

Calgary's regulatory framework has proven exceedingly difficult for developers who want to develop Smart, mixed-use, pedestrian friendly neighbourhoods

alternative standards. Instead, a developer who wants to deviate from automobile-focused forms of development must obtain special approval from the City—an extremely time-consuming process. The extra time associated with this process can significantly drive up development costs to the point of precluding private developer involvement in Smart development. Indeed, to date, the

only significant Smart developments in Calgary—Garrison Woods and The Bridges—were developed by government development agencies on public lands. There is clearly a disconnect between the City of Calgary's stated objectives of promoting sustainable urban development and the regulatory obstacles it presents to sustainability-minded developers.

Changing development and design standards can be a contentious process when new standards would apply to development in established neighbourhoods. Calgary has seen "Not In My Back Yard" (NIMBY) attitudes arise in response to progressive urban redevelopment proposals such as higher density neighbourhoods, the expansion of light rail transit (LRT) systems and mixed-use zoning. Despite considerable evidence to the contrary, the perception persists that building LRT stops and multi-unit residential developments in established neighbourhoods will result in higher crime rates and lower property values.

The idea that population densities are responsible for increasing vice and crime date back to the mid-18th century theories of Thomas Malthus. Malthus's view gained renewed attention in the 1960s and early 1970s when studies found that social order in groups of animals (such as rats and some primates) deteriorated as the size of the population increased and crowding occurred (de Waal, Aureli, & Judge, 2000). A number of social commentators seized on these results and incorrectly concluded that the social disorder affecting many U.S. inner cities at that time was attributable to high population densities. Ignoring the destructive effects of disinvestment from America's inner cities and discrimination against inner city minority populations, these commentators inappropriately transferred conclusions from animal studies to the human environment (de Waal et al., 2000).

Recent research conducted in several U.S. jurisdictions clearly indicates that there is no empirical basis linking population density with crime rates (Haughey & Bach, 2005). Instead, violent crime rates are more strongly related to issues such as unemployment, social inequity (Matthews, Maume, & Miller, 2001) and even access to alcohol outlets (Reid, Hughey, & Peterson, 2003; Zhu, Gorman, & Horel, 2004). Furthermore, one study shows that the introduction of higher-density residential development into formerly homogenous communities of single-family dwellings actually increased the value of adjacent properties by as much as 3% (Haughey et al., 2005). Crime and the negative effects it may have on property values are caused by poor social conditions, not density. Fears of density per se are not only unfounded but also contrary to a substantial body of evidence (Haughey et al., 2005).

Nonetheless, redevelopment initiatives, such as the construction of LRT stations in established neighbourhoods, have proven controversial in Calgary's recent past. One planner with the City of Calgary recalled the difficulty of routing LRT through the community of Sunnyside in the 1980s. There was concern about the criminal element it was expected to bring to the area, the noise of the train cars and the effect on property values. After much

heated public debate, a plan was approved, and the LRT station was constructed. The anticipated increase in crime never materialized, the location was altered slightly to address the concerns about noise and property values in the neighbourhood have greatly increased, in part because of accessibility of transit. Now, according to the planner, the transit stop is almost unanimously viewed as an asset to the neighbourhood. Unfortunately, transit-oriented developments continue to be opposed in Calgary despite local success stories. Changing misperceptions appears to be a slow process.

Summary

Based on interviews and a wide-ranging review of the literature, it appears that the widely held assumption that the market for low-density housing in automobile-dependent developments is simply a reflection of consumer preferences is false. Instead, choices made by homebuyers have been strongly influenced by policies and regulations implemented at all levels of government. Policies such as the DHA/NHA and the average-cost pricing of new infrastructure favour inefficient low-density development, while legislation such as the MGA has limited the ability of municipal governments to implement policies promoting more sustainable forms of development.

Existing policies, regulations, and standards have not only actively encouraged sprawl by depressing the market price of new low-density development through hidden subsidies, they have also discouraged more sustainable, innovative forms of development. There is considerable evidence that Calgary's regulatory framework presents major barriers to the creation of compact, walkable, transit-oriented mixed-use communities, despite policy statements to the contrary.

Citizens are not entirely innocent, however. NIMBYism has stood in the way of more sustainable forms of development on more than one occasion. Although it is understandable that homeowners wish to protect their interests, arguments against LRT expansion and compact, mixed-use neighbourhoods are often based on unfounded myths regarding crime and property value. Despite substantial evidence to the contrary, these misperceptions continue to influence local political discourse and decision-making.

