



# Fraser Valley Regional District

## REGIONAL GROWTH STRATEGY

### Transportation and Land Use



**This collection includes the following working papers  
by Reid Crowther & Partners Co.:**

*Transportation Analysis of Two Land Use Scenarios, (May 1998)*

*Transportation Analysis of Four Land Use Scenarios, (Draft, 1999)*

*Transportation: A Scan of the Current Operating Environment, (May 1998)*

**FRASER VALLEY REGIONAL DISTRICT  
REGIONAL GROWTH STRATEGY**

**WORKING PAPER**

**TRANSPORTATION ANALYSIS OF TWO  
LAND USE SCENARIOS**

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**May 1998**

**Project No. 33890-00**

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## **PREFACE**

### **REGIONAL GROWTH STRATEGY OF THE FRASER VALLEY REGIONAL DISTRICT**

This working paper is a product of the technical and analytical work supporting a Regional Growth Strategy for the Fraser Valley Regional District (FVRD). The District comprises of the municipalities, villages and electoral areas in the eastern portion of the Lower Mainland of British Columbia.

The purpose of the growth strategy is to guide decisions on growth, change and development within the FVRD to the year 2021.

A major objective of the strategy is to improve coordination between provincial and local government plans and policies. Its focus is on issues crossing local government boundaries, such as air pollution, water quality, traffic congestion, affordable housing, employment, energy use, and regional growth management. As indicated under the Growth Strategies Act of British Columbia, the strategy is to cover at least the following:

- a comprehensive statement on the future of the Region, including
- social, economic, and environmental objectives of the strategy;
- population and employment projections; and
- proposed regional actions in relation to housing, transportation, regional district services, parks and natural areas, and economic development.

Topics outside the strategy include municipal development standards and policies, and land use zoning.

### **RELATED PAPERS**

This is one of a series of papers on land use and transportation in the FVRD.

At time of writing, two other related papers were available: the first, entitled "The Context for Change and Growth in the Fraser Valley" was prepared by the Urban Futures Institute in January 1997; the other is a report by Urban-Eco Consultants outlining the future distribution of people, homes and jobs in the FVRD.

## ACKNOWLEDGMENTS

This paper was written by Reid Crowther and Partners of Burnaby, B.C. The firm was engaged by the International Centre for Sustainable Cities (ICSC), a non-government organization based in the Lower Mainland. ICSC has a partnership agreement with the FVRD to provide the technical work programme for the Regional Growth Strategy.

Before publication, the paper was reviewed by member municipalities of the FVRD.

## ADDITIONAL COPIES

Copies of the paper can be obtained from the Regional District.

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# TRANSPORTATION ANALYSIS OF TWO LAND USE SCENARIOS

## 1.0 INTRODUCTION

This Working Paper examines the Strategic implications of two land use scenarios on the transportation system in the Fraser Valley Regional District. The work was carried out by Reid Crowther as a part of the preliminary work on land use and transportation implications in support of the region's growth management strategy. Transportation demand forecasting was undertaken for the two land use scenarios which were developed and provided by Urban Eco Consultants. A full description of the land use scenarios is provided in the Urban Eco report titled: Fraser Valley Regional District Growth Strategy – Land Use Model. The two land use scenarios are described as:

Low Growth Scenario:	390,000 regional population
Trend Growth Scenario:	550,000 regional population

The travel demand forecasting was conducted using the calibrated 1997 Greater Vancouver Regional District (GVRD) Regional Model which provides a full coverage of the transportation system in the FVRD. For the full description of the GVRD model, refer to Transportation Model Enhancement Reports, Report 1: Demographic, Road and Transit Network Update, February 1997, jointly sponsored by Ministry of Transportation and Highways, BC Transit and the GVRD.

This coverage or modeling of the FVRD transportation system includes the establishment of a traffic zone system complete with road and transit network functions. The strategic level assessment of travel demand would enable the establishment of transportation and land use policies, as well as defining future infrastructure requirements within the FVRD and between neighboring regions. A more detailed discussion on the model would be made in the following sections.

