

# EXPLORING THE DEVELOPMENT COST CHARGE FRAMEWORK FOR ACTIVE TRANSPORTATION INFRASTRUCTURE IN BRITISH COLUMBIA



**URBAN**SYSTEMS.

EXPLORING THE DEVELOPMENT COST CHARGE FRAMEWORK FOR ACTIVE TRANSPORTATION  
INFRASTRUCTURE IN BRITISH COLUMBIA

by

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## Executive Summary

Human transportation patterns have been linked to excessive greenhouse gas (GHG) levels in the Earth's atmosphere. Unsustainable levels of GHGs are contributing to global climate change, a phenomena which has a range of negative human and environmental impacts.

In recognition of the looming threat, governments around the world, including the Province of British Columbia, are introducing legislation aimed to reduce GHGs. In B.C., local governments are required to set greenhouse gas reduction targets and identify measures to pursue them in their comprehensive plans. In order to meet their targets, B.C. local governments should consider focusing on their most polluting sectors, one of which is transportation. Studies have shown that transportation is the foremost contributor to provincial GHGs.

A promising way in which local governments can reduce GHGs from transportation is to promote active modes of travel. Research shows that increases in walking and cycling can result in decreased motor vehicle use and resultant emissions. To stimulate this type of shift, B.C. local governments should consider providing their residents with adequate hard infrastructure facilities, including separated paths, bicycle boulevards and bike lanes. A municipal finance tool available to local governments to help fund these types of investments is development cost charges (DCCs).

While DCCs can be, and are used for active transportation infrastructure in B.C., the current framework derived from the *Local Government Act* (LGA) and *Provincial DCC Best Practices Guide* is vague and ambiguous. A distinct lack of guidance has produced a number of obstacles for local governments. Municipalities who have successfully implemented active transportation DCC programs have done so largely through experimentation and broad interpretation of the LGA provisions. Moving forward, more clarity and guidance with respect to active transportation is desired both by those charging DCCs (local governments) and those paying them (developers). To ensure the power of the DCC tool is fully leveraged for provincial GHG reduction purposes, the B.C. Ministry of Community, Sport and Cultural Development should consider a review of their DCC protocols as well as an update to the LGA and/or *DCC Best Practices Guide*.

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## **Chapter One - Introduction**

### **Context**

Times are changing, both locally in British Columbia and abroad. Research suggests we humans are producing excessive greenhouse gas emissions (GHGs) and, with widespread climate change looming, that there is growing need and pressure to reduce our negative impact on the natural environment (Hillman, 2003). The reduction of GHGs is one of many interventions identified as being necessary to slow the trend of climate change and its underlying effects on environmental and human health (Hillman, 2003).

It is said that planners and policy makers have a responsibility, as well as a significant opportunity, to respond to the issue of climate change (Frank et al. 2007). The Province of British Columbia is moving in the right direction with efforts to curb GHG emissions at the community level. Among them is a Bill, known as the Green Communities Statutes Amendment Act (Bill 27 - 2008), which requires local governments to set and adopt GHG reduction policies, actions and targets in an official community plan (OCP) or regional growth strategy (Rutherford, 2009). The province-wide standard for this reduction is 33 per cent below 2007 levels by 2020 (British Columbia (C), 2008).

Studies have shown that a major source of community GHGs in British Columbia is personal vehicles. According to the Province's Community Energy and Emissions Inventory, a significant proportion (14%) of all GHGs emitted in B.C. come from personal vehicles such as cars, pickup trucks, minivans and sport utility vehicles (Ministry of Environment, 2010). To support Bill 27, and to ultimately combat the effects of climate change, it is worthwhile for B.C. communities to encourage more sustainable and active forms of transportation within their jurisdictions. From a planning perspective, there are a number of ways in which this could be done.

One method is to use municipal finance mechanisms to fund non-motorized infrastructure projects, such as separated bike lanes, multi-use paths and bicycle boulevards. The provision of such facilities is important, as the amount and type of transportation infrastructure in a community is known to correlate with the walking and cycling rates of its residents (Dill, 2009; Dill & Carr, 2003; Rodriguez, 2004; Kitamura et al. 1997; Litman, 2010; BCCC, 2007; Nelson & Allen, 1997; Krizek, Barnes & Thompson, 2009).

There are many different finance mechanisms available for municipalities to use towards investments in non-motorized infrastructure. According to the province's *Development Finances Choice Guide*, the different options include cost recovery tools, source of capital tools, developer-build agreements, and partnership agreements (MOMA, 2000). The focus of this project is on a cost recovery tool known as development cost charges (DCCs).

This Professional Project has been sponsored by a multidisciplinary civil engineering, urban planning and landscape architecture firm called Urban Systems Limited (Urban Systems). Urban Systems is interested in exploring the use of DCCs for active transportation infrastructure because: (a) active transportation is a growing practice area for the company; and (b) because DCCs are one of the few development finance tools which have specific provincial policy and legislation set out in the *Local Government Act* (LGA) (Dan Huang, Urban Systems Senior Planner, personal communication, 7 April 2011). Since the LGA largely defines what local governments can and cannot do in British Columbia, Urban Systems would like to ensure that the province's goals for GHG reduction match what is mandated for B.C. communities through the legislation.

## **Research Problem**

While it is indeed a worthwhile endeavour, using DCCs for non-motorized facilities can be more challenging than for other types of infrastructure. There are three contributing factors:

1. Legislation. The Provincial legislation for DCCs is entrenched within the *Local Government Act*. In regards to transportation, section 933 of the Act states that a municipality can charge DCCs for “highway facilities”. It does not; however, supply a definition for the word “highway” nor does it specify if active transportation infrastructure is included or excluded under the umbrella “highway facilities” term. The ambiguous language leaves much room for interpretation.

2. Best Practices Guide. The Province introduced a *DCC Best Practices Guide* (the Guide) in 1997 in hopes of standardizing the establishment and administration of DCC programs around the province (MOCS, 2005). It has since updated the Guide on two separate occasions, once in 2000 and again in 2005. Despite being effective in a variety of ways, the Guide offers little clarity in the realm of active transportation.

Keeping with the ambiguity of the DCC legislation in the LGA, the DCC Best Practices Guide does not clearly define which active transportation facilities can be included in a DCC program. Rather, it provides a list of past interpretations of the “highway facilities” term and states that it means different things to different local governments. The Guide does point out that some communities have interpreted “highway facilities” to mean bicycle and pedestrian infrastructure. It does not; however, provide examples of where or how this interpretation has been applied in British Columbia, thus there is no obvious precedent or guidance to follow.

3. Legitimate Use Question. Finally, stemming from the broad legislation and unclear guidance in the *DCC Best Practices Guide* is a question around whether active transportation facilities are a legitimate use for DCCs. Section 933 of the LGA states that DCCs can only be charged for facilities that service, either directly or indirectly, new developments for which charges are

imposed. Some would argue that non-motorized infrastructure can indeed service new development by adding capacity along transportation corridors, much like adding additional travelling lanes for cars. Unfortunately, there is a lack of empirical data and methods by which to support this claim.

### **Project Purpose and Organization**

The purpose of this project is to explore the feasibility of using DCCs for active transportation infrastructure in British Columbia. The intention is to provide some guidance and clarity to what is currently a somewhat vague and ambiguous process. This report:

- Displays why local governments should promote active transportation;
- Assesses the current DCC framework with regards to active transportation infrastructure and identifies some potential challenges;
- Suggest ways in which to address some of the potential challenges;
- Investigates the current state of affairs for local governments; and
- Identifies what is and is not working, and recommends changes to the DCC framework.

To achieve the above, this report has been organized into six chapters. Following this introduction is Chapter Two - a review of the literature around climate change, GHG reduction, the benefits of active transportation, and the different types of strategies to promote mode shift. The purpose of Chapter Two is to provide context to the overall document and to display why local governments should consider promoting active transportation through the provision of physical infrastructure.

Chapter Three is a detailed overview of development cost charges. Information from the Ministry of Community, Sport and Cultural Development (the Ministry) is used to describe the legislative framework surrounding DCCs, as well as the steps required to develop a DCC bylaw. Potential challenges/complications for the inclusion of non-motorized infrastructure in DCC



bylaws are identified and discussed. The purpose of this chapter is to display how the current DCC framework is structured with respect to active transportation.

The fourth chapter of this project identifies ways in which to address some of the potential challenges identified in Chapter Three. Options and considerations for forecasting cycling and walking trips are identified, and the latent demand concept for active modes of transportation is introduced and applied.

Chapter Five is a synthesis of eight semi-structured interviews conducted as part of the research for this project. Interview participants included planners and transportation experts in the local government sector of B.C., as well as representatives from the Urban Development Institute (UDI) and the Ministry. The purpose of Chapter Five is to articulate the current state of affairs for local governments regarding active transportation DCCs.

Chapter Six is a summary of the project findings. This chapter also makes recommendations for future consideration.

## Chapter Two - Literature Review

### GHG Reduction and Climate Change

The Intergovernmental Panel on Climate Change (IPCC), the world's leading authority on climate change research, recently concluded that climate change is indeed a reality. In their 2007 report titled *The Physical Science Basis*, the IPCC announced that the Earth's surface temperature has been rising consistently since 1850 - the earliest year measurable through IPCC instrumental observation. The IPCC also announced that, for 11 of the 12 years leading up to the 2007 publishing of their report, global temperatures were the warmest on record.

The IPCC identifies human activities as a dominant force driving climate change. In *The Physical Science Basis*, the IPCC states that "human activities are responsible for most of the warming over the past 50 years", and that this can be largely attributed to "changes in the amounts of greenhouse gases in the atmosphere" (2007). Fossil fuel dependent activities, such as motorized transportation, are cited as being the largest anthropocentric contributor of GHGs. The IPCC confirmed that pre-industrial GHGs were a stable 280 parts per million (ppm), while GHGs in 2005 were recorded at an unstable 380 ppm (2007).