For all of these reasons, Calgary continues to develop in a largely unsustainable manner. Many of the consequences are not immediately obvious or are taken as the "natural" course of development in a major city. But development policies are not "natural"; they represent social and political decisions. The next section offers policy recommendations for improving Calgary's development practices.



Part 4

Priority Actions to Support Smart Growth in Calgary

Despite significant evidence identifying sprawl as a thoroughly unsustainable form of development, alternatives such as Smart Growth have yet to be adopted in Calgary. The literature review and comments collected during interviews indicate that this is largely because of the path-dependency built into the development process, manifest in the institutional, physical and cultural barriers produced by decades of low-density development. Specifically, path-dependency has become entrenched through the local regulatory framework and government policies such as home financing and average-cost taxation that distort the housing market in favour of sprawl, along with widely held public misperceptions about certain features of Smart Growth such as compact design and public transit options.

The following recommendations are meant to provide a set of priority actions for overcoming the barriers to implementing Smart Growth in Calgary. Many of these recommendations overlap one another to varying degrees. For example, reforms to municipal policy are highly contingent upon reforming current provincial legislation that limits the ability of municipalities in Alberta to control development on a local and regional scale. Also, the development of a more participatory development process that places a higher value on citizen input is also closely tied to our recommendation that the City promote Smart Growth through education and public engagement programs. Without the latter, a participatory development process could devolve into a forum for promoting myths about Smart Growth and become a major stumbling block for its implementation. Therefore, although the recommendations presented here are broken down into seemingly discrete actions, many, if not all of them, are closely linked to and reliant upon one another if new, innovative forms of urban planning and design are to succeed in Calgary.

Recommendation 1

Promote Smart Growth through a comprehensive public engagement and education campaign aimed at explaining the costs of continued sprawl and the benefits of alternative patterns of development. The literature review detailed a number of myths that have been inappropriately associated with elements

of Smart Growth. These include negative perceptions of mixed-use zoning, higher-density, compact neighbourhoods and the provision of improved public transit, particularly LRT. The NIMBY attitude that surfaces during public debate over Smart Growth initiatives is often misplaced yet threatens to derail many initiatives that would undoubtedly improve the functionality of cities, the quality of life enjoyed by residents and the overall sense of community. Public engagement programs must be developed to inform citizens, the business community, the media and even public officials so that they better understand the issues of sprawl and Smart Growth. School curricula could also be a good venue for educating children and youth about the social benefits associated with transit, walkable neighbourhoods and mixed-use development.

Recommendation 2

Reform planning regulations so they advance rather than impede innovative development initiatives such as Smart Growth. According to the developers and planners interviewed, the regulatory framework in Calgary represents perhaps the most significant barrier to implementing Smart Growth in a meaningful way. Until this changes, the vast majority of new development will continue to follow the typical pattern of sprawling growth and restrict compact, mixed-use communities that would reduce the need for automobile use in Calgary. Planning regulations should comprehensively support the following development principles:

- Mixed-use zoning that combines residential land within convenient walking distance of employment, recreational and retail services.
- Compact, transit-oriented nodes in all new communities. This will make transit more fiscally viable and therefore a more appealing transportation alternative.
- Neighbourhood designs that prioritize the safe and convenient movement of pedestrians and cyclists rather than the movement of cars.
- Redevelopment initiatives in existing neighbourhoods including more infill development.

Recommendation 3

Reform the planning process so it mandates public involvement in the planning of new communities. The process should provide citizens with a greater say in the way this city grows. To this end, planners and developers should provide citizens with a set of alternative development options that can be discussed and debated by citizens in public forums. By providing a variety of possible development scenarios, the public can engage in the development process and take greater ownership over the benefits and costs of growth. Given the impact NIMBYism can have on innovative urban planning and design, the process also needs to provide citizens with pertinent, reliable and understandable information so that development plans can be debated based on their merit. Although any public forum needs to be broad-based and inclusive so input can best represent the values and concerns of citizens, discussion must be guided by the substantial experience and knowledge of planners and developers. On the other hand, planners and developers must be genuinely open to the possibility that their designs will be altered as a result of the process.

