Bayers Road/Highway 102 Corridor Study
Component 1 - Traffic Projections
Final Report
February 20, 2008

Department of Transportation and Infrastructure Renewal and The Halifax Regional Municipality

Completed By:

Stantec Consulting Ltd.

in association with

delphiMRC

Stantec #: 20639

Stantec Consulting Ltd.
#1 South 130 Eileen Stubbs Avenue
Dartmouth NS B3B 2C4
Tel: (902) 434-7331
Fax: (902) 462-1660

March 30, 2009
File: 20639/3

Nova Scotia Department of Transportation and Infrastructure Renewal
1672 Granville Street
Halifax, NS B3J 2N2

Attention: Mr. Dwayne Cross, P.Eng.

Dear Mr. Cross:

Reference: Bayers Road/Highway 102 Corridor Study

Enclosed are 16 hard copies of the Component 1 Report for the above-noted project. As well, there are two digital copies of the report files. This is the first of three reports as required by the Terms of Reference for this project.

The report was prepared by Stantec Consulting Ltd. and sub-consultant Delphi-MRC for the Nova Scotia Department of Transportation and Infrastructure Renewal. The material in it reflects professional judgment in light of the information available at the time of preparation. Any use which a third party makes of this report, or any reliance on or decisions made based on it, are the responsibility of such third parties. Stantec accepts no responsibility for damages, if any suffered by any third party as a result of decisions made or actions based on this report.

In particular, we caution that any future application of the model files must consider the fact that they have been modified for the purposes of this study and as such, are no longer consistent with the model used in the development of the Halifax Regional Municipality's Regional Plan. Therefore, the results from this study and the results from the Regional Planning process are from two distinct models. The process applied to carry out the QRS II model analysis followed the HRM recommended procedures. We used QRS II version 6 and GNE version 7 for this study.

Should you have any questions, please do not hesitate to contact the undersigned.

Sincerely,

STANTEC CONSULTING LTD.

B. Landry

Bernadette Landry, P.Eng.
Project Manager

Attachment

TransmittalLetterforComp1Report20639rev1

EXECUTIVE SUMMARY

The Nova Scotia Department of Transportation and Infrastructure Renewal (NSTIR) and Halifax Regional Municipality (HRM) have contracted the Stantec, Delphi-MRC team to undertake a study of the Bayers Road / Highway 102 Corridor and the proposed extension of Highway 107 to Highway 102. The team has undertaken transportation planning, traffic analysis, functional design and overall project management for the corridor study.

The purpose of the study is to determine the ultimate capacity and best use of the Highway 102 corridor and to study the alignment and connection options for the future Highway 107. The primary objectives of the Project are to determine:

- Traffic Projections (Component 1)
- Highway 102 Upgrades (Component 2)
- Highway 107 Extension (Component 3)

In **Component 1** of the project a baseline transportation demand model was developed using the 2001-planning year. The model was then calibrated and validated to ensure a reasonable replication of baseline conditions. Demographic data was developed for the future planning horizons (2016, 2026 and 2036). These data were integrated into the modeling process and the future planning horizon years were modeled and evaluated to determine the number of basic lanes required in the Highway 102/Bayers Road corridor. This report (the first of three) provides an overview of the **Component 1** process applied to the modeling effort and summarizes key findings from the analysis.

Based on direction received from NSTIR, the 2001 QRS II baseline model calibration used for the Halifax Regional Municipality regional planning purposes was modified to match NSTIR-observed peak hour traffic volumes collected within the Highway 102 corridor. A calibration procedure consistent with recommended practices from the Federal Highway Administration (FHWA) and agencies in the United Kingdom[1] was applied. Based on the results from this validation procedure, the model was validated to an acceptable level. Detailed results from this calibration and validation procedure are contained in Appendix A of this report.

Three future planning horizon years were modeled as part of this analysis (2016, 2026 and 2036). Using these horizon years, population and employment values were forecast for each traffic analysis zone (TAZ) in the Halifax Regional Municipality. The demographic forecasts were to be consistent with the 2026 HRM Regional Plan and based on discussions with HRM, appropriate modifications were incorporated into the forecasts. Details for each traffic analysis zone and planning horizon are provided in Appendix B of this report.

[1] Design Manual for Roads and Bridges. United Kingdom Highway Agency.

As part of this analysis, three future road network scenarios were analyzed at each planning horizon year during both the AM and PM peak hours. This yielded 18 model scenarios. Each of the future road networks is described below:

- **Scenario A** – Existing road infrastructure + planned network upgrades (traffic signals, lane widening, new roads) + the Highway 102/Larry Uteck Drive interchange
- **Scenario B** – All the upgrades in Scenario A + Highway 113 + Highway 107 extension connecting with the Highway 102 immediately north of Exit 4C (Duke Street).
- **Scenario C** – All the upgrades in Scenario A + Highway 113 + Highway 107 extension connecting directly with Highway 101.

Lane capacity was determined by means of a literature search. For the purposes of this study, the practical operational lane capacity was established as the maximum lane capacity (1,600 for freeways and 1,000 for urban streets) multiplied by the v/c factor of 0.9. This yields a practical lane capacity of 1,440 vphpl on Highway 102 and 900 vphpl on Bayers Road. These practical thresholds were used to determine the number of basic lanes required to service the demand identified in the model runs.

Using QRS II, the transportation demand model runs were carried out for the 2016, 2026 and 2036 planning horizons. The resulting demand values were collated and reviewed to ensure that the growth in traffic was reasonable compared to the Screenline, population and employment growth. Given that the growth rates appeared reasonable, the model volumes were then collated and expressed as the number of mainline lanes required to service both the AM and PM peak hours demand.