Academics in the transportation literature have been spreading a similar message in recent years. In his article *The Relevance of Climate Change on Future Policy for Walking and Cycling*, Mayer Hillman states that a primary cause of climate change is the quantity of fossil fuels being burned to provide for "our energy-dependent activities", i.e. our driving habits (2003). Similarly, David Greene reports that the combustion of petroleum for transportation is adding significant amounts of greenhouse gases to the earth's atmosphere, ultimately contributing to climate change (2004). Further, Lee Chapman argues that GHGs have reached unstable levels of accumulation and that the unsustainable growth in motorized transport is largely responsible (2007).

Research in the disaster and risk management literature suggests that climate change poses a significant threat to human and environmental systems (Mileti, 1999). Predictions of the effects of climate change point to more frequent and severe droughts; increased frequency and intensity of floods, storms and cyclones; and, generally, an increased likelihood, magnitude, and diversity of climatic hazard events (Mileti, 1999; Henstra & McBean, 2005; Wisner et al. 2004). A hazard event in this context is defined as “any potential threat to something that people value, including one’s life, health, environment or lifestyle” (Henstra & McBean, 2005).

It has been said that some of the effects of climate change may potentially be reduced as people adapt to them (Mileti, 1999). Many scholars argue, however, that various forms of adaptation such as building dykes and sea walls only treat the symptom but not the cause (Wisner et al. 2004). The real mitigation against climate change is said to require the concerted actions of governments of the world to reduce the production of greenhouse gases (Wisner et al. 2004).

It has been argued that any government intervention to reduce GHGs should consider and address the impact of transportation (Greene, 2004). This is because a significant proportion of total GHGs, both globally and locally in various parts of the world including British Columbia, are produced by the transport sector. The transport sector, of which the personal vehicle is considered a large part, is said to account for 26% of global carbon dioxide GHG emissions (Chapman, 2007). CO<sub>2</sub>, which is produced by the use of petroleum fuels in internal combustion engines, is said to represent virtually all (96%) of transportation's greenhouse gas emissions (Greene, 2004). The other 4% are made up of nitrous oxide and methane (Marshall & Shortle, 2005).

In British Columbia, studies have shown that transportation is the foremost contributor to provincial GHG emissions (British Columbia (C), 2008). According to the 2008 B.C. Climate Action Plan, some 36% of all GHGs in B.C. are emitted from the transport sector. This amount is said to be attributable to six different sources, including: domestic marine, domestic air, rail, off

road, heavy duty vehicles, and personal vehicles. Of these sources, personal vehicles are the largest contributor, accounting for 39% of all transportation-related GHGs (British Columbia (C), 2008). Through extrapolation, it can be concluded that 14% of all GHGs produced in British Columbia come from personal vehicle use.

Given the clear link between motorized transportation and excessive GHG emissions, there is an obvious public interest need for change. Alternatives to car travel are required today to ensure human and environmental health for future generations.

An article that articulates the need for change is Lee Chapman's *Transport and Climate Change: a Review*. In his writing, Chapman argues that we "need to break the relationship between the current preferred movements of passengers with the most polluting modes" (2007). He presents two possibilities: (1) technological change, in which transportation modes are made less polluting; and (2) behavioural change – where active modes such as walking and cycling are made more attractive via changes driven by government policy. Chapman promotes the latter, stressing that "in the short term, policies to change behavior and travel habits are more important than technological solutions" (2007). His rationale is that, while technological change can provide reductions in CO<sub>2</sub>, it is difficult to administer and is expensive. He therefore promotes policy interventions which tackle the time management and lifestyles of people instead.

Similar to Chapman, Frank et al. identify technological and behavioural change as options for reducing transportation GHGs and mitigating climate change (2007). In their article *The Urban Form and Climate Change Gamble*, the authors state that "any policy that seeks to reduce transportation-related carbon dioxide emissions will require some combination of better vehicle fuel technology, increased vehicle economy, and reduced travel demand" (Frank et al. 2007). Although they recognize technology as part of the equation, the authors suggest that behavioural change holds more potential in the long run, both in a theoretical and practical sense. The authors stress that improvements in fuel and vehicle technology are barely keeping

up with population growth, and that vehicle demand reduction techniques – notably the provision of reasonable alternatives to driving - are more important (Frank et al. 2007).

Consistent with the research of Chapman and Frank et al., Hillman also recognizes various options for addressing GHG reduction including technological and behavioural change (2003). Hillman also argues strongly for mode shift. He states:

The most effective way of minimising energy-wasteful patterns of activity, especially those related to conserving finite fossil fuels, is not by achieving a transfer from the car to public transport. Nor is it by aiming for more efficient use of fuel in motor vehicles (which all too often leads to the generation of more energy demand by lowering its unit cost). It is obvious that the way ahead lies in promoting modes of transport that do not use petrol at all - walking and cycling. (2003)

Given the studies and contemporary literature on this subject, it would seem climate change is inevitable and is caused, at least in part, by excessive GHG accumulation associated with the growing use of personal vehicles. It would appear then, that a widespread shift in driving behaviour from motorized to active, non-motorized modes is necessary to curb GHG emissions and mitigate the effects of climate change.

### **The Benefits of Active Transportation**

Active transportation, which is also known as non-motorized transport, is a form of human powered transportation that includes modes such as walking, cycling, wheelchair, scooter, and handcart use. Similar to car travel, active transportation can be utilized for utilitarian transport as well as for recreational purposes (Litman, 2010).

Active transportation modes, particularly walking and cycling, are said to play a variety of important and unique roles in an efficient community transportation system (Litman, 2010; Rietveld & Daniel, 2004). When made accessible through the provision of adequate infrastructure, active transport options can provide a range of both direct user and communal benefits.

The direct user benefits of active transportation are those which can only be enjoyed and appreciated by the individuals who are engaged in non-motorized travel. Such benefits can include, but are not limited to practicality, affordability, physical fitness and recreational enjoyment (Urban Systems, 2010; Chapman, 2007). The communal or societal benefits of active transportation, conversely, are those which benefit society at large. While there are many communal benefits, including public health, reduced noise pollution and increased tourism potential, the most undisputed and crucial in the context of climate change is the low carbon footprint / environmental impact of active transportation (Hillman, 2003; Rietveld & Daniel, 2004; Reynolds et al. 2009; Senur et al. 2009; BCCC, 2007; Urban Systems, 2010).

Active transportation modes, notably walking and cycling, are said to be the ultimate zero carbon and environmentally friendly solution for personal transport (Chapman, 2007). This is because they: (a) produce negligible emissions; and (b) have been proven to play a role in reducing existing emissions from personal vehicles (Komanoff et al. 1993).

In a 1993 study titled *Environmental Benefits of Walking and Cycling in the United States*, Komanoff et al. determined the percentage of GHG emissions which can be saved when walking and cycling trips are substituted for motor vehicle trips. Their results indicate that each 1% of motor vehicle travel replaced by walking or cycling can decrease total motor vehicle emissions by 2 – 4% (1993). The explanation for this can be attributed to two factors. First, non-motorized trips commonly replace short automobile trips, which are known to produce high emission rates (per km) as vehicle engines are inefficient during the first few minutes of cold operation (Komanoff et al. 1993; Litman, 2010; BCCC, 2007). Second, this vehicle efficiency problem, which is not an issue for walking and cycling modes, can be exacerbated due to traffic congestion in urban areas (Ewing, 1997; Litman, 2010).

The benefits of active transportation, most notably the potential for GHG reduction, are compelling evidence that governments at various levels should work towards a widespread mode shift. This has been recognized by policy makers in British Columbia, where, in 2008, the

Province passed Bill 27 which mandates cities and regional districts to include GHG reduction targets and implementation actions/policies in their comprehensive plans (Rutherford, 2009). In order to meet their respective targets, B.C. local governments should focus attention on their most polluting sectors, such as transportation. Initiatives that reduce passenger travel and support active transportation will play an important role in this pursuit, since passenger vehicles are known to be the province's largest contributor of transportation-related GHGs (Urbna Systems, 2010). As noted previously, personal vehicles comprise 39% of all transportation-related GHGs and 14% of all GHGs in British Columbia.

### **Policies to Influence Mode Shift – Soft vs. Hard**

There are many strategies discussed in the literature that have potential to change travel behaviour. The options, which are often collectively referred to as “travel demand management” or TDM for short, fall within two categories: soft and hard policies (Bamberg et al. 2011; Krizek, Handy & Forsyth, 2009).

Soft policy measures, which are also known as voluntary-change measures and psychological strategies, are techniques which do not require force, restrictions or building physical infrastructure (Moser & Bamberg, 2008). Rather, they are focused on information dissemination and persuasion, and are used to target people's knowledge, perceptions, evaluations, attitudes, intentions, expectations, and/or motivations regarding their transportation choices (Bamberg et al. 2011; Vlek, 2004). By targeting the reasoned behaviour process in humans, soft policy measures are intended to encourage, and ultimately empower people to voluntarily switch from car travel to more sustainable travel modes (Bamberg et al. 2011; Vlek, 2004). There are a number of strategies that fall within the realm of soft policy measures. Those which are most frequently noted in the literature include information provision, education, lifestyle/role modelling, persuasive marketing, and campaigning (Moser & Bamberg, 2008; Bamberg et al. 2011; Vlek, 2004).

Hard policy measures are quite different. As their name suggests, hard measures are those which modify the objective environment, either regulatory or physical. Their purpose is to make driving a personal vehicle less convenient, while making alternative modes such as walking, cycling and public transit more feasible and attractive (Bamberg et al. 2011; Vlek, 2004). Examples of hard strategies include the provision or improvement of transportation infrastructure and related facilities; regulation and enforcement techniques; and pricing policies (Bamberg et al. 2011; Vlek, 2004).

