An Evaluation of the Region of Waterloo’s plan for a Central Transit Corridor as a Smart Growth Initiative

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Summary

Study Overview

Cities across North America are growing at a rapid pace. Southern Ontario is one location in particular where urban centres have been growing rapidly. In addition to rapid urban growth, a trend throughout North America since the end of the Second World War has been towards suburban development and an increased use of the automobile at the expense of public transit. The simultaneous rise in these two trends has resulted in urban sprawl - phenomena characterized as low-density development that separates homes from places of work and outer city amenities. With urban sprawl, often the only reliable mode of transportation is by car as commercial and employment areas are not located near residential neighbourhoods. Urban sprawl has many negative consequences in urban areas, as it consumes large areas of farm lands and greenspace, increases congestion and air pollution and is more costly for municipalities. As new suburbs are created, the municipalities must build more services such as new sewers and roads, which is costly and not as efficient as maintaining already built infrastructure in older, denser neighbourhoods.

Just as urban sprawl is a phenomenon that has spread across North America, there is a planning initiative that is intended to counter sprawl and create a better urban place. That planning initiative is Smart Growth. First promoted by the American Environmental Protection Agency, Smart Growth has been adopted by many jurisdictions including the Province of Ontario. Smart Growth is a set of planning principles that are intended to combat sprawl. The six Smart Growth principles in the Province of Ontario are:

- Introduce coordinated planning with input from the public
- Provide multiple transportation and housing choices
- Provide green space to make communities attractive
- Use mixed-use development
- Build liveable communities
• Improve economic competitiveness
  (Miller & Hoel, 2002; Government of Ontario, 2003a)

The Region of Waterloo and Light Rail Transit

The Region of Waterloo, located in southern Ontario, has traditionally been a leader in environmental and planning matters. The Region is also growing rapidly. To deal with rapidly growing urban centres, the Region has approved a growth management strategy including a proposal to build a light rail transit system (LRT) to manage growth by alleviating some of the development pressures in outlying areas and increasing density in the urban core. If built, the LRT would form a key component of the Region’s Smart Growth initiative. Smart Growth, while a valuable planning tool that can help create more attractive, efficient and vibrant cities, does not cover all aspects of what would be required to create a sustainable city.

There are several measures of urban sustainability that, like Smart Growth, can serve as a tool to ensure that the necessary conditions are in place to create the urban place planners, civic leaders and residents alike want. There tends to be a gap between Smart Growth and sustainability, thus evaluating the two and combining them may help to create a more complete urban plan. The construction of an LRT serves both to help implant Smart Growth as well as contributing to sustainability principles in the Region. The two were used to evaluate what impact an LRT would have on Smart Growth and sustainability in the Region.

Study Results

In assessing both Smart Growth and sustainability principles, it was found that several key Smart Growth and sustainability principles were already in place or would likely be in place should the LRT be built in the Region. In addition to determining what the likely impacts would be, it was determined that the Region has several conditions necessary for Smart Growth in place including
• Regional Official plan encouraging inner city growth
• Transit supportive land use planning
• Zoning allowing residential use in downtowns

In addition to the criteria already met, several additional criteria would likely be in place in the Region should the LRT be built:

• A sufficient population base
• Zoning encouraging mixed use
• Urban growth boundary
• Greater funding for cities.

Generally it was found that the implantation of an LRT would increase and support Smart Growth initiatives in the Region. Many aspects of sustainability would be achieved as well.

Summary of Recommendations

While the Region’s plan is not perfect, it is well on its way to creating the conditions necessary to implant Smart Growth and sustainability. There are, however, some recommendations that Region can implement to strengthen the transit plan and to increase Smart Growth and sustainability in the region including:

More overt integration of Smart Growth and sustainability principles

Many principles already overlap. The Region only needs to make its sustainability initiatives as obvious as its Smart Growth Initiatives.

Housing

The Region should focus more on encouraging diversity in housing, especially in the downtown core to make it more attractive to a variety of people and so that they have incentives in addition to the LRT to live in the downtown core.
 Additional infrastructure

More infrastructures will be required to complement the LRT and facilitate its contribution to achieving Smart Growth and greater sustainability. Infrastructure required includes parking facilities for commuters and construction of development that is oriented around the transit stops.

Funding

Funding will be a key determinant of whether the LRT plan can be implemented. There are steps that the Region can take to increase its likelihood of receiving funding from upper levels of government. These steps are outlined in appendix C.
Acknowledgements

I would like to thank Dr. Robert Gibson for his knowledge, guidance and assistance throughout the preparation and completion of this undergraduate thesis and for all his support and encouragement throughout these last eight months.

I would also like to thank Dave Colquhoun, Kevin Curtis and Don Drackley for providing valuable information regarding light rail transit and Smart Growth.
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1.0 Introduction

Canada is becoming increasingly urbanized. Close to 80 percent of Canadians now live in an urban area consisting of 10 000 people or more (Gurin, 2003). Along with this increasing urban trend have come various challenges for cities to manage growth in an appropriate manner. The reality, however, is that many mid to large-sized cities have failed to meet the growth challenge properly and the result has been rapid and minimally controlled growth.

Addressing such a concern is paramount for Canadian cities as “a nation’s competitive advantage is directly related to the performance of its cities” (NRTEE, 2004). If all areas of a city, including its environment cannot function, the city will lose its competitiveness and fall further into decay. Uncontrolled urban growth is a real threat to the future viability and strength of cities in Canada. Such growth, typically referred to as urban sprawl, is on the increase and has been occurring since the end of the Second World War in most North American cities (Miller & Hoel, 2002). In North America sprawl has been associated with urban regions growing much faster that the actual population for the city (Gilbert, 2000). Urban sprawl can be defined as “poorly planned development characterized by the conversion of natural or agricultural land to low-density residential suburbs, commercial centres, and business parks, all separated from one another by roads and parking lots” (Smart Growth B.C., 2003). The many negative consequences related to sprawl include poor air quality associated with increased automobile use, inefficient delivery of municipal services such as water and garbage collection, and consumption of agricultural land (Gurin, 2003). These inefficiencies associated with uncontrolled growth can leave communities in debt, cause widespread traffic problems and can create unaffordable housing
conditions (Fodor, 1999). There is great environmental damage associated with urban sprawl including growing emissions of greenhouse gases, loss of prime agricultural land and a less healthy urban environment of the city residents (NTREE, 2003).

To combat this increasing problem of sprawl, several initiatives have been proposed with tools for municipalities to face these challenges. One initiative in particular that has become widespread throughout North America has been the Smart Growth Initiative. Smart Growth generally is an initiative that encourages good planning principles including mixed use and protection and enhancement of environmental features within high-density communities (Government of Ontario, 2003a; Smart Growth Network, 2003b). Planning for greater use of public transit, in particular, has been a key element of Smart Growth in easing traffic congestion and making movement throughout cities more efficient.

The Region of Waterloo is like many mid-size municipalities within southern Ontario. It too has experienced high levels of rapid growth and the challenges that come with it. The Region of Waterloo has committed itself to a Smart Growth approach to combat urban sprawl in the community. The Region of Waterloo has six key objectives to combat urban sprawl and make a more sustainable community:

- Enhance the natural environment
- Build vibrant urban places
- Provide greater transportation choices
- Protect the countryside
- Foster a strong economy
- Ensure overall coordination and communication

(Region of Waterloo, 2003a)

While there are several different initiatives associated with the Region’s attempt to control sprawl, the predominant theme is the re-urbanization and downtown intensification of the three major cities in Waterloo Region including Kitchener, Waterloo and Cambridge. The common goal in all three cities is to institute re-urbanization using a central transit corridor (CTC), which is a zone of urban
intensification with mixed use and a fixed public transportation system (Region of Waterloo 2003c). This corridor is intended to alleviate growth pressure elsewhere and revitalize the downtowns.

1.1 Issues & Research Question

While many of the problems associated with sprawl are common, each municipality is likely to have a unique set of problems that it must deal with locally. In the Region of Waterloo, the main issues are those associated with sprawl and loss of vitality in the downtown core areas of the three larger cities. What the Region of Waterloo needs are planning solutions to discourage further sprawl at its outlining areas, while diversifying and intensifying the downtown areas. The primary mechanism the Region has chosen to do this is through a fixed transit corridor, which will be the anchor from which all other planning decisions are made. It is proposed that the centrepiece of this transit corridor be a light rail transit system (LRT), which is intended to draw people downtown, alleviate traffic pressure in outlying areas and achieve the other Smart Growth objectives (IBI Group, 2003). While the Region has six key objectives, which it hopes to achieve Region-wide, the focus of this study will be in the central transit corridor (CTC) area (see Appendix A) and the attempt to achieve Smart Growth objectives within this area. This is because the CTC and the LRT are seen as the “anchor” for development within the Region; the point from which the other goals including “enhancing the natural environment” and “fostering a strong economy” will be achieved (Region of Waterloo, 2003c).

This study will examine smart growth and sustainability principles, specifically what needs to be in place in a municipality to achieve the goals of smart growth. The evaluation of smart growth in the Region of Waterloo will take the proposed light rail transit plan in context to determine if the LRT will be successful in the Region and if it will be able to help the Region achieve smart growth principles. Therefore the primary research question for this study is as follows: Given the goals of Smart Growth and what it is intended to achieve
transit higher density, mixed use, etc.), are these goals present in the Region of Waterloo and can the LRT and transit corridor facilitate and/or enhance the ability of the Region to implement Smart Growth? If the Transit plan can contribute to Smart Growth, what steps or initiatives need to be in place to make the entire plan work?

The corridor principle in general appears to be a good initiative and has a high potential for succeeding in meeting the regional goals. This study is also intended to aid in identifying any aspects and/or principles that are currently missing from the transit plan that may make it more successful. The Region of Waterloo, as well as this study, acknowledges that transit and growth need to be planned for the future in conjunction as outlined by the growth management strategy. The LRT is likely the best option as more people are likely to ride LR transit as opposed to buses (Interview with Don Drackley).

The primary focus of this study is to evaluate the LRT Plan in light of Smart Growth and sustainability goals, to determine what impact the Region’s plans will have in meeting the Smart Growth objectives. To do this, information on Smart Growth and LRTs will be presented as well as criteria by which Smart Growth in the Region will be evaluated. The evaluation criteria will be used to determine what Smart Growth principles are likely to be met and what, if any, aspects of Smart Growth have been overlooked. Based on these findings, recommendations including design alternatives for the Region to consider may be offered to add to the current plan and make it more effective.

1.2 Methods of Analysis

This study rests on background material on Smart Growth, Light Rail Transit and The Region of Waterloo itself. Information regarding Smart Growth and sustainability principles was gathered to determine what Smart Growth is and what it aims to achieve. There is a great deal of literature on Smart Growth from both American and Canadian sources including the American Environmental Protection Agency, the government of Ontario and the Ontario
Federation of Naturalists. Sources on Smart Growth included various books, journals and articles on this subject. Looking at a broad range of materials on the subject of Smart Growth allowed for the identification of key Smart Growth principles and a greater understanding of Smart Growth in general.

In addition to Smart Growth, background information on light rail transit forms another key element of this study. Studies on the pros and cons of light rail transit were used as well as case studies of light rail transit in North American cities such as Calgary and Edmonton. This allowed for an evaluation of what has worked in the past and provides lessons as to how the Region of Waterloo should implement light rail transit as part of Smart Growth.

To understand the Region’s position and policies on issues such as growth management and transit planning, several sources pertaining to the Region were used to determine what the Region’s goals are and how they fit with Smart Growth objectives. The Region’s history and stance on environmental issues was evaluated to put in context the likelihood that the Region will implement Smart Growth and pursue implementing a central transit corridor based transit system. The primary source of information for the Region of Waterloo and its plans included various reports made available from the Region. These include both internal studies as well as reports by consultants for the Region.