## 2.0 SCOPE OF WORK

The scope of the work undertaken for this Working Paper is outlined as follows:

- Examine the overall model structure and assumptions made in the Fraser Valley portion of the GVRD travel demand forecasting model.
- Review and refine the traffic zone system in the FVRD.
- Review the road and transit network, and refine as required

- Input zonal attributes: population and employment estimates into FVRD traffic zones.
- Establish the evaluation framework for transportation implications of the two land use scenarios.
- Conduct travel demand forecasting for the two land use scenarios.
- Review model output and summarize implications and conclusions.

Preliminary findings from the above work have been presented to the Inter-Governmental Committee at its January and March meetings held at the FVRD.

### 3.0 LAND USE

The Low Growth scenario, denoted as Low 390, assumes a regional population of 390,000 with 153,000 total employment and 153,000 dwelling units. The Trend Growth scenario, denoted as Trend 550, assumes a regional population of 550,000 with 212,000 employment and 193,000 dwelling units. A full description of the land use and assumptions are outlined in the Urban Eco report titled: Fraser Valley Regional District Growth Strategy – Land Use Model.

### 4.0 TRAVEL DEMAND FORECASTING, A STRATEGIC TOOL

The modifications of the GVRD model included the addition and reconfiguration of the traffic zone system and adjustment to the road network. Overall, the review of the GVRD model indicated that sufficient zonal and network details have been provided in its current model structure. It is concluded that for the strategic purpose of this Working Paper, only minor adjustments are needed for the traffic zone and network system. No other modifications were made to the GVRD model.

A total of eight traffic zones were added to the FVRD, most of them in the Abbotsford area. As well, the traffic zone system was extended into the eastern limit of the FVRD to provide proper coverage and accounting for external zonal movements. Minor adjustments were also made to the road network of the FVRD model to reflect the network in the FVRD. The traffic zone and road network used for the FVRD model runs are shown in FIGURE 4.1 and 4.2, respectively.

Subsequent to the input of population and employment estimates into the FVRD traffic zones, full model runs were conducted for the two land use scenarios involving trip generation, distribution and assignment on to the road and transit network. The model output included travel demand in vehicle trips for the weekday morning peak period.