There is little agreement in the literature about whether soft or hard measures hold more potential for change (Bamberg et al. 2011; Vlek, 2004; Moser & Bamberg, 2008). Where consensus seems to lie, however, is in the promotion of programs that marry soft and hard policy measures together. Scholars tend to agree that the largest degree of potential for change lies in a combined strategy. The interdependence between soft and hard policy measures is articulated by Bamberg et al:

With the implementation of hard transport policy measures that change the relative attractiveness of travel options, the possibility increases that soft transport policy measures would be effective in motivating and empowering car users to switch to these options. (2011)

This message is echoed widely. Charles Vlek, for instance, argues that soft and hard measures should be implemented in conjunction with one another (2004). He states that a combination of hard and soft measures is useful, and that soft measures are important means to convey results and justifications of practical hard policy interventions. Chapman, similarly, argues that while soft policies are important means to encourage the shift to other transport modes, they will “ultimately fail” without significant hard investment to make the alternatives viable and attractive (2007). Further, Parkin et al. argue that a significant increase in bicycle trip numbers may be possible from “a programme of investment in facilities coupled with appropriate promotional measures” (2008).

Given the above, it is clear that soft and hard TDM interventions when used together have potential to encourage a widespread shift to active transportation modes. What is not so



obvious, however, is how local governments can derive the necessary funds to plan and implement comprehensive TDM strategies in pursuit of their GHG reduction goals. Focusing on the 'hard' side of the equation, and in the British Columbia context, the following chapter outlines a mechanism that local governments can use to help pay for active transportation infrastructure projects.

## **Chapter Three - Development Cost Charges**

### **Introduction to Development Cost Charges**

Development Cost Charges are a tool available to local governments in British Columbia to use towards the provision of growth-related civic infrastructure. They are considered both a cost recovery and a development finance mechanism, in that they can be used to either recover money previously expended on infrastructure, or to finance new infrastructure projects (MOMA, 2000).

DCCs are collected from developers, usually as a one-time charge at the time of subdivision or building permit approval (MOCSCD (B), 2010). They are then placed in a fund separate to the local government's operating revenue, and used when deemed appropriate to offset a portion of the infrastructure costs associated with servicing the particular needs of the development. DCCs monies are often pooled from many developers this way to ensure funds are raised in an equitable manner (MOCS, 2005).

DCCs apply to developers of certain residential, commercial, industrial, and institutional projects. Provincial legislation defines which types of projects are exempt from DCCs. Buildings for public worship, developments subject to a land use contract, and buildings or renovations under \$50,000 in value, for instance, are excluded from DCC charges. Civic services such as childcare, fire and police protection, libraries and recreation are also generally exempt from DCCs, although there is no statutory requirement for this in the LGA (MOCSCD (B), 2010).

DCCs are not based on the ability to pay, property assessment values, retail sales, or the size of the development company. Rather, they are premised on the "user pay" or "benefiter pay" principle; that being those who use or benefit from civic services should also pay for some portion of those services (MOCS, 2005; MOCSCD (B), 2010). Since new development (and the uses and people that follow) can often create significant demand for infrastructure improvements, developers are expected to pay accordingly. DCCs do not have to be paid if the

new development is expected to have a negligible impact on existing infrastructure (MOCSCD (B), 2010). This logic is rooted in the provincial *Local Government Act*, where it is written that DCCs can only be charged to service, “directly or indirectly,” the development for which they are being imposed (British Columbia (A), 2011).

DCCs are used most often, and are seemingly most effective, in high growth municipalities (MOMA, 2000). Given that many cities and towns in B.C. are growing rapidly, there would seem to be a significant window of opportunity to address new infrastructure demands with DCCs, particularly for transportation facilities (MOCS, 2005). Rather than continually building new roads to meet demand, it is both possible and worthwhile to use DCCs to fund active transportation infrastructure projects instead. The legislative and legal framework through which this is possible, but at the same time complicated, is discussed below.

### **Legislative and Legal Framework**

The provincial statute that enables local governments in British Columbia to charge DCCs is the *Local Government Act*. The ability to charge DCCs, and the conditions under which they can be charged are defined within Part 26, Division 10. It is here that the legislation states a municipality or regional district may, through the adoption and implementation of a DCC bylaw, charge developers for the purpose of assisting with the capital costs of “providing, constructing, altering or expanding sewage, water, drainage, highway facilities, and parks” (British Columbia (A), 2011).

The legislation above is largely open to interpretation and precedent in its application. Besides explicitly excluding off-street parking, the legislation does not define the types of infrastructure which can be included under the umbrella terms of sewer, water, drainage or highway facilities. The only exception is the parks legislation, in which the Ministry specifically outlines the types of park improvements eligible for DCCs (MOCS, 2005).

The Ministry, with help from representatives from the Province, local government, and development community, publishes a document entitled the *Development Cost Charge Best Practices Guide*, now in its third edition. One of the purposes of the document is “to encourage local governments to standardize the establishment and administration of development cost charge programs” (MOCS, 2005). Under this mandate, the document provides some guidance as to the types of facilities which can be included under the umbrella terms in the LGA, including highway facilities.

Although somewhat unintuitive given the common lay-meaning of a highway, the Guide hints that “highway facilities” can include active transportation infrastructure. Within the Guide, it is stated that highway facilities has been interpreted in practice to include projects such as sidewalks and pedestrian facilities, boulevards and boulevard landscaping, pedestrian bridges, bicycle infrastructure, and other related facilities (MOCS, 2005). Although the meaning of “interpreted in practice” is not clear, in reading the text one is likely to assume that B.C. local governments have used DCCs to fund active transportation infrastructure projects.

Consistent with the *DCC Best Practices Guide*, the Province’s *Transportation Act* also suggests that the term “highway facilities” can include active transportation projects. In the Act, a “highway” is defined as “a public street, road, trail, lane, bridge, trestle, tunnel, ferry landing, ferry approach, or any other public way or any other land or improvement that becomes or has become a highway” (British Columbia (B), 2011). The mode of passage, be it on foot, bicycle, or motor vehicle is irrelevant in this definition. As such one might conclude that separated bike lanes and other types of non-motorized infrastructure could be used in a DCC program - as they would be legally considered a highway under the *Transportation Act*.

Despite the somewhat clear evidence of the possibility of using DCCs for non-motorized facilities, there are some issues with the guidance in the *DCC Best Practices Guide* that seem to complicate the process. The following section identifies some of the challenges a local government could potentially face in B.C.

## **Developing a DCC Bylaw – Challenges for Active Transportation Infrastructure**

DCCs are one of a few remaining local government bylaws which require both ministerial and either municipal or regional board approval. A dual approval process is required for DCCs because they are highly scrutinized, both by the general public and the development industry (Dan Huang, personal communication, 2 April 2011).

The procedures required to develop a DCC bylaw and gain the necessary approvals fall under three steps. The steps, as they are identified in the *DCC Best Practices Guide*, are: (1) projecting the estimated amount of new development to occur in a locale; (2) determining the amount and type of infrastructure necessary to service the new development; and (3) determining the net DCC recoverable amount (MOCS, 2005). The third step presents what appears to be the greatest challenge for active transportation.

The “net DCC recoverable amount” is the total dollar figure to be collected through the DCC program over a set period of time - to pay for the infrastructure costs calculated in step two. It is used to come up with a DCC rate, or dollar value per unit or building area, to be charged to developers after the DCC bylaw is adopted (MOCS, 2005). Generally speaking, in order to come up with the DCC rate one must divide the net DCC recoverable by the corresponding number of projected development units (MOCS, 2005). If no other funding sources are considered in this calculation, such as grants or municipal assistance beyond the required minimum “Assist Factor”, a scenario is created in which new development is expected to pay almost entirely for the DCC program. This can be difficult for local governments to justify and implement, especially for transportation facilities.

A comprehensive transportation system is said to be beneficial to an entire community (MOCS, 2005). For this reason, the Guide states that capital costs related to transportation DCC projects should be apportioned to existing users (taxpayers) as well as to new development (2005). In order to apportion capital costs appropriately, the Guide recommends that local governments undertake an exercise of “benefit allocation”. There is no requirement or guidance in the *Local*

*Government Act* as to how benefit allocation should be undertaken. The *DCC Best Practices Guide* does offer some recommendations, however they pertain to (and largely favour) vehicular infrastructure.

The Guide identifies two best practices for benefit allocation: (1) the “rule of thumb” approach; and (2) technical approaches. While the Guide states that either could be used, both have limited application to active transportation projects.

The issue with the rule of thumb approach is its underlying premise that DCCs can only be charged in full if construction of the infrastructure under question would not proceed if there was no new development (MOCS, 2005). The rule of thumb requires one to apportion benefit in accordance with how essential the infrastructure is to new development (and how unessential it is to the greater community). Applying this logic to non-motorized facilities poses a problem because, in the absence of new development, non-motorized facilities are in fact still essential and do provide widespread community benefit. The argument that non-motorized facilities are only needed to service new development cannot be made.

Technical approaches to benefit apportionment also present a challenge for non-motorized facilities. This is because most technical approaches utilize statistically significant motor vehicle information (such as traffic generation) and computer models to forecast the impacts of new development on road infrastructure (MOCS, 2005). It is difficult to do this in the same way for active transportation modes due to empirical data and modeling limitations (Barnes & Krizek, 2005; Turner et al, 1997; Jones & Buckland, 2008; Dill, 2009).

