

Greater Vancouver Gateway Council



FINAL REPORT – Environmental Scan of TDM Measures

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TABLE OF CONTENTS

1.	Introduction and Purpose.....	4
1.1	Purpose	4
1.2	Report Structure.....	5
1.3	Acknowledgements.....	5
2.	TDM Concept	6
2.1	What is TDM?	6
2.2	Building Blocks of TDM.....	8
2.2.1	Supportive Land Use.....	8
2.2.2	Variety of Travel Choices	9
2.2.3	Integrated Approach.....	10
2.2.4	Travel Incentives and Disincentives	10
2.2.5	Education, Promotion and Outreach	11
2.3	“Soft”, “Hard” and PPP Measures.....	13
3.	TDM in South-Western British Columbia.....	14
3.1	Soft TDM Measures	14
3.1.1	Land Use and Transportation Planning.....	14
3.1.2	Trip Reduction Programs	16
3.1.3	Rideshare and Car-Share Programs	17
3.1.4	Transit Support.....	17
3.1.5	Other “Soft” TDM Initiatives.....	18
3.2	Hard TDM Measures	19
3.2.1	Transit Expansion Programs	19
3.2.2	HOV and Auxiliary Modes Networks.....	19
3.2.3	TransLink’s Urban Transportation Showcase.....	20
3.3	Public-Private Partnership	21
3.4	Conclusion	22
4.	Case Review of TDM Applications Elsewhere	23
4.1	System Integration and Innovative TDM in Bremen, Germany.....	24
4.2	Transit and HOV Supportive Road Pricing in the Seattle Metropolitan Area	24
4.3	Designated Freight Corridors	26
4.3.1	Regional Truck Route System for Chicago	26
4.3.2	The Alameda Corridor	28
4.3.3	Puget Sound FAST Corridor – Port Access Routes.....	30
4.3.4	World Trade Bridge in Laredo, Texas	30
4.4	Highway Pricing on Existing Roads.....	30
4.4.1	California - HOT Lanes on I-15 in San Diego	31
4.4.2	HOT Lanes on Two Radial Corridors in Houston, Texas.....	31
4.4.3	HOT Lanes on I-394 in Minneapolis, Minnesota	31
4.5	Pricing on New Lanes.....	31
4.5.1	Road User Fees - Melbourne, Australia.....	32
4.6	Variable tolls for Heavy Vehicles.....	33
4.7	Cordon Tolls	34
4.7.1	London, UK Commercial District Pricing	34

4.7.2	Singapore Cordon Pricing	35
4.7.3	Cordon Pricing Pilot Project in Stockholm, Sweden	35
4.8	Conditions for Success / Lessons Learned	35
5.	Evaluation of Selected Measures	37
5.1	Transit Oriented Development	37
5.1.1	Description	38
5.1.2	Strengths.....	38
5.1.3	Weaknesses	38
5.1.4	Costs of Implementation	38
5.1.5	Benefits of Implementation.....	39
5.1.6	Conditions for Success.....	39
5.2	Car-Free Planning.....	41
5.2.1	Description	41
5.2.2	Strengths.....	42
5.2.3	Weaknesses	42
5.2.4	Costs of Implementation	42
5.2.5	Benefits of Implementation.....	42
5.2.6	Conditions for Success.....	42
5.3	Car-Share	43
5.3.1	Description	44
5.3.2	Strengths.....	44
5.3.3	Weaknesses	44
5.3.4	Costs of Implementation	44
5.3.5	Benefits of Implementation.....	45
5.3.6	Factors for Success.....	46
5.4	Roadway User Fees	47
5.4.1	Description	47
5.4.2	Strengths.....	47
5.4.3	Weaknesses	47
5.4.4	Costs of Implementation	48
5.4.5	Benefits of Implementation.....	48
5.4.6	Factors for Success.....	49
5.5	Freight TDMs	49
5.5.1	Description	49
5.5.2	Strengths.....	49
5.5.3	Weaknesses	49
5.5.4	Costs of Implementation	50
5.5.5	Benefits of Implementation.....	50
5.5.6	Factors for Success.....	50
5.6	Public Private Partnerships	51
5.6.1	Description	51
5.6.2	Strengths.....	51
5.6.3	Weaknesses	51
5.6.4	Costs of Implementation	52
5.6.5	Benefits of Implementation.....	52

5.6.6 Factors for Success.....	53
6. Conclusions and Recommendations	54
7. Seminar	56
8. Sources Cited	59

Appendices

- A. Agenda
- B. Presentation Slides
- C. Meeting Minutes

Tables

Table 5-1: Transit Density Requirements.....	40
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Exhibits

Exhibit 2-1: TDM – Transport Canada Definition	7
Exhibit 4-1: Alameda Corridor	29
Exhibit 4-2: CityLink.....	33
Exhibit 5-1: Guidelines for Where Car-Sharing Succeeds	46

1. INTRODUCTION AND PURPOSE

Transportation Demand Management measures can be applied to the movement of both people and goods. These measures often are used to complement planned or proposed capital investment in transportation infrastructure, to better manage traffic demand and to maximize the benefits of the proposed infrastructure.

The terms *transportation* demand management and *travel* demand management are often used interchangeably. The two terms are related. However, the scope, type and application of transportation demand management measures are more diverse than those applied to travel demand. Common examples of joint transportation and travel demand management measures include car-sharing, telework and other employer-based trip reduction programmes, ridesharing, time shifting, transit-oriented development, park and ride, HOV lanes and parking pricing. Additional measures specific to the broader concept of transportation demand management include freight specific solutions and tolls or other facility pricing.

In accordance with the Terms of Reference for this study, this report considers transportation demand management. Throughout the report, the TDM abbreviation denotes transportation demand management.

1.1 Purpose

iTRANS Consulting Inc. of Vancouver (iTRANS), in association with Economic Development Research Group of Boston (EDR Group), were commissioned by the Greater Vancouver Gateway Council (the Council) to develop an environmental scan of TDM measures and to prepare and lead a seminar on the topic for members of the Council. The Council has requested the scan and the seminar as the basis for developing a subsequent, more comprehensive official Council position on TDM.

The first part of this report documents the scan. It evaluates the suitability of potential TDM measures in Metro Vancouver and develops a common frame of reference for TDM. The purpose of the framework, in turn, is intended to provide the basis for the Council's subsequent development of its official position on TDM. The framework is designed to help the Council better understand how TDM could be used to complement planned or proposed capital investments in transportation infrastructure, in order to better manage traffic demand and maximize the benefits of the proposed infrastructure.

The scan is designed to serve as a "Primer" or "TDM 101" document. It is grounded in the practicality of "what works" elsewhere in similar environments for the efficient movement of both people and goods. It considers these experiences in terms of their specific applicability to Metro Vancouver and potential acceptability by the relevant stakeholders (governments, transportation facility owners and operators, residents and businesses).

To this end, the scan also served as a reference for the half-day TDM Seminar, which was held on September 7, 2007. The seminar was intended to inform the members of the Council about TDM measures and their potential applicability to Metro Vancouver and to initiate a discussion on a Council position for TDM for Metro Vancouver.

1.2 Report Structure

The report comprises eight sections. **Section 2** through **6** focus on the scan. **Section 2** begins with a discussion of TDM concepts and of the main TDM building blocks and measures. The reader is then led to explore the status of TDM activities in south-western British Columbia (**Section 3**) and in other urban centres in Canada, Europe, the United States and Australia (**Section 4**). The TDM measures identified as most promising are subsequently discussed in more detail (**Section 5**). **Section 5** also explains the basis for this identification. **Section 6** completes the scan with conclusions and recommendations.

Section 7 reports on the seminar, which was held on September 7, 2007. Finally, **Section 8** lists the sources that were cited in this report.

Section 7 – which summarizes the seminar - is accompanied by three appendices: Appendix A lists the seminar agenda. Appendix B provides the presentation slides. Appendix C comprises the minutes of the seminar.

1.3 Acknowledgements

The Environmental Scan of TDM Measures was commissioned by the Greater Vancouver Gateway Council. The research was conducted by iTRANS Consulting Inc. in association with Economic Development Research Group, Inc.

The direction and guidance of Greater Vancouver Gateway Council and the supporting agencies is gratefully acknowledged. In particular, appreciation is expressed to Bob Wilds, Managing Director of the Council (and Project Manager for this study); Pat Jacobsen and Bob Paddon of the Greater Vancouver Transportation Authority (TransLink); and Paul Landry of the BC Trucking Association, for their comments and direction.

The responsibility for the contents of this report lies with the authors of the report. The report does not necessarily represent the official positions of the Greater Vancouver Gateway Council or of its member agencies.

2. TDM CONCEPT

Transportation is a major contributor to greenhouse gas emissions, and is the single cause and the primary victim of congestion. Transportation infrastructure and services are also the recipient of millions of dollars of public money invested annually. Yet, transportation is also an agent that binds individuals, communities and regions. Transportation fuels the economy, and opens new markets, new possibilities and new horizons. Transportation is essential for communities to thrive, grow and flourish. But, is transportation in its current form sustainable; dominated as it is by single occupancy vehicles, consuming land resources and costly investments? The “No” answer to this question is well settled in the public mind. However, the “how” methods as well as the vision of the new transportation form are often hazy, lacking in substance and commitment.

Transportation Demand Management (TDM) has been identified as a medium capable of providing new, innovative solutions of demand management and breaking the auto-reliance. This section of the report discusses the concept of transportation demand management.

2.1 What is TDM?

It is appropriate, first, to define what is meant by TDM. Different sources describe the concept in different ways. Three examples have much in common, but provide slightly different perspectives:

1. **Transport Canada.** On its TDM portal,¹ Transport Canada defines TDM as a wide range of policies, programs, services and products that influence how, why, when and where people travel to make travel behaviour more sustainable. The four corners of TDM, ‘why-when-where-and how’, and the position of TDM in relation to travel activities, are graphically illustrated in **Exhibit 2-1**. However, the definition does not account for the interdependence among ‘why-when-where-and how’ and by that, the definition appears to limit TDM to a narrow scope within a wide range of activities and travel decisions. This definition has been adopted by Canadian Association of Commuter Transportation.
2. **EPOMM.** In Europe, transportation demand management is usually expressed under the term of “Mobility Management” (MM). The European Platform on Mobility Management (EPOMM), an intergovernmental agency enacted to promote and develop MM in the European Union and to support active information exchange and learning, defines TDM as *“an array of “soft” measures (e.g. information or coordination of existing user services), which enhance the effectiveness of “hard” measures of traffic planning (e.g. new tram lines, new roads and new bike tracks). Mobility Management tools (in comparison to “hard” measures) do not necessarily require large investments measured against their high potential to change mobility behaviour. The key objective of Mobility Management measures is to reduce single car use.”*²

1 <http://www.tc.gc.ca>

2 <http://www.epommweb.org>

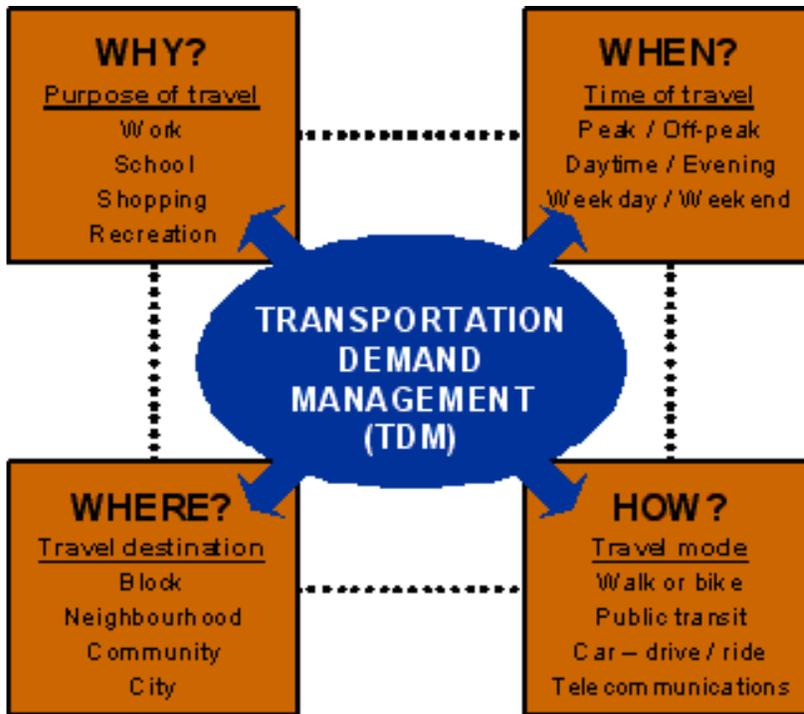


Exhibit 2-1: TDM – Transport Canada Definition

3. **TDM Encyclopaedia**. This publication of the Victoria Transport Policy Institute perceives TDM in a broad context of various strategies that increase transportation system efficiency. TDM “is a general term for strategies that result in more efficient use of transportation resources”. TDM “treats mobility as a means to an end, rather than an end in itself. It emphasizes the movement of people and goods, rather than motor vehicles, and so gives priority to more efficient modes (such as walking, cycling, ridesharing, public transit and telework), particularly under congested conditions.”³

It also should be noted that researchers and practitioners often see TDM as a concept that is closely interwoven with actions that support, Sustainability and the concepts of Smart Growth, New Urbanism, Climate Change and Air Quality. This in turn means that *TDM must be integrated into land use planning and development processes*.

Finally, in a popular view, TDM applies mainly to passenger transportation. However, *TDM measures that are aimed at commuters also benefit goods movement, and vice-versa*. For example, high-density, multiple-use developments can be more efficient to serve for deliveries; and the removal of autos from the roads improves the efficiency of truck movement. Similarly, improved curbside management of truck loading and offloading makes transit operations more efficient and reliable and, as a result, more attractive to riders.

³ <http://www.vtpi.org/>

Bringing together all of these concepts, for the purpose of this study, TDM can be defined as: **Transportation Demand Management describes strategies and programs that are designed to influence the demand for and choice of transportation services by the public, in order to improve or maintain the mobility of persons and goods, through:**

- Reducing or better managing the demand for travel; in particular, the demand for the drive-alone vehicle trip
- Augmenting the capacity of the supply of transportation – that is, of ‘hard’ infrastructure and services - through complementary, inexpensive ‘soft’ actions that better manage the use of these facilities and services
- Improving the efficiency in the usage of the overall transportation system
- Ensuring that the appropriate institutional structures and procedures are in place to support TDM
- Ensuring that TDM is integrated into complementary land use planning and development processes

2.2 Building Blocks of TDM

In the consultant’s experience, the types of TDM measures compliant with the aforementioned definition can be grouped into five ‘building blocks,’ as follows:

1. Development and implementation of supportive land use
2. Provision of a variety of travel choices
3. Integrated approach
4. Travel incentives and disincentives
5. Education, promotion and outreach

These ‘building blocks’ and their gradation stress the paramount importance of linking land use and modal choices. The body of research completed on the interaction between land use and transportation suggests that those two factors are the main cause of transportation system crises faced by many regions and agencies, and are recognized causes of transportation-related emissions of greenhouse gases and other pollutants. The five TDM building blocks and measures that accompany them are discussed below.

2.2.1 Supportive Land Use

The American Planning Association (APA) has identified urban sprawl as the primary cause of *“aggravated decline of many urban communities and older suburbs, congest streets and highways, accelerate the loss of natural resources and the deterioration of the natural environment, and limit opportunities for the retention and creation of affordable housing.”*⁴ Furthermore, the APA has acknowledged that planning, and comprehensive land use and transportation planning in particular, are essential to build sustainable communities. For its part, Transport Canada notes that [appropriate] land use planning practices can minimize the

⁴ American Planning Association at <http://www.planning.org>

need for travel, reduce trip lengths, enable effective and affordable transit service, and make walking and cycling more attractive.⁵

The primary categories of land use measures that can successfully influence the demand for and choice of transportation services are:

- Transit oriented development, which is an umbrella term denoting ways of designing communities that bring together a variety of land uses clustered together in order to enhance accessibility
- Car-free planning, which involves implementation of shared spaces, pedestrian malls, or other similar area treatments
- Parking strategies, including parking pricing or shared parking strategies designed to influence demand and recover costs

2.2.2 Variety of Travel Choices

A 1999 study researched the impacts of increases in gasoline prices and other auto usage penalties on auto dependency in the Toronto region. The research determined that a reduction in auto dependency will only “*occur within those choice markets where reasonable alternatives to the private automobile actually exist.*”⁶ In simple terms, the modal shift can only be achieved in an environment supportive to a variety of transportation choices or, for that matter, inter-personal communication forms.

The array of transportation and communication forms and choices must be accompanied by appropriate infrastructure and support programs in order to succeed. The examples of modal choice enhancing measures include:

- Public transit (ground transportation via road and rail) supported by transit priority measures, transit technology, attractive fare structure strategies, the provision of park and ride lots and high occupancy vehicle (HOV) lanes
- Public transit (water transportation) supported by the provision of multi-modal water-ground transit hubs, park and ride lots and safe and comfortable technology
- Van and carpooling supported by ride matching services, the provision of emergency ride home programs, trusted and reliable service providers
- Non-motorised modes acknowledged as a valid transportation mode with needs for planning, investments and connectivity similar to the auto mode
- Non-motorised modes such as walking and cycling supported by safe, well connected and well maintained networks of walk and cycle paths
- Telework supported by the provision of high-speed communication networks, development of new employee management standards, education and outreach
- Designated and properly maintained truck routes that provide continuous connections through metropolitan areas
- Rail options and intermodal connections that are properly rationalized to enhance freight operations and that are configured to offer economically sound alternatives to the use of over-the-road freight movement

5 Transport Canada at <http://www.tc.gc.ca>

6 Richard M. Soberman and Eric J. Miller, Impacts of full cost pricing on the sustainability of urban transportation: towards Canada's Kyoto commitments, Canadian Journal of Civil Engineers, 1999, Vol. 26, No.3, pg 345-354

- Localized design and development provisions that accommodate and expedite delivery and loading of freight in dense urban centers and emerging moderate to high density mixed-use areas
- Preservation of available lands and appropriate advanced planning for future expansion of “freight centres
- Intermodal facilities that provide for future freight demands of metropolitan areas where increased density is being pursued to support transit-intensive development

2.2.3 Integrated Approach

In Canada, the responsibility for land use and transportation planning is allocated among various levels of local, regional and provincial/territorial government; and the degree of allocation varies among provinces and territories. In common with several other urban areas, the Greater Vancouver Transportation Authority (TransLink) has the authority to plan most of the arterial road network and all transit services. However, uniquely, TransLink also has the authority to generate revenues for these facilities through taxation and tolls. However, responsibility for land use planning is still divided among different levels of government. As a result, the ability to integrate initiatives such as TDM that must integrate land use planning and transportation planning can be limited. The GVTA Act also requires that TransLink develop and implement transportation demand management strategies and programs defined as “strategies and programs that are designed to influence the demand for and choice of transportation services by the public”.

The American Planning Association has identified the development and creation, where applicable, of a comprehensive planning platform as being central to the implementation of Smart Growth or sustainable urban form. The APA Policy Guide on Smart Growth, adopted in 2002, states that the absence of “the collective decision-making processes inherent in effective comprehensive planning, those who would implement smart growth measures are limited to a series of short-term, geographically isolated, and disconnected decisions.”⁷

2.2.4 Travel Incentives and Disincentives

A basket of flexible and smart incentives and disincentives to travel in its various forms is a “must have” tool in any strategic TDM plan. These are management tools used to support or discourage certain forms or methods of travel and to generate revenue (to supplement the existing funding resources) by imposing user fees.

From a purely economic perspective, one of the most straight-forward approaches to implementing TDM strategies that integrate transit alternatives is to provide increased levels of transit service relative to auto-based services within a metropolitan area.