Additionally, to offer greater insight into transit plans, and the Region’s plan, key interviews were done to gain a first hand account of what has succeeded in the past elsewhere in terms of transit planning and using light rail to achieve key goals of reduced car transit as well as managing growth.

Section 2.0 offers a detailed background to Smart Growth, light rail transit and the Region of Waterloo and its history on environmental issues. This section also provides much of the supporting evidence from which the evaluation and recommendation will be based.
2.0 Background & Literature Review

The following is a preliminary literature review on the background to the Region’s plans and the various key components relevant to the plan. A detailed overview of Smart Growth and light rail transit is included also.

2.1 The Regional Municipality of Waterloo

The Regional Municipality of Waterloo is a collection of three mid-sized cities and four rural municipalities located in southwestern Ontario. The three closely linked urban centres are Kitchener, Waterloo and Cambridge (see appendix A). The Region has a current population of approximately 460,000 people, making it the tenth largest municipality in Canada (Region of Waterloo, 2003a). The Region is also one of the fastest growing urban regions in all of Canada with a projected population of 700,000 people expected to be reached within the next 25-35 years (IBI Group, 2003).

Waterloo Region also has a history of being an environmental leader and has traditionally taken an innovative and strong stance on environmental and planning issues (Krause, 1994; Flaherty, 1995). However, like many other municipalities in Ontario, it too has problems with rapid urban growth (Region of Waterloo, 2003a). Much of its prized farmland has already been lost due to sprawling urban development, while poor air quality is quickly becoming a major challenge for the Region (Region of Waterloo, 2003c).
2.2 Urban Sprawl vs. Smart Growth

2.2.1 Urban Sprawl

As municipalities grow, they face various challenges associated with growth. Rapid poorly controlled growth can lead to urban sprawl, which has many negative consequences including:

- Loss of wildlife habitat and green space
- Loss of farmland
- Contribution to climate change
- Poor air quality
- Negative impacts on water quality and quantity
- Decreased economic efficiency and increased municipal costs
- Increased congestion

(Pim & Ornoy, 2002; Gurin, 2003; Winfield, 2003)

Despite improvements and efforts to curb sprawl, the trend in Canadian cities continues to be negative with the rise in use of cars, decrease in transit use and generally less efficiency in cities (NRTEE, 2003). In addition to a rapid increase in car use in Canada, since the Second World War, the population has favoured residing in suburban areas over inner city and core areas (Raad, 1998). Figure 1 illustrates the rise in the suburban population in Canada since 1961.
Canada generally has less density in urban areas than other industrialized countries (Raad, 1998). This lack of density in urban areas has resulted from widespread urban sprawl.

Sprawl is defined as widely dispersed low-density development with homes separated from shops and workplaces, as well as a lack of a well-defined thriving downtown (Geller, 2003). Sprawl occurs when planning and zoning laws allow development further away from the central areas of a city, using up more land and expanding infrastructure such as roads, sewers and other utilities. The rapid expansion of cities, which in the past has been encouraged by the official plan and zoning along with other municipal innovations, causes traffic gridlock and a degraded environment and higher cost to infrastructures and servicing in outlying areas (Geller, 2003). Poor planning practices of the past further contributed to sprawl by catering to the automobile and encouraging low-density residential areas. Traditional planning practices rarely took environmental implications into consideration or tried to manage growth in a sustainable manner (Ellis, 2000). Rather than focus on good environmental decisions, planning in the
past has been about deciding who wins (usually development) and who loses as a result of the city plan (Hamin, 2003).

One of the most visible results of urban sprawl is the dwindling viability of the downtown cores due to people moving to suburban areas. Urban cores become run down and neglected as they are left behind. At the same time, new roads and subdivisions, which are expensive to service, are continually being built.

Given the problems associated with sprawl, one wonders why cities still abandon inner city infrastructures only to rebuild it further out (Smart Growth Network, 2003a). This reason is due to conventional planning principles/practices and to choices people make given what planning allows people to do. Part of the problem with sprawl has been rigid zoning. Although originally intended to keep factories and incompatible uses away from residential areas, it has made smart planning difficult and made transportation planning even more of a challenge (Mattson, 2002). This restrictive zoning type of planning has allowed the automobile to dominate and left little room for public transportation that is efficient and reliable. In addition to planning pressures, there appears to be a widespread movement of people wishing to live in outlying areas. There are many reasons people are moving to the outer areas of cities, both aesthetic and economic (Hamin, 2003). The lack of density and scattered locations of where people live and work make transit difficult and increase people’s reliance on cars (Smart Growth B.C., 2003). Thus, when people demand more roads for their cars, the problem is further compounded by more outward expansion, resulting in people seeking areas that are less congested and where planning allows for more open space. One of the key contributors to urban sprawl has been the use of the automobile (Raad, 1998). The most “automobile dependent” cities display low density, dispersed and uniformly zoned land uses and high priority for car use (Raad, 1998). This type of development has characterized most of urbanized Canada especially in Southern Ontario (Smart Growth Secretariat, 2003).
2.2.2 Smart Growth

Ontario (like other jurisdictions) has often failed to preserve valuable components of the environment with past policies. As a result, more environmentally responsible land-use planning is clearly needed (Krause, 1994). As a means to manage unchecked growth, a new planning initiative has become prevalent in North America. That planning initiative is called Smart Growth, which can be defined as:

“A collection of urban development strategies to reduce sprawl that is fiscally, environmentally and socially responsible. Smart Growth is development that enhances our quality of life, protects our environment, and uses tax revenues wisely” (Smart Growth BC, 2003).

Smart Growth has many goals and objectives in order to make better land use decisions possible. Key goals include

- Introduce coordinated planning with input from the public
- Provide multiple transportation and housing choices
- Provide green space to make communities attractive
- Use mixed-use development
- Build liveable communities
- Improve economic competitiveness

(Miller & Hoel, 2002; Government of Ontario, 2003a)

Smart Growth originated in the United States when, in 1996, the Environmental Protection Agency (EPA) partnered with several non-profit and governmental organizations to address growing concerns about urban issues including boosting the economy, protecting the environment and enhancing community vitality (Smart Growth Network, 2003b). Many communities have adopted the idea and have begun to implement it in many different forms as a means of enhancing urban economics, neighbourhoods and environments (EPA, 2004).
The concept quickly spread throughout North America and was taken up by many municipalities, planning groups as well as several governmental jurisdictions including those in Canada. The Ontario approach to Smart Growth is intended to be a forward looking approach, and to be a collaboration of many groups, from the development communities to governments at all levels (Smart Growth Secretariat, 2002). Table 1 outlines the key principles of Smart Growth according to the Federation of Ontario Naturalist (FON), the Environmental Protection Agency (EPA) and the Government of Ontario. This comparison shows the similarities and some small differences between the Canadian and American Smart Growth principles.
Table 1: Comparison of FON, EPA and Ontario key Smart Growth Principles

<table>
<thead>
<tr>
<th>Key FON Smart Growth Principles</th>
<th>Key EPA Smart Growth Principles</th>
<th>Key Government of Ontario Goals</th>
</tr>
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<tbody>
<tr>
<td>Preserve greenspace, environmentally sensitive areas, natural beauty and farmland.</td>
<td>Preserve open space, farmland, natural beauty, and critical environmental areas</td>
<td>Protect and enhance the environment</td>
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<tr>
<td>Make full use of existing urban land and infrastructure.</td>
<td>Strengthen and direct development towards existing communities</td>
<td>Make better decisions about infrastructure</td>
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<tr>
<td>Provide a variety of transportation choices, with a major focus on public transit.</td>
<td>Provide a variety of transportation choices</td>
<td>Create transportation choices</td>
</tr>
<tr>
<td>Mix land uses (combining homes, stores, offices and services in the same neighborhood).</td>
<td>Mix land uses</td>
<td>Improve competitiveness and increase opportunity</td>
</tr>
<tr>
<td>Take advantage of innovative and compact building design.</td>
<td>Take advantage of compact building design</td>
<td>Build liveable communities</td>
</tr>
<tr>
<td>Create a range of housing opportunities and choices.</td>
<td>Create a range of housing opportunities and choices</td>
<td>Grow toward a better future</td>
</tr>
<tr>
<td>Create neighbourhoods that invite walking and bicycling.</td>
<td>Create walkable neighbourhoods</td>
<td></td>
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<tr>
<td>Foster distinctive, attractive communities with a strong sense of place.</td>
<td>Foster distinctive, attractive communities with a strong sense of place</td>
<td></td>
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<tr>
<td>Make development decisions predictable, fair and cost effective.</td>
<td>Make development decisions predictable, fair, and cost effective</td>
<td></td>
</tr>
<tr>
<td>Encourage community collaboration in development decisions.</td>
<td>Encourage community and stakeholder collaboration in development decisions</td>
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<tr>
<td>Direct urban development towards existing communities, and ensure that all such development is compact</td>
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<tr>
<td>Undertake broad-scale planning for cities and towns in adjacent regions and counties in a way that integrates land-use and transportation planning for the entire area.</td>
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1 Note: shaded areas denote principles that are the same or similar
The EPA list and the FON list are quite similar, with the FON list being a bit longer with more emphasis on naturalized areas. In many of the principles the wording is almost exactly the same. The government of Ontario list is shorter, but incorporates many of the same principles, albeit being more vague about its goals. The goals and/or principles that are the same have been highlighted. The shorter list for the government of Ontario also may be a reflection of where the province is lacking, such as in committing to encouraging “mixed land use” and “making development decisions cost effective, predictable and fair” (Pim and Ornoy, 2002; EPA, 2004).

In Canada, the two provinces that seem to be leading in implementation of Smart Growth are British Columbia and Ontario. In Ontario, Smart Growth is an idea that has been adopted by the provincial government and is implemented at the local level by municipalities, even though its key principles are not as extensive as the EPA or the FON. Smart Growth in general is an attempt to instil better land use planning and make cities more sustainable.

Even though Smart Growth may be an effective manner in which to manage growth, not all communities have joined the bandwagon and taken up the cause. This is especially true where, in some communities, the economic and social cost of growth has not yet become apparent (Ellis, 2000; Hamin, 2003). Most often this occurs in smaller communities that are not facing pressures such as loss of abundant land nor reaching the limits of physical growth.

While much has been made of the potential Smart Growth has in improving urban landscapes, very little progress has been actually gained thus far within Ontario (Winfield, 2003). Although the province of Ontario has made a commitment to Smart Growth, it has yet to make any fundamental changes in its programs or in its funding approach (Winfield, 2003). Even though many direct land-use choices are made at the local level, higher levels of government will have to play a more active role if Smart Growth principles are to be achieved (Geller, 2003). In fact, while governments like Ontario often tout the various merits of Smart Growth, quite frequently the words do not translate into action. Senior governments have often encouraged suburban sprawl by building
freeways, underwriting mortgages on homes and not charging developers the full costs of services to new subdivisions (Smart Growth B.C., 2003). To date, the province of Ontario has invested more into roads than into transit, has weakened laws on land use control, and provided more incentives on new home development as opposed to incentives for redevelopment and intensification (Winfield, 2003). All of these actions go against the province’s own policy on Smart Growth, which sends mixed signals to municipalities. If Smart Growth is to be implemented across the province, then the provincial government should provide more direction and financial resources for municipalities, because the overall planning strategy for municipalities comes from the policy of the province (Pim, & Ornoy, 2002). Ontario must lead by example in order to achieve Smart Growth across the province and the country.

Aside from the province’s role, another obstacle for municipalities in implementing Smart Growth initiatives is that often there is a debate between the rights of an individual and goals of the community (Miller & Hoel, 2002). A municipal government that implements Smart Growth may not be able to see it through if it is politically unpopular. A reason that people may be reluctant to buy into the Smart Growth plan is that Smart Growth measures are still relatively untested since they are still rather new (Geller, 2003). However, some of the biggest obstacles, aside from unfamiliarity to Smart Growth principles, is that many developers still largely control what type of buildings get built and there is still a preference for large suburban homes (Winfield, 2003). The trend in Canada has steadily remained in the growth in the number of detached suburban homes (Raad, 1998: Smart Growth Secretariat, 2003). Additionally, one of the simplest but most important reasons Smart Growth may be difficult to implement is that people prefer the independence of driving their own cars (Geller, 2003).