Recommendation 4

Provide incentives that encourage developers to implement Smart Growth initiatives. The City should recognize that it has some powerful tools at its disposal for encouraging the adoption of Smart Growth, especially in the time and money-intensive development approval process. For example, the planning process could be altered to provide expedited approval and/or relief from development levies for proposals that include specific elements of Smart Growth. It is important to note that relief from development levies should not simply be giveaways but should reflect the degree of benefit that Smart Growth design will provide Calgary and its citizens over time.

Recommendation 5

Change municipal policies so they clearly mandate sustainable urban development initiatives such as Smart Growth. Some policy initiatives can be adopted by City Council now; others may require amendments to the MGA and therefore can only be implemented if the provincial government adopts legislative reforms of its own.

- Direct City administrators and planners to ensure the regulatory framework is consistent with the Smart Growth policies of the City
- Remove the economic incentives imbedded in the property tax and development levy system that are shown to subsidize sprawl
- Review administrative barriers to Smart Growth such as risk assessment
- Ensure that the City mandate higher standards in all its new buildings (such as LEED standards) to set a good example for businesses and individuals in Calgary

- Use local utilities as resources to develop alternative energy sources such as district heating, rooftop solar power generation, geothermal space heating, and community-based wind power generation
- Review the benefits of implementing an urban greenbelt or the use of Transfer of Development Rights (TDR) to maintain the integrity of agricultural and wildlife habitat near the edge of the city

Transfer of Development Rights (TDR) is a strategy that can be used to preserve agricultural land and wildlife habitat on the edge of urban centres. With this program, the City (or Province) designates undeveloped land as either sending zones or receiving zones. Developers who purchase development rights from landowners in the sending zone gain credits that allow them to develop land in the receiving zone at higher densities. Landowners who sell development rights in the sending zone are then obligated to place their land under a conservation easement that prevents future development of that land (Ryan & Wilkie, 2005).

Beyond these points, it seems apparent that municipal policies regarding Smart Growth are worded in such a way that they become meaningless. For example, council actions that include phrases like "endeavour to ensure" have proven to be inadequate in bringing substantive changes to the development process in Calgary. Policy papers such as the Calgary GO Plan, Sustainable Suburbs and the Employment Centres Strategy have not resulted in sustainable urban development. It is time that both aldermen and planners strengthen and coordinate their policies and regulations to provide the framework necessary to ensure that Smart Growth will succeed in Calgary.

Recommendation 6

Undertake a comprehensive review of provincial legislation that affects the growth of municipalities in Alberta. A number of government policies have encouraged the demand for low-density development through the use of subsidies. Among them, provincial legislation such as Alberta's Municipal Governance Act restricts the ability of municipal governments to manage growth in a sustainable manner. Therefore, provincial legislation must be changed to give municipalities in Alberta the tools they require. Reform should provide municipal governments with greater freedom to

- manage growth
- provide social programs such as affordable housing
- hold new developments accountable for all of the costs they create
- generate revenues from sources other than property assessments

Reform must also address the issue of regional planning if Smart Growth is to succeed in Calgary. With the city sprawling out across formerly rural lands, more and more low-density acreage developments are sprouting up just beyond the city's boundaries. A comprehensive review of intermunicipal cooperation and

integration of development goals is required to avoid conflict in the future. The best way to address this concern is within a regional planning framework. Although some may argue that the former framework of regional government was too bureaucratic and favoured large cities over their rural neighbours, regional planning can take many forms. For example, the system could be as simple as intermunicipal cooperation in defining a program of land conservation using TDRs (explained above). Whatever the form, a coordinated, regional planning process is an essential component to the implementation of Smart Growth.

Additionally, provincial legislation should be changed to encourage individuals to use sustainable technologies that reduce the impacts of urban development. For example, provincial legislation should be altered to improve the ability of individuals or businesses that use alternative energy sources such as wind or solar to feed excess energy back to the grid.

Recommendation 7

Plan sustainable communities that include schools, transit nodes, employment centres and a mix of housing options. Neighbourhoods should provide local residents with as many transportation, employment, retail, recreational and social opportunities as possible. Schools should be included as a central part of each new community so students (and parents) can walk or cycle to school instead of being required to take a bus or drive. Furthermore, a complete community should be designed with a central transit node, based on the City's own Transit Oriented Development (TOD) standards. Densities sufficient to support frequent transit service should be required. These nodes should include employment opportunities and provide a wide range of housing options including affordable housing so lower-income residents can enjoy better access to social and economic opportunities. The result would be vibrant and active communities that provide more equitable opportunities to all residents while reducing dependence on the private automobile.