7 American Planning Association, Policy Guide on Smart Growth, April 14, 2002. <http://www.planning.org/policyguides/smartgrowth.htm>

The revenue generation aspect of travel disincentive can be achieved by introduction of road pricing. Road pricing, or tolling, requires that road users pay a monetized of transportation services consumed, based on the time of day and/or frequency of his/her travel by charging the user a fee on the basis of actual usage (e.g., by distance travelled or by trip). The fee becomes a disincentive to travel and may force the user to seek other alternatives (reduce travel, change location and travel patterns, change when the trip is made, or change travel mode). Users unwilling or unable to change their travel patterns pay fees and, by this, shift the burden of construction, operations or maintenance cost-recovery away from the general public of non-users.

2.2.5 Education, Promotion and Outreach

This building block entails the dissemination of TDM information to the public. It uses means and approaches that have a high propensity to generate a buy-in and produce desired behavioural changes and a positive reception of new or proposed measures. It also entails the use of market analyses, in order to better understand the market potential for TDM.

In 2004, Portland Metro (the regional metropolitan planning organization in Portland, Oregon) commissioned a study to understand the real and perceived barriers and benefits to changing travel behaviour for all trip types. The study involved a broad consultation and survey of residents that resulted in a comprehensive picture of an average commuter in Oregon's largest urban area. The survey participants perceived the use of alternate modes (such as transit, van and carpool or car-share) as inconvenient, unsafe, inflexible and stressful. However, they acknowledged and found attractive the social aspects of travelling in groups. The results of the study helped Portland Metro to better design its education, promotion and community outreach programs and to increase the effectiveness of education and outreach campaign by tapping into social expectations and needs of the market.⁸

A 2002 market profile was developed for the City of Ottawa, as part of a broader initiative of potential TDM strategies. The object was to identify potential travel markets to which individual TDM measures could be targeted. The market profile categorized market segments by mode, trip purpose and trip distance – for example, approximately 10% of all auto-driver commutes between home and work were 2 kilometres or less in distance: this represents a potential market for promoting TDM alternatives, such as travelling on foot or by bicycle. The profile was based upon Ottawa's travel origin-destination survey.⁹

The City of Ottawa's TravelWise¹⁰ program provides TDM advocacy and works with local employers, schools, community groups and the general public to encourage participation in a variety of travel options and discourage the drive-alone trip. "Ottawa RideMatch" provides a publicly accessible, free, ride matching service. This supports programmes for flex-time, short week, and telework. The service is widely known in Ottawa and is accepted usage for employees.

⁸ Portland Metropolitan Region, Travel Behavior Barriers and Benefits Research, December 2004.

⁹ iTRANS Consulting Inc., Profile of Travel Demand [for] City of Ottawa TDM Strategy. Prepared for the City of Ottawa, December 2002.

¹⁰ TravelWise www.ottawa.ca/city_services/traffic/travelwise/

Many urban areas have online transit rider information and trip planners. Riders can use these to plan their trips according to specific circumstances (e.g., use buses only). They can also identify when the next bus or train is scheduled to arrive at their stop or station; this can be the scheduled time (more frequently) or the actual real time (York Region, Ontario's VIVA service and Ottawa's O-Train light rail both provide real-time travel time information; however, both are relatively new systems). Route planners for auto travellers also exist, as do GPS-based in-vehicle maps.

The City of Toronto's "Moving The Economy" (MTE) proposes to take the concept of travellers' information systems a step further. MTE has proposed the development of a multi-modal traveller information system. The system would allow travellers to plan their itineraries according to combinations of modes. Although many mode-specific information systems exist for public transport and for roads, there is a need to integrate these modal components; ensure that all of a region's public transport authorities are incorporated seamlessly; include environmentally-friendly modes (car-sharing, taxis, pedestrian networks and cycling networks); and account for inter-urban modes.

As a first step, a 2004 workshop identified technical user needs. A key component of the workshop was the identification of best practices in traveller information systems around the world; with a particular focus on Canadian, US and EU best practices. The most fully integrated example was the Deutsche Bahn (German Railways), which also allows the user to book accommodations and travel, and to calculate the costs and environmental impacts of alternatives. There was interest in developing an integrated system. However, although several individual traveller information systems existed in the Greater Toronto Area, these were fragmented (for example, among the various transit agencies); were incomplete in terms of modal coverage; were incomplete in terms of geographic coverage; and, were often based upon different data sources and geographies.¹¹

11 iTRANS Consulting Inc., Technical Needs Survey - Coordinated Traveller Information System in the GTA, Final Report. Prepared for Moving The Economy, City of Toronto, April 2004.

2.3 “Soft”, “Hard” and PPP Measures

TDM measures can be grouped into “soft” and “hard” measures, according to the level of investment that is required by the public agency. “Soft” measures such as car-sharing, telework and other employer-based trip reduction programmes, ridesharing, time shifting, transit-oriented development and parking pricing are considered low-cost measures. Those measures do not necessarily require significant capital investments by the public agency.

In contrast, “hard” measures require significant capital investments. Those measures include road and transit infrastructure expansion or alterations such as construction and maintenance of high occupancy lanes (HOV), purchase and maintenance of transit fleet vehicles, installation and maintenance of changeable message signs or traveller information systems, construction of transit/ transportation hubs, and the construction and maintenance of auxiliary modes network such as sidewalks or bicycle paths.

For the purposes of this discussion, tolling and road pricing can be considered as a “hard” measure. This is because they usually involve a significant level of investment to the physical characteristic of a tolled facility (such as construction or reconstruction of a road; installation of toll booths or toll collection technology; operation, maintenance and rehabilitation of a facility; etc.). Such investments may not depend on public money; increasingly they are achieved with the contribution of the private sector, in whole or under public-private partnerships (PPP).

3. TDM IN SOUTH-WESTERN BRITISH COLUMBIA

Many TDM measures are supported in south-western British Columbia, and more specifically, in Metro Vancouver. Regional and local authorities endorse TDM in key documents and policies.

There is also financial commitment for a variety of well-developed TDM and transit programs. These projects include EPP, Company Car, RideSharing, Parking Management Strategies, Telework, Park & Ride, and Transportation Management Associations (TMAs). Carpool and vanpool programs cover an extensive area, as well as a free on-line ride matching program open to the public through Jack Bell RideShare.

Some effective TMAs exist in south-western BC, including the Cambie Corridor Consortium and the Glenlyon Business Park TMAs in Metro Vancouver.

The reader will notice the predominance of passenger travel TDM measures: goods movement TDM is emerging. These measures are described below, grouped into soft and hard measures. A context is provided, first, through a brief introduction to land use and transportation planning.

3.1 Soft TDM Measures

3.1.1 Land Use and Transportation Planning

Metro Vancouver recognizes the benefits of the regional growth management concept for a compact metropolitan region with enhanced public transit and an improved balance between jobs, housing, and recreation to minimize traffic levels. Metro Vancouver's mid-1990s *Liveable Region Strategy* was among the first in Canada to advocate these concepts; and – also in a leading effort - TDM was a key component of the *Transport 2021* regional transportation plan.

Metro Vancouver benefits from supporting policy initiatives, with minimal SOV (single-occupant vehicle)-focused road widening. Generally, transportation infrastructure investments are directed towards the creation of a multi-modal system that is committed to sustainable transportation and clean air. Other policies, such as fuel taxes, parking measures and trip reduction measures, also are in place.

At the municipal level, the City of Vancouver has a number of TDM strategies in place and is a leader within the region on sustainable transportation and TDM initiatives. The Vancouver EcoDensity Planning Initiative was launched in June 2007. The initiative acknowledges the relationship between transportation and density. Currently, single family dwelling units

occupy half of the City of Vancouver's land area.¹² The EcoDensity initiative investigates ways to increase density across the city, especially in lower density areas, along transit routes, and in neighbourhood centres. The Draft EcoDensity Charter recommends creating multi-use communities that allow people to access the majority of their day-to-day destinations more easily, as well as favouring sustainable transportation modes and providing disincentives to car use, and designing walkable and 'cyclable' neighbourhoods with strong transit connections.¹³

A number of more specific ideas and strategies to achieve EcoDensity goals are presented in the draft "Suggested Tools and Actions" document.¹⁴ Key elements of this document that relate to TDM are:

- Rezoning land around arterials in current residential areas to permit medium density development
- Permitting infill and laneway housing and perhaps duplexes in areas that are currently single family
- Creating rapid transit station areas that are dense and green
- Possibly relax restrictions on home based businesses
- Provide lower or no parking requirements in appropriate sites
- Require car-sharing in multi-family housing and make allowance for car-sharing in lower density housing
- Charge for on-street parking

The City of North Vancouver has attempted to address some TDM initiatives and has plans in place to increase TDM activity. Population density in the City of North Vancouver is approximately 3,700 people per square kilometre, allowing for a high percentage of trips to be made by transit, walking, and cycling; especially in the Lonsdale Town Centre. The City is aware that the number of active policies and programs and public awareness of TDM are limited, and its upcoming transportation plan is intended to address these issues. According to the Interim Report of the City's Transportation Plan, several TDM initiatives already have been implemented, including bicycle parking guidelines for new developments. The City of North Vancouver's parking strategy is intended to align with TDM goals while responding to the needs of residents and businesses. The parking strategy includes recommended parking relaxations for developers who provide TDM support measures in their development.¹⁵

The City of North Vancouver acknowledges that there are a variety of challenges to implementing TDM measures. Among these is the ease and availability of SOV travel in comparison to other modes, along with a lack of incentives and disincentives and a need for education and awareness measures.

12 Vancouver EcoDensity Planning Initiative, "ECO101: Overview of the EcoDensity Initiative and themes," <http://www.vancouver-ecodensity.ca/content.php?id=2>

13 Vancouver EcoDensity Planning Initiative, "Draft EcoDensity Charter", http://www.vancouver-ecodensity.ca/webupload/File/EcoDensity_Charter5.pdf

14 Vancouver EcoDensity Planning Initiative, "Suggested Tools and Actions – DRAFT (May 2007)", http://www.vancouver-ecodensity.ca/webupload/File/Sample%20Tools%20and%20Actions_FINAL.pdf

15 Urban Systems, "Transportation Plan – Interim Report: Transportation System Goals and Key Issues", City of North Vancouver, March 2007, <http://www.cnv.org/c//data/3/426/2007%2003%2013%20-%20Interim%20Report.pdf>

In the City of Burnaby, TDM through the implementation of HOV lanes has been recognized as an important benefit to the community. The City shows a proposed HOV network on its website and already has implemented some HOV lanes.¹⁶ In addition, Burnaby - in association with Metro Vancouver - has identified four town centres that are served by rapid transit and contain a variety of land uses, including commercial and residential developments. It is planned that in the next 15 years approximately half of the residential units and commercial floor spaces that develop within Burnaby will be located in these centres.¹⁷

3.1.2 Trip Reduction Programs

Programs of this type are intended to reduce vehicular emissions through various trip reduction options, such as carpools, vanpools, and increased use of public transit, for individual commuters and employee groups.

OnBoard is one of many TDM strategies designed to change travel behaviour to make better use of the transportation system through less single-occupant vehicle use, while encouraging a shift to more walking, cycling, transit use and off-peak travel. The OnBoard program was developed and is operated by TransLink.

TransLink also provides information about a number of commuting options on its website.¹⁸ The OnBoard program has helped more than 250 employers in the Metro Vancouver area to manage commuting trips since its inception in 2002. The program encourages employers to consider a number of options, including the Employer Pass Program, discussed later in the Transit Incentive Programs section, as well as ride matching, car/van pooling, ridesharing, car sharing, cycling and walking, parking management strategies, telework, and shuttle buses, park and ride, and guaranteed ride home.

TravelSmart, a pilot program by TransLink, encourages the use of alternative modes for household trips through information and incentive programs. The program is targeted towards people who are interested in reducing their car dependence and provides personalized appointments and customized materials, including transit maps, cycle routes, park guides, and pedestrian safety information for children. In addition to the information, users receive incentives such as an umbrella, tote, SkyTrain book, transit tickets, or discounts to relevant shops.

In the Capital Regional District, BC Transit, the BC Ministry of Transportation and member municipalities have partnered to create the TravelChoices Strategy. The strategy's goal is "to divert 75% of the future growth in travel demand from driving alone (300,000 trips per day)."¹⁹ The project includes a focus on partnerships between all agencies as well as non-profit groups to encourage trip reduction. There are two key challenges for TDM under the program: the establishment of an action plan for the next two years, and the securing of long-term funding.

16 City of Burnaby, "Transportation," http://www.burnaby.ca/cityhall/departments/departments_planning/plnng_trnspr.html

17 City of Burnaby, "Burnaby's Regional Town Centre – Metrotown," http://www.burnaby.ca/cityhall/departments/departments_planning/plnng_mtrtn.html

18 TransLink, Commuting Options, http://www.translink.bc.ca/Commuting_Options/default.asp

19 ACT Canada et al. "Building Capacity for TDM in Canada," South Vancouver Island TDM Forum, <http://www.actcanada.com/EN/TDMWorkshops.aspx>

3.1.3 Rideshare and Car-Share Programs

The non-profit Jack Bell RideShare administers a vanpool / carpool ride matching program to help reduce pollution, traffic congestion and the number of single occupant vehicles. Jack Bell Rideshare (JBR) car and vanpool services are provided to general public and to a number of specific employment sites in the Vancouver area.²⁰

Jack Bell Ride-Share facilitates casual and formal ridesharing. Casual ridesharing is where commuters share rides in a privately owned vehicle. Formal ridesharing is where commuters ride in a Jack Bell Ride-Share owned fleet vehicle. In 2005, Jack Bell Ride-Share launched an online database that has resulted in over 500 historical ride-share groups and currently has almost 4,000 registrants looking to ride-share. Together, casual and formal ridesharing has eliminated over 1 million trips from GVRD roads since 2003. Commuters participating in the formal ride-share program are choice riders (92%), with regular access to another passenger car or truck. Forty percent of choice riders formerly drove their own vehicle prior to joining the program, 26% were in another private car or vanpool and 17% used public transit. Only 7% of JBR users are "captive" riders (do not have another transportation option). TransLink has provided funding for program administration since 1999.

Car-sharing allows participants to access a vehicle for short-term urban travel – e.g., for a few hours to travel to or from a business meeting. The Cooperative Auto Network (CAN) is a car-share company with approximately 1,000 members.²¹ It operates both private and corporate auto-sharing programs throughout Metro Vancouver. Another car-sharing program, “The Company Car” was launched by CAN and TransLink in 2006 and provides companies with vehicles to be used on corporate business without the expenses of fleet costs or employee parking and mileage costs.

Zipcar car-share service provider offers car-sharing for both business and personal users, allowing members to book cars on its website or by phone.²² Members pay a yearly registration fee and are able to rent cars by the hour or by the day. Cars are available in many neighbourhoods of the City of Vancouver and at two locations in the City of North Vancouver.

3.1.4 Transit Support

TransLink provides a number of commuting options, including many transit incentives. These options are showcased on their website.²³ One program, the Employer Pass Program, offers discounted (15%) transit passes to employees through the convenience of payroll deduction, but is limited to employers with 25 or more employees. Between 2003 and 2006 the number of employees with Employer Passes in Metro Vancouver more than doubled, from 6,000 to 13,000.²⁴ More than 1.4 million SOV commuter trips were eliminated between 2003 and 2006

20 TransLink, Provincial Vanpool Program – Final Report, Urban Systems, May 2001, p. 6

21 <http://www.cooperativeauto.net/>

22 Zipcar, <http://www.zipcar.com/>

23 TransLink, Commuting Options, http://www.translink.bc.ca/Commuting_Options/default.asp

24 ACT Canada et al. “Building Capacity for TDM in Canada,” South Vancouver Island TDM Forum, <http://www.actcanada.com/EN/TDMWorkshops.aspx>

through this program. Many employers add an additional subsidy to the EPP as a recruitment strategy, or where some of its employees are provided with free parking. The federal government tax credit (15.5%) has also had a positive impact in encouraging transit ridership. TransLink's U-Pass program provides 60,000 passes to UBC and SFU students.

TransLink also provides 'Bike and Ride' and 'Lock and Ride' programs designed to encourage multi-modal cycle and transit trips. Most buses are equipped with bike racks, and bikes can be taken on the SkyTrain, the SeaBus and buses without any additional charge, although there is a \$1 per day or \$15 per month charge for bicycles on the West Coast Express. TransLink also sponsors Bike to Work Week, the Commuter Challenge, the Commuter Cycling Skills Course, and Ride-Share Week.

Although these services have some time and capacity constraints, they encourage commuters to combine cycling and transit in their daily travel. Bike lockers are also available at fourteen SkyTrain stations and at four other locations, at a cost of \$30 for a three-month period. As discussed, Park and Ride lots are available throughout TransLink's system at 20 locations on SkyTrain, bus, and West Coast express routes. Park and Ride lots encourage multi-modal drive plus transit commute trips.

3.1.5 Other "Soft" TDM Initiatives

The City of Vancouver and several other Metro Vancouver member municipalities have embarked on several TDM initiatives. These include working in partnership with stakeholder agencies to redesign urban areas to encroach on existing street space with commercial and other land uses; to use different street treatments for traffic calming; to implement multiple use parking (conversion to storage) in residential apartment towers; to reduce parking requirements in lieu of auto-sharing; and to include of mandatory bicycle storage and shower facilities in office towers.

Parking management strategies at both the municipal and corporate levels have been targeted in TDM measures in south-western BC. TransLink suggests a variety of parking management measures for its OnBoard clients. These include conversion from free to pay parking, occupant-based fees, preferential parking for car and vanpools, and utilizing the revenue from parking to fund other initiatives such as the client's commuting options program.²⁵

Information on TDM is also widely available in Metro Vancouver and there is a strong and well established internet presence. The TransLink website is an excellent source of TDM information. The nearby Victoria Transport Policy Institute is another source.²⁶

The City of Vancouver utilizes the "One Day" website to encourage Vancouverites to take small steps to reduce energy use.²⁷ This includes providing information on a variety of travel options such as cycling, transit, ride-share and car-share.

25 ACT Canada et al. "Building Capacity for TDM in Canada," South Vancouver Island TDM Forum, <http://www.actcanada.com/EN/TDMWorkshops.aspx>

26 Victoria Transport Policy Institute <http://www.vtppi.org>

27 City of Vancouver, "OneDay" <http://www.onedayvancouver.ca/portal.php>

3.2 Hard TDM Measures

3.2.1 Transit Expansion Programs

Metro Vancouver has seen a long-term commitment to transit improvement and TDM supportive policy initiatives. The transit system, provided by TransLink, is comprised of a number of services, including a comprehensive bus network; the SkyTrain automated light rapid transit system; the SeaBus, a passenger ferry services connecting downtown Vancouver and the North Shore; and, the West Coast Express commuter rail service. TransLink also provides Park and Ride lots throughout the system. The Canada Line (SkyTrain) currently is under construction, and will link downtown Vancouver with the Vancouver International Airport and Richmond. TransLink also provides door-to-door custom service through handyDART for persons with physical or cognitive disabilities who are unable to use public transit without assistance

In the City of Vancouver, other planned improvements include the provision of the Downtown Streetcar, a modern electric streetcar which will provide service to new communities in Coal Harbour, False Creek North, Southeast False Creek, and the False Creek Flats and to activity centres in the metropolitan core. The system will be integrated with the existing transit modes.