The following points summarize key findings from Component 1 of this study:

- Generally, the AM peak hour demonstrates a greater peak in demand in the south portion of the corridor – particularly between Joseph Howe Drive and Highway 103 – while the PM peak hour demonstrates a more even distribution of demand throughout the corridor with only a slight increase between Joseph Howe Drive and Highway 103.
- Scenario A demonstrates an increased demand in the corridor between Joseph Howe Drive and Hammonds Plains Road relative to Scenarios B & C. This is likely due to the fact that there are no new major road facilities provided in Scenario A and ultimately increases the demand for Highway 102 as the other access points to the peninsula are congested (*i.e.* the harbour bridges).
- The Highway 113 and Highway 107 extension appear to have a significant impact on traffic demand circumnavigating the Bedford Basin. In fact, the Highway 102 between these two proposed freeway facilities is expected to experience a reversal in the peak direction as a result of this demand.
- Under Scenarios B & C the completion of the Highway 113 and Highway 107 extension essentially completes a secondary ring road around the Bedford Basin. The impact of these Scenarios increase the traffic volumes on the Highway 102 in the off-peak direction between

Highways 113 and 107 – which will benefit the overall corridor by utilizing existing roadway capacity that would otherwise be under-utilized.

- Currently, some amount of traffic in the Highway 102 corridor destined to Dartmouth/ Burnside/Halifax will use the Trunk 2 (Fall River) interchange to gain access to/from Highway 118. The completion of the Highway 107 extension is expected to significantly reduce this demand.

- The ultimate laning requirements (based on a practical highway lane capacity of 1,440 vphpl and urban lane capacity of 900 vphpl) for each planning horizon under Scenario A and Scenarios B & C are summarized in the following exhibits.

*Exhibit 1: Forecast number of mainline lanes for Scenario A (both directions)**

Location	Forecast Mainline Lanes –Scenario A		
	2016	2026	2036
Windsor St. to Connaught	4	6	6
Connaught to Joseph Howe Dr.	6	6	6
Joseph Howe Dr. to Hwy 103	6	6	8
Hwy 103 to Hammonds Plains	4	6	6
Hammonds Plains to Hwy 101	4	4	6
Hwy 101 to Hwy 118	4	4	4

*Exhibit 2: Forecast number of mainline lanes for Scenarios B & C (both directions)**

Location	Forecast Mainline Lanes – Scenarios B & C		
	2016	2026	2036
Windsor St. to Connaught	4	4	6
Connaught to Joseph Howe Dr.	4	6	6
Joseph Howe Dr. to Hwy 103	6	6	6
Hwy 103 to Hwy 113	4	6	6
Hwy 113 to Hwy 101/107	4	6	6
Hwy 101/107 to Hwy 118	4	4	4

*The forecast number of lanes is based on accommodating the peak flow for both directions. Reversing lanes are not considered.

Component 2 of the project applies the results of this work together with an analysis of intersection and interchange ramp volumes to establish a conceptual plan for upgrades to Highway 102.

BAYERS ROAD/HIGHWAY 102 CORRIDOR STUDY
COMPONENT 1 - TRAFFIC PROJECTIONS FINAL REPORT
FEBRUARY 20, 2008

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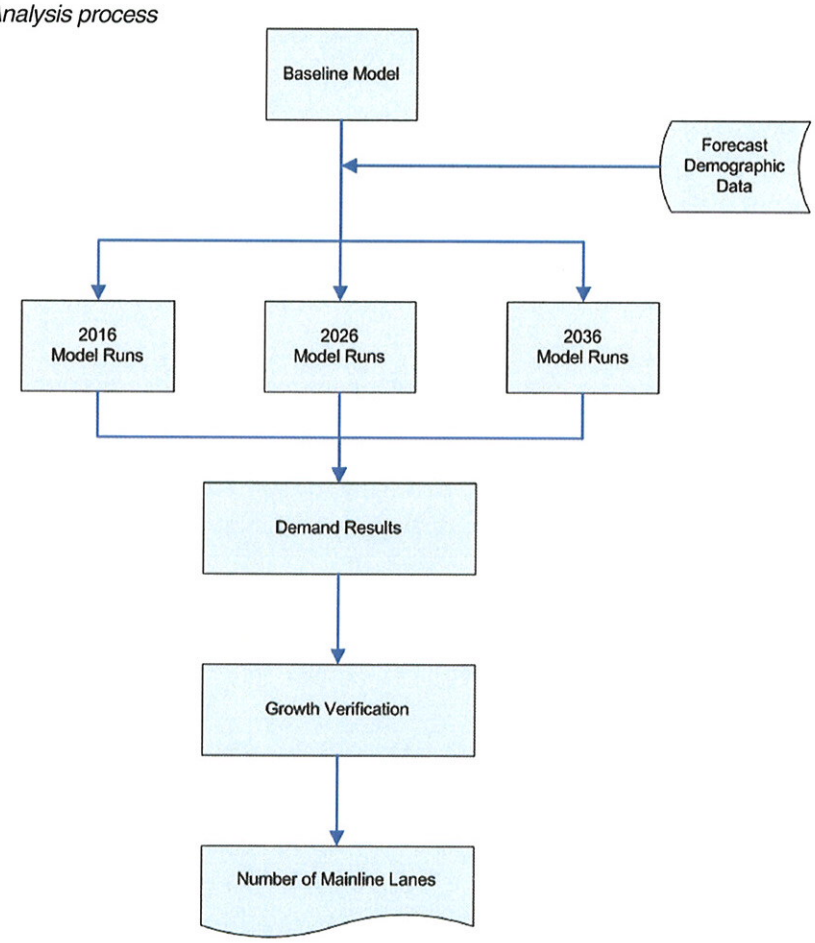
1.0 Introduction

1.1 OVERVIEW

In Component 1 of the project a baseline transportation demand model was developed using the 2001 planning year. The model was then calibrated and validated to ensure a reasonable replication of baseline conditions. Demographic data was then developed for the future planning horizons (2016, 2026 and 2036). These data were integrated into the modeling process and the future planning horizon years were modeled and evaluated to determine the number of basic lanes required in the Highway 102/Bayers Road corridor.

The following flow chart illustrates the analysis process applied to the modeling task.