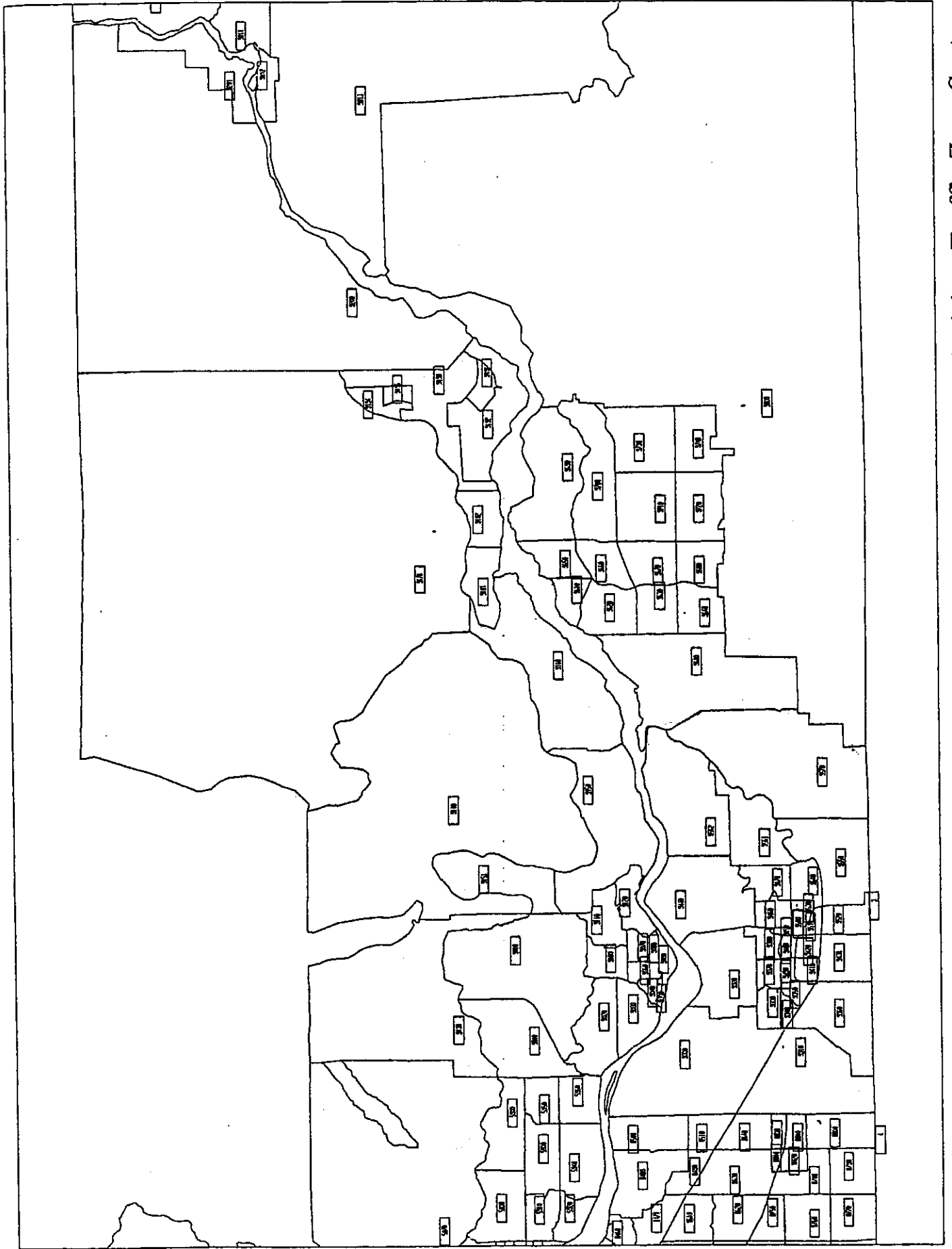
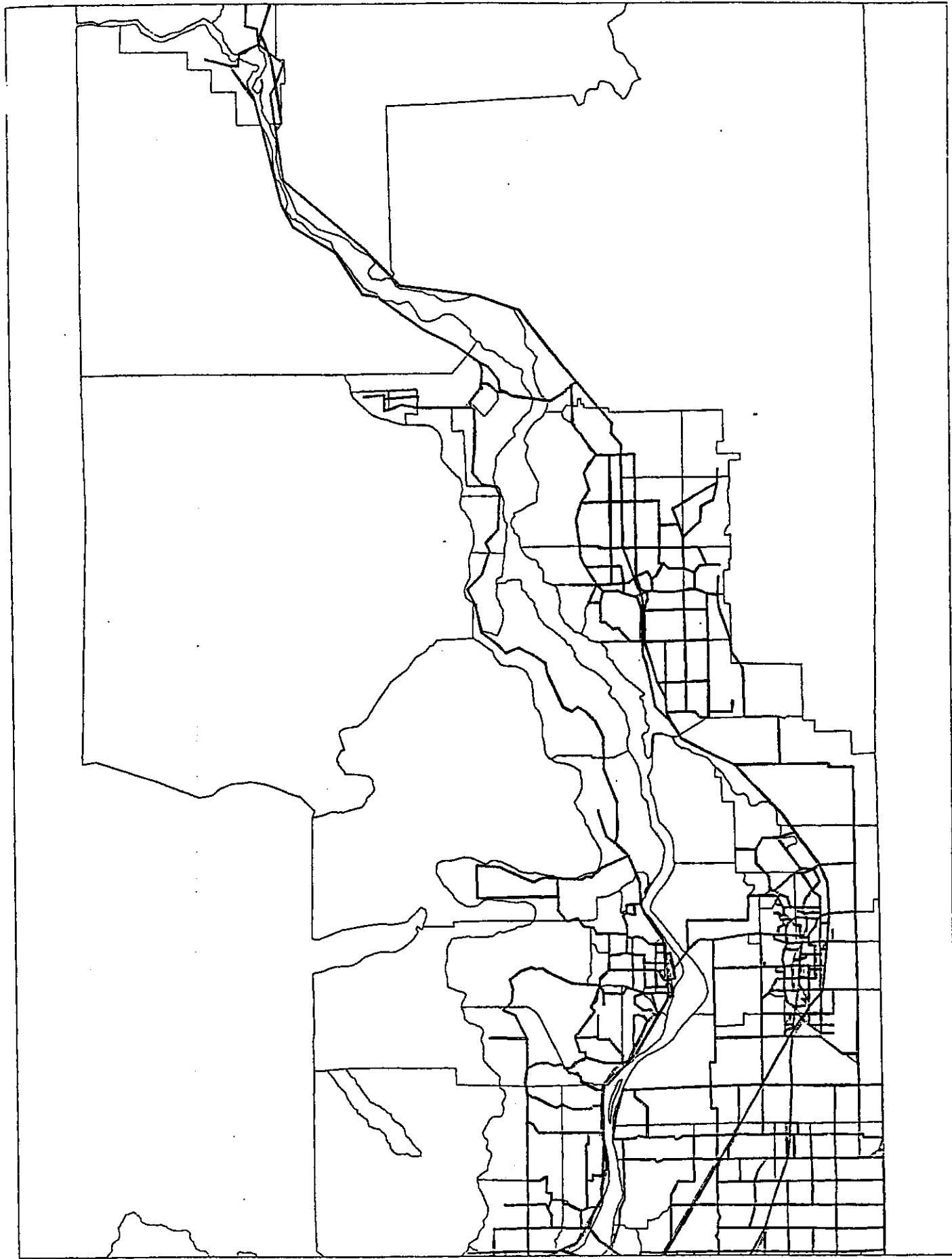