3.2.2 HOV and Auxiliary Modes Networks

Metro Vancouver has an existing system of 2+ and 3+ HOV lanes throughout the region. The majority of the HOV lanes are on the provincial highways, with 2+ HOV lanes on Highway 1 through Burnaby and Coquitlam. HOV lanes are also in place on some major routes in Burnaby and Delta, as well as on the accesses to the Lion's Gate Bridge. Bus only lane examples are McGill Street in the City of Vancouver, as well as in North Vancouver on Mountain Highway. This is not a complete listing of all HOV facilities in the region. However, the listing demonstrates that progress has been made in the implementation of these facilities. There are additional routes on which HOV lanes have been planned or may be advantageous. HOV lanes provide the opportunity for vehicles with a minimum number of occupants to pass congested SOV traffic, as well as also providing bus priority. The effectiveness of HOV lanes is limited by the relatively low proportion of car pool commuters. Bus priority benefits in 2+ HOV lanes are limited for areas where a large number of vehicles have two occupants.

Bicycling in Metro Vancouver is supported by a system of bikeways, greenways, and transit support for bicycle commuting. TransLink provides information and bicycle network maps on its website,²⁸ and the many Metro Vancouver member municipalities have bicycle-supportive policies. There are bicycle facilities on some public streets, either in the form of shared bicycle / bus / HOV lanes, separate bicycle lanes or shared roadways. In addition, there is a network of bicycle and pedestrian paths. The proposed Central Valley Greenway will connect False Creek

28 TransLink - http://www.translink.bc.ca/Maps/cycling_map_guide.asp

to New Westminster, providing the spine of the bike system and connecting important destinations and commercial areas.²⁹

3.2.3 TransLink's Urban Transportation Showcase

The Urban Transportation Showcase Program (UTSP) was initiated in 2002 by Transport Canada. The UTSP is a five-year program created to demonstrate, evaluate and promote effective strategies to reduce GHG emissions from urban transportation.³⁰ Through the UTSP, Transport Canada provided funding and worked in partnership with provinces and municipalities, to establish a number of transportation "showcases" in selected cities, for demonstrating and evaluating a range of sustainable urban transportation strategies within a broad planning framework. The impacts of these strategies on other urban challenges, such as smog reduction, congestion, infrastructure costs, also were taken into account.

Over forty municipalities expressed interest in the Showcase competition. Of these, eight – including TransLink - ultimately were awarded funding. TransLink's programme consists of six initiatives. Five of these initiatives include, or potentially include, TDM elements. The five initiatives are transit and pedestrian priority measures, development of a major active transportation corridor, transit villages at SkyTrain stations, goods movement policy and household-based travel marketing. A sixth initiative demonstrated hybrid buses which, while reducing emissions, are not inherently a TDM measure.³¹

1. **Transit and Pedestrian Priority Measures**. Main Street, a north-south arterial road in the City of Vancouver, is home to a mix of land uses, and carries approximately 30,000 vehicles per day. The Main Street transit and pedestrian priority project aims to improve transit service reliability while reducing travel times and improving the pedestrian environment. One of the major components of the project was to reduce bus delay and improve the pedestrian environment and pedestrian safety through redesigning the roadway and the instillation of transit signal priority system. The improved environment was designed to provide increased comfort and security, as well as information, for transit passengers. New bus shelters include route maps and electronic displays. Landscaping and public art providing improved ambiance and zero emission electric trolley buses will address environmental concerns. Improved cycling and transit linkages will increase multi-modal travel and reduce waiting times.
2. **Active Transportation Corridor**. The Central Valley Greenway will supply Metro Vancouver cyclists, pedestrians, and other active transportation participants in and between the communities of False Creek and New Westminster with a 22 km route between important destinations. By implementing a planning partnership among TransLink, Metro Vancouver, the Cities of Vancouver, Burnaby, New Westminster and BEST, planners were able to create the best design for all involved. The greenway will bypass approximately half the roadway intersections and involve the implementation of bicycle priority measures

29 Central Valley Greenway <http://www.best.bc.ca/programsAndServices/greenway/index.html>

30 The on-line information clearing-house, developed through works and activities of UTSP, can be accessed via Transport Canada website at: <http://www.tc.gc.ca/programs/environment/UTSP/abouttheprogram.htm>

31 See Transport Canada "Showcase description: Sustainable Region Showcase for Greater Vancouver", <http://www.tc.gc.ca/programs/environment/UTSP/vancouver.htm>, and TransLink, "Urban Showcase", http://www.translink.bc.ca/Plans_Protects/Urban_Showcase/default.asp

at other intersections. The route connects to 25 other bike routes in addition to many bus and rapid transit hubs and routes and construction is to take place between Spring 2006 and Summer 2008.

3. **Transit Villages.** TransLink envisioned two Transit Villages at the Surrey Central and Broadway / Commercial SkyTrain stations. As multimodal hubs, the villages were designed to incorporate a variety of measures, from short term to long term. TransLink envisions the Transit Villages as “attractive, compact, mixed-use communit[ies], centred around a transit station, enabling residents, workers, and shoppers to drive less and take transit, walk and cycle more.” Plans include improvements for pedestrians, better lighting and signage, and bike storage. In the long term, the areas will incorporate a multitude of uses, including community services, retail, residential, and commercial developments.
4. **Goods Movement.** TransLink’s Showcase programme specifically targeted goods movement efficiency, given the importance of the region as a freight hub and access point through its ports. Delays caused by congestion on the roadways create inefficiencies and increase GHG emissions. The project intends to enact policies and models that will reduce GHGs and energy used by goods movement through new technologies, infrastructure improvements, logistics, incentive programs, and road priority.
5. **Household-based Travel Marketing.** “TravelSmart” develops customized travel plans for individual households. The concept has been applied effectively in Australia, a number of US cities, including Portland, Oregon, and the UK. By targeting individuals and encouraging them to change their travel patterns, TransLink hopes to reduce SOV travel and encourage active transportation and transit. The plan employs marketing strategies and customized planning to achieve its goals.

3.3 Public-Private Partnership

Metro Vancouver, TransLink and the Province of British Columbia have examined user-pay for several years. The Province has now embarked on public-private partnerships to develop new transportation infrastructure in Metro Vancouver. These include non-tolled facilities, such as the Pitt River Bridge, and tolled facilities (the Golden Ears Bridge and the Port Mann Bridge / Highway 1 upgrade). The Golden Ears Bridge, now under construction, will be the first tolled facility in the region.

3.4 Conclusion

Metro Vancouver has developed a wide range of transportation demand management applications. The region was one of the first in Canada to recognize the mutual interdependence between land use and transportation and to advocate on a broad scale numerous TDM programs. As the single regional transportation authority in Metro Vancouver, TransLink has the ability to coordinate TDM measures with capital road and transit investments and the provision of transit service. Public and private organizations have been leaders in the organization of carpools, employee and campus trip reduction programs, the development of auxiliary mode networks and HOVs. The region is a Canadian leader in “soft” and “hard” TDM measures, and in the promotion of PPP and pricing.

Having said that, TDM in Metro Vancouver is focused on passenger travel – although recent initiatives also address goods movement. The many initiatives, though laudable in number, content and scope, also lack an overall coordination: An outside observer might notice a large number of initiatives that are undertaken by a number of entities (agencies, groups or individuals) delivered under separate agenda, lacking an integrated plan or strong financial commitments. There are opportunities for building upon and coordinating these measures. The first steps at exploring the “what” steps to take and “how” to take them questions are considered in the following sections.

4. CASE REVIEW OF TDM APPLICATIONS ELSEWHERE

The TDM material accessible over the Internet, through published sources and experiences of individuals and groups is vast and diverse. It includes new applications of the old proven methods, new highly innovative ideas and approaches, successful and not so successful attempts on changing the status quo in cities and urban centres of all shapes and sizes.

In this section we will discuss TDM applications in selected other urban centres around the world. The cases reviewed in this section have been selected on the basis of similarity to the conditions in Metro Vancouver.

For the purpose of the evaluation the Metro Vancouver region was described as an urban centre with:

- Approximately 2 million population spread across geographically diverse area with limited land available due to constraints set by the geographical features
- A diverse administrative structure
- Mature understanding of TDM; past experience in the application of successful TDM measures
- A strong focus on transit and with public acceptance of non-auto travel modes higher than the Canadian average (of 10%-20%)

The consultant's task was to look for and review innovative yet achievable TDM ideas elsewhere in Canada, Europe, the United States and overseas, with a prospect of acceptability by the relevant stakeholders of Metro Vancouver; focused on passenger, freight TDM and the applications of TDM-related road user fees, and, implemented by urban centres of similar size and facing similar geographical or administrative challenges.

The consultant selected the following TDM review cases:

- System integration and innovative approach to TDM in Bremen, Germany
- Transit and HOV supportive road pricing in Seattle Metropolitan Area, Washington, United States
- Designated Freight Corridors: Chicago Metropolitan Freight Plan, Puget Sound FAST Corridor, Illinois, United States, the Alameda Corridor in southern Los Angeles County and World Trade Bridge, Laredo, Texas
- Highway pricing on existing roads exemplified by "Fastrak" pricing program California - HOT lanes on I-15 in San Diego, "QuickRide" Value Pricing Pilot Program in Houston, Texas, United States
- Highway pricing on new roads exemplified by "MnPASS Lanes" program on I-394 in Minneapolis
- Time-of-day pricing in "LeeWay Program"- Variable tolls for Heavy Vehicles in Lee County, Florida, United States
- Cordon tolls exemplified by the London Commercial District, "Area Licensing" program in Singapore and congestion pricing in Stockholm

- New high-speed, limited access tollway projects – Melbourne, Australia.
- Variable pricing for trucks – Port of New York and New Jersey, United States.

4.1 System Integration and Innovative TDM in Bremen, Germany

Bremen is home to 0.5 million people. The City is located at the shores of North Sea and houses Europe's second largest container port. Only 40% of travel within the City is made by auto: the remaining 60% is made by transit (17%), cycling (23%) and walking (20%). The City's transportation network is based on multimodal hubs that integrate transit, cycling, car-sharing and taxis. Bus stops at key locations have been converted to neighbourhood mobility stations that provide access to transit, car-share, bicycles and taxis. Bike-and-ride facilities include secure bicycle storage locks, bicycle repair, rental and bicycle wash services.

All neighbourhood mobility stations are equipped with traveller information screens, a taxi fare calculation tool, bicycle locks and car-share parking. Extensive car-sharing services are integrated into new developments, which include car-sharing infrastructure and are supported by the appropriate ordinances. Streetcars run on separate tracks, often in mixed traffic; however their operation is supported by the signal pre-emption system. Real-time information system at transit stops provides up-to-date information on arrivals.

High gasoline prices and high taxation are natural deterrents from vehicle ownership. Bremen does not have toll facilities. High parking costs are prevalent across the entire city. Integrated smart cards for transit, car-sharing and banking provide a 'one-card-for-all' solution that covers fares, activation fees and user fees. The card also combines the user's banking card with a transit fare card and a car entry key for car-share.

The Bremen mobility management system is built on a premise of system integration. There is a single umbrella organization for 35 transit operators, including rail and bus operators, in the region. The organization provides integrated fares, tickets and information systems. Inclusion of car-sharing ordinances into the planning approval process for new housing (townhouse type units) has reduced the need for resident parking space by 30%.

Neighbourhood traffic calming is designed to introduce physical disincentive to auto travel while benefiting cyclists. Shared spaces, open to bicycles and pedestrians, are widely used in the downtown core. Separate supply routes regulate truck traffic in these areas.

4.2 Transit and HOV Supportive Road Pricing in the Seattle Metropolitan Area

Seattle and the surrounding King County have fully integrated TDM policies into the planning process. The population of this region is estimated at 3.13 million.³² The average transit usage

32 American Community Survey, 2005; US Census Bureau; http://factfinder.census.gov/home/saff/main.html?_lang=en

within the metro area is at 7.9%. Daily non-auto travel accounts for about 15.8% (including telework at 4.5%).³³ Transit programs and supporting policy initiatives also are in place in the Seattle Metropolitan Area and King County. There is a well-developed transit system supported by sustainable funding and an extensive HOV and HOT (high occupancy/toll) network. (Whereas HOV lanes are open to the use of high-occupancy vehicles, without charge, HOT lanes or Managed Lanes allow SOV users also to use these lanes, at the payment of a toll. HOT lanes do not exist in Canada. They have been introduced successfully in several US cities in recent years, to replace under-utilized HOV lanes on urban expressways.)

Numerous TDM programs offer a wide range of services. A number of programs were pioneered in Washington State, including trip reduction legislation, trip planning, and free web-based ride matching for car pools and vanpools. Flex time, alternative work hours, and telework have become an integral part of the transportation system. TDM information is available in abundance from the Washington State DOT. This information can be easily accessed from the DOT website.³⁴

The transit system is well developed and supported by sustainable funding. There are numerous supporting policies including fuel tax, HOV network, road pricing, and HOT lanes. Road pricing is augmented by Park and Ride lots which are open to transit, carpool and vanpool users.

As reinforced by the most recent draft of the region's growth management strategy, VISION 2040 (July 2007), the Commute Trip Reduction program is the region's primary TDM strategy. This program targets work commutes in high-traffic areas through employer-administered incentives for commuting by means other than SOV. Incentives include access to a "share-car" (e.g. City of Bellevue Flexcar Program), cash rewards (e.g. Redmond R-TRIP), emergency rides home (e.g. Pierce County Commute Trip Reduction Enhancement and Recognition Project) and discounted or free transit passes (e.g. Kitsap County Incentive Program). For example, Puget Sound Naval Shipyard employees are eligible for a "Smart Commuter Card" which allows free rides on all Kitsap Transit routes. The popularity of the program has led the US Department of Defence to expand the program to include all of its federal worksites in the county. Disincentives include increased parking fees for SOV users (e.g. Seattle PEMCO-Ride Together Commuter Benefits Program).

The FY2006/07 budget for Trip Reduction Incentive Programs in the Puget Sound region was approximately \$784,000 (USD) and reduced annualized commute vehicle trips by 2,700.

A transit-provider vanpool program in King County Metro, Washington, is the largest public vanpool system in the U.S. Initiated in 1985, it has grown from 127 vans and 720,500 annual unlinked passenger trips to 686 vans and 1,749,200 annual unlinked passenger trips in 2002.

³³ ibid

³⁴ <http://www.wsdot.wa.gov>

4.3 Designated Freight Corridors

TDM measures that address goods movement (freight) issues have many of the same characteristics of TDM measures that address commuter / non-freight demand management. However, to be successful, freight TDM must be carefully assessed relative to the underlying freight transportation infrastructure of a metropolitan area. They need substantial consensus and active participation from commercial interests if they are to be successful. A wide range of options is available and have been applied in the United States, Canada and overseas.

Pricing has emerged as one of the most commonly proposed solutions for freight TDM. This is because addressing freight demand management often involves insignificant capital investment – the costs of which can be substantial, and the benefits of which may be construed as indirect for commuters and auto travellers.

The concept of “rationalizing” the region’s transportation system refers to actions that optimize the placement and use of facilities and services. Usually this means allocating space and assigning priority for various types of vehicles (autos, buses, trucks, bicycles) and various types of trip purposes (commuting, freight movement, etc.) on relevant roads and corridors.

One form of rationalization is the development of transit priority routes where buses and streetcars are assigned special lanes and/or special priority for passing through signalized intersections or road crossings.

Another form of rationalization is the development of freight priority routes. Typically, these are arterial streets where signs, road width, intersection geometrics, ramps and vehicle parking areas are all designed to facilitate truck movement. The designation of such routes and their design features can all serve to maximize the effectiveness of truck movement on those corridors while minimizing negative impacts on residential neighbourhoods. In some cases, this may also include the development of grade-separated truck and/or rail routes for access to ports or other intermodal freight terminals. Examples span a range from truck routes along arterial streets to truck priority and truck-only routes.

4.3.1 Regional Truck Route System for Chicago

Chicago is a national US centre for delivering goods. Freight makes business work and freight-related businesses provide significant numbers of jobs. The six largest railways in North America, along with 14 smaller railways, annually move \$350 billion (all figures USD) in goods to, from or through the region. The railways and their related suppliers directly employ 37,000 workers who receive \$1.7 billion in annual payroll. Trucks annually move \$572 billion worth of goods to, from or through the region. In 2001, the more than 3,000 for-hire trucking firms in the region employed 50,000 workers whose total compensation topped \$1.8 billion. In 2000, the region’s top 40 freight centres, where concentrations of manufacturing, warehousing, shipping and related firms have ready access to rail and truck services, accounted for 553,000 jobs and \$131 billion in annual sales.

The Chicago freight transportation centre is growing rapidly. The volume of freight is contributing to traffic congestion, and inefficient infrastructure is exacerbating both freight and commuter traffic problems. Through the initiatives of freight stakeholders in the Chicago metropolitan region, a comprehensive assessment of the critical needs of freight transportation system capital investments was undertaken and a report was prepared in December 2004. The Chicago Freight Plan recommended development of a Regional Truck Route System to replace what had become a haphazard, inconsistent and poorly enforced set of truck routes in the metropolitan area. It also proposed a unique funding and investment partnership between the federal and state governments and the private sector³⁵. Subsequent participation by the US Federal Highway Administration (FHWA) and Illinois Department of Transportation provided important programmatic, environmental and expedited decision-making designed to bring projects to completion without the kinds of process delays that have plagued major capital investments in the past.

The Chicago Region Environmental and Transportation Efficiency Program (CREATE) is a partnership between the State of Illinois, City of Chicago, Metra (the regional public transit authority) and the freight railways. This new system is designed to fill in gaps in the existing system, eliminate duplication where not required, and integrate the truck routes with the location of interchanges on the Illinois toll system. Where full-time designation of truck routes is not feasible on some arterials due to loadings during peak commuting hours, there could be “time of day” truck route designations.

CREATE will invest \$1.5 billion in critically needed improvements to increase the efficiency of the region's rail infrastructure and the quality of life of Chicago-area residents.

Program Goals:

- Reduce rail and motorist congestion
- Improve passenger rail service
- Enhance public safety
- Promote economic development
- Create jobs
- Improve air quality
- Reduce noise from idling or slow-moving trains

The Federal Highway Administration (FHWA) Illinois Division Office, in cooperation with the Illinois Department of Transportation and the Chicago Department of Transportation, developed the Systematic, Project Expediting, Environmental Decision-making (SPEED) Strategy to address the CREATE Program in total (see page 6 for description of the SPEED process and page 8 for the SPEED flow chart). The SPEED Strategy supports systematic decision-making, provides an expeditious method of moving low risk component projects forward, and assesses potential environmental impacts in a proportional, graduated way.

The CREATE program identified 78 major projects and four region-wide technology, grade separation and grade crossing projects. Funding for these projects is governed by a series of Memoranda of Understanding and joint funding agreements that includes both government, private railroads and national associations.³⁶ A governance and decision-making structure

³⁵ The Metropolis Freight Plan – Delivering the Goods, Chicago Metropolis 2020

³⁶ Chicago Region Environmental and Transportation Efficiency Program - Final Feasibility Plan, August 2005

were also implemented to assure that decision-making and funding could proceed in an orderly and efficient manner. Since August 2005, when the final agreements were completed, 37 environmental permitting studies have been undertaken, with 9 completed; 43 projects have entered Phase I design and engineering with 7 completed, and construction has been completed on 3 projects (the Grand Avenue Underpass, the Deval Tower replacement and the Brighton Park junction improvement project.) \$330 million has been raised for the Phase I program. Under this phasing plan, 32 projects are expected to be completed by the end of 2009.³⁷

4.3.2 The Alameda Corridor

The Alameda Corridor in southern Los Angeles County, California is a depressed, grade-separated route that provides truck-only roads and freight-only railroad tracks connecting the ports of Long Beach and Los Angeles to highways connecting to central Los Angeles. Referred to collectively as the San Pedro Bay ports, the LA/LB complex routinely handled as much as 25% of all US-bound containerized imports – primarily from Asia – with an annual value (at the time the project was designed) of approximately \$120 billion (US). In 2006, the San Pedro ports handled nearly 36% of all US-bound containerized imports – roughly three-and-a-half times as much as all Canadian ports combined.