Figure 1.1: Analysis process



This report provides an overview of the process applied to this modeling effort and summarizes key findings from the analysis.

2.0 THE MODELING PROCESS

2.1 USE OF OBSERVED PEAK HOUR TRAFFIC VOLUMES

Based on direction received from DTPW, the 2001 QRS II baseline model calibration used for the Halifax Regional Municipality regional planning purposes was modified to match DTPW-observed peak hour traffic volumes collected within the Highway 102 corridor. These observed volumes were seasonally adjusted with factors developed using data collected from the two Halifax harbour bridges.

Although DTPW feels these changes more accurately reflect conditions in the Highway 102 corridor, the resulting model is no longer consistent with the model used in the development of the Halifax Regional Municipality Regional Plan. This fact must be kept in mind when comparing findings from these two distinct models.

2.2 CALIBRATION

To overcome the challenges associated with calibrating at the link level, a calibration procedure consistent with recommended practices from the Federal Highway Administration (FHWA) and agencies in the United Kingdom[1] were applied. This procedure is statistically reliable and accounts for the challenges typically experienced on low demand links. The steps associated with the calibration process included the following:

- Identifying the existing HRM QRSII model screenlines (primary screenlines)
- Establishing a reasonable set of secondary screenlines that would appropriately represent the specific study area.
- Carrying out a macro-level calibration procedure of the baseline demand model, at both the primary and secondary screenline level, to within 10%.
- Carrying out a micro-level calibration procedure for the freeway, freeway ramp and arterial links. The procedure involved the calculation of the GEH statistic index value[2], a similar test to the Chi-squared statistical test. FHWA guidelines for a statistically acceptable level of error recommend that a GEH value of less than 5 be achieved for at least 85% of the links. Further, FHWA guidelines suggest that it is reasonable to guarantee that the model error can be minimized for demand volumes greater than 200vph. Error associated with demand volumes less than 200vph (less than ¼ the capacity of a typical lane) are significantly challenging to minimize simply due to the coarseness of macro-level travel demand models and ultimately have no impact on network performance and the overall outcome of the

[1] Design Manual for Roads and Bridges. United Kingdom Highway Agency.

[2] Design Manual for Roads and Bridges. United Kingdom Highways Agency.

model. Efforts were made to minimize the level of error on low demand links, and to achieve GEH values of less than 10 on these road sections.

Based on the results from this validation procedure, the model was validated to an acceptable level. Detailed results from this calibration and validation procedure are contained in Appendix A of this report.

2.3 FUTURE PLANNING HORIZON DEMOGRAPHICS

Three future planning horizon years were modeled as part of this analysis (2016, 2026 and 2036). Using these horizon years, population and employment values were forecast for each traffic analysis zone (TAZ) in the Halifax Regional Municipality.

As part of the Terms of Reference for this project, the demographic forecasts were to be consistent with the 2026 HRM Regional Plan. In order to gain an understanding of the HRM-developed 2026 demographic forecasts, meetings were held with HRM Planning and Regional Planning staff to discuss the following issues:

- Identification of any significant changes to the 2026 Regional Plan demographic forecasts based on more recent information (*i.e.* the 2006 census).
- Development of an appropriate methodology to forecast demographics for the 2036 planning horizon (beyond the HRM Regional Plan).

Based on these discussions, the following modifications incorporated into the demographic forecasts:

- The 2026 population forecast were reduced based on new data from the 2006 census data.
- The 2026 employment distribution within the Region was revised based on recent developments such as Dartmouth Crossing and Northgate (developments not previously contemplated in the Regional Plan). The following table summarizes the employment modifications required by NSTIR.

Table 2.1: Revisions to the demographic forecasts

Development	Modification
Dartmouth Crossing	• Increase retail employment to 4,000 • Increase non-retail employment to 600 • No change in residential dwelling units
Northgate	• Increase retail employment to 1,200 • No change in non-retail employment • Increase residential dwelling units to

Development	Modification
	600
Bedford South & West	• No change

Table 2 contains a summary of the resulting demographic data used in the analysis for each planning horizon. Details for each traffic analysis zone and planning horizon are provided in Appendix B of this report.

Table 2.2: Highway 102 corridor study demographic forecasts

	HRM	Delphi-MRC Forecasts		
	2001	2016	2026	2036
Dwellling Units	147,662	173,612	199,634	217,138
Retail Employees	77,688	84,845	86,739	88,910
Non-Retail Employees	106,701	136,242	142,960	146,536

2.4 SCENARIOS EXAMINED

As part of this analysis, three future road network scenarios were analyzed at each planning horizon year during both the AM and PM peak hours. This yielded 18 model scenarios. Each of the future road networks is described below:

- **Scenario A** – Existing road infrastructure + planned network upgrades (traffic signals, lane widening, new roads) + the Highway 102/Larry Uteck Drive interchange
- **Scenario B** – All the upgrades in Scenario A + Highway 113 + Highway 107 extension connecting with the Highway 102 immediately north of Exit 4C (Duke Street).
- **Scenario C** – All the upgrades in Scenario A + Highway 113 + Highway 107 extension connecting directly with Highway 101.

3.0 Highway 102 Corridor Planning

3.1 LANE CAPACITIES

Freeway lane capacities can vary significantly from one facility to the next. The maximum lane capacity on a freeway is best determined using measured field data. Since this information was not available for Highway 102, we elected to carry out a literature review to determine an appropriate flow rate for the facility. In so doing, we had to recognize that Highway 102 has both varied horizontal and vertical geometry with some substandard elements – all contributing to a less-than-theoretical capacity. Table 1 summarizes the per lane flow rates (hourly) gleaned from the literature.