The Guide identifies a technical approach which is said to be the industry standard amongst local governments for measuring vehicular traffic generation. The standard is housed within the Institute of Transportation Engineers (ITE) manual: *Trip Generation (1991)* (MOCS, 2005). The following is an excerpt from the Guide which outlines how the concept of vehicle “trip rates” is utilized via the ITE manual to calculate the impact of new development:

Trip rates are commonly measured in units known as “trip ends.” ITE defines a “trip end” to mean a single or one-directional vehicle movement (i.e., either exiting or entering) a particular site. The average trip rate for the afternoon (i.e., p.m.) peak hour of the generator is suggested as the common basis for comparing road impact for DCC calculation purposes. This is because road capacity is related to peak hour needs, rather than average traffic, and greater amounts of traffic are experienced during afternoons, as opposed to mornings. (2005)

As shown above, the guide displays a broad inclination of support for vehicular infrastructure. There is no discussion in the Guide around how active transportation can play into a technical equation for benefit apportionment. There is also no reference to how one might go about performing a similar exercise for active transportation, nor is there any mention of what a reasonable alternative to the technical approach might be.

Another issue regarding benefit allocation for non-motorized facilities is the Guide’s recommendation for public input. The Guide states that public consultation is not a mandatory component of DCC bylaw development, but that best practice is to “include a meaningful public process to obtain input from stakeholders prior to first and third readings [of the DCC bylaw]” (MOCS, 2005). Although it defines stakeholders broadly as “all persons, groups or organizations that have a perceived, actual, or potential stake or interest in the results of the decision-making process”, the guide recognizes that broad outreach is not always feasible. The Guide states that, “at a minimum, consultation should include representation from residential and non-residential developers, the public, as well as local government staff from the planning, engineering and finance departments” (MOCS, 2005). The recommendation to consult with developers poses a potential challenge.

The Guide lays out the components of the DCC bylaw development process which should be subject to public consultation, including benefit allocation. It stresses that the Inspector of Municipalities may refuse approval of a DCC bylaw if the DCC calculations result in excessive charges that “deter development or discourage construction of reasonably priced housing” (MOCS, 2005). This could be interpreted to mean that a local government should cooperate with the development industry to ensure its bylaw is approved. Since there is no reference to active transportation in the DCC legislation (LGA) and virtually no mention in the *DCC Best*

*Practices Guide*, it is possible that some developers could resist the inclusion of non-motorized facilities in a DCC program. This could happen, for instance, if the inclusion raised the DCC above what it would otherwise have been without non-motorized facilities.

Moving forward, it is clear that alternatives to the rule of thumb and ITE Manual for benefit allocation are necessary in order to encourage active transportation. A fundamental shift in thinking around the role of DCCs in contributing towards all modes of transportation (rather than just motor vehicles) is also needed. The necessary shift in thinking, as well as some possible ways to link active transportation infrastructure to new development, are discussed in the following chapter.



## **Chapter Four - Linking New Development to Non-Motorized Facilities**

The current development cost charge framework in British Columbia, whether intentionally or not, promotes the use of DCCs for vehicular infrastructure over non-motorized facilities. A link between active modes of travel and new development is not articulated in the *DCC Best Practices Guide* and, as a result, some local governments may be reluctant to experiment.

This chapter addresses the above in two ways. The first section identifies options for forecasting cycling and walking trips which could be used in DCC benefit allocation formulas (in lieu of the rule of thumb or ITE Manual approaches). The second section introduces and applies the concept of latent demand for active modes of transportation. The second section is important for two reasons: 1) it represents an alternative way of producing road capacity (other than building more roads); and 2) it reflects the type of shift thinking that must occur with respect to the role of DCCs.

### **Options for Forecasting Cycling and Walking Trips**

In order to undergo benefit allocation for active transportation infrastructure, one could develop a method of forecasting cycling and walking trips. There have been many studies in the past decade and a half that have either looked at, or executed methods for doing so (Baltes, 1996; Epperson, 1996; Turner et al. 1997; Dill & Carr, 2003; Rietveld & Daniel, 2004; Rodriguez, 2004; Barnes & Krizek, 2005; Jones & Buckland, 2008; Parkin et al. 2008; Dill, 2009; Krizek, Handy & Forsyth, 2009).

The extensive research interest in this field is the result of a number of factors, including one which is directly relevant to DCCs. That factor is a desire to support non-motorized infrastructure investments and policy decisions with empirical evidence of the demand for active modes of travel (Jones & Buckland, 2008; Dill & Carr, 2003; Barnes & Krizek, 2005; Turner et al. 1997). While studies on this topic have produced varied results with little consensus, they

have in fact identified a number of different modeling methods that could potentially be used for active transportation DCCs (Turner et al. 1997; Barnes & Krizek, 2005).

Techniques for forecasting walking and cycling trips can be broadly placed in two categories: aggregate models and disaggregate models (Jones & Buckland, 2008). The purpose of aggregate models is to forecast travel behaviour based on the known characteristics of an area, such as existing mode share, population density, employment density, household income and facility type. Disaggregate models, conversely, are designed to look at travel behavior from the perspective of the individual - focusing on elements such as attitudes and perceptions related to cycling and walking (Jones & Buckland, 2008).

Aggregate and disaggregate transportation models vary both in terms of their predictive capabilities as well as their ease of use. Aggregate models are said to be easier to develop but ultimately less effective, as they rely on readily available (but generalized) methods and data sources such as census information (FHA, 1999). Disaggregate models, on the other hand, are more complicated to develop but are said to be more effective at predicting travel behaviour. They require custom data and survey collection such as stated and/or revealed preference surveys (FHA, 1999). What a person would hypothetically do under certain cycling and walking conditions, and what they actually do, are two considerations that are often addressed using disaggregate models (Dill, 2009).

The choice of modeling technique, be it an aggregate or disaggregate model, can depend on a number of factors. The available data and resources; the needs of the subject organization or institution; and a variety of other considerations can all play into a decision around which type of model is used to forecast cycling and walking (Turner et al. 1997). This project highlights aggregate models as a potential method for forecasting cycling and walking trips for DCC benefit allocation purposes.

## **Aggregate Models**

Research has shown that a significant amount of work in the field of travel demand forecasting has utilized the aggregate model approach (Barnes & Krizek, 2005). For this and other reasons, including the user-friendliness of aggregate models; the availability of census data to local governments in B.C.; and the ambiguity of the DCC framework in B.C., it would seem that aggregate models are an attractive and potentially viable option.

The key significance of aggregate models in the context of active transportation DCCs is their ease of use. As noted previously, aggregate models utilize readily available and known information such as census data. For B.C. local governments, census data currently includes bicycle and pedestrian 'commute-to-work' mode share percentages, population densities, household income, and other information relevant to active transportation. These and other variables could be entered into an aggregate model to arrive at estimates of the amount of cycling and walking that might result due to new development.

The ambiguity of the DCC framework in B.C. is another reason why aggregate models could be used for benefit allocation purposes. Specifically, the *DCC Best Practices Guide* recommends that "road charges be distributed amongst new development in proportion to the traffic volume generated by the respective land uses using the road facilities" (MOCS, 2005). There would seem to be opportunity for census data and aggregate models to satisfy this recommendation, as the Guide does not state the traffic volume generated needs to be motor vehicle traffic. Census mode shares, population densities, household income, and other related data could be applied to aggregate models to forecast active transportation traffic generated as a result of new development.

One specific type of aggregate model which could have potential is the "Sketch Plan Model". Researchers define it as an approach that predicts non-motorized travel in an area based on simple calculations and assumptions or rules of thumb. Like most aggregate models, the sketch plan model utilizes mode shares and other readily available data from the census that pertain

to travel behaviour (Barnes & Krizek, 2005; Jones & Buckland, 2008). The information produced by sketch plan models is said to be useful for general political purposes, such as justifying expenditures by reference to the forecasted number of pedestrians and bicyclists and the benefits they receive from walking and cycling (Barnes & Krizek, 2005).

Although aggregate models appear to hold some potential for benefit allocation purposes, it should be noted that their application is likely not practical for all local governments. Where budgets and staff are limited or where there is not a political climate supportive of experimental modeling techniques, other approaches to forecasting cycling and walking trips may be required.

Whether an aggregate model or some other means of forecasting cycling and walking trips is used in DCC benefit allocation, one should be aware of several key differences between the two modes of travel.

### **Considerations for Forecasting Cycling and Walking Trips**

There are three factors that should be considered when using aggregate models or other techniques to forecast non-motorized trips. The considerations include: (1) that census data usually under represents levels of cycling and walking in communities; (2) that walking and cycling are fundamentally different and have different influencing factors; and (3) that not all areas of a community will produce active transportation trips, regardless of growth.

1. Walking and cycling are underrepresented. It has been argued widely that ‘commute-to-work’ mode share data, such as the census mode share data in B.C., often under represents the amount of cycling and walking in communities (Litman; 2010; Jones & Buckland, 2008; Krizek, Handy & Forsyth, 2009; Sener et al. 2009). Todd Litman stresses that walking and cycling are generally more common, and thus more important than most travel statistics indicate. He associates this with the fact that “conventional travel surveys undercount shorter trips, off peak trips, non-work trips, travel by children, and recreational travel” (2010).

Similar to Litman, Jones and Buckland argue that census mode shares are understated for the walking and cycling modes. In their article *Estimating Bicycle and Pedestrian Demand in San Diego*, the authors state:

The census often undercounts the actual number of walking and biking trips made in a locality. Census data only includes commute trips, leaving out the significant number of people who bicycle or walk for recreation, to conduct personal business or to socialize. Additionally, the long-form, which is used to gather journey to work information, requires that respondents choose only one mode. As a result, multi-modal trips, such as walking to transit, are not counted as a walking trip (2008).

Consistent with Litman and Jones and Buckland, a number of other authors also believe that cycling and walking are understated in census mode share data. Sener et al argue that bicycling frequency is known to be generally higher for non-commute reasons than for commuting, and that this reality is not captured in 'commute-to-work' mode shares (2009). Meanwhile, Krizek, Handy and Forsyth argue that many people fail to think of cycling and walking as legitimate modes of travel and, resultantly, underreport their daily travel on census forms (2009).