FIGURE 4.1 Traffic Zone System



**FIGURE 4.2** Road Network System

It is acknowledged that currently the Ministry of Transportation and Highways is conducting the Highway 11 corridor analysis from which a subarea model has been developed for the corridor analysis. The FVRD study team has been contacted on several occasions by the Highway 11 study team to exchange model output and other information. It has been noted by both the Ministry and Reid Crowther that differences are present when comparing the Highway 11 corridor model with the FVRD model, in particular the assignment on the Mission Bridge connecting Abbotsford and Mission. Further discussion will be made on the difference on the Mission Bridge.

## 5.0 EVALUATION FRAMEWORK

The evaluation framework for the assessment of the land use scenarios and their transportation implications involved the relative comparison of population level, and transportation system parameters such as total trip volume, and other demand characteristics derived from the model and the screenline. Specifically, the following parameters were used:

- Regional population
- Total trip volume generated
- Total vehicle-kilometre traveled
- Average travel speed
- Average trip lengths
- Travel time
- Transit Modal Split

These key parameters serve as descriptors of changes in the road network performance of the FVRD. Screenlines at five major locations were established to enable comparison of automobile volumes changes on major regional roads for each of the land use scenarios. The screenlines are shown in FIGURE 5.1. Trip interchange patterns are also used to evaluate changes in travel both internal and external to the FVRD.

## 6.0 FINDINGS

The transportation system assessment is summarized in FIGURE 6.1. The results are discussed as follows:

### *Automobile Volumes*

The screenline analysis results were used to describe the automobile volumes. During the morning peak hour conditions, the total automobile volume within the region increased by 81 percent for the Low 390 scenario and 150 percent for the Trend 550 scenario. The details of the screenline analysis are summarized in