The Alameda Corridor project consolidated the operations of the freight railroads that served the harbour and was designed to mitigate the impact of the containerized international traffic transferring through the San Pedro Ports, reducing delays, emissions, and congestion. Upon completion of the project, Burlington Northern Santa Fe (BNSF) and Union Pacific/Southern Pacific, which formerly used four independent routes consisting of 90 miles of track, shifted operations to a single 20-mile, high-capacity, below-grade train way (see **Exhibit 4-1**). The configuration of the corridor circumvents more than 200 rail crossings via bridges, underpasses, overpasses and street improvements that separate freight trains from street traffic and passenger trains. The project's lynchpin is the Mid-Corridor Trench, which carries trucks and freight trains in an open trench that is 10 miles long, 33 feet deep and 50 feet wide.

The Alameda Corridor one of the largest public works projects in the United States – a \$2.4 billion intermodal rail corridor. It began modestly as a low budget planning study in the early 1980s in response to anticipated rapid growth of trade through the Ports of Los Angeles and Long Beach. The combination of public and private funding for the project was substantial and, at the time, unprecedented. The Los Angeles County Metropolitan Transportation Authority (LACMTA) committed \$347 million in grants for the project, and the San Pedro Ports purchased necessary rights-of-way (ROW) from railroads for \$ 394 million.

³⁷ See: CREATE web site at: <http://www.createprogram.org/>

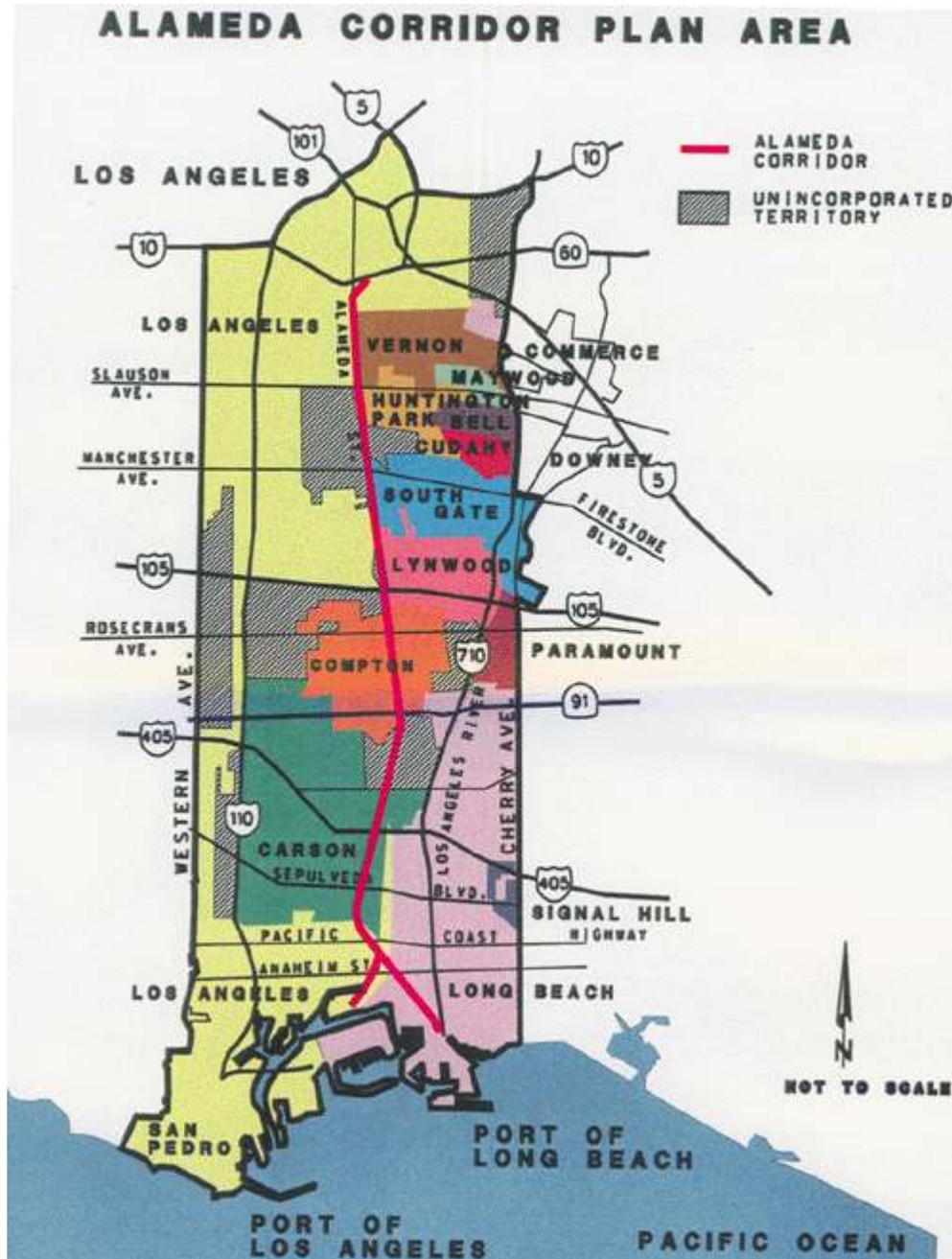


Exhibit 4-1: Alameda Corridor

Financing for the corridor depended on innovative approaches for both the federal and metropolitan government-backed financing as well as the participation of the ports and the metropolitan government. Government financial commitments were instrumental in convincing private stakeholders to participate. In 1995, the National Highway System Designation Act designated the Alameda Corridor as a High Priority Corridor. Thereafter, the Alameda Corridor Transportation Authority (ACTA) that had been created to fund and oversee

the public private partnership, was able to obtain a \$400 million federal loan under the combined provisions of the Surface Transportation and Uniform Relocation Assistance Act of 1987 and the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA).

Railroads agreed to pay a container-based user fee for access to the Alameda Corridor. The projected revenue stream allowed ACTA to finance a \$1.1 billion revenue bond issue and also helped in securing a \$400 million federal loan. The user fee concept negotiated with the railroads as a part of the ROW purchase made it possible to create a debt repayment structure that would grow in the future as cargo and fee increases translated into higher revenues for ACTA. The rail corridor user fee and container charge system was essential to assembling and leveraging funding resources for the project without massive government grants generally associated with public infrastructure projects.³⁸

4.3.3 Puget Sound FAST Corridor – Port Access Routes

The FAST Corridor includes a series of projects for improving freight flow. In addition to road / rail grade separations, the FAST Corridor includes a set of port and rail yard access projects that are essentially truck routes to those facilities. Three examples are the Port of Tacoma Road, which allows trucks to flow into and out of the Port of Tacoma while passing over SR509 and parallel railroad tracks; the South Spokane Street Viaduct with widened lanes to improve the direct link used by 45% of the Port of Seattle’s truck traffic to go between I-5 and the West Seattle freeway; and the Atlantic Street overpass and expressway ramps to separate ferry and freight traffic to the Port of Seattle terminals from local vehicle traffic.

4.3.4 World Trade Bridge in Laredo, Texas

Beginning in the 1980s, increasing trade volumes at the US-Mexico border crossing began to cause serious congestion in downtown Laredo near the Juarez-Lincoln Bridge. In 1991, representatives from Laredo, Texas, Nuevo Laredo and Juarez, Mexico, and other regional stakeholders convened to devise a solution. The favoured plan was a “Truck-Only” bridge over the Rio Grand, which would separate heavy trucks from pedestrians and passenger cars through the port of entry. The project was funded in 1995 and the bridge, dubbed the “World Trade Bridge,” opened to traffic in 2000.

4.4 Highway Pricing on Existing Roads

Most of these projects involve the conversion of existing HOV (high occupancy vehicle) lanes to HOT (high occupancy/toll) lanes. Examples are discussed below.

³⁸ “Alameda Corridor: A Blueprint for the Future? Davidson Conference Center University of Southern California”, Ajay Agarwal, Genevieve Giuliano, and Christian Redfean; School of Policy, Planning and Development University of Southern California, June 2004.

4.4.1 California - HOT Lanes on I-15 in San Diego

San Diego's "Fastrak" pricing program was implemented in April 1999. SOV drivers pay a toll each time they use the Interstate 15 HOV lanes. The unique feature of this pilot project is that tolls vary dynamically with the level of congestion on the HOV lanes. Toll collection are automated and the tolls can vary in 25-cent increments as often as every six minutes to help maintain free-flow traffic conditions on the HOV lanes. The tolls are used to fund an express bus service on the same corridor.

4.4.2 HOT Lanes on Two Radial Corridors in Houston, Texas

Houston's "QuickRide" Value Pricing Pilot Program consists of automated High Occupancy Toll (HOT) lanes on the Katy Freeway (I-10W) and the Northwest Freeway (US 290W). The Katy Freeway is a 13 mile route, serving over 219,000 vehicles per day and 28,585 person-trips per day. Its HOV lanes were converted to HOT lanes through the QuickRide program in 1998. The Northwest Freeway is a 15 mile route, serving over 235,000 vehicles per day, and over 20,500 person-trips per day. The QuickRide program was implemented on it in 1999. On both highways, under this program two-person carpools (HOV2) use the HOV lane for \$2 per trip during peak hours, while larger carpools (HOV3+) and buses use the lane for free. Funding from FHWA has supported TxDOT and METRO in the continuing expansion of the QuickRide program.

4.4.3 HOT Lanes on I-394 in Minneapolis, Minnesota

The I-394 "MnPASS Lanes" program was implemented in early 2005. The project was funded and constructed through a public/private partnership involving the State of Minnesota and a private entity, which has funded 20% of the project's estimated \$10 million cost. Carpoolers and bus users have free access and priority use. Drivers of single occupant vehicles use the lanes on an as-needed basis by paying tolls that are automatically collected.

4.5 Pricing on New Lanes

These are projects in which new highway lanes are built specifically as HOT lanes. This allows them to have fully private funding. An example of such project is Express Lanes on State Route 91 in Orange County, California.

The State Route 91 (SR 91) Express Lanes in Orange County, California opened as a four-lane toll facility in 1995. Today, the Express lanes capture 11% of total daily traffic. The lanes are located on a 10-mile section of one of the most heavily congested highways in the U.S. Toll revenues have been used to pay for construction and operating costs.

As of November 1, 2001, tolls on the facility vary between \$1.00 and \$4.75, with the tolls set by time of day to reflect the level of congestion delay avoided in the adjacent free lanes, and to maintain free-flowing traffic conditions on the toll lanes. All vehicles must have a "FasTrak" transponder to travel on the express lanes. Vehicles with three or more occupants pay a

reduced toll. In November 2002, average daily traffic on the Express Lanes was 26,000 vehicles per day, bringing in over \$29 million of revenue. On average, 75% of the daily traffic is from HOVs, and 25% is from toll-paying customers.

4.5.1 Road User Fees - Melbourne, Australia

CityLink is a 22-kilometre automated tollway that connects the Tullamarine Freeway, the West Gate Freeway and the Monash Freeway in metropolitan Melbourne, Australia (see **Exhibit 4-2**). One of the world's first fully electronic tollroads, it became operational in January 2000. The roadway was established as a partnership between the state government and Transurban who will hold the concession through 2034. Transurban wholly owns the infrastructure and is responsible for all operations.

Users obtain a CityLink pass or open an account before traveling on CityLink roadways, and several levels of service are available. The transponder device is called "e-TAG", and it is integrated with tolling systems elsewhere in Australia including New South Wales and Queensland. Service is expanding within Victoria through 2008.

Key operational statistics include the following:

- More than 700,000 tolling transactions per weekday
- More than two million CityLink Passes issued to more than 800,000 casual users each year
- More than 1.5 million vehicles (or over 40% of Victoria's vehicles) registered with CityLink

Transurban reports the following economic impacts of the corridor:

- Business savings estimated at more than AUD \$250 million annually
- Economic growth valued at more than AUD \$300 million. (Source: Allan Consulting)
- 10,000 jobs created (pre- and post-construction) (Source: Allan Consulting)
- Savings of up to 25 million litres of fuel a year for businesses (VPTI)

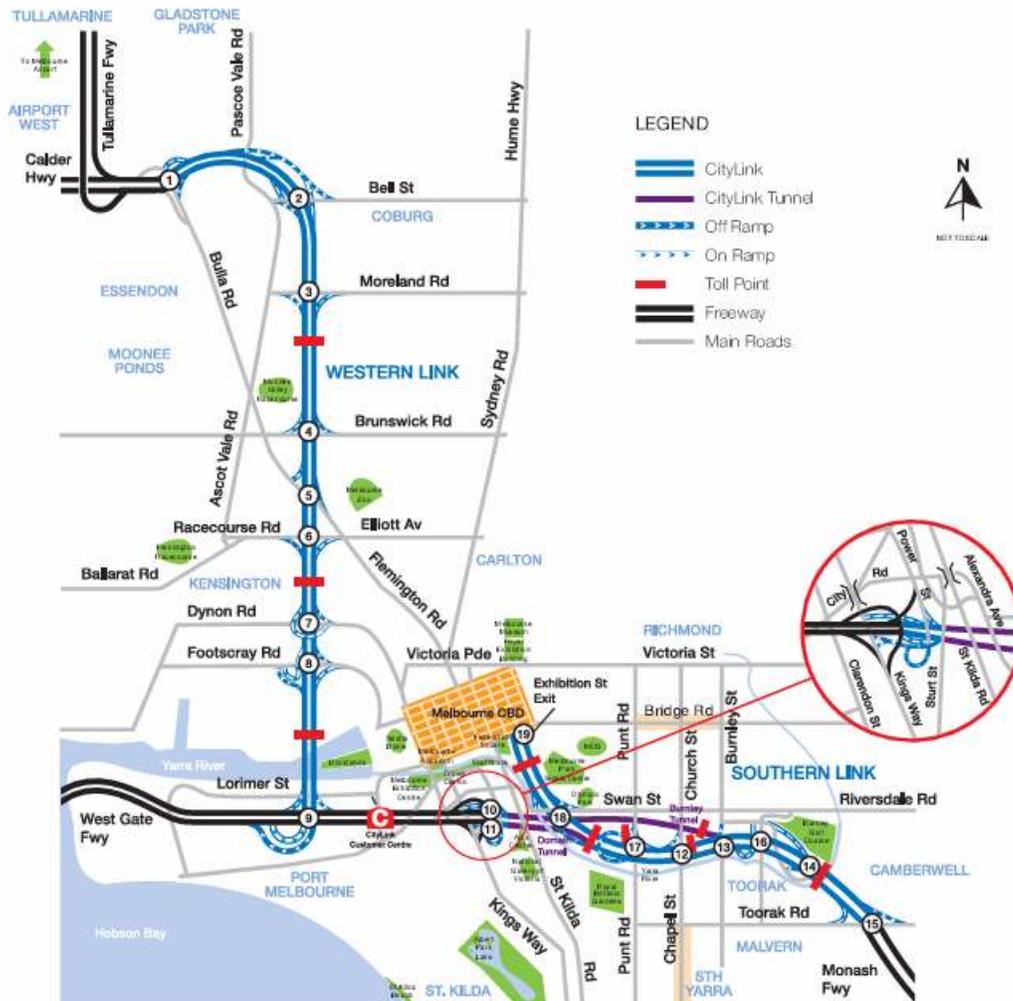


Exhibit 4-2: CityLink

4.6 Variable tolls for Heavy Vehicles

Unlike the preceding examples of tolls on only some lanes, these projects provide for time-of-day pricing and special truck pricing policies on toll roads. These policies can serve to encourage off-peak truck movements.

Variable tolls for Heavy Vehicles in Lee County, Florida - the “LeeWay Program” – were implemented in 1998 on two toll bridges crossing the Caloosahatchee River. The Midpoint Bridge and Cape Coral Bridge are on primary commuter corridors. The program involves giving toll discounts of 50% just before and just after the peak traffic periods to entice commuters out of peak hour travel and distribute traffic more uniformly over different times of the day.

The Port Authority of New York and New Jersey operates bridges and tunnels spanning the Hudson Rive connecting New York City with various points in New Jersey. The Port Authority instituted variable tolls for several classes of heavy vehicles based on vehicle size and the number of axels. In addition to vehicle type, these tolls are priced by time of day (peak and off-peak) and also provide discounts for using electronic toll tags (the EZ Pass program, which is available to motorists in both New York and New Jersey.) Electronic tolling on the East Coast of the US includes the ability to recognize and transfer tolling charged through transponders issued by states from Massachusetts to Maryland – enabling both drivers and truckers to use electronic toll collection lanes (generally medium to high-speed lanes) throughout the Northeast Corridor of the US.

4.7 Cordon Tolls

The most comprehensive and inclusive form of road pricing is the development of a “cordon” line around the most heavily congested part of an urban area, with a system of daily charges put on vehicles that enter the area. Typically, persons living inside the cordon area and government vehicles are excluded from the tolls, or receive a discount or other adjustment in toll charges that they incur. Some variations of cordon charges are based on zone-to-zone rates within the cordon in addition to crossing the cordon. Most cordon pricing plans also adjust charges so that multiple crossings in a single day are adjusted to reflect a single crossing per day.

4.7.1 London, UK Commercial District Pricing

Congestion pricing took effect in February, 2003. Between the hours of 7:00 am and 6:30 pm, drivers entering an area bounded by “Inner Ring Road” must pay £5.00 via cell phone text messaging or at sidewalk kiosks. Some users, such as seniors or local residents, are eligible for discounted rates. Weekly and monthly passes are also available at discounted rates. The toll is enforced using an advanced network of cameras that check license plates against a database of paid users.

After several months of congestion pricing, London’s Commission for Integrated Transport conducted a study of the program’s impact. The study, completed in September, 2003, consisted of surveys of businesses and stakeholders from different business categories. It found that nearly 25% of survey participants supported the charge, a little over half held mixed views or were neutral, and the remaining quarter held a negative opinion of the charge. The greatest level of support was observed among courier services. Also supporting the study were large companies that adapted their travel and delivery schedules. The greatest level of opposition was found among convenience store owners and other small businesses. The study found that while the charge reduced congestion, resulting in shorter and more predictable travel times, events in the larger economy (a general economic slowdown, SARS outbreak and closures of key Tube lines) made it difficult to determine a precise economic impact.

4.7.2 Singapore Cordon Pricing

Singapore, a city-state the size of Seattle, implemented its “Area Licensing” scheme in 1975 specifically to control severe road congestion. This was a manual system of tolls for multiple entries into the restricted central zone. Electronic road pricing (ERP) became operational in Singapore in 1998, replacing the manual congestion pricing scheme. Studies found that the system has raised about US \$1 billion per year and significantly reduced car travel, as well as inducing mode shift to public transport. However, critics indicate that some business activities and hence some congestion have merely moved to other locations outside of the cordon line.

4.7.3 Cordon Pricing Pilot Project in Stockholm, Sweden

The goal of the Stockholm congestion pricing (in the trial stage) is to reduce traffic entering central Stockholm by 10 to 15%. A cordon has been established around the innermost islands of the archipelago with 18 charging points. A charge of US\$1.33 to US\$2.66 will be imposed for each crossing of the cordon, depending on the time of day. The maximum charge will be US\$8.00 per day. Crossings are estimated at 500,000 a day. Estimated impacts include a 10 to 15% reduction in traffic into the city center (20% at cordon points) during peak periods, a 7% increase in public transport use (12,000 new riders, above current high levels), and an increase in traffic on the circumferential roads.

The technology used for the charging scheme involves both electronic identification using onboard units, or transponders, and automated number plate recognition photo systems that work independently. Only the photo system will be used as part of the payment and enforcement process (since a photo was deemed necessary for adjudication).³⁹

4.8 Conditions for Success / Lessons Learned

The experience gained elsewhere helpful in understanding the necessary conditions that should be created to ensure the successful life of any of those TDM initiatives. Conditions for success and lessons learned are summarized below.