In a 2004 study titled *Determinants of Bicycle Use: Do Municipal Policies Matter*, Rietveld and Daniel set out to quantify the degree to which census data under represents the amount of walking and cycling in any given area. Their results display that non-motorized travel is generally three to six times more common than conventional surveys indicate (2004).

The idea that walking and cycling are underreported in census data is an important consideration for active transportation DCCs in British Columbia. In undergoing benefit allocation, practitioners may want to start with a baseline commute-to-work mode share and then exercise discretion to increase the share based on local conditions.

2. Walking and cycling are fundamentally different. The second key factor that one should consider when forecasting active transportation trips is that walking and cycling are fundamentally different. Although they are often lumped together under the term "active transportation," the two modes are influenced by different factors. DCC practitioners should

think about analyzing, modeling and/or forecasting walking and cycling trips separately (Jones & Buckland, 2008).

Jones and Buckland have identified three key differences between walking and cycling which they feel are important to understand in the context of forecasting future travel demand (2008). The first difference is that walking trips are generally shorter than cycling trips. The authors state that this is significant as it may affect the spatial scale of analysis in forecasting and modelling.

The second key difference between walking and cycling is that a large percentage of walking trips are made to access other modes, such as public transit and the automobile (2008). The authors believe one should consider that pedestrian trips may not replace automobile trips, but may result from those trips - or vice versa.

The third and final key difference between walking and cycling is that the decision to ride a bike involves a greater conceptual leap than the decision to walk (2008). Jones and Buckland state that “public health and social marketing fields have shown that the decision to even consider riding a bicycle is a multi-staged process involving a variety of interacting personal, social and environmental factors” (2008). As such, the authors believe that where it is practical and feasible, attitudinal research should inform or enhance modelling exercises pertaining particularly to cycling.

In addition to three core differences noted above, there are also some external forces that are said to influence people’s decisions to walk or cycle in different ways. Research suggests that climate/weather; land use patterns; street connectivity; street friendliness; topography; and the presence and type of infrastructure facilities all have differing impacts on each of the two modes (Jones & Buckland, 2008; Sener et al. 2009; Dill & Carr, 2003).

Walking and cycling are unique methods of travel and should be treated as such in DCC programming. By understanding, or at least considering the internal and external factors that affect whether people walk or cycle, DCC practitioners will be better positioned to forecast the number and types of trips that may result from new development in a community.

3. Not all areas of a community will produce active trips. The third and final consideration for modeling and forecasting is that not all areas of communities will produce non-motorized trips. Active travel can require a significant amount of time and personal energy, thus in some cases it might not be practical for people to walk or cycle to their destinations.

Recent findings on this topic include: (1) that people often live too far from their workplace for walking or cycling to be feasible; and (2) that topography is a considerable factor in whether people walk or cycle (Kingham et al. 2001; Parkin et al. 2008). A good example is the Parkin et al. study titled *Estimation of the Determinants of Bicycling Model Share*, which found that ‘hilliness’ has significant negative effects for walking and cycling (given the additional effort and time required to pass over this type of terrain) (2008).

DCC practitioners should consider distance and other externalities, such as the impact of steep topography, when forecasting active transportation trips (Parkin et al. 2008). It might occur that in some neighborhoods, specifically those in rural areas of communities or in steep sloped areas, walking and cycling trips are not produced regardless of new development. In cases such as these, a local government might consider whether to charge area-specific or municipal wide active transportation DCCs.

Area-specific DCCs divide a community into sectors in accordance with geography or some distinctive quality (for example, a vacuum sewer system). Each sector within an area-specific DCC has a different set of DCC infrastructure projects, and therefore different charges per land use category. Municipal wide DCCs, conversely, impose the same DCC rate per land use category throughout an entire community. The infrastructure projects in a municipal-wide

scenario are not intended to exclusively serve any one area or population but rather the community at large (MOCS, 2005). Although DCC practitioners tend to avoid area-specific DCCs for transportation (as they are difficult to administer and have less financial flexibility compared to municipal wide DCCs), there has been some debate as to which type of DCC is more appropriate (Joel Short, Urban Systems Senior Planner, personal communication, 10 August 2011).

Overall, it seems possible to address the lack of guidance for benefit allocation by using forecasting techniques such as aggregate models. The following section further supports active transportation DCCs - by introducing and applying the concept of latent demand for active transportation modes. This concept is important because: 1) it represents an alternative way of producing road capacity (other than building more roads); and 2) it reflects the type of shift thinking that must occur with respect to the role of DCCs.

### **Latent Demand for Active Transportation**

There is a concept in the literature known as 'latent demand' which has potential to link new development and active transportation infrastructure. The concept is premised on the idea that inadequate non-motorized infrastructure can hold levels of bicycling and walking in a community below their true potential (Barnes & Krizek, 2005). In order to unlock the potential, and ultimately get more residents walking and cycling, new or improved active transportation facilities are said to be necessary. This is significant to DCCs as it suggests that, by building new active transportation facilities, existing residents will switch modes and free up existing road capacity for the use and benefit of new development.

Many studies and literature reviews have provided strong support for the noted concept. Works by individual authors, research teams, and organizations such as Dill; Dill & Carr; Rodriguez; Kitamura, Laidet and Mokhtarian; Litman; and the British Columbia Cycling Coalition shows that the amount, type and/or quality of non-motorized infrastructure in a community



correlates with the levels of walking and cycling in the same community (2009; 2003; 2004; 1997; 2010; 2007). Similar conclusions have been made by Nelson and Allen, and Krizek, Barnes and Thompson (1997; 2009). The work of both teams is described below.

Nelson and Allen credit themselves with being the first research team to produce a study that looks at bicycle pathway supply and commuting by bicycle while controlling for related factors (1997). In their study, which is titled *If You Build Them, Commuters Will Use Them*, the authors use data from eighteen U.S. Cities to assess the relationship between extent of bicycle facilities and the percentage of bicycle commuters. When controlling for factors such as weather, terrain and the number of college students in each respective city, Nelson and Allen found a positive association between the two variables. They discovered that each additional mile of bikeway per 100,000 people was associated with a 0.07 percent increase in bicycle commuting. Given this finding, Nelson and Allen suggest that “one problem with shifting the mode of commuting away from automobiles may simply be an inadequate supply of bicycle facilities (1997).

A more recent study related to the latent demand concept is Krizek, Barnes and Thompson’s *Analyzing the Effects of Bicycle Facilities on Commute Mode Share Over Time* (2009). In their research, the authors studied how the presence of bicycle facilities in the Minneapolis – St. Paul area affected the percentage of commuting mode share over a ten year time frame. The authors found that, as time progressed throughout the study period, areas near new bicycle facilities showed a considerably higher increase in bicycle mode share than areas that were farther from new facilities (2009). Similar to Nelson and Allen; Krizek, Barnes and Thompson concluded that “bicycle facilities significantly impact levels of bicycle commuting” (2009).

The following section expands on the concept of latent demand by introducing vehicle substitution rates - the inverse relationship between active transportation and motorized travel.

## **Vehicle Substitution Rates**

Research has shown that, as walking and cycling rates increase in a community (as a result of new infrastructure or other factors) the proportion of vehicle travel decreases – all other things being equal (Krizek et al. 2007; Guo & Gandavarapu, 2010; Newman et al. 1999). Again, this relationship is significant for DCCs as reducing the frequency at which current residents engage in vehicular travel can free up road capacity for the benefit of new development.

One relatively recent study that analyzed the relationship between vehicular and non-motorized travel was Krizek et al.'s study *Non-Motorized Transportation Pilot Program Evaluation* (2007). In their research, the authors looked at five U.S. communities before and after non-motorized improvements were made. While there was said to be variation across the communities, it was concluded that new active transportation infrastructure generally could be attributed to a reduction in approximately 0.25 to 0.75 mile of daily driving per adult (2007).

Guo and Gandavarapu also studied the impact of new infrastructure on levels of vehicular and non-motorized travel (2010). Their analysis looked at the impact of sidewalks in typical North American communities on the amount of daily walking/cycling and subsequent decreases in vehicle travel time. The authors discovered that if an average North American community was to build sidewalks along its major neighbourhood routes, a daily per capita increase of approximately 0.1 miles of walking and cycling and a decrease of about 1.15 miles of vehicle travel would likely result. The authors extrapolated this to conclude that a reduction of 12 miles of daily per capita vehicular travel would result from an increase of approximately one mile of daily per capita non-motorized travel (2010).

In addition to Krizek et al. and Guo and Gandavarapu, Newman et al. also studied the relationship between non-motorized infrastructure, active transportation levels and decreases in vehicular travel (1999). In their book *An International Sourcebook of Automobile Dependence in Cities*, the authors describe how they found increases in cycling and walking at the metropolitan scale result in decreases in vehicular travel. The specific numbers reported were

similar to Guo and Gandavarapu; Newman et al. discovered that one mile of cycling and walking replaced approximately seven miles of vehicular travel on a daily per capita scale (1999).

There are several reasons which explain why increased walking and cycling may result in decreased motor vehicle use in a community. Litman, in his paper *Evaluating Non Motorized Benefits and Costs*, presents two explanations (2010). First, he states that short walking and cycling trips often substitute for longer motorized trips; for example, when a person chooses to shop locally rather than driving to more distant destinations. He also describes how, as local efforts to support walking and cycling are implemented, they can at the same time facilitate change in social attitudes and norms around driving (2010).