# SCREENLINE LOCATIONS

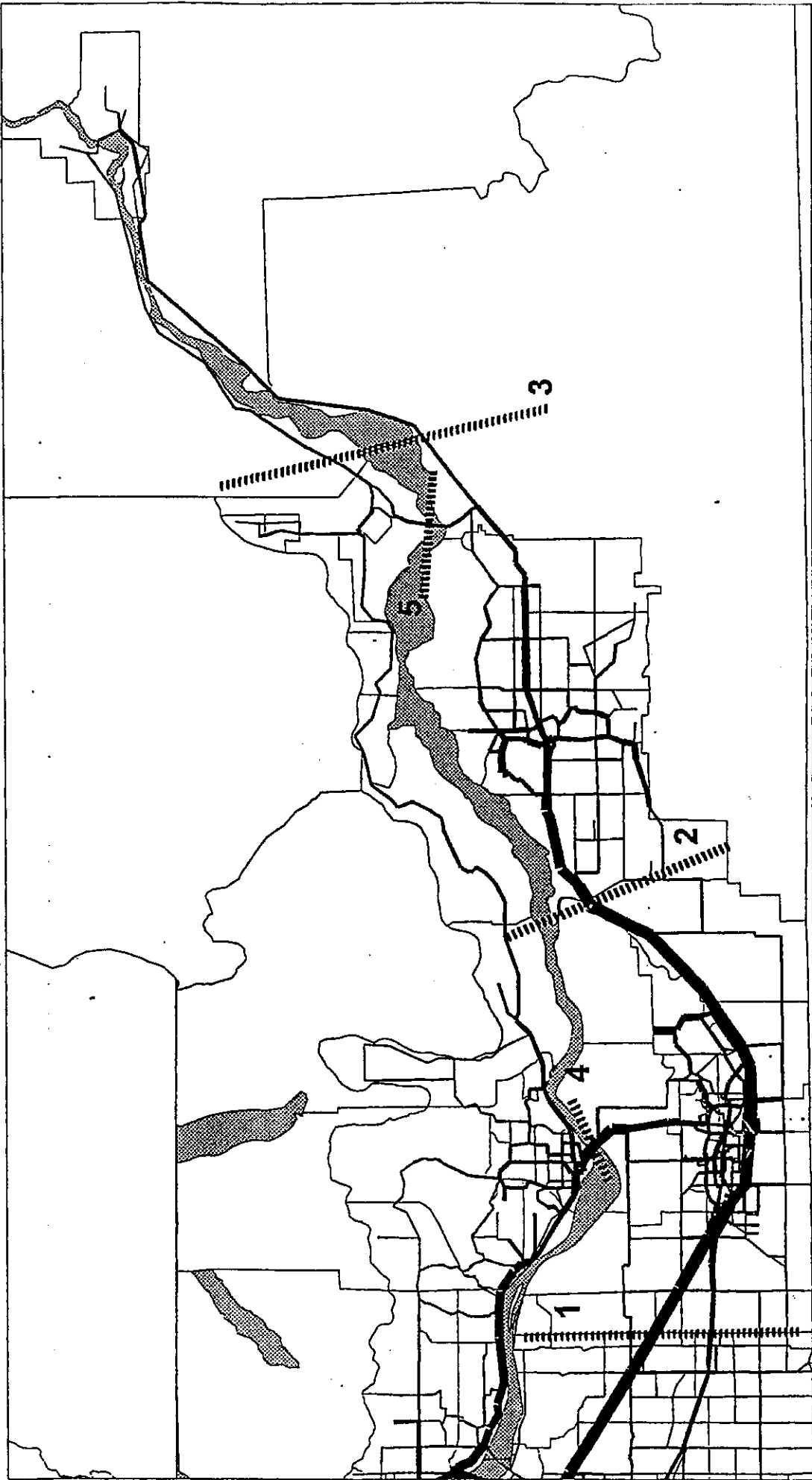


FIGURE 5.1

# Projected Changes In Key Transportation Characteristics

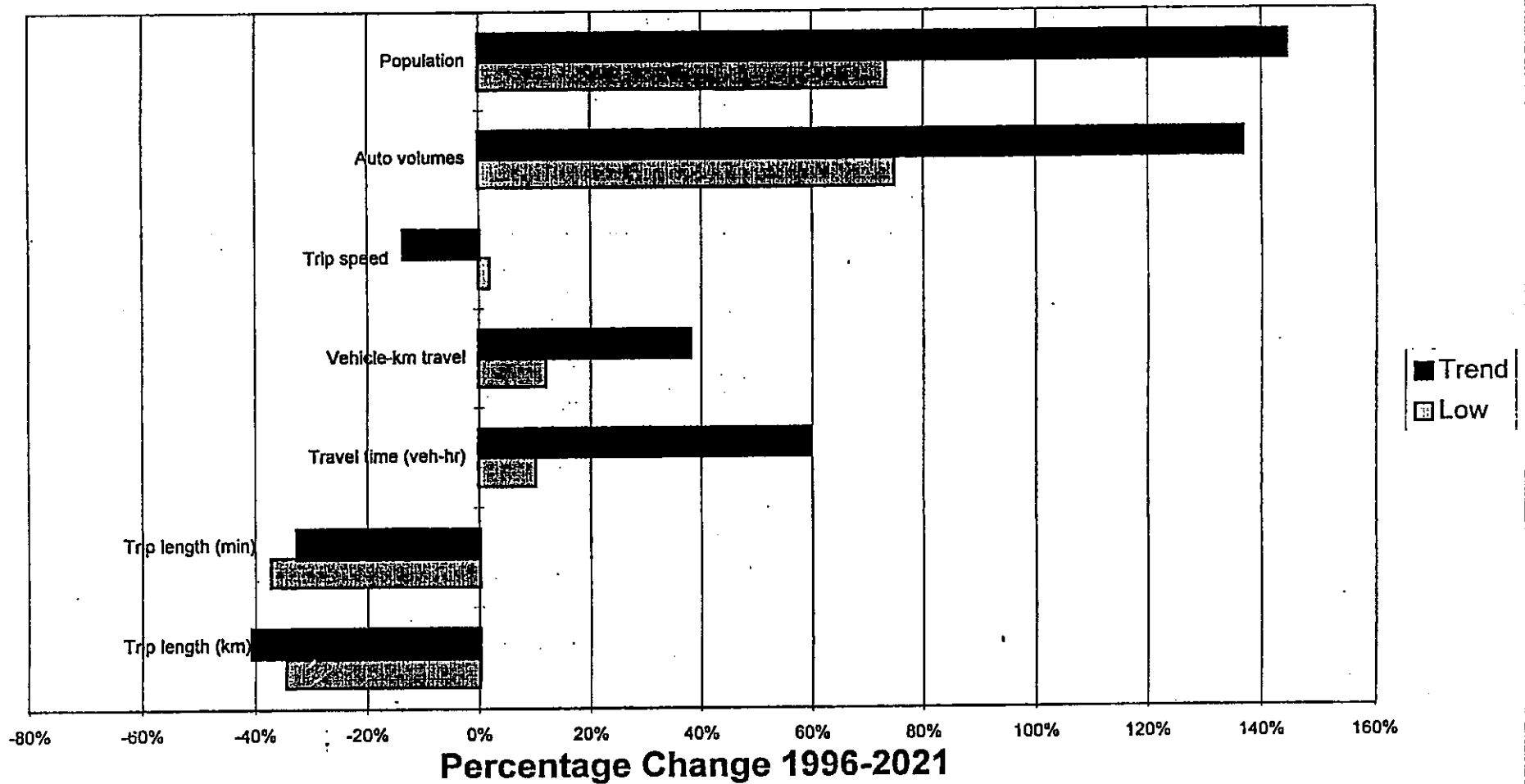


TABLE 6.1. The following table is for relative comparative purposes for automobile volumes located at strategic locations.

It is noted that the trip assignment on the Mission Bridge taken from the GVRD model is different from that of the Corridor subarea model prepared by the Ministry of Transportation and Highways. However, the difference is noted between the 2021 FVRD assignment and the 2006 Corridor 11 study assignment. For the FVRD assignment, there is virtually no change to the northbound volume between 1997 and 2021. This may be explained by the toll charges and other transportation demand management (TDM) measure installed for the 2021 model, a new Cottonwood Crossing, and the improvement of Highway 7 west of Mission. These assumptions would need to be tested. For the Ministry output, the northbound volume showed an increase for the 2006 volume. According to the Ministry, this increase is consistent with the historic growth of bridge traffic between Mission and Abbotsford. At the time of writing, the Ministry has not developed 2021 volumes, nor any TDM measure comparable with the GVRD model.