2.3 Urban Sustainability

Smart Growth may be an effective way for municipalities to think about growth management and urban planning; however, for all its advantages, there
are elements of Smart Growth principles that are deficient when it comes to viewing planning in a more holistic manner. As a means of strengthening Smart Growth, sustainability measurements are good way to complement Smart Growth criteria and initiatives, and help communities make growth decisions that will help communities grow economically with greater quality of life for the long term.

A sustainable society can be defined as “one that meets the needs of the present without compromising the ability of future generations to meet their own needs” (Fodor, 1999). Describing sustainability for a city, which is often constantly expanding, is more complicated, the biophysical system cannot support endless levels of human waste nor limitless expansion (Gibson, 2001). Therefore city sustainability can be defined as “the enhanced well being of cities or urban regions including integrated economic, ecological and social components, which will maintain the quality of life for future generations” (NRTEE, 2003).

While sustainability is not explicitly mentioned in Smart Growth objectives, it appears that it is too great a consideration to be left out entirely. Including sustainability as a Smart Growth objective adds to the legitimacy and fairness of Smart Growth if it is to be viewed as a preferred planning approach.

Urban sustainability is something that is implied by smart growth criteria though not explicitly expressed. The National Round Table on the Environment and the Economy (NRTEE) defines urban sustainability as “the enhanced well-being of cities or urban regions, including integrated economic, ecological, and social components, which will maintain the quality of life for future generations.” (NRTEE, 2003). The key consideration in urban sustainability that is not currently part of Smart Growth is viewing economic, social and environmental considerations as one common goal, whereas currently Smart Growth principles tend to focus on the three considerations separately.

One problem with Smart Growth is that it may be too focused on “development”, ensuring that the communities look aesthetically pleasing and fostering economic development, while not enough emphasis is placed on the environmental or social considerations (Boyal et. al., 2003). The urban quality of
life is becoming an increasingly important consideration for people. The ability of cities to attract skilled workers and employment is a direct result (NRTEE, 2003). The only way to increase quality of life is if economic, social, and environmental considerations are all accounted for. Including urban sustainability with smart growth could help account for these considerations and improve the quality of life by taking smart growth initiatives further.

It can become quite easy for municipal leaders to forget the environmental side of the equation in Smart Growth. Getting actual compliance with Smart Growth initiatives may be difficult when economic interests come into the equation – it is hard to fight the “business as usual” train of thought (Tomalty, 2002). Including a sustainability measure as part of Smart Growth could help to bring in more of an environmental focus (Gibson, 2001). Sustainability measures can also be seen as a tool to balance the economic arguments made when debating for or against a given project. For proper analysis it is important to use measurement and assessment tools like sustainability criteria for policy setting, in order to better come up with a decision that is best for everyone (IISD, 2004). A sustainability measure can help identify other considerations such as who benefits and what the non-economic costs are.

Similar to how smart growth has a listing of key principles, sustainability can be summarized with a few key sustainability criteria. The sustainability criteria similar to the smart growth principles are intended for use in starting and improving assessment activities of community groups, non-government organizations, corporations, and national governments (Hardi and Zdan, 1997). These general criteria are based on work by Hardi and Zdan (1997) for the International Institute for Sustainable Development (IISD), and Gibson, (2001) for the Canadian environmental assessment agency. Sustainability criteria should have regard to, and include the following general sustainability principles:
Table 2: Comparison for Key Sustainability Principles

<table>
<thead>
<tr>
<th>Hardi and Zdan Sustainability Principles²</th>
<th>Gibson’s Sustainability Principles¹</th>
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<tbody>
<tr>
<td>Holistic Perspective</td>
<td>Integrity</td>
</tr>
<tr>
<td>Adequate Scope</td>
<td>Sufficiency and Opportunity</td>
</tr>
<tr>
<td>Practical Focus</td>
<td>Equity</td>
</tr>
<tr>
<td>Openness</td>
<td>Efficiency</td>
</tr>
<tr>
<td>Broad Participation</td>
<td>Democracy and Civility</td>
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<tr>
<td>Effective Communication</td>
<td>Precaution</td>
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<tr>
<td>Ongoing Assessment</td>
<td>Immediate and Long term integration</td>
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<td>Institutional Capacity</td>
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</tbody>
</table>

The sustainability measures or criteria can help planners implement smart growth while taking wider implications into account. Ultimately these criteria can help define social goals and provide clear objectives and targets in conjunction with smart growth (IISD, 2004). These key sustainability principles could be included in smart growth principles fairly easily. While Smart Growth principles tend to be broader such as “create transportation options” or “build liveable communities” urban sustainability issues can be used as guidelines to specify means of reaching wider smart growth goals. For example integrating the sustainability issue of “equity” with the Smart Growth principle of “transportation” options would entail ensuring that transportation plans serve all segments of the population from the commuter to the senior. While Smart Growth tells municipalities what they should consider and take into account in their planning approaches, urban sustainability brings in a more holistic perspective and can tell planners what wider implications such initiatives will have on the residents and environment of the city (Gibson, 2001). Ultimately sustainability and smart growth are tools that are used to meet a common goal of attempting to encourage a greater community which will result in a more viable, pleasant and secure future for the city (Gibson, 2001).

² See Appendix B for explanation of sustainability principles
2.4 Smart Growth and Region of Waterloo

Over the past decade or so, several Canadian jurisdictions have moved to integrate environmental considerations more effectively in land use planning (Boyal et. al, 2003). Waterloo Region is particularly committed, often making environment a priority in planning decisions. In fact, Krause (1994) argues that the Region of Waterloo may be one of the best examples of a government in Ontario working to integrate environmentally friendly land use planning.

Given this past of good environmental planning decisions and with a rapidly expanding population, the Region of Waterloo had to develop a plan to meet its growth needs and yet protect its various environmental features. The result was that on June 25, 2003, after a lengthy study and consultation period, the Region approved a Regional report entitled “Planning our Future – Regional Growth Management Strategy”. (Region of Waterloo, 2003 a&c). With the approval of the Regional Growth Management Strategy (RGMS), the Region had a guideline to deal with the growth challenges facing the Region, and to be consistent with the provincial Smart Growth principles (Region of Waterloo, 2003a). Two key components of the RGMS were the establishment of a firm countryside line to limit sprawl and establishment and intensification of a central transit corridor (CTC) with the implantation of a light rail transit system (Region of Waterloo, 2003b&c). The CTC has many implications from decreasing the number of cars on the road, to fostering greater cooperation and encouraging economic development by traveling to the University of Waterloo’s Research and Technology Park. (Region of Waterloo, 2003c)

Although the Region has accepted the strategy, a significant challenge remains to convince the population at large that the RGMS is a good idea. Regional urban dwellers will be the ones most affected by this decision, especially if they would rather live in an urban setting, but outside the firm boundary line (Hamin, 2003).
2.5 Light Rail Transit

There are many options available for municipalities when it comes to providing a mass public transportation system. One of the options growing in popularity is that of Light Rail Transit (LRT). LRTs are a mode of transit generally using a segregated right of way on tracks primarily at ground level, designed to carry high volumes of passengers over short distances (Due, 1997; Wiecking, 1998; IBI Group, 2003). Typically, LRTs can carry between 120-170 passengers per vehicle (IBI Group, 2003). While buses are the most common form of public transportation, there is often a push for rail over buses as it is viewed as a more attractive option, thus getting higher numbers of transit ridership (Due, 1997). It appears that people who won’t ride buses will take trains. Uses of LRTs are growing rapidly, as more municipalities in North America are considering them (Wiecking, 1998). The move to include trains as a mode of public transportation is not new. Rail, in the form of the streetcar, was common at turn of the 20th century, but with the rise of the car, tracks were removed and people abandoned transit. Ironically, many LRTs are built today on the same location of old tracks that had been removed (Due, 1997). If an LRT system is built in the Region of Waterloo, it will likely be built where the old streetcar tracks once were. The predominant mode of transportation in North America continues to be the automobile due to its convenience, privacy and comfort (Gilbert, 2000). It is difficult for trains and public transportation to compete with the car on short trips but on longer trips the comparison is more even.

2.5.1 Technical issues

It is estimated that in order to make an LRT system feasible, a density in the order of 150 to 250 residents or employees per hectare is required within 500 meters of the higher order transit (IBI Group, 2003). In order for an LRT system to be practical, the population of the Region of Waterloo must continue to grow by 88 000 to 250 000 (~18% -50%) people/employees living and/or working in the urban core (see appendix A), thus intensifying the CTC (IBI Group, 2003). Currently the population of the Region of Waterloo is 438 515 (~470 000 by the
Region’s own estimates\(^3\) with a density of 320.4 people per square kilometre and a projected population increase to 700 000 in 25-35 years (Statistics Canada, 2003a; IBI Group, 2003). The transit line should be successful if much of this density can be concentrated near the urban core.

One consideration for the Region of Waterloo is that at the time Calgary built their LRT, they had a population of approximately 500 000 people, which is similar to the current population of 438 515 in Waterloo Region, thus making the construction of an LRT appear to be more feasible (Kok et. al, 1994; IBI Group, 2003). However, LRTs are not inexpensive. The cost is about $15-$50 million/kilometre (IBI Group, 2003). Thus, ensuring people change their habits and take transit in addition to making sure there is adequate ridership available becomes quite important (IBI Group, 2003). To convince people to take public transit there are several incentives and disincentives available. One example is removing long-term parking in the core areas, while increasing free parking at the outlying stations (Kok et. al., 1994; Senior, 1999). Another major consideration is that in order for the LRT system to work the entire transit system within the Region will have to be overhauled and improved to enhance and complement the LRT and serve as a feeder system for the LRT (Kain & Liu, 1999). Whatever the transit option chosen, increase in ridership can be achieved with service increase, lower fares and increased population (Kain & Liu, 1999). In Waterloo Region the municipal leaders and planners hope that an LRT system will provide these key elements and prove successful.

2.5.2 Benefits

There are many benefits associated with implementing and running an LRT system as the primary public transit option of choice. The Edmonton Transit System (2002) lists several benefits to having a LRT system in a city:

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\(^3\) The Region of Waterloo includes University students in its calculation of regional population (Region of Waterloo, 2003d)
• Fast
• Efficient
• Clean
• Saves energy
• Low operating cost
• Reduces roadway congestion
• Reduces need for road construction
• Quick and easy transfers with buses
• Direct access to Park & Ride facilities

One of the most basic advantages is that an LRT can greatly enhance the image of the community (Lawless, 1999). Many of the more fundamental benefits of an LRT also fall in line with Smart Growth ideals, thus making LRTs a good tool in implementing Smart Growth and when making environmental considerations (Smyth, 1995). A key aspect of implementing Smart Growth initiatives is to reduce the dependency on cars. Another consideration to take into account is that transportation disproportionately adds to the greenhouse gas contributions in Canada (NRTEE, 2003). LRTs are a safe and relatively clean mode of urban transportation that could potentially alleviate traffic congestion in growing populations as well as aid in reducing emissions of greenhouse gases (Due, 1997; Wiecking, 1998; NRTEE, 2003). LRT systems can even go further and be more sustainable as is the case of Calgary’s system, which is partially run on electricity from wind energy (Light Rail Transit Association, 2002).

In addition to alleviating traffic, increased density along lines may relieve pressure in outlying areas and increase open and green spaces (Smyth, 1995). Portland Oregon is a good example of a city where the transit plan has had good success at reducing traffic congestion and relieving pressure in outlying areas (Geller, 2003; Handy et. al., 2003).