Another explanation for vehicle substitution rates is the 'safety in numbers' phenomenon. This is the idea that motorists adjust their driving behavior in response to a greater presence of pedestrians and cyclists in an area (Pucher & Buehler, 2007; Litman, 2010). As more people cycle and walk through an area, the safer and thus more attractive the modes become both for existing users and for drivers who might be considering making the switch (Litman, 2010).

Various studies have looked at and supported the safety in numbers theory. Peter Jacobsen, for instance, in his study *Safety in Numbers: More Walkers and Bicyclists*, focused on the degree to which safety can be enhanced through increased frequency of walking and cycling (2003). He found that the probability that a motorist will strike an individual person walking or bicycling declines with roughly -0.6 power of the number of persons walking or bicycling in a given area.

Sener et al. took a different approach in studying the phenomenon (2009). In their work, the authors focused on the causal factors behind safety in numbers, as well as how the theory contributes to increased levels of cycling. The authors found that individual attitudes and perceptions of safety play a significant role in the decision to bicycle. They also found that the safety in numbers phenomenon is significant for stimulating latent demand (2009).

In pursuit of a broader understanding of how safety impacts cycling/walking rates, research in areas beyond 'safety in numbers' has been undertaken. Specifically, much attention has been paid to the types of facilities that are most preferred by cyclists. Studies such as Birmingham et al.'s *Cost of Obesity* in Canada; Pucher and Dijkstra's *Making Walking and Cycling Safer*; *Go for Green/EnviroNics'* National Survey on Active Transportation; and UBC's *Cycling in Cities Program* have all demonstrated that people are willing to cycle more frequently if specific facilities are provided (1999; 2003; 1997; DiPaul & Elias 2007).

The following section discusses some of these facilities, specifically those which could or perhaps should be included in active transportation DCC programs.

### **Preferred Facilities**

The non-motorized facility which is commonly cited as being the most valued, both in theory as well as in practice is the separated bike path. According to Portland State University, the separated bike path is defined as: "a paved bicycle path physically separated from motor vehicle traffic (generally outside the road's right of way) [which is] often shared with pedestrians and other non-motorized users, and occasionally equestrians" (PSU, 2011). Preferences surveys, interviews, and other research methods have shown that this facility has strong potential to encourage mode shift. Parkin et al. and Krizek, Forsyth and Baum, for example, have studied separated paths and found: (1) that they are perceived as being a safe option for cyclists; and (2) that they are associated with high levels of ridership (2008; 2009).

Another type of facility that has strong potential to facilitate mode shift is the bicycle boulevard. Portland State University describes and characterizes the bicycle boulevard as follows:

Bicycle boulevards take the shared roadway bike facility to a new level, creating an attractive, convenient, and comfortable cycling environment that is welcoming to cyclists of all ages and skill levels. In essence, bicycle boulevards are low-volume and low-speed streets that have been optimized for bicycle travel through treatments such as traffic calming and traffic reduction, signage and pavement markings, and intersection crossing treatments. These treatments allow

through movements for cyclists while discouraging similar through trips by nonlocal motorized traffic. Motor vehicle access to properties along the route is maintained. (2011)

Researchers and research teams such as Dill; Dill and Gliebe; and Go for Green/Environics have all pointed to bicycle boulevards as being an option with significant potential to stimulate change (2009; 2008; 1998). As the facility puts pedestrians and cyclists before cars, it too (like the separated path) is perceived as a safe option.

A third type of facility that is known to have some potential to stimulate mode shift is the dedicated bike lane. Bike lanes are defined as “one-way on-street lanes that are signed and marked to designate the space occupied by cyclists on the roadway (PSU, 2011). While there is some skepticism around the potential of this type of infrastructure, particularly for less experienced cyclists, it is regardless said to be an important piece of any active transportation system (Dill & Gliebe, 2008). Research shows that cyclists indeed use and value the bike lane; one study showed that 28% of all cycling occurs on these facilities (Dill & Gliebe, 2008).

One particularly compelling argument in favour of bicycle lanes is that they are often the most practical, or in some cases the only feasible option (Dill, 2009). In her study *Bicycling for Transportation and Health*, Dill identifies that there are limited opportunities to build separated bike paths and bicycle boulevards in existing neighbourhoods. She cites space constraints and costs as being the two key factors (2009).

Given the various benefits of the three types of facilities mentioned above, it is reasonable to assume that any or all could be included in an active transportation DCC program. This of course is not to say they are the only facilities which should be considered. As Chapter Five will show, some municipalities are incorporating a wide variety of active transportation facilities into their DCC bylaws.

This chapter has addressed some of the potential challenges for active transportation DCCs which stem from the *Local Government Act* and *DCC Best Practices Guide*. It has presented a

number of techniques and concepts from the literature in an attempt to support a link between new development and active transportation infrastructure. While the ideas here are not necessarily technical in nature (as the ITE manual is), they represent the type of thinking which is necessary to help meet provincial targets for GHG reductions and other environmental goals. By considering different options for forecasting trips, and by conceptualizing increased road capacity as something other than new construction or widening of roads, the DCC framework could become a powerful legislative tool by which to advance the sustainability goals and intentions of the province.

The following chapter looks at the current state of affairs for active transportation DCCs in British Columbia. It summarizes interviews with local governments, the development community, and the Ministry.

## **Chapter Five - Current State of Affairs (Interview Results)**

Despite the potential challenges for active transportation DCCs identified in this report, municipalities have been experimenting and, through doing so, have been largely successful in implementing their DCC bylaws. While one might have expected a different outcome given the current status of DCC framework, local governments in B.C. are in fact using DCCs as a tool to raise capital for growth-related active transportation infrastructure.

This chapter elaborates on the above by going over the outcomes of a series of semi-structured interviews. Interview participants included representatives from relevant local governments, as well as the Urban Development Institute and the Ministry of Community, Sport and Cultural Development. The varied perspectives were important for developing an understanding of the current state of affairs for active transportation DCCs, as each party plays a different role within the DCC framework.

Eight semi-structured interviews were carried out between the months of December 2010 and May 2011. Interviewees were first identified by means of internal knowledge within Urban Systems, and later contacted through e-mail to gauge interest and gain consent. The contact letter and consent form used for this purpose are included in Appendix 2 and 3 respectively. The UBC ethics approval certificate which was necessary to undertake the interviews is included in Appendix 1.

All of the individuals who were contacted were interested and willing to take part in the study, resulting in a 100% response rate. Once consent was received from these individuals, scheduling occurred and the interviews were executed over the noted five month period. The primary interview medium was the telephone. Six of the eight interviews were executed over the phone, while two interviews were performed in person.

The following sections discuss the interview process and outcomes associated with each of the three sectors.

### **Local Government**

Local governments are responsible for developing DCC bylaws and collecting the charges once the bylaws are in place. Given the diverse size, geography and demographics of communities in B.C., it was important to interview representatives from as many local governments as possible. A broad cross section of B.C. local governments was desired, and to the extent it was possible, was largely achieved with this project. Through the use of internal knowledge at Urban Systems it was possible to identify six B.C. municipalities, representing three different regions of the province, which are currently using DCCs for active transportation infrastructure. These municipalities are:

- City of Kamloops;
- City of Coquitlam;
- City of New Westminster;
- City of Richmond;
- City of Surrey; and
- City of Victoria.

The above list is not necessarily exhaustive. It is possible that other municipalities could also be using DCCs for active transportation infrastructure. It is, however, very difficult to identify the other municipalities without having inside knowledge about their operations. The challenge is that DCC bylaws available online seldom if ever include information about the types of projects included in the rate calculation. This kind of information is included in a background report which is usually not widely disseminated to the public.

The following is an overview of the questions asked, and the responses received from the six municipalities. Names of the individuals and direct quotes/identifying statements have been omitted at the request of the interviewees.



## **Questions and Responses**

Each of the six local government interviews began with a question regarding interpretation of the “highway facilities” term. The six interviewees were asked to explain how their organization interprets the term and how their interpretation influences the types of projects included within the DCC. The responses were largely similar. Half of the individuals said they subscribe to the legal interpretation of a highway; that being a public right of way (land between two property lines) which is controlled by government and used by the public for the purpose of movement. Of the three remaining municipalities, one declared use of the *Transportation Act’s* definition of a highway; one declared use of the interpretation housed within the *DCC Best Practices Guide*; and one declared use of its own interpretation of highway facilities, which it defines as “transportation systems necessary to support the consequences of growth”.

Given the broad interpretations above, it is no surprise that all six interviewees stated they are able to include most types of active transportation facilities within their respective bylaws. Specific facilities mentioned included: sidewalks, boulevards, pedestrian/cycling bridges, transit shelters, and paths both on and separated from roadways. Transportation planning studies were also identified as being DCC-eligible projects. One type of facility which was said to be difficult to include was rapid transit stations, as the responsibility to build this type of infrastructure is said to be vested in the public sector (eg. transportation authorities such as Translink) and not the development community. Road and streetscape re-development projects were also stated to be difficult to include and justify, as they are often more expensive and complex than Greenfield projects.

The second and third questions presented to each of the interviewees were focused around whether the organizations experienced any barriers or obstacles in the DCC process. The individuals were specifically asked to comment on both the pre and post adoption phases.

All six interviewees stated that their organization did not receive much pushback from either the Ministry or the development community. While there were a few instances of pushback

related to rapid transit stations, re-development projects, and general ignorance with respect to the benefits of active transportation, in most cases pushback was not cited as being a prohibiting factor to the development and collection of active transportation DCCs.

Two municipalities attributed their success in implementing active transportation DCCs without pushback to consultation efforts. They stated they regularly consult with committees of local developers, consultants, real estate agents and so forth, and that this enables flexibility and mutual understanding. Surprisingly, several other interviewees stated that developers tend to be of the same mindset on sustainability as municipalities and in turn, that they generally support active transportation improvements. One municipality stated that developers will generally support non-motorized projects because of the lower associated cost compared to vehicular improvements.