### ***Origin Destination Travel Pattern***

Travel pattern changes are illustrated schematically in FIGURE 6.2. For major east-west travel near the GVRD boundary (on the Trans-Canada Hwy.), a 40 to 48 percent increase in traffic volume can be expected in the peak direction for the Low 390 and Trend 550 scenarios, respectively. For the screenline located at the Abbotsford/Mission-Chilliwack border, increases of 42 percent to 89 percent in automobile volume can be expected for the Low 390 and Trend 550 scenarios, respectively.

The change in travel pattern can be illustrated in the magnitude of internal travel increase shown in FIGURE 6.2. In 1996, 22,400 "internal" trips are estimated for the FVRD. In 2021, 40,700 and 56,200 automobile trips are projected for the Low 390 and Trend 550 scenarios, respectively.

### ***Travel Speed***

It was observed that for travel speed expressed in kilometres per hour, there is virtually no change between 1996 and the Low 390 scenario. However, travel speed decreased from 59 km/h to 51 km/h between 1996 and the Trend 550 scenario.

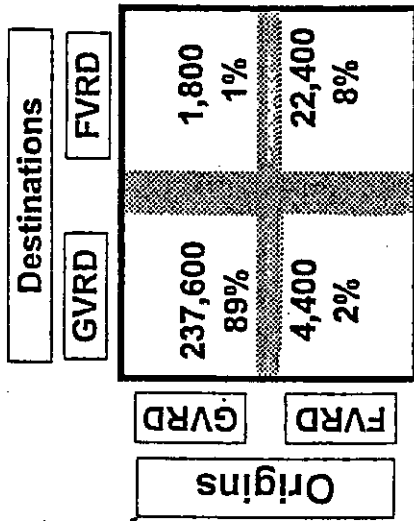
### ***Travel Time***

A comparison of travel times (veh-hr) between 1996 and the Low 390 scenario indicates a 10 percent increase. In contrast, travel time increases by 60 percent in the Trend 550 scenario.

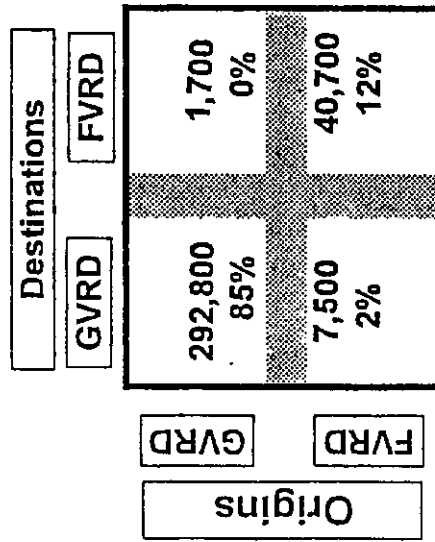
**TABLE 6.1: Screenline Analysis Summary**

Screenline	Planning Horizon/ Land Use Scenario	Westbound/Northbound (% growth)	Eastbound/Southbound (% growth)
<b>1. FVRD/GVRD</b>			
Trans-Canada Hwy.	1996 AM Peak Hour	2500 vph	1100
	2021 AM Peak Hour (Low: 390,000 pop.)	3400 (36%)	900 (-18%)
	2021 AM Peak Hour (Trend: 550,000 pop.)	3700 (48%)	900 (-18%)
Fraser Hwy.	1996 AM Peak Hour	700	800
	2021 AM Peak Hour (Low: 390,000 pop.)	1000 (43%)	700 (-13%)
	2021 AM Peak Hour (Trend: 550,000 pop.)	1000 (43%)	600 (-25%)
King Rd (16th Ave.)	1996 AM Peak Hour	200	200
	2021 AM Peak Hour (Low: 390,000 pop.)	400 (200%)	100 (-50%)
	2021 AM Peak Hour (Trend: 550,000 pop.)	400 (200%)	100 (-50%)
Screenline 1 Composite	1996 AM Peak Hour	3400	2200
	2021 AM Peak Hour (Low: 390,000 pop.)	4800 (41%)	1700 (-23%)
	2021 AM Peak Hour (Trend: 550,000 pop.)	5100 (50%)	1600 (-27%)
<b>2. MISSION AND ABBOTSFORD / CHILLIWACK</b>			
Lougheed Hwy	1996 AM Peak Hour	300	200
	2021 AM Peak Hour (Low: 390,000 pop.)	300 (0%)	300 (50%)
	2021 AM Peak Hour (Trend: 550,000 pop.)	700 (133%)	200 (0%)
Trans-Canada Hwy	1996 AM Peak Hour	1600	1000
	2021 AM Peak Hour (Low: 390,000 pop.)	2400 (50%)	1000 (0%)
	2021 AM Peak Hour (Trend: 550,000 pop.)	2900 (81%)	1200 (20%)
Screenline 2 Composite	1996 AM Peak Hour	1900	1200