Another goal of Smart Growth is to foster economic development. Dallas, for example, has an LRT that has drawn in retail, residential, and office development (Geller, 2003). Developments such as these, in addition to direct economic benefits, could bring in more people, which help with increasing
density. The more people are drawn to the area, the more likely they will spend money and make the area more viable. Other positive economic benefits include increased property values. There is a correlation between LRT and residential property values, though only in relatively close proximity (Ryan, 1999). Commercial property values tend to rise most near transit stations where there is a high degree of passenger traffic boarding and getting off the train (Personal Interview with Don Drackley). Lawless (1999) agrees that in close proximity to the route there is a slight increase in both commercial and residential property values which goes up as the number of riders increase. Economic benefits will make the LRT more attractive to residents, which should increase ridership numbers. Increased riders will benefit the environment by removing cars off the road and relaxing development pressure in outlying areas.

2.5.3 Drawbacks

Although an LRT could be a tool to achieve Smart Growth, there is some scepticism about what such transportation plans can actually achieve (Smyth, 1995). LRT may be an attractive mode of public transportation but it is not necessarily the most cost effective. On the basis of total cost, a bus system is more cost effective to operate (Kain & Liu, 1999). However, a more efficient cost structure on paper may not mean much if riders are in short supply. An additional drawback is that to be successful LRT systems usually require conditions of high density and low car ownership (Smyth, 1995). Currently the Region of Waterloo would have to attract more density to the CTC to make an LRT viable while car ownership in the Region is high. This then becomes a chicken and egg question; will an LRT bring higher density and lower car ownership, or do these conditions need to be in place in order for LRT to be successful?

On the issue of increased property values and economic development, in order for a new transportation initiative to influence property values, often it must be a rather large project, like a new highway, to influence land-use patterns (Ryan, 1999). It remains to be seen if the proposed transit plan is a large enough
project to change the value of land in the CTC. Additionally, there are those who argue that public transportation is limited in location such as to the downtown urban areas (Geller, 2003). If the residents who do not live in the CTC do not feel the need to use the system, then ridership numbers may not be high enough to support the LRT. Finally, as the LRT is a fixed-link, it will primary serve the downtown cores, while other areas will be serviced by bus feeder systems. Many areas of employment in the Region are in various other locations, thus the employees and residents who do not work in the downtowns contribute to more unpredictable travel patterns (Ryan, 1999). This situation is unlikely to change as few companies may alter their decision on where to locate based on such transit considerations (Lawless, 1999).

While LRT systems can be beneficial to communities even with smaller populations, there need to be different considerations for smaller urban centres with around 500 000 people such as Waterloo Region, as opposed to larger urban centres (Sullivan, 1986). Evaluating the feasibility of an LRT must take into account these differences. It is important that the Region evaluate all possible transit alternatives beyond implantation of an LRT, as success of such a transit solution will both be determined and have an impact on viability and vitality of a city’s commercial core and adjacent area (Smyth, 1995). In other words, the success of the LRT is both dependent on, and will affect, the success of implementing Smart Growth principles in the Region.

2.6 Projections for the Region

While the region has embarked on a fairly ambitious plan, any action will require funding from all three levels of government. The national round table on the environment and the economy recommends that the federal government play a more active role in supporting transit in Canadian urban centres – it specifically recommends that the government target growing urban centres (Waterloo Region) (NRTEE, 2003).
Transit use in general has been declining in Canada, as people tend to favour the automobile (Raad, 1998). It will be difficult for the region to combat this trend. In addition to gaining upper level government support, the Region will have to work at convincing its residents and visitors to support the construction of the transit system and to support it if it does indeed get built.

Growth in the Region has continued to be relatively strong and projections for the future point to a continuation of the growth (Smart growth secretariat, 2003; Region of Waterloo, 2004). That growth will be necessary for the LRT to be successful. It is likely that the transit ridership will indeed be great enough to support the system. While increased growth will be important for transit ridership, it will pose a challenge for Smart Growth in the region. While the transit plan will help, the Region must be committed to all its Smart Growth goals in order to accommodate them. Regional staff feels confident that growth could be managed with the LRT and by maintaining the firm countryside line (Personal Interview with Kevin Curtis). Maintaining the countryside line will be crucial to all the Smart Growth objectives, and currently the Region appears committed to discouraging development outside the designated areas. A new growth management plan for 2005-2009 for the Region will be released in 2004 and will be the basis for the official plan and designating any new developments in the Region (Region of Waterloo, 2004).
3.0 Project Rationale

The Region of Waterloo has many goals and programs/policies in place in an attempt to implement Smart Growth. In addition to the LRT and core intensification, the Region has put in place a firm boundary, as to where development may take place in the future, as well a policy to increase brownfield development and the density of residents and workers in the downtown (Region of Waterloo, 2003b).

Beyond the aesthetics of improved downtowns, it is important to consider other potential outcomes of such a large transit plan, such as who truly benefits from the Region’s plans, and who may be negatively affected. For example, housing and land values are likely to change, which will affect people of all income brackets. While Smart Growth is a valuable tool for physically planning better cities, to address concerns such as these and to go beyond infrastructure concerns, municipalities require an additional evaluation tool (NRTEE, 2003). Sustainability principles could be the tool municipalities such as the Region of Waterloo use, in conjunction with Smart Growth.

Should the transit portion of the Region’s Smart Growth plan fail, it is likely that the other goals will not be met as quickly or easily as the Region would like. The LRT as part of the transit corridor, is not only the key component of a successful transit plan, but is also likely to be the key step in achieving other Smart Growth principles in the Region. Given the importance of these goals and initiatives, it was essential that all aspects of the transit plan were evaluated to ensure that no key components were left out. While there has been a great deal of work done on implementing Smart Growth Principles into the transit plan, equally important considerations, such as sustainability principles outlined in section 2.3, can and should be evaluated to strengthen the Region’s plans.

Many aspects of Smart Growth do overlap with sustainability principles, however, they are not always explicitly mentioned. This report was intended to evaluate the Region’s plan for implanting a Central Transit Corridor and how that fits in with Smart Growth, but beyond that, it is intended to evaluate where
sustainability principles have been included and where they may be lacking. While the Region of Waterloo may have already considered sustainability aspects, an evaluation of the Region’s plan should help determine to what extent this has been done, if at all. Given the importance of both Smart Growth and sustainability principles, this report has attempted to evaluate both and integrated them into one set of evaluation criteria.

These criteria were used to determine where the Region is succeeding in implementing Smart Growth and sustainability principles in respect to its LRT plan, as well as where there are areas for improvement. Smart Growth and sustainability principles are equally important and should be included in the Region’s plans, thus, to be most effective both sustainability principles and Smart Growth principles should be implemented together. This evaluation was intended to help ensure that the two sets of principles are indeed present in the Region’s plans to build an LRT.

This report of the Region’s plan to use the LRT and the CTC to reach Smart Growth initiatives was intended to attempt to provided lessons for the Region itself and for other mid-sized municipalities on what role transit, such as an LRT, may have on Smart Growth initiatives and on creating a more sustainable city. By determining what the key components of Smart Growth are and how they can be best incorporated into city planning, the Region may be able to strengthen its Smart Growth and transit plan and ensure adequate benefits for the entire population of the Region. Merging the two principles would be beneficial for filling the gap between Smart Growth and sustainability in Canadian urban cities (NRTEE, 2003).
4.0 Analytical Framework

4.1 Method

Several different methods were employed in this evaluation of the Region’s central transit corridor plan as a means to achieve Smart Growth.

Initially, background information from secondary sources was obtained to make an evaluation of Smart Growth in general, and to understand what exactly it is and what its primary objectives are.

Background research on the Region’s past in environmental planning as well as its record in making good land use (environmentally responsible) decisions was also obtained. Additional background research was completed on light rail transit and the Region’s plans in general. Finally, interviews with key persons provided context and first hand accounts into issues and benefits of implementing transit such as LRTs in mid to large cities. These interviews also provided valuable insight into planning issues and Smart Growth issues. For context on planning and transit in the Region of Waterloo, an interview with Kevin R. Curtis, Ph.D, MCIP, RPP, Administrator of Policy Planning in the Planning, Housing and Community Services Department was conducted. Don Drackley, MCIP, MITE of the IBI Group, the Region’s primary consultants, provided insight in light rail transit and what the Region should do to implement such a system in the Region. Finally, Dave Colquhoun, Manager, Transit Planning for Calgary Transit, provided valuable insight into the history of implementing transit in the city and the benefits and challenges that municipality has faced and obtained in the 25 years it has had an LRT. That insight was translated into the Region of Waterloo’s context.

Based on all the above sources, a set of evaluation criteria on what Smart Growth is, was developed and applied to the Region of Waterloo and its plans. That evaluation was then used to determine the strengths of the Regional plan and area of possible improvement. While Smart Growth is a valuable tool,
sustainability criteria were included in with the Smart Growth criteria to determine if the Region’s goals are sustainable and if its actions go far enough.

### 4.2 Smart Growth Evaluation

In order to measure how the Region is implementing Smart Growth, it was necessary to determine what Smart Growth is and what a good Smart Growth plan entails. Smart Growth principles vary by source though several similarities and common aspects are found throughout on various lists. Table 1, found in section 2.2, outlines some key Smart Growth principles both from the original source of Smart Growth, the EPA, as well as Smart Growth principles from Ontario sources. The Region’s growth management plans are largely based on the six key Smart Growth principles found on the Government of Ontario list.

#### 4.2.1 Smart Growth/Sustainability Criteria

While Smart Growth provides good initiatives that can help municipalities plan their communities better, a more comprehensive and all encompassing approach is needed to fill in the gaps that Smart Growth does not address. In addition to Smart Growth principles, there are several sustainability principles that can be used to measure the sustainability of a project, plan or policy, in the same manner as Smart Growth principles are used. Two key lists of sustainability criteria are found in Table 2.

Based on the three Smart Growth lists and the two sustainability criteria lists, a general list of key Smart Growth/sustainability principles was created. Sustainability was included with Smart Growth as several sustainability principles overlap and complement Smart Growth principles. Additionally, sustainability was included in the attempt to have a more thorough and comprehensive evaluation of the Region’s plans. Together, these general lists (Smart Growth and sustainability) formed the basis of the evaluation criteria that were used to evaluate the LRT plan and its potential for contributing to Smart Growth in the Region of Waterloo.
Table 3 is a combination of the primary Smart Growth principles based on the EPA, the FON and the Government of Ontario as well as sustainability principles from Gibson (2001) and (Hardi and Zdan, 1997). The result is a master list of the Key Smart Growth and sustainability criteria. Using a checklist system, the Regional transit plan as part of wider Smart Growth principles was measured against the general Smart Growth/sustainability list. Table 3 serves as a measure of the level of Smart Growth/ sustainability in the Region of Waterloo.
Table 3: Key Smart Growth/Sustainability Principles for the Transit Plan

<table>
<thead>
<tr>
<th>Smart Growth/Sustainability Principles</th>
<th>Will occur with transit plan</th>
<th>May occur with transit plan</th>
<th>Will not occur with transit plan</th>
</tr>
</thead>
<tbody>
<tr>
<td>Protect and enhance the environment</td>
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<td>Make better decisions about infrastructure</td>
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<tr>
<td>Create transportation choices</td>
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<tr>
<td>Mix land uses</td>
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<tr>
<td>Take advantage of compact building design</td>
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<tr>
<td>Create a range of housing opportunities and choices</td>
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<tr>
<td>Create walkable neighbourhoods</td>
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<tr>
<td>Foster distinctive, attractive communities with a strong sense of place</td>
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<tr>
<td>Make development decisions predictable, fair, and cost effective</td>
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<tr>
<td>Encourage community and stakeholder collaboration in development decisions</td>
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<tr>
<td>Improve competitiveness and increase opportunity/ Openness</td>
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<tr>
<td>Build liveable communities</td>
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<tr>
<td>Grow towards a better future</td>
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<tr>
<td>Ensure sufficiency and opportunity</td>
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<tr>
<td>Ensure equity</td>
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<tr>
<td>Ensure democracy and civility broad participation/Effective communication</td>
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<td>Take precautionary steps</td>
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<td>Ensure long term ongoing assessment</td>
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<tr>
<td>Adopt holistic perspective</td>
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<td>Ensure adequate scope /Practical focus</td>
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<tr>
<td>Increase efficiency</td>
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<tr>
<td>Increase social and environmental system integrity</td>
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</table>

The above table outlines what principles will be achieved or could be achieved if the transit plan goes ahead. The completed table is located in section 6.0 where the principles are analysed and a determination is made as to which Smart Growth/sustainability principles will and will not be in place as a result of
implementing the transit plan. The assumption of this report is that if most of the evaluation criteria are met, then it can be inferred that the Region of Waterloo is on track to meeting Smart Growth and all of the benefits that result from that. However, in order for Smart Growth/sustainability principles to be met in the Region, certain criteria must be in place first. These criteria are policy initiatives, infrastructure, and general conditions that will have to be present in order for the principles in Table 2 to be achieved. Without the criteria in Table 4, the principles in Table 2 will not be met. The criteria are based on the American Planning Association and The Federation of Ontario Naturalist’s criteria for achieving Smart Growth. The conditions in Table 4 must be in place in order to achieve sustainability with transportation as measured in Table 3.