A primary ‘condition for success’ is that TDM should be integrated and coordinated across the region – for example, as in Bremen. This means that:

- System integration should be achieved not only between travel modes, but also between administrative structures and planning processes
- The development of partnerships, among public and private agencies, is of primary importance in achieving system integration
- The successful introduction of individual measures, such as car-share, carpools, vanpools, etc., also may require the collaboration of several different agencies
- TDM measures should be viewed as complementing other transportation initiatives, such as transit and land use planning

39 USDOT and FHWA, Managing Travel Demand, Applying European Perspective to U.S. Practice, May 2006 available on-line at: <http://international.fhwa.dot.gov/traveldemand/index.htm>

- Integrating modes is not primarily a question of technology, although it may be a necessary element of a given measure, technology alone will not guarantee the success of a measure in the absence of organizational, procedural and administrative coordination
- Establishing clear investment priorities should be accompanied by leadership in implementation by public and private sectors

Unique in Canada, the Vancouver region has the administrative ingredients that would enable this integration and coordination, through the existence of a regional, multi-modal transportation authority (TransLink) as well as a well-established forum that brings together public and private interests in passenger and goods movement (the Gateway Council). To a large degree, this integration is happening already; but the lesson from Bremen is that the programmes require a focus across all interests.

Metro Vancouver is already achieving success with TDM. Specific measures that would augment this success are:

- Expanded car-share services to complement transit services in high density urban centres
- Non-auto community planning to complement transit service in high-density centres
- Integration of land management with passenger and freight system needs
- Developing truck / freight priority or exclusive routes can be successful in improving the efficiency of goods movement while relieving capacity and operational pressures on passenger networks
- Provision of ITS-based traffic monitoring and management systems for dissemination of travel information to all modes and for enhanced traffic operations
- Linkage of economic development strategies to TDM strategies and to comprehensive freight plan
- Improved access management and design for retail and commercial uses in high density areas to accommodate efficient freight delivery

Specific TDM measures of interests are further discussed in **Section 5**.

5. EVALUATION OF SELECTED MEASURES

This section provides the reader with more discussion of TDM measures that have been found successful elsewhere and that present opportunities for success in Metro Vancouver. Some of the measures, such as transit oriented development or car share are either known or have gained some ground in the region. However, in the view of the authors of the report, these measures and knowledge of their impacts deserve further reinforcement.

Over the next 20 years, Metro Vancouver will significantly increase in population and employment. At the same time, the region is land-locked between the mountains regions and the Strait of Georgia, and is divided by the Fraser River and numerous waterways. The combination of population influx, limited land supply, high levels of transit investment already achieved, and the availability of federal funding for transit creates conditions where the development industry and housing markets may be more receptive to accepting higher-density urban forms in previously low-density areas. The high density, transit oriented development has a proven record of decreasing auto travel, increasing transit usage and usage of auxiliary modes.

Car-free planning, also known as “Shared Space” or “Pedestrian Malls,” is a low-cost measure that sends a positive TDM message to the public, is attractive to business, appeals to pedestrians and cyclists, and has a positive impact on urban cores. Properly executed, car-free planning can not only rejuvenate the local economy, but also can significantly reduce the number of auto trips without sacrificing accessibility for deliveries.

Car-share has become vary popular in Europe and is spreading its popularity throughout North America. Car-share does not necessarily require public investment; although public support can be important, and can include permission to use a portion of municipal and private parking lot(s) to store company vehicles; encouragement of the residential development industry to consider car-share lots in their planning; and, support for placing car-share lots in close proximity to busy transit stations.

The recommended TDM measures are discussed in detail in the following sections.

5.1 Transit Oriented Development

Transit-Oriented Development (TOD) is a type of clustering, or a way of designing communities that brings together a variety of land uses for accessibility.⁴⁰ Many reports, websites, and guidelines address TOD, including two recent reports by the US Transportation Research Board (Chapter 17 of TCRP Report 95⁴¹ and TCRP Report 102⁴²). The Victoria

40 Victoria Transportation Policy Institute, “Land Use Density and Clustering”, *TDM Encyclopedia*, <http://www.vtpi.org/tdm/tdm81.htm>, Victoria: Victoria Transport Policy Institute, 2007.

41 Evans J.E., IV et al. “Traveler Response to Transportation System Changes: Chapter 17 – Transit Oriented Development” TCRP Report 95, Washington: TRB, 2007.

42 Cervero, R et al., “Transit Oriented Development in the United States: Experiences, Challenges, and Prospects” TCRP Report 102, Washington: TRB, 2004.

Transportation Policy Institute's TDM Encyclopaedia also provides a great deal of information concerning TOD.⁴³

5.1.1 Description

TOD attempts to increase ridership through the provision of compact, mixed-use development in transit nodes or along transit corridors. Normally, TOD neighbourhoods are designed with pedestrian priority and have a residential emphasis, or at minimum a residential component. Ideally, these areas provide a mix of residential, shopping, and employment land uses, either at one node, or through easy access by transit between closely spaced transit nodes. It can also take the form of transit joint development, where the transit agency owns a portion of the land and takes part in the financing of the development.

5.1.2 Strengths

TOD is supportive of other TDM measures. Investment in TOD provides some of the greatest returns in the area of peripheral benefits to the local community and the region. Many proponents of TOD argue that it can reduce sprawl and traffic congestion. The greatest strength of TOD is its potential to boost transit ridership.

5.1.3 Weaknesses

TOD does have some social weaknesses, which may include affordability impacts to lower income households. Although lower income residents and non-drivers benefit from access to transit, some TOD are relatively expensive and where TOD takes place as urban infill, it may displace some lower income residents.

Because these developments are often dense, infill developments close to rail lines or along low-cost corridors, they carry higher costs and risks than other development types. TOD also can face political opposition in the form of "not-in-my-back-yard" (NIMBY) opposition to infill. Successful TOD developments require the coordination of a number of actors, including developers, transit agencies, local governments, and stakeholder groups. The cooperative nature of these projects can form a barrier to success. Finally, the nature of TODs as node developments can create spot congestion.

5.1.4 Costs of Implementation

Costs associated with TOD include capital expenditures to improve pedestrian and cycling facilities and the additional cost of improved public transit services. In addition, TOD communities may experience increased local traffic congestion and noise exposure as a result of the higher densities.

43 Victoria Transportation Policy Institute, "Using Public Transit to Create More Accessible and Liveable Neighbourhoods", *TDM Encyclopedia*, <http://www.vtpi.org/tdm/tdm45.htm> Victoria: Victoria Transport Policy Institute, 2007.

5.1.5 Benefits of Implementation

Like other TDM measures, TOD has environmental, economic, and societal benefits. According to one source, TOD “reduces transportation costs and externalities, increases travel choice, and reduces land paved per capita.”⁴⁴ Further, TOD neighbourhoods have higher property values and increased commercial activity and reduce parking requirements, as well as reduce vehicle ownership, vehicle usage (expressed as vehicle-kilometres travelled [VKT]) and emissions. It may also promote physical activity through the encouragement of walking and cycling as viable travel modes.

Residents of TOD neighbourhoods are more likely to commute using transit than residents of automobile oriented suburbs (although, on the other hand, dual-income families and residents who have changed jobs [i.e., from workplaces in close proximity to their place of residence] may not be able to use transit, regardless of their residency). TOD improves basic mobility while decreasing auto trips and providing communities with a wider range of amenities. The residents of TOD neighbourhoods often have lower automobile ownership rates and correspondingly higher transit trip rates and more trips by active modes. This, in turn, can have positive health benefits. They also benefit from higher property values and increased commercial activity.

5.1.6 Conditions for Success

TOD is most successful under specific circumstances. When demand for real estate and traffic congestion are both high, market pressure may be sufficiently high to show a clear benefit to development with good access to rail⁴⁵. That said, there are ways local governments and agencies can encourage successful TOD.

In order for TOD neighbourhoods to be successful, a key requirement is density. Different Transit service types require different densities to achieve ideal ridership. Although these required densities differ significantly between developments depending on a variety of factors, the values in represent average residential density requirement values.

The residential minimum density values in can be reduced through a variety of measures that can increase the success of a TOD neighbourhood. These include improved service quality, lower fares and the provision of passes, commuter financial incentives, employment density through larger and more centralized commercial areas, ‘walkability’ and marketing.

44 Transportation Policy Institute, “Using Public Transit”, 2007

45 Cervero, R et al., “Transit Oriented Development”, 2004.

TOD is supportive of and supported by many other TDM strategies, including:

- Public transit improvements
- Parking management
- Traffic calming
- Car-sharing
- Active transportation improvements

Table 5-1: Transit Density Requirements⁴⁶

Mode	Service Type	Minimum Density (Dwelling Units Per Acre)	Area and Location
Dial-a-Bus	Demand response serving general public (not just people with disabilities).	3.5 to 6	Community-wide
“Minimum” Local Bus	1/2-mile route spacing, 20 buses per day	4	Neighborhood
“Intermediate” Local Bus	1/2-mile route spacing, 40 buses per day	7	Neighborhood
“Frequent” Local Bus	1/2-mile route spacing, 120 buses per day	15	Neighborhood
Express Bus – Foot access	Five buses during two-hour peak period	15	Average density over 20-square-mile area within 10 to 15 miles of a large downtown
Express Bus – Auto access	Five to ten buses during two-hour peak period	15	Average density over 20-square-mile tributary area, within 10 to 15 miles of a large downtown
Light Rail	Five minute headways or better during peak hour.	9	Within walking distance of transit line, serving large downtown.
Rapid Transit	Five minute headways or better during peak hour.	12	Within walking distance of transit stations serving large downtown.
Commuter Rail	Twenty trains a day.	1 to 2	Serving very large downtown.

This table, based on research by Pushkarev and Zupan (1977), indicates typical residential densities needed for various types of transit service. Such requirements are variable depending on other geographic, demographic and management factors.

There are a number of ways for local governments and agencies to support TOD. The most effective way for metropolitan planning organizations and other agencies to support TOD is to provide funding for station area planning, infrastructure and other capital improvements. Smart growth legislation and grants for urban renewal in transit adjacent areas are also positive steps to encouraging success. It is essential to streamline institutional coordination and increase cooperation between agencies that control different elements of land development and transit-service delivery. Zoning bonuses and other public policy incentives such as allowing a mix of

46 From Victoria Transportation Policy Institute, “Using Public Transit to Create More Accessible and Liveable Neighbourhoods”, *TDM Encyclopedia*, <http://www.vtpi.org/tdm/tdm45.htm> Victoria: Victoria Transport Policy Institute, 2007 based on Pushkarev and Zupan (1977).

uses and increasing density envelopes reward developers for considering TOD and encourage success and also result the benefits of a highly integrated network.

Implementation of TOD in the environment where the responsibility for land use planning is still divided among different levels of government can be challenging to say the least. Development of a common and integrated planning platform, shared by all partners and supported by higher levels of government is essential. Types of barrier for developing integrated approach may include individual's resistance to change, political, institutional, societal (at municipal or neighbourhood level) or methodological barriers.⁴⁷ Overcoming barriers will require well planned change management approach combined with understanding of the common goal.

5.2 Car-Free Planning

Car-free planning through the implementation of shared spaces, pedestrian malls, or other similar area types can effectively support other TDM measures. These types of area treatment combined with preference for walking and cycling are more common in European cities than in North American cities, although they do exist on our continent as well. The term "Shared Space" originated in Europe to describe streets and public spaces that integrate traffic with other forms of human activity.⁴⁸ This section provides a brief overview of the shared space / pedestrian mall concept, including the description, an overview of strengths and weaknesses, costs and benefits of implementation, and finally the conditions for success.

5.2.1 Description

There is a wide range of car-free planning based activities, which range from complete restrictions on automobiles to reduced or discouraged usage to alternative forms of automobiles integration with other modes taking precedence. Pedestrian malls are often commercial districts that are focused on pedestrian traffic, with automobiles being partially or entirely restricted. Car-free planning can also take the form of urban districts where personal automobiles both restricted and unnecessary. In all cases, restrictions may be relaxed for certain vehicle types, including transit, emergency vehicles, delivery vehicles, taxis, or vehicles for people with disabilities.⁴⁹

Car-free zones can also take the form of shared spaces. These areas have no conventional traffic management measures, and automobile traffic must interact with other modes directly. All road users in these areas are responsible for practicing "good manners" and being considerate of other road users. Shared spaces stress the importance of public space, and give priority to users who are staying in the public space instead of those travelling through the public space.⁵⁰

47 Organization for Economic Co-operation and Development, Policy Instruments for Achieving Environmentally Sustainable Transport, Paris, 2002

48 Shared Space, <http://www.shared-space.org/>

49 Victoria Transport Policy Institute, "Car Free Planning", 2007

50 Shared Space, "Room for Everyone: A new vision for public spaces", www.Shared-space.org, The Netherlands: Fryslân Province

5.2.2 Strengths

Pedestrian malls, or commercial districts that are restricted to pedestrians, can encourage urban revitalization and create an attractive pedestrian environment. Although car-free zones may not reduce VKT when undertaken in isolation, when completed on a larger scale along with other TDM strategies, they may generate significant travel benefits: Shared spaces and pedestrian malls can make alternatives to SOV travel more attractive and adjust overall driving habits over time. This is most likely when integrated with land use management techniques, such as TOD, smart growth or traffic calming.

5.2.3 Weaknesses

When enacted in a small area as a TDM measure, car-free zones may have little impact on VKT reduction, as it may simply shift VKT to other locations and times.

5.2.4 Costs of Implementation

The most significant expenses associated with car-free zones are related to infrastructure and administration. Car-free areas must be identified, signed, and enforced. There is also some reduced convenience for motorists. If car-free areas are not effectively applied, there may be lost revenue to businesses.⁵¹

5.2.5 Benefits of Implementation

The implementation of pedestrian malls can encourage pedestrians to purchase more goods. A study by Accent Marketing & Research of consumer expenditure by mode in British towns, cited by VTPI, found that customers who walk spent more than those that travel by any other mode. In fact, pedestrians spent almost a third more than customers traveling by car. This increased expenditure can contribute to the economic viability of an area.

When implemented in large areas and as part of a comprehensive TDM plan, car-free planning can improve liveability, reduce traffic congestion, result in savings in road maintenance, reduce VKT and emissions, and increase road safety. Reducing vehicle traffic improves the pedestrian experience and reduces the number and severity of collisions, while encouraging active transportation, which reduces health care costs.

5.2.6 Conditions for Success

In order for a pedestrian mall to be successful it must be attractive and lively. There is a critical mass of users required to create such an environment, and the area must therefore form a connection among many types of attractions and be landscaped in an attractive way. The area should incorporate a variety of pedestrian-oriented activities. This may include retail, services,

51 Victoria Transport Policy Institute, "Car Free Planning: Reducing Driving at Particular Times & Places", *TDM Encyclopedia*, <http://www.vtpi.org/tdm/tdm6.htm>,
Victoria Transport Policy Institute, 2007

housing and employment. Often, residential and commercial space is incorporated on the second floor, over street level shops. The land use should highlight historical features while encouraging the development of artistic, cultural, and recreational amenities. The area should be clean and safe and accessible by different travel modes. In some cases, it may be advisable to allow motor vehicle access with restrictions, such as morning access, transit vehicle access, or pick up and drop off areas. Car-free areas experience the most success where there are travel alternatives to SOV, as well as peripheral parking options and benefit greatly when located in high-density areas.⁵²

Shared space must make public spaces complete and accessible; an active part of the community. It requires that there be a “slow” network, where traffic must adapt to social behaviour. There must be an associated “fast” network, where traffic can travel quickly, so destinations that are outside of walking distance can also be reached with relative ease. The “slow” network should provide a “fine-meshed network of paths and lanes”⁵³ where pedestrians are the first priority while the “fast” network provides high-quality thoroughfares

Kimberly, BC has implemented a successful commercial pedestrian mall in the form of the Platz, a primarily pedestrian commercial area. Kimberly’s OCP stipulates that all developments in the area must be in the pedestrian scale.⁵⁴ The area is now advertised on Kimberly’s website as a tourist attraction.

There are many examples of car-free zones throughout Europe. These areas are often tourist destinations and form the core of social and commercial activities within the cities. Some cities have transitioned to modern car free zones from busy auto-oriented streets, such as Balingen, Germany. Other locations have maintained traditional pedestrian squares, such as Krakow, Poland.

5.3 Car-Share

In 2005 the US Transportation Research Board released a report concerning car-sharing.⁵⁵ The report gives an overview of the practice of car-sharing, including possible markets and the resulting impacts. Also included is an outline of the role of partner organizations and the contributions and benefits that these partners, such as local governments, transit agencies, employers and businesses, developers, and universities extract from partnerships with car-sharing organizations. This report provided much of the following information.

52 Victoria Transport Policy Institute, “Car Free Planning?”, 2007

53 Shared Space, “Room for Everyone”

54 City of Kimberly, “Official Community Plan” <http://kimberley.fileprosite.com/contentengine/launch.asp?ID=440>, 2005

55 Millard-Ball, A., G. Murray, J. ter Schure, C. Fox, J. Burkhardt, “Car-Sharing: Where and How It Succeeds”, TCRP Report 108, Washington: Transportation Research Board, 2005.

5.3.1 Description

Most often, car-sharing is a service provided by private, for profit companies (e.g. Flexcar, Zipcar, Communauto), non-profit organizations (e.g. City CarShare in San Francisco, PhillyCarShare in Philadelphia), or by cooperatives (e.g. Cooperative Auto Network in Vancouver). In some cases, it may be sponsored by partner organizations, such as local government, transit agencies, or universities.

Car-sharing allows members to access a fleet of vehicles on an hourly basis and be charged for their total usage at the end of the month. These cars are easily accessible, booked online, or by phone, and often unlocked using an electronic key card. Used as a substitute for both car ownership and business fleets, car-sharing has rapidly gained popularity in North America. It remains, however, a niche product, with only 0.03% of US licensed drivers utilizing car-sharing as a mode of transportation.

In some cases, car-sharing can provide the mobility to make car ownership unnecessary. It compliments other alternative modes, filling a gap where other modes may not be appropriate. Car-share members may walk or cycle for the majority of trips, but utilize the service on occasions when they require one. Although it fills a niche, car-sharing is not appropriate for all trips. Taxis may be a better alternative for one-way trips and people who are unable to drive and it may be more affordable to employ a rental car for long distance trips.

5.3.2 Strengths

Car-sharing increases mobility while providing an alternative to car ownership. It makes the cost per trip more apparent to the user by charging on a per trip basis. Car ownership, conversely, involves large payments with little additional expense for each additional trip. Overall, communities where car-sharing has been integrated experience reduced vehicle travel and the associated environmental benefits.

5.3.3 Weaknesses

Along with the mobility gains seen in car-sharing there is some induced travel for members who did not previously have access to a car. This is mitigated, however, by a reduction in the number of members who choose to buy cars in the future, or who choose to buy second cars.

The success of car-share programs is often dependent on partnerships between independent firms and agencies or organizations, such as local government or transit agencies.

5.3.4 Costs of Implementation

For car-sharing organizations to experience continued growth, they require partner organizations to provide a variety of services. Partners are normally local governments, transit agencies, developers, employers and businesses, and universities who may benefit from the activities of the car share organizations. Partners can provide several types of support: marketing, administration, funding, parking, transit integration or memberships.

