TECHNICAL BULLETIN

Smart Growth on the Ground

A Partnership of:
Real Estate Institute of BC
SmartGrowth BC
Sustainable Communities Program, University of British Columbia

MAPLE RIDGE
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Reducing Automobile Dependence in Maple Ridge

1.0 Introduction

Socio-demographic and land use characteristics can significantly influence the travel patterns of a community. Neighbourhoods with medium- to high-densities, mixed land uses, interconnected street networks, a strong local employment base, and viable connections to transit can minimize automobile use and encourage walking, bicycling, and using public transit. Communities that are designed to encourage these alternative forms of transportation can significantly reduce average household greenhouse gas emissions and can dramatically improve physical activity and public health levels.

This technical bulletin examines current and potential socio-demographic, land use and travel characteristics of Maple Ridge Town Centre (the Centre) and provides strategies to reduce automobile use. Current and potential travel patterns have been calculated using the CMHC Tool for Evaluating Neighbourhood Sustainability. This tool analyzes socio-demographic, land use, and transportation network characteristics in order to calculate average household travel behaviour and greenhouse gas emissions.

2.0 Current Socio-Demographic and Land Use Characteristics

Table 1: Minimum Desired Densities for Transit Service [2]

Service Type	Minimum Desirable Population Density
Conventional Bus	30 pph
Community Shuttle	20 pph

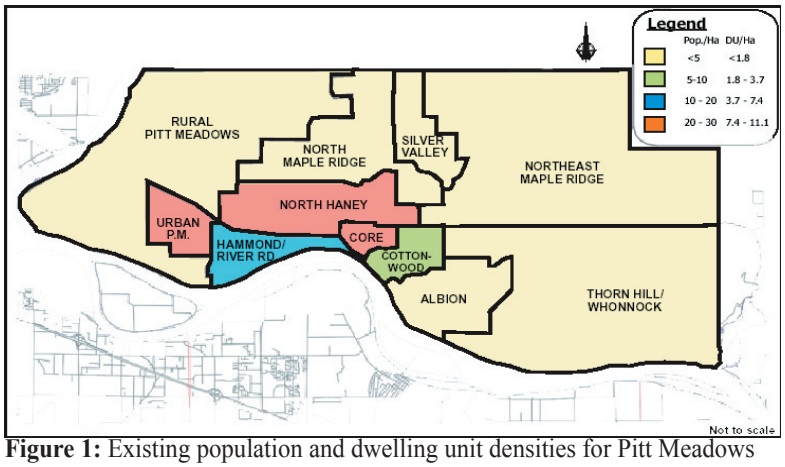

Figure 1: Existing population and dwelling unit densities for Pitt Meadows and Maple Ridge [2]

The District of Maple Ridge has been growing rapidly over the past several decades, reaching a population of 66,300 in 2001. It is anticipated that the population will increase by a further 27,400 to reach a total population of 93,700 in 2021.[1] Half of this growth is projected to occur in Maple Ridge Town Centre. With an area of 294 ha and a population of 8,050 residents, the Centre has a current population density of 27.4 persons per hectare (pph) (figure 1). This density complies with TransLink's minimum desired densities for transit service (table 1).[2]

In addition to having density levels that are supportive of public transit, the Centre exhibits many other characteristics typical of smart growth communities. The Centre has a well-developed and predominantly interconnected street network (figure 2); a relatively diverse array of residential and commercial land uses of varying intensities; connections to local and regional transit service; and a significant employment base of 4,575 jobs. In addition, 37% of the district-wide labour force lives and works in the District of Maple Ridge, which is considered to be very high for an outlying community.[3]