Table 4: Criteria needed to be in place to achieve Smart Growth/ Sustainability Principles

<table>
<thead>
<tr>
<th>Criteria to be met</th>
<th>Currently Occurs</th>
<th>Will Likely Occur</th>
<th>May Potentially Occur</th>
<th>Likely will not Occur</th>
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<tbody>
<tr>
<td>Sufficient population base</td>
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<tr>
<td>Regional official plan to encourage inner city growth/land policy present</td>
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<tr>
<td>Transit-supportive land-use planning guidelines</td>
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<tr>
<td>Zoning allowing residential use in downtown</td>
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<tr>
<td>Zoning encouraging mixed use</td>
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<tr>
<td>Urban growth boundary</td>
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<tr>
<td>Urban core redevelopment</td>
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<tr>
<td>Link with inter-regional transit</td>
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<tr>
<td>Lowest net cost transit solution</td>
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<tr>
<td>Priorities are to build more roads before funding transit</td>
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<tr>
<td>Ease traffic on surrounding highways</td>
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<tr>
<td>Diverting taxes (e.g. gas tax) to subsidise cost</td>
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<tr>
<td>Greater funding for cities</td>
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<tr>
<td>Residents living closer to work</td>
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(Weitz and Waldener, 2002).

The completion of this checklist was based on the relevant information gathered on Smart Growth/sustainability, case studies, the Regional plans and
information provided from the expert interviews. The results of these two checklists are found in section 6.0.
5.0 Analysis

5.1 Current Progress in Smart Growth

Waterloo Region has traditionally been regarded as a leader in Ontario amongst municipalities when it comes to Smart Growth and environmentally conscious policies. The implementation of a transit corridor anchored by a light rail system would simply be an extension of this long held policy of strong environmental initiatives. Had the Region of Waterloo simply tried to implement a transit system and called that its Smart Growth initiatives, then it could hardly be said that the Region was true to its commitments or that the Region was making any real changes that would bring about Smart Growth. What the Region has done that shows that it is at least committed to trying to achieve Smart Growth is introduce a variety of initiatives in an effort to create a “Smart Community”.

The LRT, or more broadly the transit corridor, while being extremely important and likely the backbone of any plan, is only one of a number of initiatives the Region is attempting to implement. Currently, the Region has accepted a Regional Growth Management Strategy (Region of Waterloo, 2003c). Part of the plan entails a transit corridor where it would like to see most of the Region’s density concentrated as well as more mixed use (see appendix A).

While the LRT plan by far is the most involved of the initiatives, it will be all the projects and initiatives put in place collectively that will ultimately be the deciding factor in the attempt to reach the Region’s goals. This will include everything from promoting more mixed use, to the infilling of brownfield areas.

The Region of Waterloo appears to be on track in implementing the majority of its Smart Growth goals. Some of the following key initiatives listed are but a sample of the kind of programs and strategies the Region is perusing to achieve Smart Growth:

- Implementation of Regional Growth Management Strategy in June 2003
  - designed to protect urban and rural areas as well as protect environmental sensitive areas
• Currently working on 2005-2009 Regional Growth Management Strategy
• Movement to formalize countryside line intended to delineate limit of the urban area
• Recognition of need to reorganize urban design
• 70 to 80 projects are currently being implemented
• As part of the CTC the Region is also looking at re-urbanizing the corridor
  - will have an infill program
• Looking at corporation for mixed land use
• Attempts to take pressure off greenfields with infilling
  
  (Region of Waterloo, 2004)

One area in particular the Region is in the midst of considering is the next step in trying to obtain funding for the LRT. A requirement for the project will be the completion of an Individual Environmental Assessment, including a full review of routes and technology (Region of Waterloo, 2004). Currently the Regional staff is working on a terms of reference for this undertaking (Region of Waterloo, 2004).

While the Region is working towards implementing projects associated with Smart Growth, it has not explicitly mentioned that it is pursuing sustainability. Many of the initiatives indirectly deal with sustainability issues though there is no conscious effort on the part of the Region. There does not appear to be any driver within the Region to take a broad scale approach to its programs. Currently the Region is in a good position to implement Smart Growth criteria as well as sustainability criteria, which will help the Region meet its goal of creating a vibrant and well functioning community (Gibson, 2001). As it is moving forward with many plans and constantly re-evaluating the merits of its programs, it could easily include these considerations to help strengthen its plan. While the corridor is intended to focus development and density inwards, a parallel policy is the implementation of a firm countryside boundary (Region of Waterloo, 2003c). The Region's environmentally sensitive areas, and groundwater protection areas will
limit its urban expansion (Region of Waterloo, 2003c). An important consideration is that there are calls for the Region to ensure adequate employment lands are made available (letter from technology triangle etc.).

5.1.1 Potential Setbacks

While the Region is progressing well in its attempt to reach Smart Growth, there are still many challenges and potential setbacks. In many respects the Region is facing an uphill battle when it comes to combating traffic congestion and trying to reduce the number of car trips in the Region. The rapidly increasingly trend across Ontario has been increased congestion which includes the Waterloo Region (Smart Growth Secretariat, 2003). Personal car travel is a way of life in Canada, thus getting people out of their cars will be a daunting task.

In addition to the trend for car travel, the preference for housing has been single detached households. Half of the households in central Ontario, including the Waterloo Region, live in single detached homes (Smart Growth Secretariat, 2003). Few, if any, initiatives have been announced to attempt to change this statistic. The Region has only stated that it would like to see more variety in housing but has not yet implemented any specific program. What the Region is doing is working with area municipalities on height and density studies (Waterloo) and transit policies (Cambridge) though it has yet to announce plans of attracting developers with alternative housing to single detached homes. In the future, however, the Region will study housing needs and demands in Waterloo Region, which may result in a housing program being introduced (Region of Waterloo, 2003a).

Another great hurdle the Region will need to leap if it is to implement its Smart Growth goals will be funding. From the large expense of the LRT to the smaller programs Region wide, it will be difficult to secure adequate funding when municipal budgets are spread thin across the province. Because there are many potential projects to implement, the Region must choose wisely which ones will be most effective and can most easily get implemented given the potential funding shortfall.
The government of Ontario states that Smart Growth is to be a collaborative effort but in the Region this has not been the case (Smart Growth Secretariat, 2002). For the most part, the Region has acted alone when it comes to implementing many of its strategies. It has applied for greater funding from both the provincial and the federal government, but has yet to receive a response. Additionally, the Region has not done much in the way of partnering with the private sector – which may be a deliberate choice. There have not been announcements regarding any major partnerships to help with the cost of building the LRT or to create more housing in the core of the downtowns.

5.2 The Transit Plan

One of the key elements for the entire Smart Growth initiative in the Region is the implementation of a central transit corridor through the core areas of Kitchener-Waterloo and the eventual expansion into Cambridge. Some of the key initiatives the Region is currently, or will be working on, to implement a higher order transit system include:

- Developing a business plan for higher order transit
- Amending the Regional plan to establish policies that facilitate increased use of transit
- Determining best route options

(Region of Waterloo, 2003a)

While there are various options available, currently the preferred transit options is light rail transit, which is seen to have many advantages over other modes of public transit such as rapid bus systems (Interview with Don Drackley). LRT is favoured over other transit choices in the Region because many of the tracks for the LRT are already in place and in a favourable location, and people who would not take buses would take trains (Interview with Don Drackley). Trains appear to be a more favourable mode of transit for attracting people out of their cars. The initial stage of the LRT would run approximately 10 km of an ultimate 40 km of the light rail corridor (Region of Waterloo, 2002)
The transit plan is a key element of the growth management strategy and would be the “spine of the growth corridor” (Region of Waterloo, 2003c). All other transit in the Region would radiate out from this backbone of transit (Region of Waterloo, 2003c, Interviews with Don Drackley & Kevin Curtis). The LRT would form the primary mode of transportation in the core areas while buses would still service the remainder of the Region. Additionally, to increase the efficiency of transit in other areas outside the core, the entire transit system would be overhauled to improve the bus efficiency. Programs may include specified bus lanes and more right of ways (Interview with Don Drackley).

It is believed that the Region will have the population base to support a LRT system (Region of Waterloo, 2003c; IBI Group, 2003). Many other jurisdictions in North America have begun their systems with approximately 500,000 people (IBI Interview with Don Drackley and David Colquhoun). However the Region would likely still like to encourage more people to the urban cores in order to make the LRT more viable. With increased employment and feeder buses, the system would likely have the required ridership numbers.

The Region will need to implement the LRT in the near future even when many believe it is not yet needed, as transit should be looked at as a long-term process. Ottawa developed its bus system some 25 years ago and is now one of the best transit systems in Canada. The Region is looking at transit in this perspective (Interview with Don Drackley).

5.3 General LRT Evaluation

LRT systems are fairly prevalent across North America in mid to large sized cities. By evaluating light rail transit in other jurisdictions, it is possible to determine what seems to be the most effective way to implement an LRT in order to achieve the Region’s goals. Additionally, the evaluation may be able to determine what special considerations Waterloo Region should take when and if it builds its own transit system. Many of these lessons come from Calgary, Alberta, which has a light rail transit system that is regarded by many as a
successful case in the over twenty years it has been in operation (Interview with Don Drackley). Using Canadian jurisdictions such as Calgary, as well as other successful transit system jurisdictions such as Edmonton or Ottawa, may prove useful as points of reference and comparisons for the Region, as these jurisdictions share common characteristics such as their size. Additionally, since they are Canadian examples, they represent many of the same political and cultural factors that will affect the success of transit implementation in the Region of Waterloo.

5.3.1 Lessons & Comparison with Calgary

Calgary and its LRT can be seen as a success story that the Region of Waterloo would do well to emulate. Calgary implemented its LRT in 1981 and had several of the same conditions that are currently found in the Region of Waterloo.

Calgary originally built the first leg of its LRT with 12.5 km of track serving a community of approximately 500,000 people at the time (City of Calgary, 2003a; Interview with Dave Colquhoun). The Region of Waterloo would also build approximately 10 km of track at a cost of $230 million for the first phase of the construction (Region of Waterloo, 2002). The projected population in the Region of Waterloo is approximately 700,000 people within 25-35 years. Calgary currently has a population of over 800,000 and an urban density of 1,252 people per square kilometre, while Waterloo Region has an overall region wide density of 320 people per square kilometre (IBI Group, 2003; Statistics Canada, 2003a,b; City of Calgary, 2003a). If the Region is projected to have a population similar to Calgary, it can use Calgary as a reference to what the Region may look like by seeing what Calgary is today.