Recommendation 8

Mandate the provision of affordable housing as an integral part of every new development. Affordable housing options are sorely needed in Calgary. As downtown communities such as the East Village, Victoria Park and Connaught are redeveloped with higher priced dwellings, the need for social housing will no doubt intensify. City officials and the development industry must address this issue in an aggressive manner if progress is to be made.

It is crucial to be mindful of the needs of low-income Calgarians. For example, the location of affordable housing units must provide residents adequate access to transit, employment, retail services and community support. Also, experience has shown that creating identifiable concentrated enclaves of low-income housing can be a recipe for stigmatisation and dysfunction. Taking these last two points into account, it is clear that affordable housing should be integrated alongside, and visually indistinguishable from, standard

market-based development. Such an approach will allow low-income residents access to the full range of economic and social opportunities Calgary has to offer.

Recommendation 9

Create a citizens' panel to review and recommend reforms to restore the public's trust in Calgary's electoral system. A public review of campaign financing should be undertaken and measures taken to reduce the public unease about the influence campaign contributions have on the workings of local government. Candidates are raising tens, or even hundreds, of thousands of dollars, largely from private companies or affluent individuals, reinforcing public perceptions that politics is the exclusive domain of those who can afford it. Given the very low voter turnout in municipal elections, steps toward reform of the electoral system would go a long way to restoring confidence and fostering stronger participation in the democratic process.

Recommendation 10

Make monitoring and reporting of sustainability indicators an integral part of the planning process in Calgary. The City of Calgary should develop a system of goal setting and assessment regarding its pursuit of sustainable urban development. This process should implement a triple-bottom-line approach that examines a set of well-defined social, environmental and economic indicators on an annual or semi-annual basis. A good example of this sort of report is the *State of the City Report* produced by Sustainable Calgary. This review process should be open to public scrutiny and input throughout its development and implementation.

Concluding Comments

Considering the consequences of sprawling development presented in Part 1 of this report, it is clear that a new model of development must be adopted throughout North America if a number of environmental, social and fiscal crises are to be avoided. Given the history of government development policy and regulation and the influence of special interests on development decisions, claims that sprawl is a natural consumer preference can no longer be considered tenable. It is time for a new vision of sustainable development in Calgary.

Smart Growth, which has been implemented in a number of jurisdictions in Canada and the United States, provides a viable alternative to sprawl. It is based on a compact, mixed-use development that aims to reduce automobile dependence and improve quality of life. Smart Growth can significantly reduce the environmental, social and fiscal impacts linked to conventional, low-density, automobile-dependent forms of growth.

However, several significant barriers prevent the widespread adoption of Smart Growth in Calgary. These include portions of the regulatory framework with which new development must comply, insufficient political commitment to promote and support Smart Growth at all levels of government, and public misperceptions about certain features of Smart Growth. Calgary's institutions, infrastructure, and attitudes have set the city on a path of sprawling growth. To start down a path of more sustainable development, these factors must be addressed. Citizens, City officials and the development industry must work together in this endeavor. The longer we delay, the more entrenched the barriers to sustainable development will become.

This journey requires a willingness to adapt and accept change as well as a renewed sense of commitment to face challenges with innovative thinking and new ideas. The result of this effort, however challenging to achieve, will be a more humane, vibrant, and healthy Calgary in which the benefits of development are shared by all.

Appendices

Appendix A – Principles of Smart Growth by Organization

Smart Growth Online, www.smartgrowth.org; U.S. EPA, cfpub.epa.gov/sgpdb/sgdb.cfm

Ten Principles of Smart Growth

- Create a Range of Housing Opportunities
- Create Walkable Neighbourhoods
- Encourage Community and Stakeholder Collaboration
- Foster Distinctive, Attractive Communities with a Strong Sense of Place
- Make Development Decisions Predictable, Fair and Cost Effective
- Mix Land Uses
- Preserve Open Space
- Provide a Variety of Transportation Choices
- Strengthen and Direct Development Toward Existing Communities
- Take Advantage of Compact Building Design

Smart Growth America, www.smartgrowthamerica.com

Six Objectives of Smart Growth

- Improve Neighbourhood Livability: safe, convenient, attractive and affordable
- Better Access, Less Traffic: mix land uses, cluster development, multiple transportation options
- Thriving Cities, Suburbs and Towns: investment in existing built up areas
- Shared Benefits: greater socio-economic equity and integration, equal access to jobs, services and facilities
- Lower Costs, Lower Taxes: take advantage of existing infrastructure, decrease greenfield development
- Keep Open Space: protect natural areas, air and water quality from development