Table 3.1: Results from literature review of freeway flow rates

Source	Description	Hourly flow rate
Boston MPO	I-93 Expressway Boston	1,100-1,600 vphpl
Ontario Ministry of Transportation	QEW Toronto	1,600 vphpl
Caltrans	Maximum capacity threshold	1,650 vphvpl

Based on this literature, we determined that an appropriate maximum hourly per lane flow rate to apply to the freeway portions of the corridor was 1,600 vehicles/hour/lane (vphpl). Of course, specific flow rates at which freeway breakdown occurs – the maximum capacity – can vary from site to site and from day to day.

Within the urban street component of the study area (Bayers Road), it was agreed that a maximum lane capacity of 1,000 vphpl would be used.

The difference between practical and maximum lane capacity is the difference between a level of service D and a level of service F (representing congested conditions and long delays). The Department of Transportation and Public Works has established a volume to capacity (v/c) ratio threshold of 0.90 for infrastructure upgrades. This value was applied to the analysis. Thus, for the purposes of this study, the practical operational lane capacity was established as the maximum lane capacity (1,600 for freeways and 1,000 for urban streets) multiplied by the v/c factor of 0.9. This yields a practical lane capacity of 1,440 vphpl on Highway 102 and 900 vphpl on Bayers Road. These practical thresholds were used to determine the number of basic lanes required to service the demand identified in the model runs.

3.2 TRAFFIC GROWTH VERIFICATION

Using QRS II, the transportation demand model runs were carried out for the 2016, 2026 and 2036 planning horizons. The resulting demand values were collated and reviewed to ensure that the growth in traffic was reasonable compared to the Screenline, population and employment growth. This information is summarized in figures 2 and 3 for the AM and PM peak, respectively. These figures represent the corridor as a line diagram and identify the mid-block traffic growth rate (per annum) for each of the planning horizons.

The growth verification review was carried out for the Scenario A road network only. This provided the most relevant basis of comparison to the Baseline road network since the future road networks of Scenarios B and C include both the planned Highway 113 and Highway 107 facilities. These facilities introduce significant demand into the corridor at specific locations greatly impacting the traffic growth rate – making it difficult to reasonably compare to the Baseline scenario. We concluded from our review of the demand in Scenario A that reasonable traffic growth rates were demonstrated in the model results relative to the population, employment and Screenline growth rates.

There were two locations where the traffic growth rates were higher than the typical growth rate experienced in the corridor. The first location was in the vicinity of the new Larry Uteck Drive interchange. We would expect a greater increase in growth when a new interchange facility is constructed and introduces new demand to the corridor – demand not contemplated in the baseline model.

The second location is on Bayers Road between Connaught and Windsor Streets during the AM peak hour. If we review the calibration results for this section of roadway, the percent difference between modeled and observed demand was 0%. Given that the model was accurately calibrated in this area of the corridor, we concluded that the increased growth on this section of Bayers Road is likely due to both the increased demand in the corridor (Highway 102) during the AM peak (relative to the PM peak), and to the limited reserve capacity of facilities leading on and off the peninsula.

Figure 3.1: Validating model growth for 2036 Scenario A – AM peak hour

	2016	2026	2036
Population Growth	1.2%	1.4%	1.3%
Employment Growth	1.6%	1.0%	0.8%
Screenline 2 (Bedford Basin)	1.2%	1.8%	1.6%

Figure 3.2: Validating model growth for 2036 Scenario A – PM peak hour

	2016	2026	2036
Population Growth	1.2%	1.4%	1.3%
Employment Growth	1.6%	1.0%	0.8%
Screenline 2 (Bedford Basin)	1.2%	1.8%	1.6%

3.3 FUTURE DEMAND MODEL RESULTS

Given that the growth rates appeared reasonable, the model volumes were then collated and expressed as the number of mainline lanes required to service both the AM and PM peak hours demand.

We have assumed the impacts of HRM transit and travel demand management techniques remain unchanged into the future and we do not explicitly account for the transit penetration targets established in the HRM Regional Plan. The potential impacts of increased transit use and travel demand management (TDM) techniques will be evaluated in a future phase of this study.

The AM and PM peak hour mid-block forecasts for the peak direction are summarized in Figures 3.3 through 3.8 for the 2016, 2026 and 2036 AM and PM peak hours, respectively. In these figures, the corridor begins at the Bayers Road/Windsor St. intersection on the left and ends at the Highway 102/Trunk 2 interchange on the right. The forecast volumes are summarized in Appendix C.