With Calgary’s current population the transit system handed 76 million rides per year in 2002, up from 54 million in 1995 (City of Calgary, 2003a). With

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4 Population and density for Calgary City—the population for metropolitan area is 951,395 with a density of 187.2 people per square kilometre (Statistics Canada, 2003b).
5 No data available for density of core area only - Region wide density is greater than Calgary’s citywide density (Statistics Canada, 2003a).
the rapidly growing population the “C-train” was an immediate success and, after ten years, had grown to 29.3 km operated by a fleet of 83 light rail vehicles (LRVs) (Light Rail Transit Association, 2002). Currently, demand is outpacing supply at peak hours of the day on the “C-train” (Interview with David Colquhoun).

Waterloo Region will likely strive for similar ridership numbers based on the population and trips taken by commuters. Additional ridership in Calgary comes from the University in the city; the Region of Waterloo has two universities that could also provide the system with riders (Interview with David Colquhoun).

In addition to population requirements, other considerations for the Region of Waterloo are the development and operating costs of an LRT system. The following is a breakdown of some of the costs associated with developing and operating Calgary’s LRT system:

- Total system development costs to date: $548 M
- Cost of vehicle acquisition/unit: $1.2 M
- Vehicle replacement cost: $3.7 M
- Total costs of track construction per meter:
  - above ground $30,000
  - at grade $15,000
- Average costs per station: $2.1 M
- Cost of Rail Control facilities: $3.1M
- Annual vehicle Maintenance costs: $7.7M (2002)
- Annual station Maintenance costs: $2.2M (2002)
- Average annual power costs: $3.0M Annual LRV Operator wages: $3.6M (includes fringe benefits of 17.66%)

(City of Calgary, 2003a)
5.3.2 Development and Smart Growth

The Calgary area, especially the downtown, is well served by its LRT, being an efficient and reliable transportation option for commuters and residents alike (Interview with David Colquhoun). One of the biggest reasons for planning for an LRT and transit development is that it can be used as a means to achieve Smart Growth (City of Calgary, 2003b). It has seemed to work well for Calgary thus it may also work well for the Region of Waterloo.

Another key area in which the Region of Waterloo should emulate Calgary is in its transit oriented development (TOD) strategy. TOD is a “walkable, mixed use form of development focused around the transit station” (City of Calgary, 2003b). The Region of Waterloo would likely want to use a similar practice in order to increase traffic at the LRT stations and get increased economic activity as well. The majority of the economic activity generated from transit lines will come from the creation of stations not the transit line itself (Interview with Don Drackley). Transit stations are critical to the success of the transit system as they make the LRTs more accessible and increase development along the line.

Calgary has 33 stations in all and 11 in the downtown (City of Calgary, 2003b). In addition to accessible stations, parking is another consideration. It is important to get a good balance of just enough parking without undermining the system (City of Calgary, 2003b).

5.3.3 Benefits to the City

Overall, Calgary has benefited from its LRT system. It has brought many people downtown, increased accessibility to those without cars, which has increased equity (Interview with David Colquhoun). While the initial expense was and continues to be significant, savings in other areas make up for the development expense (Interview with David Colquhoun). With the LRT Calgary has saved money by avoiding the construction of several roads, decreased car traffic and likely improved the downtown air quality (Interview with David Colquhoun). The C-train has controlled growth and is now the backbone of the city and its transit. The Region of Waterloo will want and need to do the same
thing if transit is to be successful in the Region (Interview with David Colquhoun). With the LRT, Calgary has achieved several of the key Smart Growth principles such as increase transit options, build a vibrant urban place and foster a stronger economy among other success.

5.3.4 Other Transit Examples

Calgary is not alone in having an effective transit plan that benefits the city. Another good case study is Edmonton, which was the first city in North America to build a light rail transit system with a population of less than one million people (Edmonton Transit System, 2002). Edmonton received funding for its system for the 1978 Commonwealth Games but it did show that LRTs could be implemented in jurisdictions with smaller populations and still be successful (Edmonton Transit System, 2002; Interview with Don Drackley). Similar to Calgary, Edmonton has a fairly successful transit system which is frequently busy during all times of the day especially peak commuter hours (Edmonton Transit System, 2002). Edmonton’s system is smaller than Calgary’s LRT at 12.3 km in length (4.7 km underground including Dudley B. Menzies Bridge, 7.6 km surface) and consists of 37 vehicles with 10 stations (Edmonton Transit System, 2002). Apart from the underground stations, it is a system most like what the Region of Waterloo will look like at first.

One particularly interesting idea in Edmonton is that between 9:00 a.m. and 3:00 p.m. travel of the LRT in downtown is free of charge (Edmonton Transit System, 2002). An integral part of the LRT for Edmonton and one that the Region will most likely have to emulate is coordinating the bus schedule with the LRT service (Edmonton Transit System, 2002). This will allow for a more efficient transit system and help in making the LRT part of an overall system that is a viable option to driving a car as a means to getting around the city in an efficient and timely manner.

Another transit leader in Canada has been Ottawa (Interview with Don Drackley; Raad, 1998). Ottawa’s well-planed system has one of the highest transit ridership in North America (Raad, 1998). While Ottawa primarily employs
a rapid bus system not a LRT, Ottawa shows what long term planning and a well thought out transit plan can achieve. Ottawa managed to double its transit boarding (from 75 to 155 annual boarding per capita). It invested in its ridership in the 1970s and it is paying off today (Interview with Don Drackley).
6.0 LRT Smart Growth/Sustainability Analysis

The lessons learned from other jurisdictions such as Calgary, Edmonton and Ottawa could be employed in the Region of Waterloo to determine what aspects of the plan are in line with Smart Growth and where the Region needs to improve. Incorporating sustainability measures into Smart Growth will ultimately strengthen the transit plan in the Region. The following checklist outlines where it is projected the Region will meet Smart Growth and sustainability principles within its current transit plan and where uncertainty still exists. The analysis is based on the evaluation of the literature as well as from the case studies from other jurisdictions. The checklist only evaluates the role a LRT and transit plan will have on the listed Smart Growth and sustainability principles.
<table>
<thead>
<tr>
<th>Smart Growth/Sustainability Principles</th>
<th>Will occur with transit plan</th>
<th>May occur with transit plan</th>
<th>Will not occur with transit plan</th>
</tr>
</thead>
<tbody>
<tr>
<td>Protect and enhance the environment</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Make better decisions about infrastructure</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Create transportation choices</td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Mix land uses</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Take advantage of compact building design</td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Create a range of housing opportunities and choices</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Create walkable neighbourhoods</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Foster distinctive, attractive communities with a strong sense of place</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Make development decisions predictable, fair, and cost effective</td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Encourage community and stakeholder collaboration in development decisions</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Improve competitiveness and increase opportunity/ Openness</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Build liveable communities</td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Grow towards a better future</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ensure sufficiency and opportunity</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ensure equity</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Ensure democracy and civility broad participation/ Effective communication</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Take precautionary steps</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ensure long term ongoing assessment</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adopt holistic perspective</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ensure adequate scope /Practical focus</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Increase efficiency</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Increase social and environmental system integrity</td>
<td>X</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The Smart Growth/sustainability principles most likely to be achieved with the implementation of the LRT and transit plan (CTC) are:

- Create transportation choices
- Foster distinctive, attractive communities with a strong sense of place
- Build liveable communities
- Ensure equity
- Ensure adequate scope /Practical focus
- Increase efficiency
• Increase social and environmental system integrity

For some of the above, such as transit choices and equity, the role transit will play is fairly obvious. Equity will be improved because all segments of the population will have the opportunity to have increased mobility as long as fares are kept reasonable. Transit in the form of an LRT will also build more liveable communities as it will likely reduce car dependence at least in the core, and make the area near the transit line more liveable based on the experience of places like Calgary and Edmonton. Should the transit plan be implemented, efficiency would be increased both in moving people around to their destination as well as for the Region. For the individuals fewer car trips would be required with a new transit option. For the Region, an LRT may attract more density to the core and thus reduce the need for additional services in suburban areas. The environmental and social integrity benefits from an LRT would also contribute to Smart Growth and sustainability by reducing the number of cars on the road and taking development pressure of suburban areas.

The LRT and the transit plan will also have the potential to serve more Smart Growth principle albeit more indirectly. Some principles may result from the implementation of an LRT but depend more on the direction and motivation of the Region. These include:

• Protect and enhance the environment
• Make better decisions about infrastructure
• Mix land uses
• Create a range of housing opportunities and choices
• Create walkable neighbourhoods
• Improve competitiveness and increase opportunity
• Grow towards a better future
• Incorporate long term ongoing assessment
• Adopt holistic perspective

While there is a chance the LRT, if implemented, will contribute to achieving the above principles, there is not definitive evidence that it will do so for sure. In
places like Calgary, there have been mixed results for items such as mixed land use; most downtown development is commercial and not mixed use (Interview with David Colquhoun). The environment may be protected if indeed more brownfields are developed and the LRT takes significant pressure off greenfields. Objectives such as walkable neighbourhoods and growth towards a better future are likely to occur but only if the residents embrace the LRT system and shift their commuting and living habits. Long-term assessment by the Region will likely occur, but this is yet to be seen. Finally, the creation of a range of housing choices is a key principle. This will depend on several policy choices from the Region and the will of developers to help out in this regard. Some aspects will only be as strong as the Region is willing to make them. Based on information gathered by the Region, the LRT plan contributes to a holistic approach, as incorporated in the larger goal of overall growth management and creating a more liveable community. However, as there are principles that are unlikely to be met, there is a limit as to how holistic the plan will actually be.

The third set of principles are those that are least related to transit thus are unlikely to be influenced by the construction of an LRT. They are as follows:

- Take advantage of compact building design
- Make development decisions predictable, fair, and cost effective
- Encourage community and stakeholder collaboration in development decisions
- Ensure sufficiency and opportunity
- Ensure democracy and civility broad participation/ Effective communication
- Take precautionary steps

The Region may still institute these types of initiatives but they are unlikely to occur as a result of the LRT system. Several of the principles such as precaution and predictable fair decisions may influence the decision to create an LRT, but will not be influenced by the LRT.
6.1 Required Conditions for Smart Growth

There are several criteria that must be in place in the Region of Waterloo in order for the aforementioned Smart Growth principles to be met. Additionally, for an LRT to be successful, many of the criteria listed below will also have to be implemented in the Region whether by policy or through municipal by-laws. These required criteria are summarized in the following checklist displaying whether or not the criteria are currently met in the Region of Waterloo.

<table>
<thead>
<tr>
<th>Criteria to be met</th>
<th>Currently Occurs</th>
<th>Will Likely Occur</th>
<th>May Potentially Occur</th>
<th>Likely will not Occur</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sufficient population base</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Regional official plan to encourage inner city growth/land policy present</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Transit-supportive land-use planning guidelines</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Zoning allowing residential use in downtown</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Zoning encouraging mixed use</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Urban growth boundary</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Urban core redevelopment</td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Link with inter-regional transit</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lowest net cost transit solution</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Priorities to fund transit before building more roads</td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Ease traffic on surrounding highways</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diverting taxes (e.g. gas tax) to subsidise cost</td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Greater funding for cities</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Residents living closer to work</td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
</tbody>
</table>

**Sufficient population base**

Currently, the Region of Waterloo has just about enough people to warrant the construction of a LRT (IBI Group, 2003). However, LRTs and transit in general are not built for the present, they are built to meet future capacity and need. By the time an LRT would be completed the population of the Region would be even larger and more able to support an LRT system. Similar to Calgary in the early days of its LRT, the Region can support such a system. Also,
if the LRT were built, it would likely attract more development to the core and ultimately more population to support the transit system. Large-scale development is unlikely to occur until the Region makes a firm commitment to implement the LRT. Growth in the surrounding areas will also contribute to a large population base from which to draw potential riders.