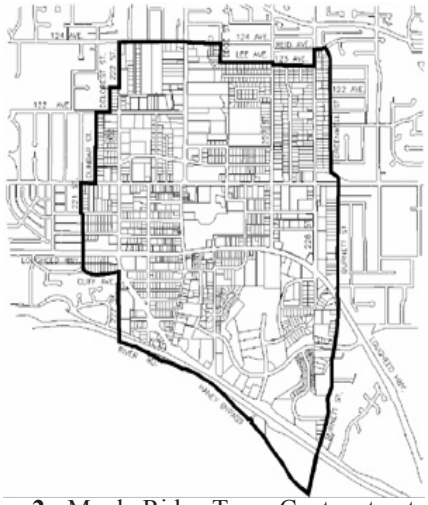

Figure 2: Maple Ridge Town Centre street network

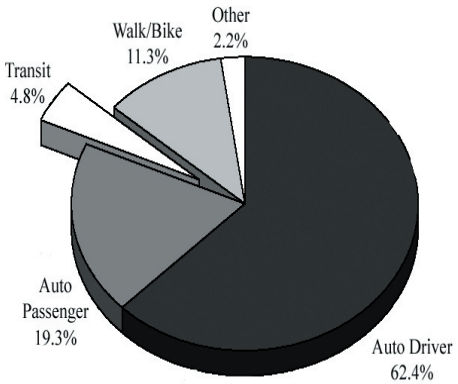

Figure 3: 24-Hour Mode Split for Pitt Meadows and Maple Ridge

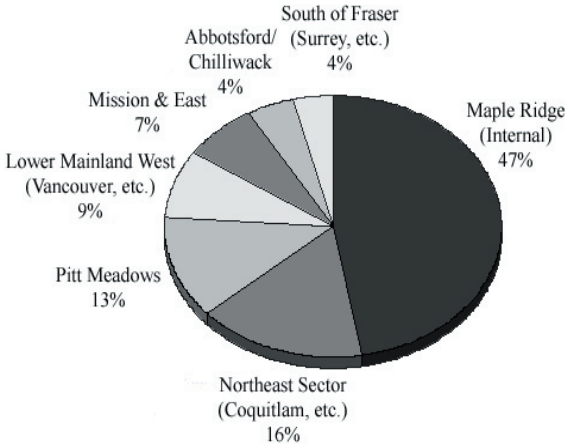

Figure 4: AM Peak distribution of destinations of vehicle trips from Maple Ridge

3.0 Current Travel Patterns

Although the Centre exhibits many smart growth attributes, the automobile is the dominant mode of transportation. Throughout the districts of Maple Ridge and Pitt Meadows, public transit currently accounts for only 4% of all trips (compared to 10% throughout Greater Vancouver) and walk and bike trips account for 12% of all trips. In contrast, over 80% of trips generated from these municipalities are made using the automobile (figure 3).[4] Inserting current metrics from Maple Ridge Town Centre into the CMHC Tool for Evaluating Neighbourhood Sustainability produced even more dramatic results. The model estimated that the average household in the Centre currently generates 84.8 vehicle kilometres of travel (VKT) per weekday (92 % of all travel) and only 7.4 transit passenger kilometres of travel (PKT) per weekday (8% of all travel).[5] The model also estimated that vehicle ownership levels are relatively high in the Centre with an average of 1.19 vehicles per household. It should be noted, however, that the CMHC Tool only estimates mode share for automobiles and for public transit and does not take into account mode share for walk and bike trips.

Maple Ridge Town Centre is well-served by regional east-west transit services such as the West Coast Express and the #701 bus route to Coquitlam Town Centre, however the Centre itself is not well-served by local transit routes. Currently, there are 5 locally serving bus routes, but these routes do not operate frequently, and even less so during non-peak hours. These routes also do not completely cover the Centre. Since nearly half of all automobile trips currently generated in Maple Ridge and Pitt Meadows remain internal to these communities (figure 4), there is a significant opportunity to capture some of these local automobile trips through improvements to the local-serving transit system.[6] Regional transit connections will be significantly improved when the new Fraser River Crossing opens in 2007 providing regional north-south transit service to Langley and Surrey Town Centres and a more direct link to the SkyTrain.

4.0 Possible Changes in Socio-Demographic and Land Use Conditions

There are several possible changes to the socio-demographic and land use conditions within Maple Ridge that would help fulfill Smart Growth on the Ground's principle to provide options to the car. First of all, as stated previously, the Centre is anticipated to capture 50% of the projected district-wide population growth over the next 16 years. This would add 13,700 new people to the Centre, requiring the creation of approximately 7,000 new dwelling units (consisting of a variety of typologies to support the needs of all sectors of the community). As a result, population density would increase to about 70-100 pph or 38-54 dwelling units per hectare (uph). Second, to conform to the Livable Region Strategic Plan's principle of balancing housing and jobs in regional town centres, it is anticipated that for each new dwelling unit built, 0.25 to 0.75 new jobs will be created. This would add 1,750 to 5,250 new jobs to the existing 4,565 jobs currently found in the Centre. Third, public transit should be located within 250m of all residents in order to comply with Translink's minimum recommended transit service standards, which state that 90% of the population in areas that have densities that can support transit should have a transit stop within 50m of their dwelling.[7] Fourth, to create a complete community, all residents should be located within 400m of commercial and cultural facilities. By implementing these changes, walking, bicycling and public

transit can become viable alternatives to the automobile.