Figure 3.3: 2016 AM peak hour corridor demand results

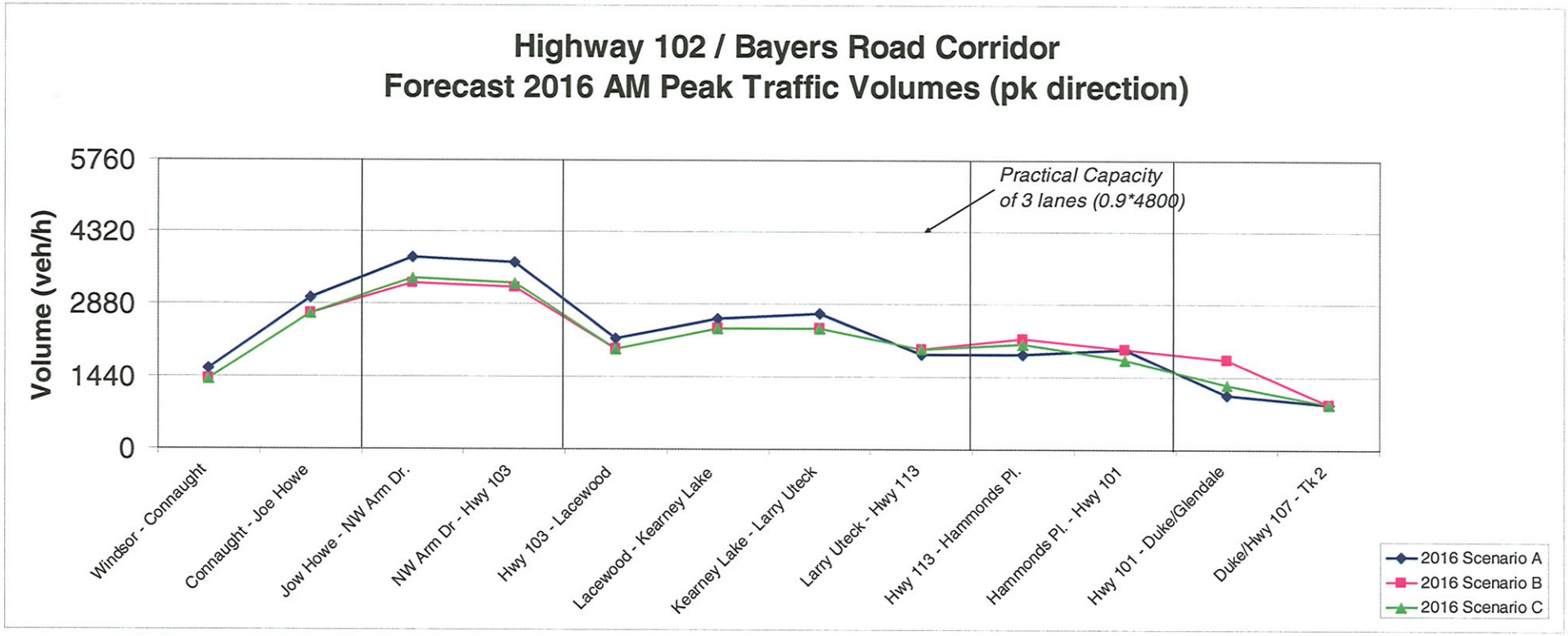


Figure 3.4 2026 AM peak hour corridor demand results

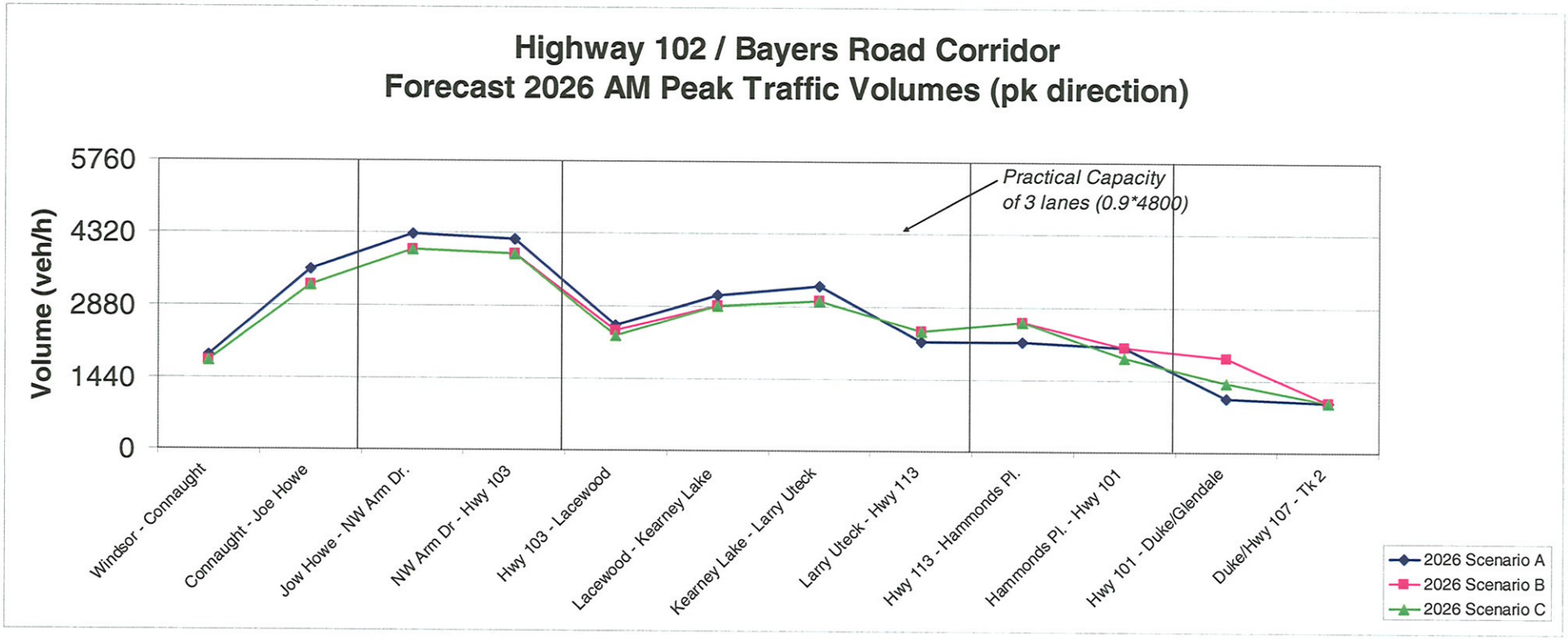


Figure 3.5: 2036 AM peak hour corridor demand results

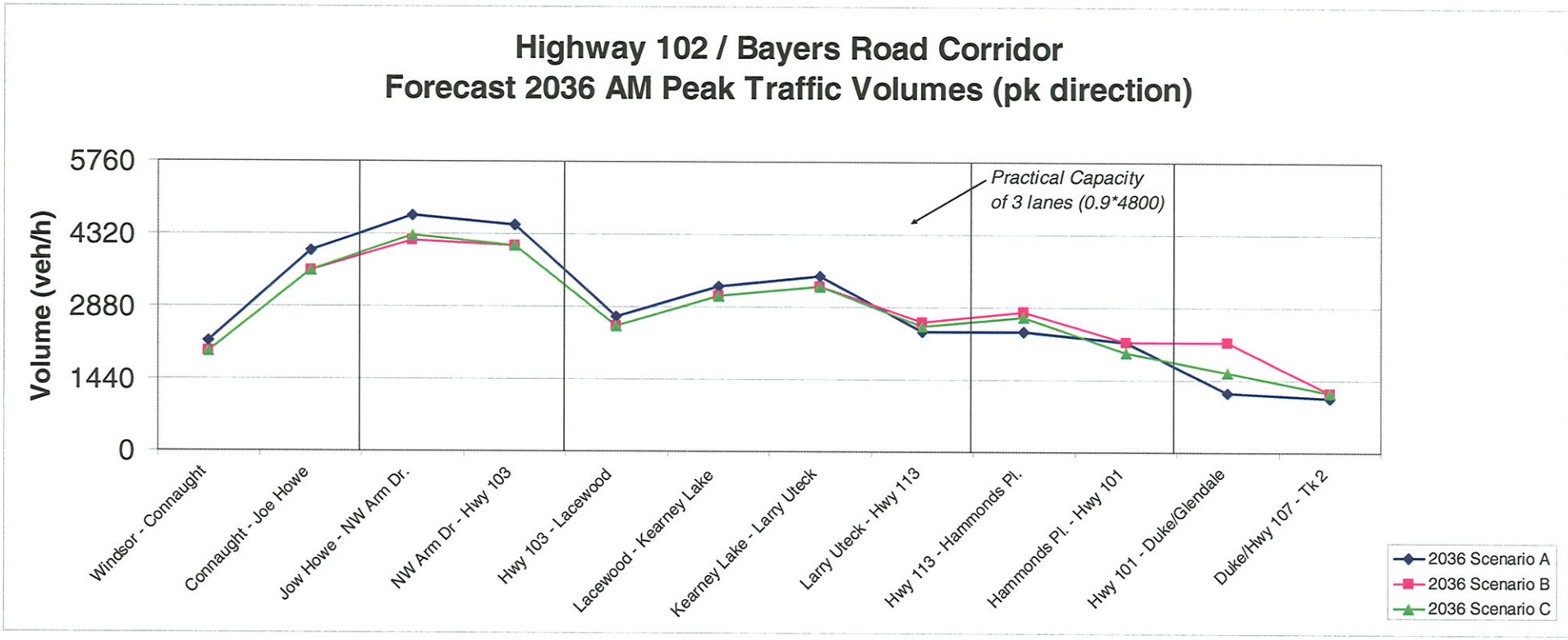


Figure 3.6: 2016 PM peak hour corridor demand results