The fourth and final interview question asked whether, in each municipality's opinion, there are any areas for improvement within the current DCC framework. Although each individual seemed content with the framework and its flexibility when presented with the previous three questions, each identified at least one suggestion for improvement in question four. Many of the following suggestions reflect the challenges identified earlier in this report:

- Provide more guidance and clarity around what types of active transportation projects are considered a legitimate use of DCCs;
- Provide guidance and clarity around how the benefit factor for active transportation infrastructure should be calculated;
- Develop/address methods to calculate the DCC recoverable other than traditional trip generation;
- Provide flexibility for public transit infrastructure, specifically rapid transit stations in urban areas;
- Re-word the off-street parking exclusion in S. 933 of the LGA such that DCCs can be charged for bicycle parking, storage and other end-of-trip facilities;

- Consider an area-specific DCC framework within which motorized transportation can be discouraged in urban areas but not discouraged in rural areas where there is no suitable alternative;
- Rework the framework so that road and streetscape re-development projects, which are arguably more sustainable, are encouraged over greenfield projects;
- Review the financial implications of section 933.1 of the LGA (the Bill 27 DCC waiver/reduction legislation) for local governments and consider re-working the legislation;
- Reduce the amount of time required for the review and approval of DCC bylaws by the Ministry and Inspector of Municipalities;
- Revise the *DCC Best Practices Guide* to reflect current times and to provide considerations for active transportation; and
- Eliminate all reference to “road DCCs” and start thinking about and referring to DCCs as “transportation DCCs”.

## **Urban Development Institute**

The Urban Development Institute is an industry body that represents the interests of residential, commercial, industrial and institutional developers in various parts of Canada and Australia (UDI, 2011). The organization strives to foster effective communication between government, the public and the development community. UDI serves as the public voice for developers as well as an advocate for affordability, environmental leadership, and regulatory efficiency (UDI, 2011).

UDI is present in British Columbia within three regions: Vancouver, Victoria and the Okanagan. Developers outside of these areas are represented by other organizations such as the Homebuilders Association, the Real Estate industry, or one-off committees. B.C. local governments are strongly encouraged, via the *DCC Best Practices Guide*, to consult UDI or an equivalent organization during the development of a DCC bylaw.

Given that five of the six local governments interviewed for this Project fall within UDI's geographic mandate, it was deemed necessary to approach the organization for an interview. The perspective from 'the other side of the table' was strongly desired in order to better understand the current state of affairs for active transportation DCCs in B.C. Internal knowledge at Urban Systems was utilized to determine who within the Urban Development Institute would be best able to speak to the issues surrounding DCCs for non-motorized infrastructure.

The following is an overview of the questions asked, and the responses received from the UDI representative who agreed to participate in an interview. The name of the individual and direct quotes/identifying statements have been omitted for confidentiality reasons.

## **Questions and Responses**

The interview with the UDI representative consisted of four different questions, each of which pertained to the development community's perspective on DCCs for active transportation infrastructure. The first question called for an interpretation of the "highway facilities" term from the *Local Government Act*. The response was that highway facilities is interpreted by UDI to be a dynamic term in constant flux as municipalities continue to push the envelope. A distinct interpretation of the term was not provided as presumably there is no single definition agreed upon within the Urban Development Institute.

The second question presented to the UDI representative was related to the legitimate use question (i.e. whether active transportation facilities are a legitimate use for DCCs). The representative was asked to comment on whether s/he feels that building new active transportation infrastructure can add capacity to a transportation network similar in manner to adding new vehicular infrastructure. The response was that active transportation can add capacity, but that local governments should look at how they are undertaking their active transportation programs to achieve that capacity. Specific concern was raised around the frequent widening of road allowances and asphalt paving of additional surfaces to allow for bike and pedestrian infrastructure, especially when sustainability and GHG reduction are the end goals.

The third question for the UDI representative regarded land developers' general feelings towards paying DCCs for active transportation infrastructure. A direct response was not given, however the individual did identify two key issues which are common concerns amongst the development community:

1. Charges Should Be Based on an Empirical Measure. The development community would generally like to see active transportation DCCs be tied to an empirical measure, such as density. There is a concern that the current level of investment being made in rural and suburban areas is not appropriate given the densities needed to support/justify non-motorized

infrastructure. The UDI representative identified benefit allocation as being an issue in this context. S/he expressed that the current framework is subjective and, as such, it is difficult to determine what should be paid by existing residents (through taxes) and what should be paid through DCCs. An appetite for guidelines that establish and outline the types of densities eligible for active transportation infrastructure, or some other empirical measure, was expressed.

2. Avoid Double Charging. Land developers do not appreciate being double charged for things such as bicycle and pedestrian infrastructure. Development approval procedures including, for example, community amenity contributions (CACs), can require developers to build bicycle and pedestrian infrastructure as part of their development. The UDI representative stated that paying DCCs for active transportation on top of CACs can be considered a double (and unfair) charge in the eye of some developers.

The fourth and final question for the UDI representative was an inquiry pertaining to legal precedent. The individual was asked to comment on whether s/he was aware of any relevant case law in which a developer challenged a municipality's DCC bylaw with respect to its active transportation projects or disproportionate benefit allocation. The individual was unaware of any such cases, however s/he did identify that it is unlikely for a legal incident to occur under the noted circumstances. S/he stated that if a legal battle ensued, a municipality could simply turn around and require bicycle and pedestrian infrastructure as part of a rezoning process.

## **The Ministry of Community, Sport and Cultural Development**

The Ministry of Community, Sport and Cultural Development is the provincial body responsible for local government matters in British Columbia. With respect to planning, it provides municipalities and regional districts with a legislative framework; sets direction for community planning initiatives; provides funding, advice and other supports; and ensures that the property assessment system is transparent, flexible and fair (MOCSCD (A), 2011).

A small part of the Ministry's broad mandate is the regulation of DCCs. To ensure DCCs are consistent with the requirements of the *Local Government Act*, the Ministry must review all new DCC bylaws and DCC updates proposed by local governments. The Inspector of Municipalities, an employee of the Ministry, has the authority to reject a DCC bylaw if it could potentially result in excessive charges that deter development or discourage construction of reasonably priced housing (MOCS, 2005).

In addition to the above, the Ministry also takes part in the activities of the Development Finance Review Committee (DFRC). The DFRC is a group of local government, private sector, and provincial representatives who together are responsible for the *DCC Best Practices Guide* and the *Development Finance Choices Guide*. The Ministry plays a support role within the group, by contributing to amendments, coordinating the actions of others, and endorsing/advertising the most recent editions of the guides.

Given the obvious significance of the Ministry within the DCC framework, it was important to approach an appropriate representative for an interview. As was the case with the local government and UDI interviews, Urban Systems local knowledge was utilized to determine eligible candidates within the Ministry who are knowledgeable about active transportation DCCs.

The following is an overview of the questions asked, and the responses received from the Ministry representative who participated in the interview. The person's name as well as

quotations and self-identifying statements have been omitted for purposes of confidentiality. Also, it must be stated that the individual's comments reflect only those of the individual, and that the views of others within the Ministry and the Ministry at large might vary.

### **Questions and Responses**

The interview with the Ministry representative consisted of four different questions. The questions regarded the history of the DCC legislation; the lack of guidance in the *DCC Best Practices Guide* with respect to non-motorized infrastructure; and the Ministry's overall experience with and perspective on active transportation DCCs.

The first interview question asked the representative to identify why the DCC legislation for transportation infrastructure is so vague, and why a term such as highway facilities and not something more specific is being used. The response was that the legislation is very old, and that during its inception it made sense (and it still does to some degree) to have it be vague in order to allow broad interpretation. It was desirable not to limit the types of transportation infrastructure projects merely to the building and paving of roads.

The Ministry representative elaborated on question one by discussing the more narrowly defined parks DCC legislation. S/he stated that parks are a much different and less essential form of infrastructure than transportation facilities. Therefore, it is considered appropriate to have different wording and legislation for parkland acquisition and improvements than for highway facilities. The individual also mentioned that there were some historical events involving a different ministry that contributed to the parks legislation being so prescriptive. Had history played out in a different manner, the parks legislation could possibly be more broad.

The second interview question addressed the lack of guidance within the *DCC Best Practices Guide* for active transportation infrastructure. The Ministry representative was specifically asked to identify why the Guide excludes detailed information about how certain communities are interpreting the legislation. The individual responded by stating that the Guide was never



intended to be a vehicle for “how or why”. It was and is simply an attempt to provide some high-level guidance and to set a broad framework. That said, the individual did state that s/he is generally in favour of active transportation DCCs. The rationale offered was that new non-motorized infrastructure can potentially increase levels of walking and cycling, thus servicing new development by relieving pressure on existing roadways. This argument is a reiteration of the latent demand and vehicle substitution rate concepts presented earlier in Chapter Four.

The third question presented to the Ministry representative was whether there have been any cases of misinterpretation in the past, and whether the Inspector has refused approval of any bylaws as a result. The individual stated that s/he personally was not aware of any instances of misinterpretation or refusal of a DCC bylaw.

The fourth and final question invited the individual to describe the Ministry’s overall perspective on the issue of charging DCCs for active transportation infrastructure. The individual could not answer on behalf of the Ministry; however s/he did reiterate and expand on the response given to question two - that s/he generally supports non-motorized infrastructure projects. The individual also identified a list of checklist items which s/he takes into account when considering a DCC bylaw:

- Are the charges based on a capital plan that is prepared by professionals?
- Did professionals (engineers, etc.) produce the list of projects?
- Did the projects in the model/calculations make it into the bylaw?
- Who developed the bylaw? Was it a reputable consultancy or local government with adequate capacity?
- Do the proposed active transportation facilities fall within the road right of way?
- Will the active transportation facilities potentially take cars off the road and add road capacity?
- Are the projects and calculated charges ‘reasonable’?