5.0 Impacts of Changes on Travel Patterns

To evaluate how increased density, local job creation, the creation of a bike network, proximity to public transit and commercial and cultural facilities may impact travel patterns in Maple Ridge, the CMHC Tool for Evaluating Neighbourhood Sustainability was consulted. The results obtained were impressive (Table 2). By incorporating these elements of smart growth, this tool estimates:

- Reduction in vehicle ownership per household by 40%
- Reduction in automobile VKT per household by 52%
- An increase in transit PKT per household of 20%

Table 2: Vehicle Ownership, Automobile VKT, and Transit PKT Levels for Existing Conditions (2001) and for 2021 Vision

Travel Pattern Comparison	Maple Ridge Town Center, Existing	Maple Ridge Town Center, 2021 Vision
Neighbourhood Attributes		
Urban context	Suburb	Suburb
Land area	250 ha	250 ha
Road layout type	Primarily grid	Primarily grid
Total length of non-expressway roads	26km	26km
Total number of intersections	112	112
Total length of wide arterials (4 lane)	2.5km	2.5km
Daily Bus Vehicle Service Hours	4.7	6.2
Total length of bike routes	0km	7km
Socio-Demographic Data		
Total number of residential units	4330	13000
Total residential density (units/ha)	17.3	52
Housing Mix (1= total mix; 0 = no mix)	0.79	0.79
Number of grocery stores (1-km radius)	0	4
Number of jobs (1-km radius)	4565	9565
Number of jobs (5-km radius)	10000	40000
Locational Characteristics		
Distance to CBD	14km	3km
No. of Jobs (5-km radius)	10000	40000
Distance to nearest rapid transit station (rapid bus)	0km	0.25km
Distance to nearest commuter rail (WCE)	0.25km	0.25km
NEIGHBOURHOOD PERFORMANCE COMPARED		
Weekday Household Travel Behaviour		
Average Vehicles Owned/household	1.19	0.71
Average VKT generated/household	53.7	25.7
Average PKT generated/household	7.4	8.9

6.0 Options to Reduce Automobile Dependence

As mentioned above, changes in land use and socio-demographic characteristics can have dramatic cumulative effects on travel patterns. If only one or a few of these changes are implemented, however, it is unlikely that there will be a significant change in travel behaviour. This section addresses the various options that should be considered to reduce automobile dependence and encourage alternative forms of transportation.

Increasing Density

Increasing residential and commercial density is an important first step to creating more sustainable communities. By increasing density, the community becomes more compact and distances between

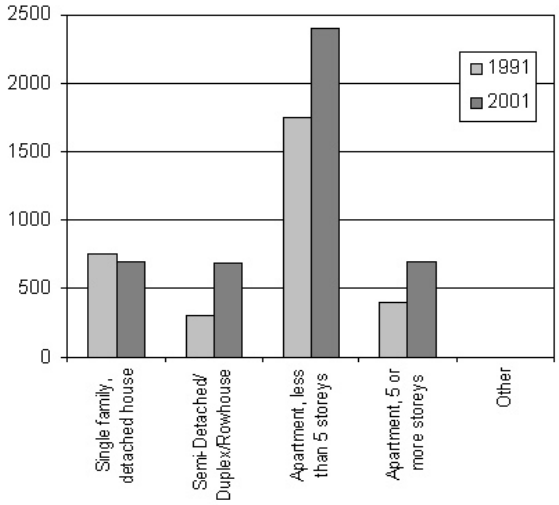

Figure 5: Households by Dwelling Type: Maple Ridge Town Centre, 1991-2001

origins and destinations are reduced. A large body of research has shown that by locating activities close together, automobile dependence is reduced and alternative forms of transportation are encouraged.[8] One study, for example, found that doubling urban density in North American cities can result in a 25% to 30% reduction in VKT.[9]

Increasing Land Use Mix

Another vital component to reduce automobile dependence is to provide a diverse array of residential and commercial land uses within a given area. As land use mix is increased, the proximity between origins and destinations decreases. Studies have shown that if retail shops are within 90m (300 feet) from residential units, people are more likely to commute by transit, foot or bicycle.[10] As shown by Figure 5, apartment buildings less than 5 stories currently dominate the residential dwellings in the Centre. To increase housing options, alternative dwelling types should be investigated. By increasing and diversifying residential, office and retail uses within the Centre, residents can be enticed out of their cars.