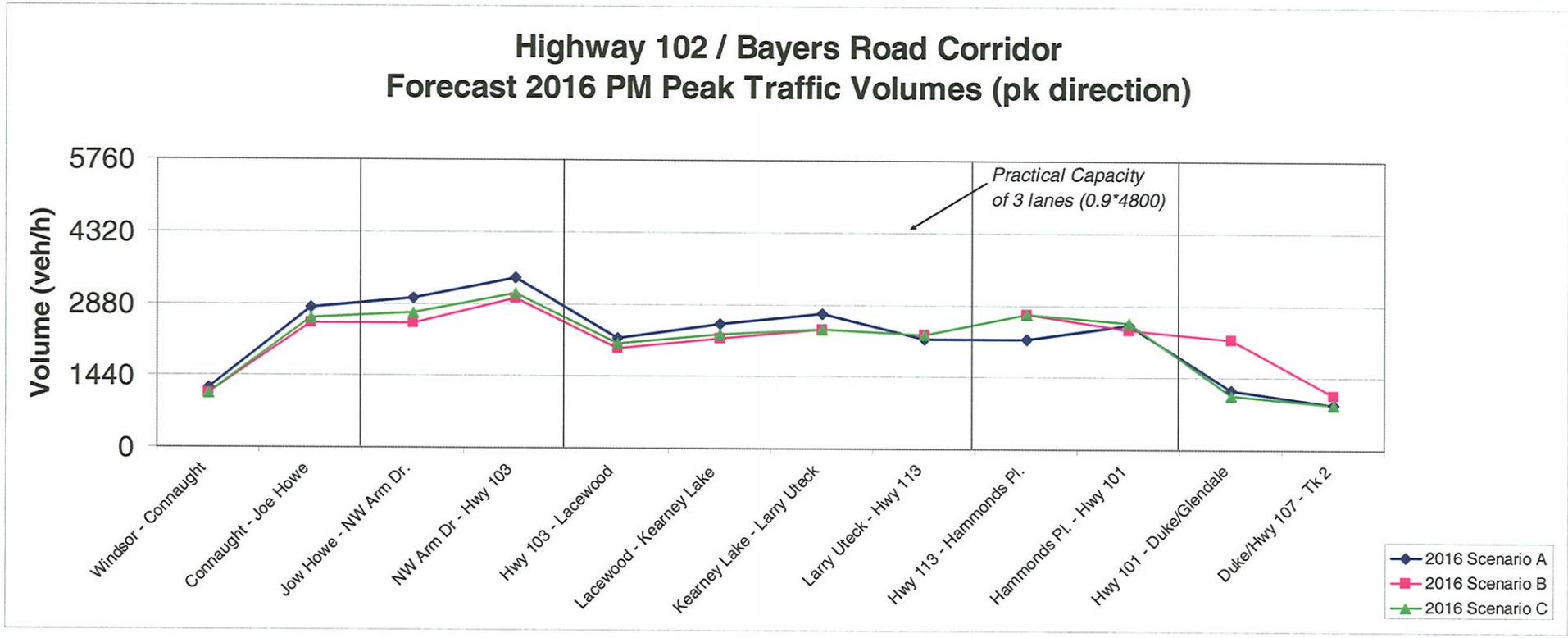


Figure 3.7: *2026 PM peak hour corridor demand results*

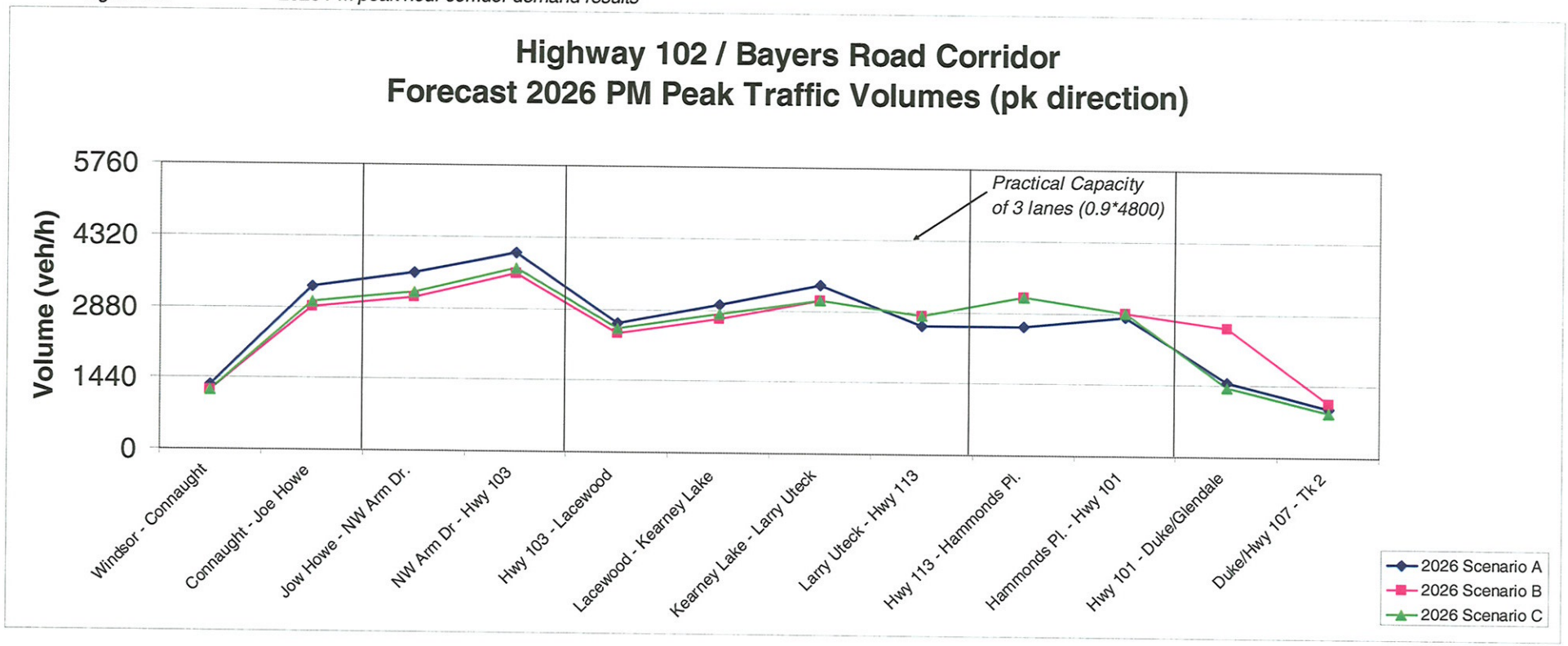
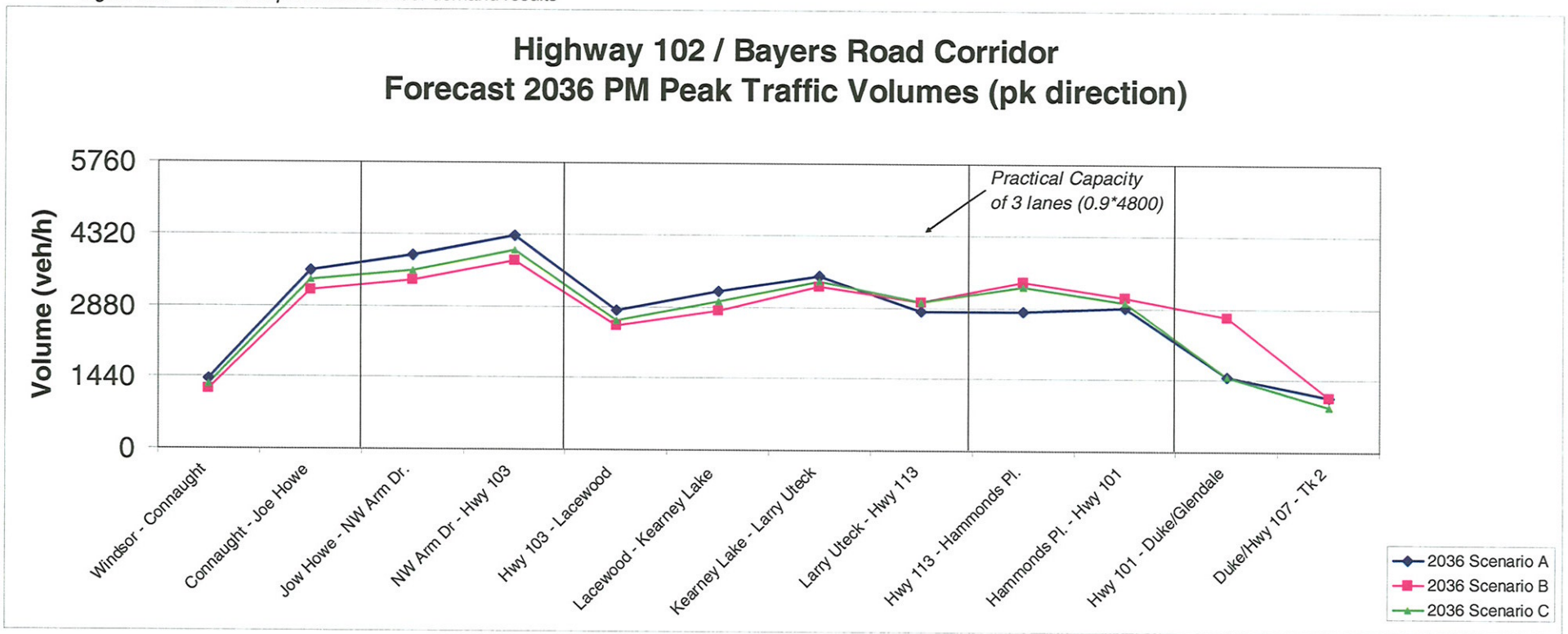


Figure 3.8: 2036 PM peak hour corridor demand results



4.0 Key Findings

The following points summarize key findings from Phase 1 of this study:

- Generally, the AM peak hour demonstrates a greater peak in demand in the south portion of the corridor – particularly between Joseph Howe Drive and Highway 103 – while the PM peak hour demonstrates a more even distribution of demand throughout the corridor with only a slight increase between Joseph Howe Drive and Highway 103.