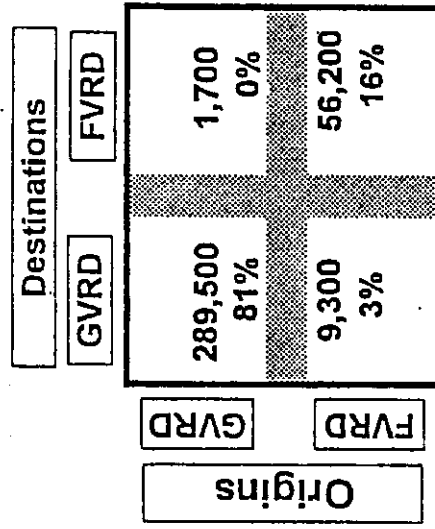
# Degree of Inter-Dependency for Auto Trips



1996 AM Peak Hour



2021 AM Peak Hour (Low390)



2021 AM Peak Hour (Trend550)

FIGURE 6.2

### *Trip Length*

Trip length is expressed in distance (kilometre) and time (minutes). The average trip length decreases from 16 km in 1996 to 11 km in 2021 for the Low 390 scenario. A further reduction of the trip length to 10 km for the Trend 550 scenario was observed. Expressed in minutes, the trip length drops from 17 minutes to approximately 11 minutes for the Low 390 and Trend 550 scenarios.

### *Transit Modal Split*

The 1996 transit modal split is estimated at 2 percent of total travel in the FVRD. Transit modal split increases to 4.5 percent and 4 percent for the Low 390 and Trend 550 scenarios, respectively

## **7.0 Implications and Conclusions**

The transportation implications resulting from the demand analyses of the Low 390 and Trend 550 scenarios are summarized as follows:

- The Trans-Canada Highway at the GVRD border will be operating at near capacity for the Trend 550 scenario (volume/capacity ratios of 0.85 to 0.9). Lougheed Highway is expected to operate satisfactorily in 2021. Major river crossings are also expected to operate satisfactorily; however, the approaches to the Mission Bridge should be reviewed for operational improvements.
- The distribution of trips, traffic patterns, and trip lengths suggests a greater percentage of internal trips within the FVRD. This would indicate more self-sufficiency for the transport system given the distribution of population and employment in 2021.
- With the increase in internal travel, and although the major roads are operating satisfactorily, attention should be focused on the local system to ensure that arterial and collector roads are adequate to accommodate travel demand increases.
- The increase in the transit modal split is attributed to the growth of both local and external trips destined for the GVRD. For the Trend 550 scenario, approximately 1,600 person-trips are projected for transit service between the FVRD and the GVRD.
- At the Trend 550 development level, congestion is anticipated to build over the entire road network (reduction of average trip speed from 59 km/h in 1996 to 51 km/h in 2021). Consideration should be given to increase transit modal split and the implementation of various TDM measures.

- It is important to note that these results are a direct product of the land use pattern input, population and notably, employment distribution in the FVRD. We understand that the employment figures may be over-estimated, especially in the Trend 550 scenario. Lower employment figures would almost certainly increase the amount of commuter travel on the major roads and thereby reduce the “self-contained” nature of the region as illustrated in the current work.