The final question above is what the Ministry representative referred to as the “test of reasonableness”. The representative stated that if a DCC bylaw contains active transportation projects that are reasonable, and if the bylaw was produced in a reasonable manner, then s/he is likely to support the bylaw.

## Chapter Six - Conclusion

It is evident from the eight interviews that local governments are managing to use DCCs for growth-related active transportation infrastructure in British Columbia. They are utilizing the flexibility and ambiguity inherent within the DCC framework to their advantage and, in doing so, are overcoming many of the challenges identified in this report. While there are looming concerns for local governments, many are not out of reach and could be addressed through the following recommendations:

- **Update the *DCC Best Practices Guide*.** Specifically, the Ministry and the DFRC should ensure that: (1) all reference to “road DCCs” is eliminated and replaced with “transportation DCCs”; (2) case studies and examples of communities charging DCCs for active transportation infrastructure are included; (3) methods to calculate the net DCC recoverable amount for active transportation infrastructure (other than the “rule of thumb” or ITE manual approaches) are identified and described; (4) guidance around what types of active transportation projects have been successfully incorporated into DCC bylaws is included (to a greater extent than in the current Guide); and (5) statements and considerations that make it clear to all local governments that DCCs can be used for non-motorized infrastructure are included and highlighted.
- **Update the *Local Government Act*.** Specifically, the Ministry should consider revising Section 933 such that it continues to restrict the use of DCCs for off-street vehicular parking but not off-street bicycle parking, storage and other end-of-trip facilities.
- **Review Current Ministry Protocols.** Specifically, the Ministry should focus on improving its response time for reviewing DCC bylaws. It was expressed by several interviewees that there is significant lag time between submission and final approval of a DCC bylaw – in some cases up to a year. The Ministry should consider the effect that this can have on community sustainability. For example, in a one year window in a rapidly growing area

such as the Lower Mainland, a significant number of opportunities to charge developers for active transportation projects could be missed.

Moving past recommendations, what was unexpected but perhaps most encouraging from the research for this Project was the development community's acceptance and broad support for active transportation. A growing acceptance of sustainability and an understanding of the economics of active transportation projects together have created a seemingly favourable environment for local governments. While developers would like to see an empirical measure for benefit allocation, this desire is shared with local governments and could be addressed through the DFRC.

Overall, the current DCC framework appears to be functioning in a sufficient manner for active transportation purposes. Local governments are experimenting with the legislation to advance their sustainability agendas; developers are cooperating and reciprocating in a largely favourable manner; and the Ministry is consistently reviewing and approving the DCC bylaws. There does not seem to be a significant problem at the current time based on the input received from the eight interviews. That said, there is certainly room for improvement.

In closing, it should be stressed that DCCs are only one of many infrastructure financing tools available to local governments in B.C. The broad nature of the Local Government Act allows local governments to pick and choose the tools that are most appropriate to their unique circumstances (MOMA, 2000). Although they are a powerful tool, DCCs are not suitable in every case and, as such, local governments in B.C. should actively explore alternative and supplementary methods for encouraging non-motorized transportation.

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## Appendices

### Appendix 1 – Ethics Approval Certificate

<b>CERTIFICATE OF APPROVAL - MINIMAL RISK</b>		
<b>PRINCIPAL INVESTIGATOR:</b> Mark Stevens	<b>INSTITUTION / DEPARTMENT:</b> UBC/College for Interdisciplinary Studies/Community & Regional Planning	<b>UBC BREB NUMBER:</b> H10-02800
<b>INSTITUTION(S) WHERE RESEARCH WILL BE CARRIED OUT:</b>		
Institution	Site	
N/A		
<b>CO-INVESTIGATOR(S):</b> N/A		
<b>SPONSORING AGENCIES:</b> N/A		
<b>PROJECT TITLE:</b> Exploring Development Cost Charge Legislation for Active Transportation Infrastructure in BC		
<b>CERTIFICATE EXPIRY DATE:</b> November 10, 2011		
<b>DOCUMENTS INCLUDED IN THIS APPROVAL:</b>		<b>DATE APPROVED:</b> November 10, 2010
Document Name	Version	Date
<u><b>Protocol:</b></u> Research Proposal		
	1	October 24, 2010
<u><b>Consent Forms:</b></u> Consent Form		
	2	November 9, 2010
<u><b>Questionnaire, Questionnaire Cover Letter, Tests:</b></u> Interview Script		
	1	October 24, 2010
<u><b>Letter of Initial Contact:</b></u> Letter of Initial Contact		
	2	November 9, 2010
<u><b>Other Documents:</b></u> Communication with Fraser Smith, USL		
	1	November 9, 2010
The application for ethical review and the document(s) listed above have been reviewed and the procedures were found to be acceptable on ethical grounds for research involving human subjects.		
<i>This study has been approved either by the full Behavioural REB or by an authorized delegated reviewer</i>		

## **Appendix 2 – Letter of Initial Contact for Interviews**



Dear name of person:

Thank you for taking the time to read this letter. My name is Ryan Beaudry and I am a second year Masters student in the School of Community and Regional Planning (SCARP) at UBC. I am writing to inquire into the possibility of interviewing you as part of my graduation project.

I have contacted you specifically as my project is based on the enabling legislation behind development cost charges (DCCs) in British Columbia (BC). I understand you are an expert in this field - I was given this information by Fraser Smith at Urban Systems Ltd (USL). USL is the client for my Masters project, which means they will receive a copy of the finished project and assist my research advisor in assigning me a final grade.

Your participation is sought for a 20 minute semi-structured interview. Interview questions will be solely based around your organization's experiences with DCCs as they pertain to active transportation infrastructure. You will not be asked to disclose personal information or your personal opinions at any point during the interview.

Should you choose to participate, your answers to the interview questions will be used by me, the researcher to write a section of the project essay. The section will discuss the process by which BC municipalities are using DCCs to fund active transportation infrastructure projects. It will also address the current perspectives of the Urban Development Institute and the Ministry of Community and Rural Development on the matter. You will be given the option to be identified and quoted, or to remain anonymous in the essay.

If you are interested, you can choose to participate in the study either over the phone or in person. You can also choose a date/time that best suits your schedule. If you prefer to interview in person, I am able to travel anywhere within the Lower Mainland and Vancouver Island for this study.

Should you wish to confirm your interest in this study, or require further information about the study or the interview process, please contact me at your earliest convenience. I can be reached by e-mail at [beaudryr@interchange.ubc.ca](mailto:beaudryr@interchange.ubc.ca) or by phone at 778.554.6998. Alternatively, you can contact my research advisor Mark Stevens at [xstevens@interchange.ubc.ca](mailto:xstevens@interchange.ubc.ca) or 604.822.0657.

I appreciate your time and look forward to your response.

Sincerely,

Ryan Beaudry  
Master of Arts (Planning) Candidate  
UBC School of Community and Regional Planning

### **Appendix 3 – Consent Form for Interviews**



#### **CONSENT FORM**

This consent form applies to your participation in a UBC research project titled: *Exploring Development Cost Charge (DCC) Legislation for Active Transportation Infrastructure in BC*. You have received this form as you are an expert in the field of DCCs. You also previously indicated an interest and/or willingness to participate in an interview pertaining to this study.

The Principal Investigator for the study is Mark Stevens, an Assistant Professor in the School of Community and Regional Planning (SCARP) at UBC. Mark can be reached by e-mail at [xstevens@interchange.ubc.ca](mailto:xstevens@interchange.ubc.ca) or by phone at 604.822.0657. Mark will not be carrying out any research, but rather advising a SCARP graduate student who will undertake all aspects of the study.

The graduate student and Co-Investigator of the research project is Ryan Beaudry. The study forms part of Ryan's graduating essay, which is a formal requirement for his Masters degree. The information you provide as part of your interview will be used by Ryan to write his final essay. Ryan can be reached by e-mail at [beaudryr@interchange.ubc.ca](mailto:beaudryr@interchange.ubc.ca) or by phone at 778.554.6998.



To enhance the realism of the graduating essay, Ryan has chosen to involve an external client. The client he has chosen is Urban Systems Ltd (USL). Once complete, the graduating essay will be submitted to USL to inform their company practice in the area of DCCs. Any information you provide as part of your interview will be available to USL through Ryan's essay.

Any information you provide as part of your interview will also, upon Ryan's completion of the final essay, become public information available within and outside UBC. Since the essay is a graduation project similar to a formal thesis, it will be available within the school to students, faculty and staff, as well as outside the university to anyone who may retrieve a copy.

Your personal information, including your name and contact information, is considered confidential. However, due to your position and the nature of the information you may provide, it is possible that people in the field may recognise you as the subject. As a precautionary measure, all interview documents will be kept in a password-protected file on Ryan's personal computer. You will also not be identified by name in the completed essay, unless otherwise consented by you (see end of this form regarding consent to be identified and quoted in the essay).

Your participation in this study is entirely voluntary and you may refuse to participate, or you may withdraw from the study at any time. If you have any concerns about your treatment or rights as a research subject, you may contact the Research Subject Information Line in the UBC Office of Research Services at 604.822.8598 or [RSIL@ors.ubc.ca](mailto:RSIL@ors.ubc.ca).

### **Appendix 3 – Consent Form for Interviews (cont)**

	 <b>SCARP</b> School of Community And Regional Planning
<p>If you have any questions or desire further information with respect to this study, you may contact Ryan Beaudry.</p> <p>Your signature below indicates that you consent to participate in this study. Your participation is greatly appreciated.</p>	
_____ Participant Signature	_____ Date
_____ Participant Name (please print)	
<p>An additional signature below indicates that you consent to be identified and quoted in the essay. This is entirely optional.</p>	
_____ Participant Signature	