Pembina Institute for Appropriate Development, www.pembina.org/publications.asp

Principles of Smart Growth

- Higher density, clustered land use
- Infill (brownfields and greyfields) development location
- Well mixed land use
- Human scale buildings, street blocks and roads
- Local, distributed, smaller public services, accessible by walking
- Multi-modal transportation choices
- Highly connective roads, sidewalks and paths
- Streets designed to accommodate multiple activities, use of traffic calming
- Planning process that is multi-jurisdictional and involves stakeholders
- Emphasis on public space

Smart Growth BC, www.smartgrowth.bc.ca

What Smart Growth BC Promotes

- Encouraging mixed-use zones
- Promoting compact and walkable neighbourhoods and towns
- Concentrating new growth into existing areas
- Enhancing the range of housing options (more affordable, appropriate, accessible)
- Linking new development to public transit and other transportation options
- Using demand management techniques that reduce the amount of a service or resource used, rather than simply increasing its supply
- Integrating storm water management with stream corridor and riparian area protection strategies
- Reducing the overall amount of impervious surfaces, while maximizing the use of public open spaces as rainwater catchment areas
- Preserving and linking greenways, open spaces, farmland and environmentally sensitive areas
- Ensuring effective citizen participation in development decisions

Sierra Club of Canada, www.sierraclub.ca/prairie/Sprawl/defining_smart_growth.htm

What is Smart Growth?

- Revitalize Existing Urban Areas
- Channel Public Funds to Existing Areas
- Provide Tax Incentives for Downtown Development
- Set an Urban Growth Boundary
- Preserve Natural Habitat and Farmland
- Reduce Car Dependence
- Develop Efficient Public Transport

Sustainable Urban District Freiburg-Vauban, www.forum-vauban.de/overview.shtml

Excerpt from the submission for the 2002 Dubai International Award for Best Practices to Improve the Living Environment. Further information about the Dubai Award, announced by the United Nations Human Settlements Programme (UN-HABITAT): see here

Summary

In the southwest corner of Germany where Switzerland and France meet, forming the beautiful "three corner land", on a former French army barrack site in the city of Freiburg, the new Vauban Residential Area (42 ha) is being developed for 5,000 residents and will be completed in 2006. The City of Freiburg is responsible for the planning and development of the community. The principle "Planning that Learns" allows a great deal of flexibility. An extended citizen participation process organized by the NGO "Forum Vauban" went far beyond legal requirements. Together with city authorities and other partners, Forum Vauban created the project "Sustainable Model District Vauban," with the intention of defining an outline to implement, in a cooperative participatory way, a concept of development for a community meeting ecological, social, economic and cultural requirements.

The project has been very successful in the fields of energy-saving, traffic reduction, social integration and in creating a sustainable neighbourhood. For example:

- 1) All new houses meet low-energy, passive-house or even plus-energy standards (0—30% energy of the average house in Germany needed—respectively 0—60% of the average new house).
- 2) A highly efficient cogeneration plant operating with wood chips (80%) and natural gas (20%) plus many solar installations provide all heat (including hot water) and 65% of the electricity in an environmentally friendly way.
- 3) The traffic concept promotes "living without an owned car" (35% car reduction) and provides alternative forms of mobility such as car sharing and outstanding public transportation.
- 4) Streets blend into other open areas such as playgrounds, public gardens and widened sidewalks along the main boulevard surrounded by preserved old trees, thus becoming areas for social interaction. Cars, which are allowed to travel to and from the residences at a very slow rate of speed, must be parked in multi-storey car parks at the periphery of the residential areas.
- 5) More than 50 major workshops were held with the local residents and approximately 40 co-building (co-housing) projects were founded, so far providing living space for about 1200 people.
- 6) With the support of Forum Vauban, residents started many further community activities such as cooperative shops, a farmer's market and a neighbourhood center