There are opportunities for transit agencies to enter into mutually beneficial partnerships with car-sharing organizations. These partnerships can improve access to stations while increasing ridership and improving mobility for transit customers. Transit agencies can provide marketing and administration help, as well as parking on transit lots. Joint discounts or fare integration may encourage ridership and increase car-sharing travel. Station car programs, such as those in Portland, Oregon, link transit to the home or work place, allowing travellers to drive to a transit station and make the majority of the trip by transit or to utilize a shared car to access a destination that is beyond walking distance of the transit stop. Transit agencies may be able to replace some non-revenue fleet vehicles with shared cars through membership. Finally, car-sharing friendly policies can be incorporated in to planning, policy, and tax strategies. BART in the San Francisco Bay Area has included car-sharing in its Station Access Guidelines by reserving car-sharing spaces in high-profile locations.

Local government agencies can be an especially important partner to a car-sharing organization. In turn, car-sharing can be an essential part of a TDM strategy, reducing car ownership, as well as parking demand, VKT and emissions, and providing social benefits through access to a car for lower income residents. Many local governments, such as those in Arlington County, Virginia, St. Paul, Minnesota, and Brookline, Massachusetts see car-sharing as an essential part of their larger TDM strategy. In turn, local government agencies can provide marketing help, and administrative assistance. Local governments can provide access to parking, including on and/or off street spots. Some cities have made financial contributions to car-sharing organizations or established memberships that benefit the car-sharing organization by providing patronage and the agency by providing access to shared vehicles. Car-sharing can reduce or replace fleets. Finally, local governments can incorporate car-sharing friendly policies into planning, policies, and tax strategies.

5.3.5 Benefits of Implementation

Almost all levels of society can see benefits of car-sharing. Households and individuals gain access to a vehicle for occasional trips and can avoid the costs of an additional vehicle. Parking requirements can be reduced. Generally, car-sharing seems to reduce the amount of vehicle travel; by converting the fixed costs of car ownership to the usage fees of car-sharing, members are encouraged to make use of other, cheaper forms of transportation. However, for members who did not previously have access to a car, there is some induced travel. This is accompanied by improved mobility and offset by the reduced travel of members who have sold their cars. In summary, car-sharing leads to lower emissions, increased transit ridership, cost savings for households and businesses and greater mobility.

Partner organizations may also see some financial benefits to supporting car-share organizations. In the case of replacing fleet vehicles, some agencies have experienced significant savings. The City of Philadelphia replaced its fleet vehicles with car-sharing through PhillyCarShare in response to a budget crisis. The City estimates that it saved approximately \$9 million USD in the first year of this program.

5.3.6 Factors for Success

Because car-sharing fills a niche in the range of alternative transportation options and depends to a certain extent on density, it is more suitable for some geographic markets than others. It is only valid in neighbourhoods where other modes, like walking, transit, and cycling are viable options. It is most successful in metropolitan cores, where high density, mixed uses, and a pleasant pedestrian environment contribute to its success. **Exhibit 5-1** presents guidelines for the types of geographic environments where car-sharing is most likely to experience low and high growth. The most important factor listed is vehicle ownership. Car-sharing is most successful in neighbourhoods where it is possible to live with one car or completely without a car.

Variable	Low Growth	High Growth
Demographics		
% 1-person households	30%	40%-50%
Commute Mode Share		
% drive alone to work	55%	35%-40%
% walk to work	5%	15%-20%
Vehicle Ownership		
% households with no vehicle	10%-15%	35%-40%
% households with 0 or 1 vehicle	60%	70-80%
Neighborhood Characteristics		
Housing units per acre	5	5

Note: For most variables, the values are the suggested *minimums* that are needed for a viable car-sharing service in a given neighborhood. For the "% drive alone to work" variable, the values are the suggested *maximums*.

Exhibit 5-1: Guidelines for Where Car-Sharing Succeeds⁵⁶

Car-sharing has had less success in smaller communities. Aspen and Whistler, Colorado both have active car-sharing organizations, but in Halifax and Traverse City, Michigan, car-share operators were forced to close. In small and suburban communities the success of car-sharing organizations is dependent on community and volunteer support, as well as a strong champion.

There are several common neighbourhood characteristics that encourage successful car-share programs. Neighbourhoods where there are pressures on parking, or where parking is scarce or expensive, make car-sharing more attractive. As car-sharing does not meet all the mobility needs of a household, the neighbourhood must be well supplied with other modes, such as transit or pedestrian and bicycle facilities. Density impacts car-sharing in two ways; it increases the possible customer base within walking distance of each shared vehicle and increases the likelihood that residents will join, since dense neighbourhoods already have

⁵⁶ Millard-Ball, A., et al. "Car-Sharing", 2005 p ES-2.

lower rates of vehicle ownership and travel. Finally, having a mix of uses is essential to the success of car-sharing in a given neighbourhood. Business members are important to car-share organizations, as they increase utilization rates during working hours, when personal trip rates are lower. Car-sharing programs that can access both personal and business members with the same vehicle have a higher chance of success.

Car-sharing can also be successful in some other applications. University campuses have high car-sharing success rates. Developers and managers of apartment building may create another niche market for car-sharing, which can be seen as an amenity to tenants and reduce parking requirements. In small towns and villages, successful car-sharing is often dependent on the personal commitment of the members, although there are many successful cases throughout Europe and some in North America. Another approach depends on the partnership between a “parent” car-sharing organization and committed local members to encourage successful car-sharing in small communities. The Cooperative Auto Network successfully operates five rural locations throughout BC.

5.4 Roadway User Fees

5.4.1 Description

Road user fees offer the ability to create a variety of revenue generation, traffic management, and congestion management options. Road user fees can be implemented in a number of ways – through variably priced lanes on existing facilities and HOV/HOT lanes; tolling on entire facilities or roadways such as new highways, projects designed to increase the capacity of existing corridors, bridges and tunnels; cordon pricing involving either a fixed or variable charge to drive into or within a congested urban area; and area-wide charges which involve charges for movement into and out of traffic zones, per-mile charges for use of certain roadways within a metropolitan zone structure.

5.4.2 Strengths

Properly priced and evaluated with regard to price response (elasticity of demand), pricing has been proven as a long-term way to manage capacity, institute transportation demand strategies within highly congested corridors and urban areas and provide a source of revenue for both capital improvements and continuing operations and maintenance. Pricing strategies can be “fine-tuned” to discourage non-essential trips in peak hours and to induce travelers to use shoulder periods for travel to work as well as for non-work purposes.

5.4.3 Weaknesses

Pricing most often fails due to the lack of initial consensus building, poor public outreach in advance of pricing implementation or the inability to sustain commitments in the face of public discussion concerning the use of current (pre-toll) highway revenues. This is most often manifest as a “double-taxing” given that most current transportation revenues are derived

from gas taxes that both users and non-users of a particular segment of road pay irrespective of travel on the tolled facilities.

Other weaknesses include perceptions that priced lanes discourage low-income drivers to using roadways (Lexus lanes), costs of collection (both for electronic, on-the-fly collection as well as traditional toll booths), toll evasion, and overall pricing fairness and equity – including modal equity.

5.4.4 Costs of Implementation

Introduction of tolled facilities can be costly for both existing and new facilities. Most road pricing projects require electronic tolling to avoid the physical barriers, labour costs, and time penalties commonly associated with toll booths. This requires investments in sensing technologies, communications links and high-speed central data processing as well as establishing of new or enhanced programs for collecting tolls, monitoring violations and addressing billing and toll revenue management.

Implementing a system-wide tolling and pricing strategy also entails significant financial and time costs as transportation systems, pricing strategies and revenue allocation are integrated into an overall regional or metropolitan planning and capital improvement program.

5.4.5 Benefits of Implementation

Properly implemented, pricing has been shown to be an effective transportation demand management strategy. It can produce rapid declines in congestion on those roadways where it is implemented, and can be managed (through price adjustments in toll rates) to sustain demand reduction and manage capacity by damping demand for new lane miles and roadways.

Pricing can also generate revenues (although this must be balanced against demand management and preserving level of service operations on existing tolled and untolled roadways.) These revenues can be used to underwrite both highway and transit capital improvements, and operations and maintenance.

Implemented at a regional scale, pricing can also supplement or even provide revenues that can be used for long-term obligations for bond and revenue enhancements, leveraged finance and other creative financing of capital infrastructure that is currently unable to be financed using existing tax revenue streams.

Pricing can directly benefit both automobile commuters and transit riders. Reduction of congestion can improve travel times on currently congested highway and improve the commute of those who choose to pay tolls. Increased ridership on transit adds to farebox revenues, and coupled with possible cross-subsidies from the revenue generated by highway users, can improve the basis for capital improvements of the transit system.

5.4.6 Factors for Success

Successful introduction of pricing systems, especially in areas where tolls have not traditionally been levied on transportation facilities, requires a broad-based acceptance of the idea of pricing. A clear case for the revenue generating advantages of pricing coupled with a recognizable, measurable and well-defined program of infrastructure improvements is essential.

Once pricing is instituted, immediate and observable reductions in traffic congestion – whether on a dedicated facility (for priced lanes or corridor pricing), within the urban core (in the case of cordon or area pricing) or through the diversion of paying drivers to alternative facilities (such as HOV/HOT lanes and truck only toll – TOT lanes) should follow. These changes should be measured and publicly presented and discussed by the sponsoring agency to demonstrate good faith and the achievement of the objectives of pricing programs. Where this has been done in other countries, the public (even if at first sceptical) has warmed to and even demanded that pricing be maintained or expanded as a congestion management measure.

5.5 Freight TDMs

5.5.1 Description

Freight transportation demand measures are programs and policies designed to improve the logistics supply chain and increase the efficiency of surface freight movement. Most often, these measures are designed to reduce conflicts with highway traffic (through grade separation and improved grade crossing for railroads) or to improve the flow and operations of trucks and truck-based delivery in an metropolitan area.

5.5.2 Strengths

When properly implemented, freight TDMs can both reduce conflicts with auto traffic and increase the productivity of freight and logistics systems with a metropolitan area. The key measures of a freight TDM strategy are its ability to improve traffic flow by reducing rail and truck conflicts with autos (at both peak and off-peak hours), provide consistent and predictable delivery times for truck and intermodal operations, and reduce variation and incident-related stoppages on routes predominantly designated for truck traffic.

5.5.3 Weaknesses

Implementation freight TDMs often involves an entirely different set of stakeholders and businesses than are commonly included in traditional commuter-oriented transportation planning. Providing for freight operations often requires different and sometimes inherently conflicting policies than those associated with current trends in encouraging mixed land use. Significant design and operational considerations, such as designing delivery zones, off-street loading dock access, and spot delivery curb-side reserved spaces are not fully appreciated or implemented in normal planning and design processes.

Freight operations involve a number of diverse companies and industries – all of whom may not have the same objectives or logistics management goals. Plans that do not recognize the operational uniqueness of the various suppliers of freight services may have difficulty being implemented as key stakeholders in certain elements of the industry, modal service providers or shippers/manufacturers may have fundamental disagreements concerning prioritizing investments or even the kinds of transportation infrastructure investments that are most important to them.

5.5.4 Costs of Implementation

Costs of implementation for freight TDMs can be relatively small if undertaken as modest grade or access improvements. However, costs of implementing system-wide freight TDMs or addressing major freight flow management issues such as those associated with import/export operations, Intermodal and multimodal operations and other rail/highway interfaces often require many millions – if not billions of dollars to address.

Even the costs of planning and engineering involved in developing freight-based TDMs, including achieving consensus among stakeholders and sustaining that consensus through the long time periods that it takes to bring projects on-line in the public sector can be daunting and costly for all involved.

5.5.5 Benefits of Implementation

In regions where significant investments in freight demand management have been achieved, significant competitive advantages that have accrued as a result of these investments have enabled regions to maintain and even increase market share of trade and cost/time sensitive shipments. These benefits have important consequences for metropolitan competitiveness, employment and job retention, and economic growth. While instituting TDMs to control automobile congestion is a way of preserving or, in some cases addressing the increases in congestion levels, freight TDMs and major infrastructure improvements can have measurable, significant and long-term economic benefits for an entire metropolitan area.

5.5.6 Factors for Success

One of the most clear requirements for successful implementation of freight management systems is the close cooperation, fostering of solid working relationships and consensus building with freight system operators, ports, railroad operators and logistics management organization with a metropolitan region. These relationships are not easy to develop or to maintain, but they are essential to even modest success in addressing freight issues.

Development of a coherent and widely accepted freight plan that is the product of consultations and collaboration between all freight stakeholders is another factor that is a key to successfully implementing effective freight demand management strategies. Regions that have been successful in moving freight issues forward have uniformly devoted serious and

consistent efforts to developing a strategy and phased implementation approach to freight TDMs.

Finally, securing public, private and intergovernmental financing agreements is a key to making plans a reality. Most businesses cannot wait for three to five years to see changes in freight infrastructure designed to improve their operations. They look for improvements on a quarterly basis and become disillusioned with long-term plans with questionable, little or no funding. Successful freight demand management programs are those with both a plan and the funding commitments to implement the plan in a timely manner.

5.6 Public Private Partnerships

5.6.1 Description

Public Private Partnerships (PPP) are used for procuring public services or projects using private sector capital and financial resources in return for an economic return on investment to the private sector. PPPs are usually constructed as Project Finance and Investment (PFI) projects such that governments or public agencies grant a concession for a limited period to a private company for the design, construction, financing and operation of key infrastructure. These partnerships can range from joint ventures with equity stakes for both parties to completely outsourced private equity deals.

5.6.2 Strengths

PPPs have, if properly structured, proven to bring major public projects requiring significant capital investments to fruition faster, with less risk of cost overruns and with better fundamental cost management than similar public sector projects. PPPs provide a foundation for more robust risk sharing and transparency in risk allocation. They allow orderly and well-documented monetization of public assets with appropriate safeguards for the long-term public interest. In many cases, significant infrastructure projects that would not normally be feasible can be implemented and can even generate revenues for the governmental agencies sponsoring the project.

5.6.3 Weaknesses

PPPs that are poorly structured financially, with regard to risk allocation and management, and for which inappropriate or weak performance measures are designed can lead to dissatisfaction on the part of either party and lead to possible renegotiation or in the extreme, failure of the PPP.

One of the riskiest and most common weakness of PPPs are the estimates of future revenues. Careful vetting of revenue forecasts by third parties and advisors to all parties involved is one of the most frequent reasons why PPPs fail – revenues fail to cover costs and there is no alternative plan to deal with these situations.

Positive public perception (the “other PPP” and political consensus are required and need to be carefully developed and maintained to provide assurances to the private sector that there is a real and sustainable public commitment over the long-run to PPPs. Hence, a strategic plan that is not fully subscribed by all stakeholders poses a significant risk and can become a major weakness to any PPP.

Lack of transparency is probably one of the most common, yet most controllable of all the weaknesses confronted in developing PPPs. Agreements, once achieved in negotiation, should be reviewed carefully with all parties and measured periodically against objectives in the strategic plan. Confidence building for all parties should be a continuous process.

5.6.4 Costs of Implementation

From the public sector’s standpoint, some of the most obvious implementation costs are associated with securing proper legal and financial advice. Additional up-front costs include preparing feasibility studies and developing strategic plans – including securing significant and meaningful participation by stakeholders.

The time and effort involved in reviewing proposals, structuring each deal and the due diligence while PPPs are under construction also pose significant costs to the sponsoring agency. Finally, and sometimes overlooked, are the commitments of the public sector to continuous monitoring of operations, finances, returns and contract details for the life of the concession or project.

Increasingly, availability payments (shadow prices) for tolled facilities or ramp-up cost sharing are included in the costs required of public agencies for larger or multi-phased projects.

5.6.5 Benefits of Implementation

Well-structured PPPs can be used to leverage private capital and access to capital markets for public facilities. Successful implementation can generate revenues and assist in managing demand (if priced options are developed). Successful implementation can also lead to additional PPPs that can have the effect of accelerating congestion management, capacity enhancement and provision of key multi- or single-purpose infrastructure (e.g., freight corridors.)

For tolled or managed facilities, there is often an important ITS linkage for both new facilities and for retro-fitted existing or older facilities. Introduction of new technologies of traffic management and fee collection under a PPP can be leveraged to non-PPP facilities once the technology has been proven.

Finally, the biggest benefit is that the increasing gap between available public sector fund and infrastructure needs can be reduced, if not closed, by implementing a carefully structured and managed PPP strategy.

5.6.6 Factors for Success

The most important factor that signals a successful program using PPPs is that the sponsoring agency or governmental body has a well-conceived and executable strategy for implementing PPPs that meet clear and measurable legal, social and financial objectives. These strategies should identify the key elements of infrastructure for which private participation is to be solicited and clear economic justification and goals for receiving a public franchise. They should be backed up by the necessary legal framework to assure that such arrangements will be binding on all parties.

Successful strategies usually involve several projects and start with projects that are as straightforward and as feasible to all concerned as well as attractive to the market. One of the keys to recognizing a potentially successful PPP is that risks and risk management can be properly allocated to those parties most able to manage the risks (e.g., financial, permitting, etc.) involved in each project.

Lastly, the process of forming a PPP must recognize and involve multiple parties and recognize the appropriate role and function of each party. These are especially true when both investment teams and other private parties (e.g., companies who may also be users/consumers of a proposed PPP facility) are involved in structuring the deals or in contracting for services in advance from such facilities.

6. CONCLUSIONS AND RECOMMENDATIONS

TDM provides many options, possibilities and approaches to manage travel demand, build sustainable transportation, improve the environmental conditions and generate supporting funding.

This report has developed a framework for assessing TDM options, by defining the concept of TDM; reviewing existing initiatives in south-western British Columbia; reviewing international practices; and, identifying practices that would be applicable to the Metro Vancouver region.

The report has found that Metro Vancouver has several TDM initiatives underway. However, based upon practice elsewhere, there is a need to establish a coordinated and integrated region-wide strategy. Specific conditions for success are:

- Strategic, region-wide planning and coordination among public and private interests in passenger and goods movement
- System integration and complementarity among modes
- System integration between administrative structures and planning processes
- Development of partnerships
- Developing of non-proprietary systems open to cross-boundary cooperation and inviting to external (private) operators and partners
- Establishing clear, long-term investment priorities
- Integration of land management with passenger and freight system needs
- Cohesion between economic development strategies, TDM strategies and freight

The report has established that TDM has a role to play in the region's long- and short-range plans. (Planning efforts, in turn, must establish supporting policies, identify funding sources and ensure investment streams.) The report also identified several measures that could be introduced, or existing measures that could be enhanced. Listed according to their potential impact, the measures are as follows:

- Increase the efficiency of land utilization by increasing densities and the provision of transportation services (transit oriented development)
- Enhance human experience by transforming neighbourhoods and downtown areas (car-free planning)
- Decrease auto travel (transit oriented development, car-free planning, car-share)
- Free roadway capacity for freight (by shifting passenger travel to transit and auxiliary modes)
- Generate revenues (by building public-private partnerships and imposing costs on users)
- Influence location selection and the amount of travel (tolling and road pricing)
- Enhance operating conditions for freight (designated freight corridors, tolls for trucking)

The framework, lessons learned, conditions for success and possible measures will be discussed at the upcoming seminar.

The following possible next steps are also presented for consideration at the seminar to enable the Council to establish a position on TDM:

- Undertake the development of the TDM Strategic Plan as intended
- Define the scope of TDM Strategic Plan to include evaluation of needs, measures, costs, funding sources for the integrated passenger- freight TDM symbiotic with land use and economy of the region. The scope of the Plan should allow for extensive vertical and horizontal consultation process
- Define the scope of TDM Plan to allow for an in-depth analysis of successful and not-so-successful applications of passenger-freight TDM measures in other countries; to establish and quantify cost and benefits, strengths and weaknesses of each candidate measure and to recommend menu of measures suitable for providing support to future population and employment growth in the region
- Allow for the development of a broad TDM platform encompassing transit and roadway infrastructure plans
- Empower the TDM Strategic Plan to lead the planning process
- Identify stakeholders and develop strategic partnerships in the area of land use planning and private-public partnerships
- Investigate the opportunities and conditions for the development of private-public partnerships

7. SEMINAR

The Environmental Scan of TDM Measures Seminar was held on September 7, 2007 at UBC Robson Square in Vancouver. The four-hour seminar essentially followed the sequence of this report, and combined presentations with significant discussion time, as follows:

- Part 1: The TDM Concept (consultant presentation)
- Part 2: TDM in action (consultant presentation)
- Part 3: Discussion
- Part 4: TDM Measures (consultant presentation)
- Part 5: Moving forward planning for successful TDM (consultant presentation)
- Part 6: Discussion

Approximately two dozen Gateway members participated in the meeting. The agenda and presentation slides are provided in Appendix A and B, respectively, along with the meeting minutes in Appendix C.