**Regional official plan to encourage inner Growth/land policy present**

The Regional growth management study is in place and in the process of being updated. This will be a key tool in the Regional Official Plan that will guide growth in the Region in the future. Should the LRT be built, it will surely be included in the official plan as a driver for encouraging inner-city growth. Additionally, with the LRT in place, it would be much easier for the Region to implement a strong policy or even a by-law to help encourage growth in density in the urban cores of each municipality.

**Transit-supportive land-use planning guidelines**

An LRT would do much to increase transit options for residents and visitors to the Region. What transit would do for sustainability and Smart Growth is alleviate traffic and some of the pressure on developments elsewhere. An LRT would help the efficiency of the transit in the area and allow greater and better mobility for the segment of the population that cannot drive or chooses not to. Currently transit options in the Region are limited, the addition of the LRT would increase sustainability by increased choice and enhance viability - conditions necessary for achieving other Smart Growth principles.

**Zoning allowing residential use in downtown**

Currently zoning already allows for residential redevelopments in the downtowns of the three municipalities. The addition of transit would likely allow for greater flexibility and more investment especially for areas near the transit stations.
Zoning encouraging mixed use

Mixed use is allowed in the downtowns, which are largely the jurisdiction of the municipalities. Although this aspect is outside of the realm of LRTs if mixed use is encouraged, it will give more incentives for increased transit ridership as people may have reason to travel via public transit.

Urban Growth Boundary

This criterion is crucial to the success of the LRT; conversely, the strength of the urban growth boundary in many ways is based on the construction of the LRT. Implementing both will strengthen the other. A firm urban growth boundary will increase the likelihood that density will concentrate in the urban core and that there will be sufficient riders to keep the LRT sustainable.

Urban Redevelopment

The likelihood of this criterion being met is dependent on various factors, being both a criterion for achieving Smart Growth and an outcome of successful Smart Growth implementation. While an LRT may attract some development, it is up to the Region to institute policies and more incentives to attract more development in the urban areas. Successes with these initiatives will also take pressure off outlying areas and make the urban boundary principle a more viable option. Urban redevelopment will also depend on influences from the province. Cleanup of brownfields is a prime example of increasing urban redevelopment but it will require the aid of the province to make this a reality.

Link with inter-regional transit

This criterion too is dependent on assistance from the province. Should this happen it will significantly strengthen the viability of the LRT and all the benefits that result from that. This requires the province and possibly the federal government to introduce funding for commuter transit such as the Go-train.
Lowest net cost transit solution

With this criterion, the Region will likely have to make a trade off. The lowest cost transit solution is likely a rapid bus system. Currently the preferred option is an LRT system which is much more costly to build, maintain and operate. While places like Ottawa have been successful with a rapid bus system, the LRT remains likely the preferred option for its impact on other Smart Growth principles such as enhanced viability and more transit options. LRTs have been shown to be more successful at attracting new riders, which will help generate more revenue than buses can and providing greater payback. Transit subsidies will be required no matter what transit option is used, thus the higher expected revenues from the LRT should help offset the maintenance and operation costs (Interview with Don Drackley). Buses will still be required to service the majority of the Region but as far as the core area, the LRT is likely to remain the preferred option.

Priorities are funding transit before building more roads

This criterion will likely be one of the greatest challenges for the Region. People are accustomed to having more roads built to accommodate growth and it may take a lot of convincing to get people to change their minds (Raad, 1998). Convincing the public that transit spending will alleviate gridlock better than more roads is a message the Region will be hard pressed to get across.

Ease traffic on surrounding highways

According the officials from Calgary, transit can help alleviate some traffic on highways. Within the Region the traffic most likely to be cleared is commuter traffic. The LRT and other Smart Growth initiatives may ease passenger traffic within the Region but alleviating traffic outside the Region is the responsibility of the province, both to fund and implement. The Region can join with other municipalities to lobby the provincial government to link transit in an effort to alleviate highway traffic.
Diverting taxes (e.g. gas tax) to subsidise cost

Governments, at both the provincial and federal levels, have suggested recently that a portion of the gas tax may be diverted to subsidise city infrastructure and transit. Municipalities across the province hope that this will become a reality but it does not appear that it will occur in the near future.

Greater funding for cities

Greater funding for municipalities will not be achieved as a result of transit, but transit may come from increased spending on cities. Similar to the gas tax, governments at both levels have pledged greater funding for municipalities. This in an important step as greater funding is required for the Region to implement many of its Smart Growth initiatives.

Residents living closer to work

There will inevitably be a segment of the population that will live closer to work if the transit option goes ahead. However, this segment is likely to remain small. While an LRT will allow people to get to work easier if they work downtown, it is unlikely a significant majority will move solely for this purpose.

6.2 Linking Transit to Smart Growth

Transit forms an integral part of Smart Growth, as a good transit system and Smart Growth seem to go hand in hand. The LRT in Waterloo Region will play a major role in achieving Smart Growth should the transit system be built. Conversely, if the transit plan does not get implemented, Smart Growth in Waterloo Region will become much more difficult to achieve.

What the Region must keep in mind is that an LRT is more than simply a system to move people, it will be a key consideration in how the Region looks and operates and will go a long way in bring together the principles of Smart Growth and a sustainable community together. The key will be to go beyond the
basic question of what the benefits of an LRT are and move to more fully integrate Smart Growth and sustainability plan for the Region. Including sustainability principles does not have to be that difficult. Appendix B includes a chart of potential question that the Region can ask when formulating and implementing its policies that determine the sustainability of the particular policy.

The key for implementing all the Smart Growth initiatives and maintaining the urban growth boundary will be getting urban density by providing good transit options as “cities with such limited transportation choice are dependent on automobiles to meet urban travel needs” (Raad, 1998). Concentrating core density in conjunction with better transit options may help decrease car usage rates. Table 5 demonstrates the advantage of concentrating people in core areas – they tend to drive less and use public transit. This table is based on a Toronto example, but the same trend occurs all across central Ontario (Smart Growth Secretariat, 2003).

<table>
<thead>
<tr>
<th>Area</th>
<th>% Of Households With No Car</th>
<th>Daily KM per Person By Car</th>
</tr>
</thead>
<tbody>
<tr>
<td>Core</td>
<td>51.89</td>
<td>6.83</td>
</tr>
<tr>
<td>Core Ring</td>
<td>31.45</td>
<td>10.16</td>
</tr>
<tr>
<td>Inner Suburbs</td>
<td>17.37</td>
<td>13.36</td>
</tr>
<tr>
<td>Outer Suburbs</td>
<td>5.82</td>
<td>23.23</td>
</tr>
</tbody>
</table>

Source: (NRTEE, 2003)

Reducing car usage in cities occurs with higher urban densities and higher transit service provision (Raad, 1998). While the most effective option for getting people out of cars is to limit car ownership, this option however, is highly unlikely (Gilbert, 2000). Thus the Region will have to rely on enticing motorists to take transit by presenting it as the best commuting option or by restricting parking available. If the Region is successful in attracting more residents to the urban
core it is likely to get a decrease in car use, which would contribute significantly to urban sustainability.

6.3 Conditions for Successful Transit

There appear to be certain key elements an urban centre must possess in order to attract and maintain higher order transit. A growing population and a vibrant strong economy is one aspect required, based on conditions in Calgary, Edmonton, Ottawa and other successful transit locations. These are the conditions present in the Region of Waterloo and that warrant a higher order transit system (Region of Waterloo, 2002). The Region of Waterloo has a strong economy and a GDP of over $16 billion in addition to a strong employment base (Region of Waterloo, 2002; IBI Group, 2003; Interview with Don Drackley). Other conditions required for success appear to be well-planned and effective routes that serve the population well. The Region has the advantage of being fairly linear in layout, with Conestoga Mall on one end and Fairview mall on the other. This will facilitate a transit route that is efficient and can get passengers from one major centre to another (Interview with Kevin Curtis). Since major centres are not spread out, a single line of transit may better serve the Region, and buses that radiate out may access all other areas.

Other conditions such as population requirements and increased employment is required, especially in the urban core. The Region must ensure it continues attracting business to the downtown areas in order to make it a more effective system (Region of Waterloo, 2002). On this condition the Region is well positioned as well. In 2000, 85% of Ontario's new jobs were in the central area of the province where Waterloo Region is located. This trend needs to continue to keep enough people to sustain transit but the challenge will be managing any new growth and keep it in the core (Smart Growth Secretariat, 2003). An additional advantage the Region has is the proximity of two universities from which to draw passengers.
7.0 Recommendations

Recommendations are based on the analysis of what is included and what is missing from the Region of Waterloo’s plan. They are based on what has worked in other cities and what is most likely to work in Waterloo Region.

7.1 Smart Growth in Waterloo Region

The Regional Municipality of Waterloo is well on its way to implementing Smart Growth initiatives within the Region. However, the Regional decision makers ought to have more consideration for sustainability principles. It appears that currently Smart Growth is mostly geared toward economic development - certainly a worthwhile endeavour, but the Region should be more open to the other benefits associated with Smart Growth. Specifically, the Region should, in keeping with a sustainable approach, “Ensure that sufficiency and effective choices for all are pursued in ways that reduce dangerous gaps in sufficiency and opportunity (and health, security, social recognition, political influence, etc.)” (Gibson, 2001). For the Region, this means incorporating sustainability into decision making and determining the impact of any new program or policy it institutes in the name of Smart Growth. For the LRT specifically, the Region should make more mention and have greater regard to how immediate and long-term integration of the transit system will affect other Smart Growth initiatives. The benefits and consequences of an LRT will be felt long into the future thus the Region should clearly communicate with the public what the benefits and setbacks may be, and how the LRT fits into the Regions greater scheme (Hardi and Zdan, 1997).

Something that is out of the control of the Region is more direction and commitment from the government of Ontario – they are too vague in the wording of their Smart Growth goals, which translates to vague policies. For example, the province simply advocates building liveable communities without really going into what that means (Government of Ontario, 2003). The Region should instead follow the EPA or the FOM principles which are much more in-depth. Ontario’s
main focus is on economic development, forgetting that there needs to be other social and environmental considerations in order to foster the conditions necessary for enhanced communities.

7.2 The LRT Plan and Design Specifications

On the route taken

The Region has a fairly good plan in place for implementing a light rail system, as there are several proposed routes all within the boundary of the CTC. The different routes all have pros and cons and ultimately the route selected will be that which is most logistically feasible and provides the greatest benefit to the most people (IBI Group, 2003). The only additional specific consideration that the Region should have greater regard to is the impact the proposed route has on equity and property values (Gibson, 2001). Ultimately, the selection of the route will create winners and losers and some will profit more than others.

Housing

For the LRT to go beyond simply transporting people around town, it will need to be integrated with other aspects of Smart Growth. One of these key aspects should be housing. This aspect is related to the LRT in that increased housing in the core will contribute to greater viability in the transit plan and region wide (Interview with Kevin Curtis). Also, in accordance with Smart Growth Principles, the Region has not introduced many programs that encourage more housing types. A strong housing policy with mixed use with a variety of housing types, from low income to high income, will increase the equity and integrity of the Region as well as be a valuable assist to the LRT. This is currently an area of weakness in the Region. A strong integration of housing and other Smart Growth issues is needed.
Funding

Funding will be critically important to the successes and likelihood of the project being implemented. Without funding from upper levels of government such as the provincial and federal government, the LRT will not get built (interview with Kevin Curtis). There are steps the Region can take to increase the likelihood of receiving funding. The National Round Table on the Environment and the Economy (NRTEE) has recommended that the federal government contribute $1 billion for ten years in transit (NRTEE, 2003). The NRTEE has outlined several conditions and criteria for receiving part of this funding (see Appendix C). It is strongly recommended that the Region of Waterloo attempt to meet all these criteria to be in a better position to receive funding from the federal government (NRTEE, 2003). The Region is already likely to meet many of the criteria including showing how the “transit investment fits into a comprehensive longer term plan to support transit ridership” and “documenting environmental and economic benefits of the investment” (NRTEE, 2003). What the region must work harder to present is show financial commitment from other partners, like the province or private sector, as well as from the municipalities themselves (NRTEE, 2003). If the Region is successful at obtaining federal funding, than the provincial government is also more likely to contribute as government often provides matching funds for such projects.