Appendix B — Ye et al. 2005, Common Principles of Smart Growth

1. *Planning* for smart growth encompasses six broad areas: comprehensive growth planning, mixed land use zoning, design and planning for increased residential density, design for street connectivity, innovation in water infrastructure provision, and enhancement of public service facilities, including recreational areas. Comprehensive planning is deemed to be "smart" in light of its utilization of existing infrastructure and its potential contributions to reducing automobile use and energy consumption; its inclusiveness and inherently regional logic and character; and integrating housing, economic development, and transportation elements. It is thus a key element in promoting sufficiently mixed land use, so that "residents provide a market and employees for businesses, and, in turn, businesses provide desired amenities and employment opportunities for residents" (Hirschhorn and Souza 2001, 18). The social and economic interaction of residents and businesses in a neighborhood requires increasing density. Density, in turn, promotes more open space and natural land; offers economies of scale in public transit, schools, and emergency services; and decreases automobile dependency. The design and construction of public infrastructure is also part of the planning process for smart growth, with street connectivity design to avoid dead ends, integrate new roads within the existing street network, and minimize curb cuts, especially on arterials (National Wildlife Federation n.d.). The logic is as follows: "Gated communities, private road systems, and the introduction of disconnected cul-de-sac systems promote disconnections. Proper street connectivity, on the other hand, reduces miles traveled, increases non-motorized trips, and supports transit use" (APA 2002b, III—B—7). Concerns over water infrastructure tend to initially arise from waste water problems. Increasingly, however, these concerns include assuring source water quality as well as wetlands protection, incorporating the need to protect the natural function of stream and wetland systems into all aspects of the planning process. Public service facility planning overall recognizes that such installations can enhance the viability of existing communities and reduce outward migrations. Efforts to avoid subsidies to new development through facility provision include heightened need justification standards for public financing of new facilities and public-private cost sharing with developers.
2. "*Transportation choice* means providing residents with multiple, safe and connected options—driving, rail and bus transit, bicycling, walking—to get from one place to the other" rather than being automobile dependent (EPAn.d.a, emphasis added). Pursuing this objective involves "better coordinating between land use and transportation, increasing availability of high quality transit service . . . [and] . . . ensuring connectivity between pedestrian, bike, transit and road facilities" (SGN 2002, 62). The common goal across all smart growth efforts in this dimension is simply pursuit of reduced reliance on cars and, therefore, fewer miles traveled, lower road budgets, and less pollution.
3. *Economic development*, whether as a goal to be promoted or as a process to be managed, is arguably a central concern of planning efforts, smart or otherwise. In the smart growth context, development promotion efforts involve three threads: encouraging neighborhood business, infill development, and downtown redevelopment. *Encouraging neighborhood business* reflects, first, building communities in which people can live, work, shop and recreate and, second, revitalizing depressed neighborhoods by encouraging new economic activity, thus supporting continued use of available infrastructure. *Infill development* involves using vacant and abandoned spaces, both for housing and new nonlocal businesses, in order to avoid urban area spatial expansion while promoting economic growth. *Downtown redevelopment* policies involve efforts to change the status of city centers as destinations and development targets by promoting more housing (often purposefully mixed income), employment, and public amenities as attractions for residents and recreational activities.
4. *Housing* policies generally encompass offering more options in order to provide households of all income levels with the ability to live in a home that meets their needs. Smart growth housing policies tend to promote alternatives to the postwar standards of the stand-alone single-family home in income-segregated areas. The smart growth housing orientation is intended to create "opportunities for communities to slowly increase density without radically changing the landscape" (SGN 2002, 18).

5. *Community development* as a concern represents an acknowledgment that people remaining in place create locally specific sociocultural values that need to be protected and enhanced in the face of change. Different communities have their own cultural, historical, and economic values. This uniqueness can be supported by efforts to build consensus in each community about how it wants to pursue smart growth. Policies under this category emphasize the specific community characteristics and historical values that will help maintain existing communities and the need for community participation in local planning efforts. The approaches tend to stress identifying diverse resources that different community groups possess and setting up a platform through which a range of organizations can participate in policy making and implementation.

6. *Natural resource preservation* may be at the heart of smart growth from a purely environmental perspective, with the resources in question covering animal habitat, farms, ranch land, wetlands, and other places of "natural beauty" and "critical environmental value." Major tools that are being widely used include strict land use and preservation regulations and "the use of market-based mechanisms such as donated conservation easements, transfer of development rights (TDR), and purchase of development rights (PDR)" (SGN 2002, 44—45).

In essence, the smart growth definitions we have examined incorporate some or all of these six dimensions into an integrated policy or program. The real value of the concept of smart growth—if the term has any remaining utility—thus lies in the extent to which the policies, programs, and plans that are promulgated under that label manage to incorporate the conceptual depth of the definition in any practical sense, whatever the mix of emphases across the six major dimensions they may reflect.

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