Increasing Local Employment

Many regions in North America suffer from a jobs-housing imbalance, where certain areas contain the bulk of employment while others are dedicated primarily to housing.[11] Numerous studies have shown that a job-housing imbalance encourages the use of the automobile. Providing a sufficient supply of jobs within the Centre can ensure that as many residents as possible are able to work close to home and reduce the need to commute to other communities. One study found that, while travel behaviour is affected by small changes in land use, it is also affected when certain employment level thresholds are met or exceeded. Specifically, the study found that reductions in work-related trips require an employment density of 123-173 employees per gross hectare (50-70 employees per gross acre), of which approximately 18% should be residents. For significant reductions in non-work trips, such as shopping, an employment density of 185 employees per gross hectare (75 employees per gross acre) is needed, of which approximately 18% should be residents.[12] Although it is difficult to control how many jobs will locate in the Centre and where these jobs will be located, the scenario used in the CMHC model estimated the creation of .7 local jobs for every new housing unit. From a transit standpoint, increasing the employment density and the jobs-to-housing ratio will also increase viability, since transit can service both employees and residents in the area.

Increase Options for Walking, Biking, and Transit

Maple Ridge Town Centre already exhibits a fairly interconnected street network. It is possible, however, to increase the connectivity for pedestrians and bicyclists through the creation and improvement of pedestrian/ bicycle paths or by restricting vehicle traffic on certain streets. The scenario used in the CMHC model suggested that pedestrian/bicycle paths be doubled. Increasing connectivity for pedestrians and bicyclists will increase the utility for pedestrians and bicyclists while decreasing the utility for automobiles. This can help reduce automobile dependence and encourage non-motorized forms of transportation.

7.0 Conclusion

With an increased mixture and intensity of land uses, the possible creation of transit routes across the new Fraser River Crossing, and with a goal of ensuring that every household is located within a 250m walk of a bus stop, there is tremendous potential to increase transit service in the Centre. The scenario used in the CMHC model suggested a tripling of current transit service hours, which can be achieved by increasing the frequency and coverage of both local and regional bus routes. It is likely that the use of Community Shuttles for local-serving routes would be the most cost-effective way to provide this increase in transit service.

This bulletin has shown that by increasing residential and commercial density, increasing land use mix, increasing the number of local jobs, improving the pedestrian and bicycle network, and improving transit service, Maple Ridge Town Centre can see a transition from being a bedroom community to being a

complete community. This transition results in a dramatic reduction in automobile use and an increase in alternative modes of transportation.

Notes:

[1] The Sheltair Group and Kelly & Associates. 2004. Demographic Analysis and Population and Housing Projection for Maple Ridge, 2001-2031 p. 35 Report found at: http://www.mapleridge.org/municipal/departments/planning/demographics-march04.pdf

[2] Greater Vancouver Transportation Authority. 2004. Interim Report #1 – Background Research & Transit Performance: Pitt Meadows/Maple Ridge Area Transit Plan. P. 9 Report found at: http://www.translink.bc.ca/files/area_plans/int_rep1bkd_research_transit_perf.pdf

[3] The Sheltair Group and Kelly & Associates. 2004, p. 22

[4] Greater Vancouver Transportation Authority. 2004. p. 14

[5] This figure was found using the 2001 Base Case with the CBD being Downtown Vancouver. This scenario assumes that the Town Center is currently a 'bedroom community' instead of being a CBD in its own right.

[6] Greater Vancouver Transportation Authority. 2004. p. 14

[7] Greater Vancouver Transportation Authority. 2004, p. 34

[8] Frank, Engelke, Schmid. 2003. Health and Community Design: The Impact of the Built Environment on Physical Activity. Washington, DC: Island Press, p. 137

[9] Holtzclaw. 1994. Using Residential Patterns and Transit to Decrease Auto Dependence and Costs. Natural Resources Defence Council, San Francisco, p. 6-8 and 21.

[10] Cervero, Robert. 1996. Mixed Land-Uses and Commuting: Evidence from the American Housing Survey *Transportation Research A* 30(5): 361-377. p. 375

[11] Frank et al. 2004, p. 145

[12] Frank and Pivo. 1994. Relationships Between Land Use and Travel Behaviour in the Puget Sound Region. Washington State Department of Transportation, Seattle, p. 9-37