On additional infrastructure

A key part of successful transit plans appears to be provisions for ample parking at the stations (City of Calgary, 2003b). However a balance must be struck between adequate parking and not providing too much. As a general rule, the closer to the core of the downtowns, the less parking should be provided. This should create incentive for people to ride the train and view it as a viable option for moving aground the centre of the major cities in the Region. Also, to facilitate the downtown core vitality, the Region should look closely at creating walkable infrastructure (City of Calgary, 2003b). The Region could use Calgary’s
Transit Orientated Development (TOD) as a guide for including design and neighbourhoods that are walkable. People will be more willing to use transit if they can get on and off easily and have a short walk to the destination.

One key consideration that likely makes the system attractive is that the distance a person is willing to walk to take transit is where the most development should occur (City of Calgary, 2003b). This usually is about 5 minutes or 400-600 meters (City of Calgary, 2003b). Waterloo Region’s advantage is that the system is not yet built so there is ample opportunity to make the system work by designing it from scratch.

Employment lands

There appears to be some concern in the business community over adequate availability of employment lands. The Region has put aside land intended for creating business opportunity, though some feel it is not enough (Region of Waterloo, 2003b). Traditionally, greenfields were used to fill this need. However, to ease the concerns of the business community and to implement more goals of Smart Growth the Region should partner up with the provincial government and private partners and look at brownfields as a source of development lands. The Region ought to partner more with the private sector to cover the cost of some of the projects anyway and this is a good place to begin.

7.3 Linking Transit to Smart Growth

The LRT is but one component of the Region’s attempt at Smart Growth - though it is a large and critical step. It is important to link transit, specifically the LRT with as many other Smart Growth and sustainability initiatives as possible. For the most part the Region has done well integrating Smart Growth with transit but there are deficiencies when it comes to the sustainability principles. The route selection must take more into consideration than the most convenient location. It should take into account who it will serve and try and preserve equity (Gibson,
2001). The transit system should have a holistic perspective within the Region and be planned in an open environment (Hardi and Zdan, 1997).

A key consideration is that even if the Region is able to increase density in the urban core, sprawl may still occur in outlying areas. Even with moderately increasing average densities, the prevalence of low-density development can still result in substantial sprawl (Raad, 1998). If the population is growing rapidly, many people will likely still choose to live in outlying areas. To counter this potential trend, it is important that increasing density be only a part of the overall strategy - drawing people to the core with incentives while increasing disincentives for the outlying areas (growth management strategy) - to be put in place to prevent further sprawl development. The transit option alone will likely not stop sprawl. A firm development boundary will likely need to be implemented effectively to complement the transit option. The Region does have a fixed countryside line in place but must make a firm commitment that the line will not change once development pressure rises. This is the only way transit and Smart Growth can be properly linked.
8.0 Conclusions

8.1 The Regional Transit Plan

The Region of Waterloo appears to have a fairly solid plan in place to implement an LRT within the Region. The implementation of the LRT also appears to have great potential in helping the Region implement its Smart Growth plans.

As outlined in section 7.0, the only place the Region appears to be lacking is in complementing Smart Growth principles with those of sustainability. While Smart Growth can be a great planning tool for making cities look and function better, Smart Growth may help the Region improve the urban environment overall, which will not only help enrich the quality of life but also improve the economy of the Region and even contribute in a small way to the betterment of the global environment problems by setting an example (NRTEE, 2003).

Smart Growth, as an effective planning tool, can only go so far. It is thus important to consider sustainability aspects to ensure that there are sufficient and effective choices for all, and that all residents and their needs are properly represented in the community (Gibson, 2001). The combination of Smart Growth and sustainability will likely be effective tools to implement these goals.

Many of the necessary criteria are already met in the Region or are planned to be in place in the near future (Region of Waterloo, 2003c). This will facilitate the implementation of the key steps that will lead to a smart and sustainable community. What is of the utmost importance for the Region to consider is that many of its plans hinge on the success of others. The LRT is a prime example - as good an addition as it may be to the community, without restricting growth in the other areas of the Region, the LRT has little chance of success. Conversely, the Region will likely have difficulty holding off development pressures in outlying areas if there is not a viable alternative available such as an LRT in the core to divert traffic and take the pressure off these outer areas. Other important elements of Smart Growth, such as housing, brownfield development,
liveable community etc, will also hinge on the success of implementing an LRT and the Region being committed to its long-term plans.

**8.2 Smart Growth and Transit**

Other jurisdictions, such as Calgary, have shown that transit oriented development can contribute greatly to making connections between jobs and housing, creating more opportunities for affordable housing and making identifiable walkable neighbourhoods (City of Calgary, 2003b). This would not only accomplish the goals of Smart Growth but it would also make the urban environment more sustainable. Other lessons from jurisdictions such as Ottawa show what long term planning and can achieve as seen with the success of a bus system that was initially planned and implemented 25 years ago (Interview with Don Drackely). The Region would likely like to see similar success eventually with the implementation of an LRT. The challenge will be convincing the population of Waterloo Region that while it may appear that the Region is not yet ready for such an advanced system, by the time it appears the Region is ready, it may already be too late. In order to manage growth effectively into the future, the Region understands that it must plan now. The role Smart Growth and sustainability measures have and should have is in guiding which projects take priority, and which projects and initiatives fit in best with others, in order to achieve broad and long lasting benefits region wide.

The current political atmosphere is one in which provincial and federal governments are beginning to notice the importance of growth management. The Region should use this to its advantage in lobbying for support from these areas of government. While the Region has the potential to accomplish much in the areas of growth management and implement Smart Growth, upper levels of government have an obligation and an important stake in seeing that projects such as the LRT in Waterloo Region, as well as other Smart Growth initiatives, get implemented.
9.0 References


* * *

Interview with, Dave Colquhoun, Manager, Transit Planning for Calgary Transit. Regarding Calgary’s LRT and transit planning March 1, 2004.


Appendix A: Map of Regional Central Transit Corridor
(Source: Region of Waterloo: Planning, Housing and Community Services, 2003)
Appendix B: Assessing sustainable development – key questions and considerations

Principles in Practice


...
Holistic Perspective
Assessment of progress toward sustainable development should:
• include review of the whole system as well as its parts
• consider the well-being of social, ecological, and economic sub-systems, their state as well as the direction and rate of change of that state, of their component parts, and the interaction between parts
• consider both positive and negative consequences of human activity, in a way that reflects the costs and benefits for human and ecological systems, in monetary and non-monetary terms

Adequate Scope
Assessment of progress toward sustainable development should:
• adopt a time horizon long enough to capture both human and ecosystem time scales thus responding to needs of future generations as well as those current to short term decision-making
• define the space of study large enough to include not only local but also long distance impacts on people and ecosystems
• build on historic and current conditions to anticipate future conditions—where we want to go, where we could go

Practical Focus
Assessment of progress toward sustainable development should be based on:
• an explicit set of categories or an organizing framework that links vision and goals to indicators and assessment criteria
• a limited number of key issues for analysis
• a limited number of indicators or indicator combinations to provide a clearer signal of progress
• standardizing measurement wherever possible to permit comparison
• comparing indicator values to targets, reference values, ranges, thresholds, or direction of trends, as appropriate

Openness
Assessment of progress toward sustainable development should:
• make the methods and data that are used accessible to all
• make explicit all judgments, assumptions, and uncertainties in data and interpretations

Effective Communication
Assessment of progress toward sustainable development should:
• be designed to address the needs of the audience and set of users
• draw from indicators and other tools that are stimulating and serve to engage decision-makers
• aim, from the outset, for simplicity in structure and use of clear and plain language
**Broad Participation**
Assessment of progress toward sustainable development should:
- obtain broad representation of key grass-roots, professional, technical and social groups, including youth, women, and indigenous people - to ensure recognition of diverse and changing values
- ensure the participation of decision-makers to secure a firm link to adopted policies and resulting action

**Ongoing Assessment**
Assessment of progress toward sustainable development should:
- develop a capacity for repeated measurement to determine trends
- be iterative, adaptive, and responsive to change and uncertainty because systems are complex and change frequently
- adjust goals, frameworks, and indicators as new insights are gained
- promote development of collective learning and feedback to decision-making

**Institutional Capacity**
Continuity of assessing progress toward sustainable development should be assured by:
- clearly assigning responsibility and providing ongoing support in the decision-making process
- providing institutional capacity for data collection, maintenance, and documentation
- supporting development of local assessment capacity
Basic Sustainability Requirements


**Integrity**
Build human-ecological relations to maintain the integrity of biophysical systems in order to maintain the irreplaceable life support functions upon which human well-being depends.

**Sufficiency and opportunity**
Ensure that everyone has enough for a decent life and that everyone has opportunities to seek improvements in ways that do not compromise future generations’ possibilities for sufficiency and opportunity.

**Equity**
Ensure that sufficiency and effective choices for all are pursued in ways that reduce dangerous gaps in sufficiency and opportunity (and health, security, social recognition, political influence, etc.) between the rich and the poor.

**Efficiency**
Reduce overall material and energy demands and other stresses on socio-ecological systems.

**Democracy and civility**
Build our capacity to apply sustainability principles through a better-informed and better-integrated package of administrative, market, customary and personal decision-making practices.

**Precaution**
Respect uncertainty, avoid even poorly understood risks of serious or irreversible damage to the foundations for sustainability, design for surprise and manage for adaptation.

**Immediate and long term integration**
Apply all principles of sustainability at once, seeking mutually supportive benefits.
Appendix C: Key criteria for receiving federal finding for transit as outlined by the NRTEE
In a recent report entitled *Environmental Quality in Canadian Cities: The Federal Role*, (2003) the National Round Table on the Environment and the Economy outlined several recommendations for increasing the sustainability of Canadian urban centres. Their fourth recommendation in particular would be of interest to the Region of Waterloo, as it highlights the need for increased public transportation. The following are conditions laid out by the NRTEE for urban centers to obtain federal funding for public transit.

NRTEE Recommendation #4 - That the federal government invest $1 billion per year for 10 years in urban transit in Canada’s cities. This investment should target growing urban regions where there are opportunities to discourage land use that doesn’t support transit and to significantly increase the number of net transit riders. Federal funding should be allocated according to a basic yet effective set of criteria, such that project proponents:

a) show how the proposed transit investment fits into a comprehensive, longer-term plan to support transit ridership and, specifically, increase the share of trips taken by urban transit;

b) estimate the number of net new transit riders who will be attracted from cars as a result of the investment;

c) indicate how the attractiveness of transit will be improved relative to the automobile (e.g., traveler cost, travel times, convenience);

d) quantify investment in transit versus investment in automobile-related travel;

e) document a comprehensive approach to achieving land use patterns that will support transit ridership, including area-wide planning policies; transit node and corridor-specific land-use policies; and area-wide, transit node and corridor-specific municipal pricing policies (e.g., development charges, property taxes, user fees);

f) create a transportation demand management plan;

g) quantify the cost of the investment per net new transit rider;

h) indicate the financial contributions and roles of other partners, including provincial and municipal governments, other agencies, and the private sector;

i) document the environmental and economic benefits of the investment (e.g., reductions in greenhouse gas emissions, road infrastructure investments averted, congestion costs averted);

j) monitor the results (e.g., actual net new transit riders, development in identified transit nodes and corridors).