Because the presentations essentially followed the main points of this report, the ensuing summary considers only the key points of the discussion; further details of which may be found in the meeting minutes (Appendix C):

- There is a need for a suite of TDM options – this will allow for a more cohesive understanding.
- There are pressures for both transit investments and other infrastructure investments.
- There is a need to understand the relationships between land use decisions and their impacts on regional competitiveness and economics.
- There is a need to designate transportation corridors when plans are being developed and to provide the institutional and long-term support to assure that these designations are maintained.
- Reducing the variability of journey times is critical for freight movement, and for improving economic competitiveness and efficiency. Congestion is a key contributor to variability, but other factors – such as improving incident response times – also are important.
- Initiatives such as flexible hours of work and telework exist throughout the region today, but these can be implemented further to targeted market segments.
- There is a need to balance the needs for passenger and freight movement. Priorities must be set, and they must be expressed in terms that are meaningful to all participants (e.g., expressing the business case to employers). There can be conflicts between passenger and freight initiatives, but these can be addressed by proper planning and design.
- TDM needs to be marketed and supported by providing both ideas and resources.
- There is a need to better integrate port (and other facility) plans with municipal land use planning – i.e., planning for regional-scale facilities often is not well integrated into local planning decisions. This is a governance issue; and there is a need to develop a way to share revenue (among governments) to allow for better land use planning. There are no alternative revenues for municipalities besides the tax base; and there is a need to change the structure so as to be less dependent on the property owner.

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- There is a need to develop an Industrial Land Reserve, similar to the Agricultural Land Reserve.
 - Cities do not do an economic evaluation of the use of the land – the ballot box wins over the Economic plan.
 - TransLink will be developing a new structure under the new Governance. It is expected that there will be a closer relationship with the stakeholders involved in the movement of goods and services as well as a more regional approach to land use planning.
 - There is a need for a major commercial transportation system, to complement the passenger transportation network.
 - There is a need to show the benefits of TDM – bring the focus to a higher level and highlight how TDM can provide a better overall system throughout the region.
 - Commercial and residential development needs to be focused about transit corridors. There is a particular need to influence the location of new employment in transit corridors so that employment densities support ridership. There is a need to influence public housing decisions as well as the selection of locations for public employment by the Province and other levels of government to be more transit-supportive.
 - There is a need to pre-set the transit network and have a pre-agreement for employment development.
 - With respect to road pricing, taxation is already high in the region; and accordingly there is a need to rationalize where money is being spent. There is a need to discuss user fees, traffic management, and funding requirements for capacity expansion in conjunction with taxation as authorities design and develop strategies. (The Province has some concerns regarding road pricing; namely, there needs to be a toll-free alternative [if tolls are implemented on a particular route or corridor]; and equity must be considered [e.g., ramp metering benefits longer distance user who already are on the system].)
 - There is a need for agencies to play a leadership role – starting with the philosophical base, conceptualizing it and communicating it.
 - Freight plans need a higher level of involvement from the private sector – there is a need to build a stronger relationship.
 - There are two main issues in trying to move forward – politics and equity.
 - There is a need to review the Major Road Network of GVTA from a strategic point of view with more control for the movement of goods; and there is a need to link this to Gateway initiatives.
 - There is a need to move goods transportation issues higher on the agenda – there is a small voice regarding votes in the GVTA. Goods and services have been largely ignored in the 2021 Strategic Plan. “Service” also must be considered as a goods transportation issue.
 - Variable insurance (per distance travelled) is an option for consideration.
 - Non-transportation or land use factors can impact efficient freight transport: for example, local bylaws or terminal operating practices that restrict hours of operation.
 - Concern with the difficulties with coordinating with municipalities: An example discussed was Southern Railways which mainly operates at night. Recent residential developments were allowed close to the line and now complaints have been received.
 - Conditions for success are fair and equitable taxation; and a coherent, consistent message [across the region, all modes and all organizations].

- There needs to be business leadership, for the key reasons that there is a skills shortage (in the freight transportation industry) and the need for a retention strategy.
- The term “TDM” should be expressed in words that can be understood by local constituents – for example, “Commuter Options.” Fairness and equity should be incorporated; and the target message should be personalized.
- There is a need for a policy position from the Gateway Council. The GVTA is working towards a 2040 policy – the two initiatives can work together. There is a need to have a common vocabulary with parallel paths – it is very important to have the correct language.
- It is also important to repeat the same message as individual groups, at different forums – this will resonate among all Gateway Council members.
- There is a need for public education with local politicians.

Bob Wilds, Managing Director of the Gateway Council, closed the proceedings by noting that this scan and seminar were only the first steps in the TDM initiative.

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http://www.vancouver-ecodensity.ca/webupload/File/EcoDensity_Charter5.pdf

Vancouver EcoDensity Planning Initiative, “ECO0: Overview of the EcoDensity Initiative and themes,” <http://www.vancouver-ecodensity.ca/content.php?id=2>

Vancouver EcoDensity Planning Initiative, “Suggested Tools and Actions – DRAFT (May 2007)”, http://www.vancouver-ecodensity.ca/webupload/File/Sample%20Tools%20and%20Actions_FINAL.pdf

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Victoria Transport Policy Institute, “Car Free Planning: Reducing Driving at Particular Times & Places”, TDM Encyclopedia, <http://www.vtpi.org/tdm/tdm6.htm>, Victoria Transport Policy Institute, 2007

Victoria Transportation Policy Institute, “Land Use Density and Clustering”, TDM Encyclopedia, <http://www.vtpi.org/tdm/tdm8.htm>, Victoria: Victoria Transport Policy Institute, 2007.

Victoria Transportation Policy Institute, “Using Public Transit to Create More Accessible and Liveable Neighbourhoods”, TDM Encyclopedia, <http://www.vtpi.org/tdm/tdm45.htm> Victoria: Victoria Transport Policy Institute, 2007 based on Pushkarev and Zupan (977).

Victoria Transportation Policy Institute, “Using Public Transit to Create More Accessible and Liveable Neighbourhoods”, TDM Encyclopedia, <http://www.vtpi.org/tdm/tdm45.htm> Victoria: Victoria Transport Policy Institute, 2007.

Washington State Department of Transportation, <http://www.wsdot.wa.gov>

Zipcar, <http://www.zipcar.com/>



Appendix A: Agenda

Environmental Scan of TDM Measures Seminar

Friday, September 7, 2007
7:30AM to 12:00PM

Time (from/to)	Topic
7:30AM to 8:00AM <i>(30 minutes)</i>	Registration
8:00AM to 8:15AM <i>(15 minutes)</i>	Introductions and Orientation Presenter: Bob Wilds, GVGC
8: 15AM to 8:30AM <i>(15 minutes)</i>	Part 1: The TDM Concept Presenter: David Kriger, iTRANS
8:30AM to 9:15AM <i>(45 minutes)</i>	Part 2: TDM In Action Presenters: David Kriger, iTRANS Stephen Fitzroy, EDRG
9:15AM to 9:45AM <i>(30 minutes)</i>	Part 3: Feedback and Perspectives Group discussion Moderators: David Kriger, iTRANS Stephen Fitzroy, EDRG Donna Howes, iTRANS
9:45AM to 10:00AM <i>(15 minutes)</i>	Break
10:00AM to 10:30AM <i>(30 minutes)</i>	Part 4: TDM Measures Presenters: David Kriger, iTRANS Stephen Fitzroy, EDRG
10:30AM to 11:00AM <i>(30 minutes)</i>	Part 5: Moving Forward Planning for Successful TDM Presenters: David Kriger, iTRANS Stephen Fitzroy, EDRG
11:00AM to 12:00PM <i>(60 minutes)</i>	Part 6: Feedback and Perspectives Group discussion Moderators: David Kriger, iTRANS Stephen Fitzroy, EDRG Donna Howes, iTRANS

Appendix B: Presentation Slides

iTRANS

Environmental Scan of TDM Measures Seminar

For the Greater Vancouver Gateway Council

September 7th, 2007



iTRANS Consulting
In association with
Economic Development Research Group, Inc.

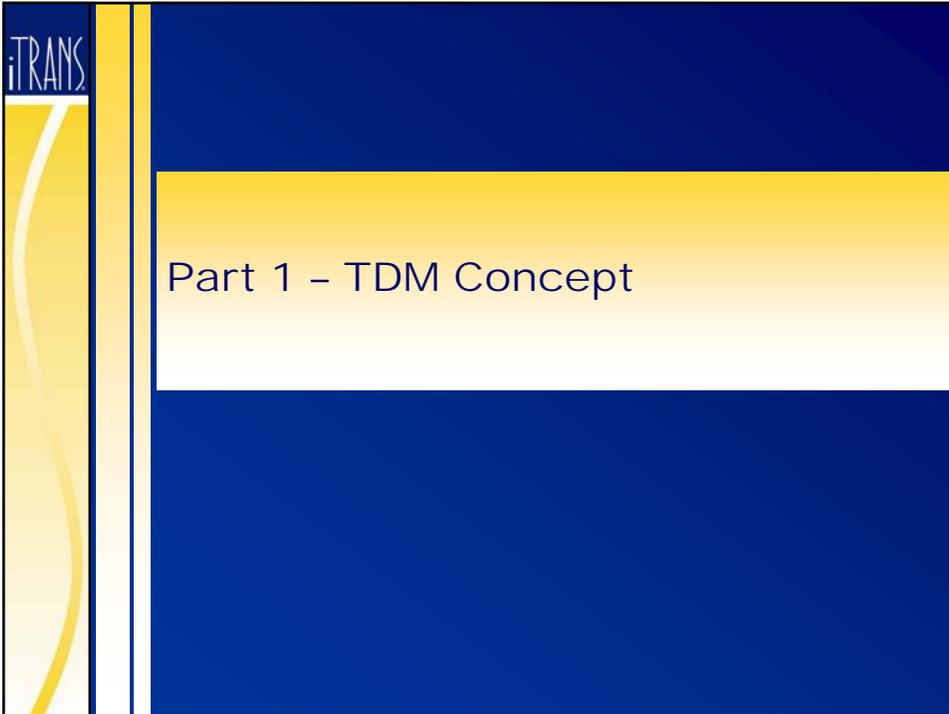


iTRANS

Overview

- Part 1 – TDM Concept
- Part 2 – TDM in Action - Applications Locally and Elsewhere
- Part 3 – Discussion: Feedback and Perspectives
- ✦ *Break*
- Part 4 – TDM Measures for consideration
- Part 5 – Moving Forward
- Part 6 – Discussion: Feedback and Perspectives

2

The slide features a dark blue background with a yellow and white decorative border on the left side. The iTRANS logo is positioned in the top left corner. The main title, "What is Transportation Demand Management (TDM)?", is centered in yellow text. Below the title is a bulleted list of points in white text. A small number "4" is located in the bottom right corner of the slide content area.

What is Transportation Demand Management (TDM)?

- ◆ TDM describes strategies and programs to improve or maintain mobility
- ◆ Through:
 - Reducing/better managing the *demand* for travel (especially SOV)
 - Augmenting the capacity of the *supply* of transportation
 - ◆ 'hard' and 'soft' actions; road user fees
 - Improving efficiency
 - Supportive institutional structures and procedures
 - Integration with land use and development planning

4

TDM Building Blocks

- ◆ Land use
- ◆ Modal choices
- ◆ Integrated approach
- ◆ Incentives and disincentives
- ◆ Education, outreach and partnerships

5

TDM Measures - Soft

- ◆ Soft measures:
 - Employer-based trip reduction programmes
 - ◆ E.g. Car-sharing, telecommuting
 - Ridesharing, time shifting, transit-oriented development, parking pricing

No need for capital type investments by public agency !

6

TDM Measures – Hard

- ◆ Hard measures:
 - Road and transit infrastructure expansion or alterations
 - ◆ E.g. High Occupancy Vehicle (HOV) lanes
 - Transit fleet vehicles
 - Changeable message signs or traveller information system
 - Transit/ transportation hubs, Auxiliary modes network
 - ◆ E.g. Sidewalks, bicycle paths

Need for capital type investments by public agency !

7

TDM Measures – Road User Fees

- ◆ Limited resources – difficult to keep up demand for infrastructure
- ◆ Introduces user pricing; congestion management

8

iTRANS

Part 2 - TDM in Action (Local)

iTRANS

Local TDM - 'Soft' Measures



- ◆ Approach to transportation and land use planning
- ◆ Trip reduction programs
- ◆ Rideshare and car-share
- ◆ Transit support
- ◆ Other Initiatives

10

Local TDM - 'Hard' Measures



- ◆ Transit expansion programs
- ◆ HOV and auxiliary modes networks
- ◆ Urban Transportation Showcase Program:
 - Main Street transit improvement
 - Central Valley Greenway
 - Transit Villages
 - Efficient goods movement
 - TravelSmart

11

Local TDM – Road User Fees

- ◆ Non-tolled and tolled initiatives underway:
 - Non-tolled infrastructure – e.g., Pitt River Bridge, SFPR, Canada Line
 - Tolled infrastructure: GEB, Port Mann (GEB will be first tolled facility)

12

Local TDM - Conclusions

- ◆ Leader in Canada
- ◆ Need to go further
- ◆ Need for integrated approach
- ◆ Need to include freight
- ◆ Potential to include Road User Fees as TDM measure and revenue generator

Part 2 - TDM in Action (Other)

Review Method

- ◆ Look for and review for passenger-freight TDM ideas that are:
 - Innovative yet achievable
 - Can be accepted by the relevant stakeholders
 - Focused on needs of passenger and freight
 - Include TDM related roadway pricing
 - Implemented by urban centres of similar size and facing similar geographical or administrative challenges

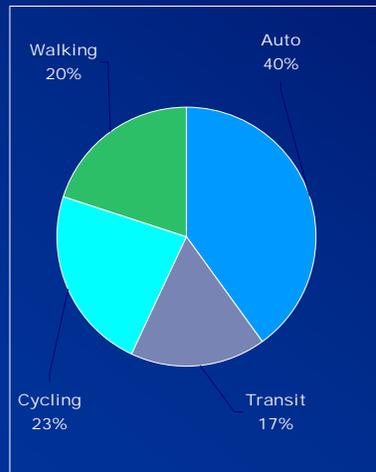
15

Selected review cases - Seminar

- ◆ Bremen, Germany
 - System integration and innovative approach to TDM
- ◆ Seattle
 - Transit and HOV supportive road pricing
- ◆ Chicago
 - Freight strategy case
- ◆ Melbourne
 - Pricing / PPP

16

Bremen, Germany



- ✦ Population – 0.5 million
- ✦ Multi-modal networks
 - Linked by transit-cycling-car-share-taxi hubs
- ✦ Focus on
 - car-sharing services
 - 1/3 less parking/unit & built-in car-sharing
- ✦ Support for cycling
 - facilities
 - supportive neighbourhood traffic calming

17

Bremen, Germany



"eierlegendewollmilchsau"
= "egg-laying-wool-milk-sow"
= Everything in one card!

- ✦ Integrated smart card for
 - fare collection (transit),
 - service activation (car-share)
 - bank access (banking card)
- ✦ Integrated service delivery
 - 35 transit agencies
 - open for cooperation with private system providers (taxis and car-share)

18

Metro Seattle

- ◆ Population - 3.13 million
 - Average transit usage at 7.9%
 - Daily non-auto travel accounts for about 15.8%
 - ◆ including telecommuting at 4.5%
- ◆ Commute Trip Reduction (CTR)
- ◆ CTRs are supported by numerous TDM programs
 - trip planning
 - free web-based ride matching for car pools and vanpools
 - flex time
 - alternative work hours
 - telecommuting
 - emergency ride home

19

Metro Seattle



- ◆ Bus-rail-water transit system
 - sustainable funding and infrastructure (HOV & HOT)
- ◆ Largest public vanpool system in the US
 - 686 vans in 2002



20

Chicago Metropolitan Freight Plan



- ◆ Key Freight TDM Components
 - CREATE
 - Bottleneck/choke point elimination
 - Improve rail efficiency
 - Network of IM yards and truck route connections
- ◆ Conditions for Success
 - Establishing investment priorities
 - Leadership
 - ◆ public and private sectors
 - Integration of land management with freight system needs

21

Melbourne PPP / Pricing Strategy



- ◆ Profile
 - 34-year concession
 - 40 km facility linking 3 major motorways
 - Distance tolling system
 - Booth-free electronic tolling
 - Payments made before or after trip

22

Melbourne PPP / Pricing Strategy

◆ Benefits

- Improves traffic flow
- Removes trucks from local streets
- Reduces travel time to/from downtown/ports



23

Conditions for Success

- ◆ Integrated, coordinated program
 - Integrate among
 - ◆ Modes
 - ◆ Administrative structures
 - ◆ Planning processes
 - Develop partnerships
 - Collaborate for individual measures
 - TDM complements Land Use and transit planning
 - Technology important – not stand alone
 - Establish clear investment priorities
 - ◆ **Needs leadership and implementation**

24

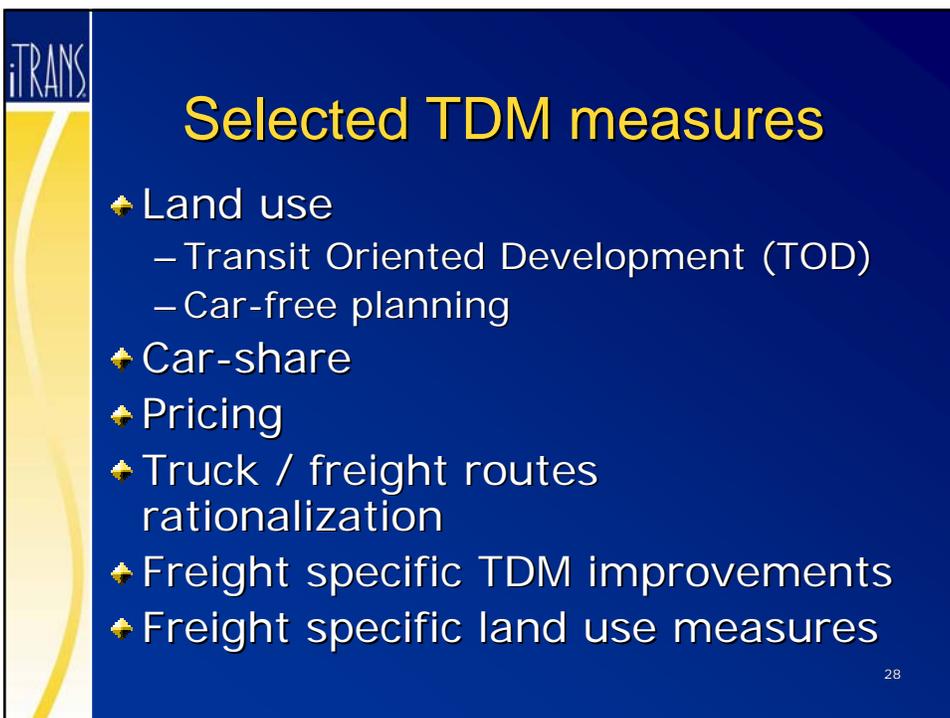
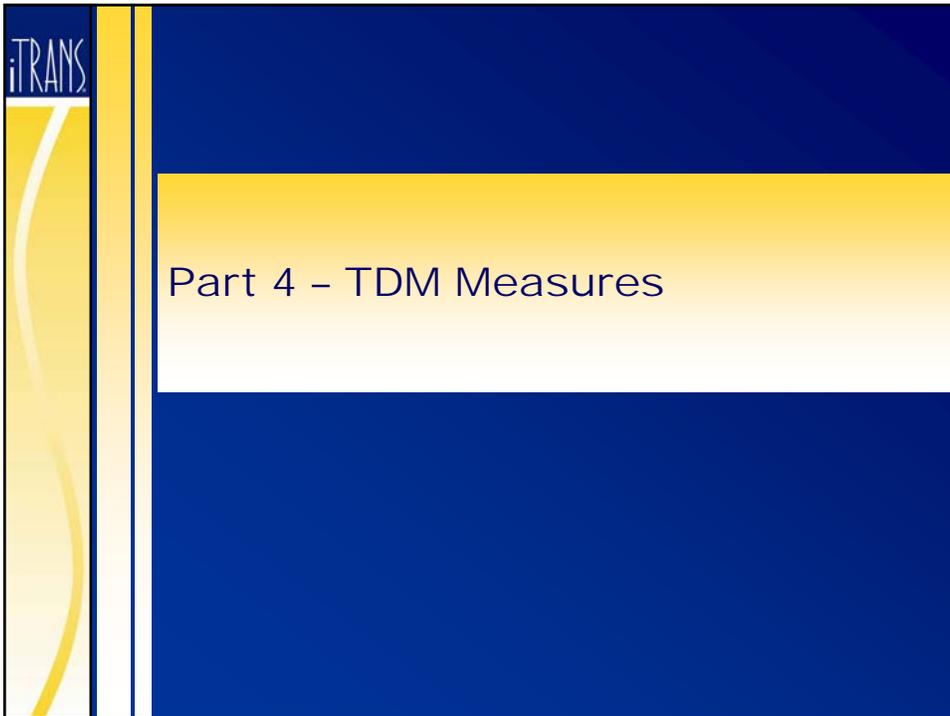
Lessons Learned - Measures

- ◆ Build on the many existing successes:
 - Expanded car-share services
 - Non-auto community planning
 - Integration of land management & passenger/freight systems
 - Truck priority or exclusive routes
 - Travel information dissemination
 - Integrate TDM into
 - ◆ economic development
 - ◆ freight plans
 - Access management and design for retail and commercial

25

Part 3 – Feedback and Perspectives

Group Discussion



Land Use Transit Oriented Development

- ◆ Multiple land uses
- ◆ Transit Accessible
- ◆ Affordability Impacts
- ◆ Requires
 - Density
 - Funding for station area planning
 - Policy incentives
 - Integration with other TDM strategies

29

Land Use Car-free Planning



- ◆ Public space
- ◆ Pedestrians have first priority
 - Shared Spaces
 - Pedestrian Malls
- ◆ Improve Livability
- ◆ Road maintenance savings
- ◆ Must be complete and accessible

30

Car-share



- ◆ Service provided by
 - Profit companies
 - Non-profit
 - Cooperatives
- ◆ Increases mobility
- ◆ Alternative to ownership
- ◆ Cost per use
- ◆ Requires
 - Strong partnerships
 - Density
 - Good supply of other modes
 - Mixed use

31

Pricing Strategies

- ◆ Corridor Pricing - HOT/TOT lanes
 - New lanes
 - ◆ SOV (tolled)
 - ◆ trucks
 - ◆ open to HOVs
- ◆ Cordon pricing
 - Tolling surrounding CBD
 - ◆ Trondheim, Norway
 - ◆ London, England
 - ◆ Stockholm
 - ◆ Singapore
- ◆ Peak Hour Pricing/Tolling
 - Premiums a peak/discount at shoulder/off-peak
 - Existing or new facilities

32

Freight-Specific TDM Measures



- ✦ Rationalize truck/freight routes
- ✦ Create priority and exclusive corridors
- ✦ Delivery/drop-offs in high-density areas
- ✦ Alternatives for short-haul truck movements
- ✦ System-wide infrastructure investments
- ✦ ITS-based traffic monitoring and management
- ✦ Port gate management system

33

General TDM Measures with Freight Implications

- ✦ Ramp metering at peak hours
- ✦ Coordinated incident response management
- ✦ ITS implementation for traffic management
- ✦ Transit penetration along congested freight corridors
- ✦ Cash-out parking programs

34

Freight Related Land Use Strategies

- ◆ Creation and preservation of manufacturing and commercial transportation land
- ◆ Link economic development strategies to comprehensive freight plan
- ◆ Design retail and commercial in high density areas to accommodate efficient freight delivery
- ◆ Design truck routes to accommodate widths, queues and turning radii associated with current and future truck fleet

35

Part 5 – Moving Forward

Planning for Successful TDM

Conditions for Success

- ◆ Gateway (multi-modal forum)



- ◆ TransLink (regional agency)

Provide strong basis for a coordinated plan!

37

Conditions for Success

- ◆ Strategic, region-wide planning and coordination
- ◆ System integration
 - ◆ among modes
 - ◆ administrative structures
 - ◆ planning processes
- ◆ Development of partnerships
- ◆ Open to cross-boundary cooperation
 - inviting to external (private) partners
- ◆ Clear, long-term investment priorities
- ◆ Integration of land management with passenger and freight system needs
- ◆ Cohesion between economic development strategies, TDM strategies and freight

38

What can TDM Measures do?

- ◆ Increase the efficiency of land utilization
 - *Transit oriented development*
- ◆ Enhance human experience
 - *Car-free planning*
- ◆ Decrease auto travel
 - *Transit oriented development, car-free planning, car-share*
- ◆ Free roadway capacity for freight
 - *Shift passenger travel to transit and auxiliary modes*
- ◆ Generate revenues
 - *Build public-private partnerships, imposing user cost on travel*
- ◆ Influence location selection and amount of travel
 - *Tolling, pricing*
- ◆ Enhance operating conditions for freight
 - *Designated freight corridors, tolls*

39

Next step recommendations

- ◆ Develop TDM Strategic Plan
- ◆ Define the scope of TDM Strategic Plan
- ◆ Allow for in-depth analysis of successful and not-so-successful applications of passenger-freight TDM elsewhere;
 - Establish and quantify cost and benefits, strengths and weaknesses of each candidate measure

40

Next step recommendations

- ◆ Develop a broad TDM platform
- ◆ Empower the TDM Strategic Plan to **lead** the planning process
- ◆ Identify stakeholders and develop strategic partnerships
- ◆ Investigate the opportunities and conditions for the development of private-public partnerships

Part 6 - Feedback and Perspectives

Group discussion

Image Credits

- ◆ Logos
 - OnBoard – TransLink - http://www.translink.bc.ca/Commuting_Options/onBoard/
 - GO GREEN Choices – GO GREEN - <http://www.gogreen.com/choices/free.html>
- ◆ Bremen, Germany Photos
 - Bremen Department for Building and Environment
- ◆ Melbourne CityLink Images
 - CityLink – <http://www.citylink.com.au/1045.jsp>
 - Vic Roads - <http://www.vicroads.vic.gov.au/Home/RoadsAndProjects/RoadProjects/InnerCity/CityLink/>
- ◆ Local Vancouver Photos and European Car-free photos
 - Allison Clavelle, iTRANS Consulting
- ◆ Seattle Transit Photos/Map
 - Metro Transit <http://transit.metrokc.gov/tops/travops.html>
- ◆ Other Photos courtesy of iTRANS



Appendix C: Meeting Minutes



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Distribution: _____
 File: 2.0
 Project # 427

Meeting Minutes

Project: Environmental Scan of TDM Measures
 Subject: Seminar for the Greater Vancouver Gateway Council
 Meeting Date: 8:00 a.m., Friday, September 7, 2007
 Location: UBC Robson Street, Vancouver, BC
 Prepared by: Donna Howes
 Attendees: See attached attendee list
 Distribution: To Bob Wilds for all attendees

	Item
1.	<p><u>Introduction:</u> Bob Wilds opened the meeting and introduced the Panel for the presentation and discussion - David Kriger (DK) and Donna Howes (DH) from iTRANS Consulting Inc. and Stephen Fitzroy (SF) from EDRG. The agenda set out the presentation and discussion as follows:</p> <ul style="list-style-type: none"> ▪ Part 1: The TDM Concept ▪ Part 2: TDM in action ▪ Part 3: Discussion ▪ Part 4: TDM Measures ▪ Part 5: Moving forward planning for successful TDM ▪ Part 6: Discussion
2.	<p><u>Part 1: The TDM Concept and Part 2: TDM in action:</u> DK and SF presented and DH moderated the discussion.</p>
3.	<p><u>Part 3: Discussion:</u> [Questions and comments are shown in <i>italics</i>. Responses from the Panel are shown in normal text].</p> <ul style="list-style-type: none"> ▪ <i>How does Seattle compare with Chicago?:</i> <ul style="list-style-type: none"> ▪ The Seattle FAST Corridor includes 26 partners (public and private, including the Port Authorities, operators and local governments. Phase I funded 9 projects (US \$586m) designed to alleviate choke points in the freight system. Funding for Phase II, begun in 2006, allocated (US) \$262m for 10 projects. Federal and state funding is

	Item
	<p>used for these projects. They are managed by the Washington DOT and programmed in conjunction with the regional Transportation Improvement Program and with the Statewide Transportation Improvement Program.</p> <ul style="list-style-type: none"> ▪ The Chicago Metropolis Freight Plan is a public/private partnership between the State, City of Chicago DOT and METRA, and eight freight railroads operating in the Chicago metropolitan area. Initial funding of US\$330m developed through the CREATE program. This program was initiated in December 2006, and is scheduled to deliver 32 projects by 2009 - a number have already been completed. A unique permitting plan (SPEED) provides formal agreements through various MOUs to expedite permitting by federal and State agencies so that projects can be brought on line as scheduled with little or no permitting delays. ▪ <i>There is a need for a suite of TDM options – this will allow for a more cohesive understanding:</i> There is a need to identify the choke points. The key to a successful freight plan is to have the right people at the table - private and public sectors must be represented - and to properly assess and assign risks associated with developing and implementing freight solutions to those parties that have the ability to manage these risks. Need to establish “Political” capital and “Physical” capital. ▪ <i>There are pressures for both transit investments and other infrastructure investments:</i> <ul style="list-style-type: none"> • There is a need to understand the relationships between the development of transit systems and the concurrent need to provide other infrastructure that will support densities needed to sustain densities needed to support transit ridership. Planning for delivery, access, shift changes and other business needs requires a broad examination of all aspects of development, not just relative commercial land value. • “FAIR concept,” whereby revenues from highways [or road funds] are allocated to transit or can be “credited” to participating drivers who are not using tolled lanes. Revenue splits can be developed for a variety of scenarios, including dynamically priced lanes and enhanced ride-sharing. ▪ <i>Land use and density – there are 21 municipalities in GVRD:</i> <ul style="list-style-type: none"> • There is a need understand the relationships between land use decisions and their impacts on regional competitiveness and economics. • Need to designate transportation corridors when plans are being developed and provide the institutional and long-term support to assure that these designations are preserved. • Freight centres often evolve with time and are based on historical land use patterns. Freight centres and the corridors linking them

	Item
	<p>need to be treated as a system, and preserved/enhanced to meet the future demands of the region's economy. There is a need to designate and preserve these areas so that commercial activity can grow in conjunction with population.</p> <ul style="list-style-type: none"> • Timing of deliveries – the biggest factor affecting freight costs and “last mile” operations is time variation on the highway system, which is that portion of the road network that is most severely affected by congestion. Delivery delays increase costs to both truckers and receivers in that labour costs associated with late deliveries drives up costs for all parties. Severe or chronic delays attributable to the transportation system can reduce the efficiency – or even result in termination of efficiency gains from operations such as cross-docking. • The plans need to be robust, to assure that all elements of the regional economy that depend on the transportation system are addressed. • Few metropolitan areas properly assess the economics of land use decisions as they affect industrial and commercial lands, productivity and efficiency. <ul style="list-style-type: none"> ▪ <i>Concern regarding response to incidents on major corridors:</i> <ul style="list-style-type: none"> • There is a need to establish clear protocols so that roads are cleared quickly so as not to create incident-related congestion due to the “curiosity factor” and hence increase delays for both auto commuters and freight movement. • The Ministry is centralising incident responses, to try to limit delay. • In other areas, screens have been used to surround a crash area which has some effectiveness in mitigating the slowing down of passing vehicles. • Information on the corridor needs to be readily available so that if an incident occurs, drivers, especially freight, can make choices. • ITS systems can be installed when new infrastructure is being built and therefore leverage funding from the private sector to implement. ▪ <i>Flexible time, teleworking – is this promoted by employers?:</i> <ul style="list-style-type: none"> • The peak is spreading but there is also a shift in that larger groups are starting early and leaving early. • Need to segment the market that can best use flex time – not suitable for some industries. Focus on that market. ▪ <i>How do you balance the needs for passengers and freight? Are these measures not in conflict?:</i> <ul style="list-style-type: none"> • There is a need to set priorities and use the same language. An example is curb side management for deliveries in urban areas. • There are conflicts such as in smart growth principles where in practice there are serious problems with freight deliveries such as noise and pollution. These can be addressed by proper planning and

	Item
	<p>design.</p> <ul style="list-style-type: none"> • Congestion and delays or breakdowns in the highway system often exacerbate these conflicts. ▪ <i>TDM needs to be marketed and supported by providing both ideas and resources:</i> <ul style="list-style-type: none"> • Need to emphasise that TDM can reduce green house gases. • Need to present TDM in terms that are easy to understand. • Reference information on ‘best practices for TDM’ is needed. • Government assistance is needed to promote this and provide a resource for business. For example, Portland, Oregon’s TriMet Transportation Management Associations (TMAs) are non-profit coalitions of local businesses and/or public agencies that work to strengthen partnerships with businesses to reduce traffic congestion and pollution by improving commuting options for their employees. The six TMAs in the region provide resources to help medium and small businesses and individuals with customized solutions. ▪ <i>Land use planning – there is a need to integrate port plans and improve linkages with municipalities. Decisions are made based on local input.</i> <ul style="list-style-type: none"> • This is a governance question. In Portland – there is a metro government that has set up a programme for economic development much like the ALR here. • There is a need to develop a way to share revenue to allow for better land use planning. ▪ <i>Industrial Land Reserve – is work being done?:</i> <ul style="list-style-type: none"> • There is a need for political will to make this happen. • Coordinate the railroad’s land inventory (developable parcels) with those of the public utility and “rationalize” these holdings to create development parcels of the scale needed to support new industries. ▪ <i>Cities do not do an economic evaluation of the use of the land – the ballot box wins over the Economic plan.</i> ▪ <i>TransLink will be developing a new structure under the new Governance. It is expected that there will be a closer relationship with the stakeholders involved in the movement of goods and services as well as a more regional approach to land use planning.</i> ▪ <i>To complement modal shift – there is a need for a major commercial transportation system: The barriers to this occurring need to be established in a tangible form. In Seattle, the ferry is designated as part of the highway system (for funding purposes).</i> ▪ <i>Need to show the benefits of TDM – bring the focus to a higher level and highlight how TDM can provide a better system.</i> ▪ <i>There is a need to influence the location of new employment in transit corridors so that employment densities support ridership.</i>

	Item
4.	<p><u>Part 4: TDM Measures and Part 5: Moving forward Planning for Successful TDM:</u> DK and SF presented and DH moderated the discussion.</p>
5.	<p><u>Part 6: Discussion:</u></p> <ul style="list-style-type: none"> ▪ <i>Land uses – both commercial and residential –need to be located within transit corridors.</i> ▪ <i>There is a need to influence public housing decisions as well as the selection of locations for public employment by the Province and other levels of government to be more transit-supportive.</i> ▪ <i>Need to pre-set the transit network and have a pre-agreement for employment development.</i> ▪ <i>Road pricing – taxation is already high in this region - how do you contend with this?:</i> Need to rationalise where money is being spent. Need to discuss user fees, traffic management, and funding requirements for capacity expansion in conjunction with taxation as you design and develop your strategy. ▪ <i>There is a need to play a leadership role – starting with the philosophical base, conceptualising it and communicating it.:</i> Consensus can be built through clear communication. It must be a transparent process. This can be undertaken through monitoring and communication. ▪ <i>Freight plans need a higher level of involvement of the private sector – there is a need to build a stronger relationship:</i> There is a sense in the public sector of NIMBYism (not in my back yard). The private sector must be integrated into the planning system at an early stage to overcome this hurdle. ▪ <i>There are two main issues in trying to move forward – politics and equity.</i> ▪ <i>There is a need to review the Major Road Network of GVTA from a strategic point of view with more control for the movement of goods. Need to link this to Gateway.</i> ▪ <i>Need to move goods transportation issues higher on the agenda – there is a small voice regarding votes in the GVTA. Goods and services have been largely ignored in the 2021 Strategic Plan. Need to add “Services”.</i> ▪ <i>The Province’s has some concerns regarding road pricing:</i> <ul style="list-style-type: none"> • <i>Concerns with a system toll - there needs to be a toll-free alternative.</i> • <i>Ramp metering benefits users who are travelling the longer distances.</i> ▪ <i>Variable Insurance is something that is being looked at more closely:</i> This can also be converted to per mile insurance that has been used elsewhere.

	Item
	<ul style="list-style-type: none"> ▪ <i>Hours of operation for freight terminals:</i> This has been difficult where restrictions apply close to neighbourhoods. In moving forward, the public have to realise that you cannot have it both ways. ▪ <i>Concern with the difficulties with coordinating with municipalities:</i> An example discussed was Southern Railways which mainly operates at night. Recent residential developments were allowed close to the line and now complaints have been received. ▪ <i>There is a need for an Industrial Land reserve:</i> Portland has produced an Atlas of industrial land. CN and CP both have inventories of lands available for development. Many public Utilities (BC Hydro) also have industrial lands inventory including utility availability. ▪ <i>Municipal revenues:</i> <ul style="list-style-type: none"> • <i>There are no alternative revenues for municipalities besides the tax base.</i> • <i>Need to change structure to be less dependent on the property owner</i> ▪ <i>Conditions for success are:</i> <ul style="list-style-type: none"> • <i>Fair and equitable taxation</i> • <i>Coherent, consistent message</i> ▪ <i>Need broad assumptions re land use - how it would work.</i> ▪ <i>Other initiatives are LEED and PowerSmart – need a “TravelSmart” for employers. YVR provides a rebate of \$50 per person for those who carpool or take transit. In other areas, parking allowances have been transferred to cover transit costs (e.g., parking cash-out plans) with employee contributions eligible to be deducted from federal taxes. Need to offer something big as an incentive.</i> ▪ <i>There needs to be business leadership for the key reasons that there is a skills shortage and the need for a retention strategy.</i> ▪ <i>Need to call TDM something else – such a as “Commuter options”. Express TDM in the terms that can be understood by local constituents. Express fairness and equity. Make it personal.</i> ▪ <i>There is a need for a policy position from the Gateway Council. GVTA is working towards a 2040 policy – the two initiatives can work together. Need to have common vocabulary with parallel paths. Very important to have the correct language.</i> ▪ <i>It is also important to repeat the same message as individual groups, at different forums – this will resonate between all of us.</i> ▪ <i>There is a need for public education with local politicians.</i>
6.	<p>Conclusion: Bob Wilds thanked everyone for their participation in the Seminar. He thanked the Panel with special thanks to Elizabeth Szymanski from iTRANS. He said that this was the beginning, and he will need volunteers to move this forward.</p>
7.	<p>The meeting concluded at 12:00pm.</p>