- Scenario A demonstrates an increased demand in the corridor between Joseph Howe Drive and Hammonds Plains Road relative to Scenarios B & C. This is likely due to the fact that there are no new major road facilities provided in Scenario A and ultimately increases the demand for Highway 102 as the other access points to the peninsula are congested (*i.e.* the harbour bridges).

- The Highway 113 and Highway 107 extension appear to have a significant impact on traffic demand circumnavigating the Bedford Basin. In fact, the Highway 102 between these two proposed freeway facilities is expected to experience a reversal in the peak direction as a result of this demand.

- Under Scenarios B & C the completion of the Highway 113 and Highway 107 extension essentially completes a secondary ring road around the Bedford Basin. The impact of these Scenarios increase the traffic volumes on the Highway 102 in the off-peak direction between Highways 113 and 107 – which will benefit the overall corridor by utilizing existing roadway capacity that would otherwise be under-utilized. This is illustrated in Figures 3.3 through 3.8 where Scenarios B & C demonstrate a greater demand in the corridor between Highways 113 and 107 relative to Scenario A. This corroborates the findings from the Highway 113 strategic context study.

- Currently, some amount of traffic in the Highway 102 corridor destined to Dartmouth/ Burnside/Halifax will use the Trunk 2 (Fall River) interchange to gain access to/from Highway 118. The completion of the Highway 107 extension is expected to significantly reduce this demand.

- The ultimate laning requirements (based on a practical highway lane capacity of 1,440 vphpl and urban lane capacity of 900 vphpl) for each planning horizon under Scenario A is summarized in Table 4.1 and Scenarios B & C are summarized in Table 4.2

*Table 4.1: Forecast number of mainline lanes for Scenario A (both directions)**

Location	Forecast Mainline Lanes –Scenario A		
	2016	2026	2036
Windsor St. to Connaught	4	6	6
Connaught to Joseph Howe Dr.	6	6	6
Joseph Howe Dr. to Hwy 103	6	6	8
Hwy 103 to Hammonds Plains	4	6	6
Hammonds Plains to Hwy 101	4	4	6
Hwy 101 to Hwy 118	4	4	4

*Table 4.2: Forecast number of mainline lanes for Scenarios B & C (both directions)**

Location	Forecast Mainline Lanes – Scenarios B & C		
	2016	2026	2036
Windsor St. to Connaught	4	4	6
Connaught to Joseph Howe Dr.	4	6	6
Joseph Howe Dr. to Hwy 103	6	6	6
Hwy 103 to Hwy 113	4	6	6
Hwy 113 to Hwy 101/107	4	6	6
Hwy 101/107 to Hwy 118	4	4	4

*The forecast number of lanes is based on accommodating the peak flow for both directions. Reversing lanes are not considered.

APPENDIX A

Terms of Reference

NOVA SCOTIA

Procurement Services - Public Tenders Office
6176 Young Street, Suite 200
Halifax, Nova Scotia B3K 2A6
Telephone: (902) 424-3333

Date: **December 20, 2006**

To: **All Suppliers**

Subject: **Addendum**

ADDENDUM # 1
Tender 60130901
Highway 102 Corridor Transportation Study for the Department of Transportation & Public Works

The following change are to be noted in the document referenced above.

1. The project scope is to be consistent with a project budget of $275,000.00

2. The proposal closing date has been changed. The new date for closing is Tuesday, January 23, 2007

In your bid, please indicate that you have noted these changes by including the words "Includes Addendum # 1". If there is more than one (1) Addendum issued for this tender, please acknowledge each separately.

Yours truly,

Jane MacConnell
Senior Procurement Officer

NOVA SCOTIA

Procurement Services - Public Tenders Office
6176 Young Street, Suite 200
Halifax, Nova Scotia B3K 2A6
Telephone: (902) 424-3333

Date: **January 10, 2007**

To: **All Suppliers**

Subject: **Addendum**

ADDENDUM # 2
Tender # 60130901
for the Department of Transportation & Public Works

The following additional information is provided to clarify the scope of work for the above noted Tender.

1. Section 2.1 - This project is being commissioned to determine the ultimate capacity and best use of the Highway 102 corridor. An estimate for the timing of the need to widen the highway is required but is not the focus of the study.

2. Section 2.1 - Functional designs are expected to identify the number of lanes, auxiliary lane requirements, etc. Field survey is not required for completion of the functional designs.

3. Section 2.1 - The purpose of Component 1, Traffic Projections, is to provide the data required to complete Components 2 and 3.

4. Section 2.3.1.5 - No travel time data is available other than what is already in the existing QRS II model. The consultant is responsible for collecting any additional data required to complete the study.

5. Section 2.3.1.7 - The HRM QRS II model is currently calibrated on the basis of 2001 data. Although the study base year is 2006, the model re-calibration is expected to be done using the existing 2001 data. The re-calibration of the existing model is required to refine the model for the purpose of simulating the 100 series highway network and other major arterials. It does not need to be calibrated for local streets. Separate models, calibrated for AM and PM peak hour traffic counts, are required. The final model deliverables are to be in QRS II file format.

6. Section 2.3.2.9 - The working session for the design of the Highway 102/107 interchange is intended to be an opportunity for the consultant to more efficiently access TPW/HRM staff knowledge and feedback on the proposals. Staff will be participating by providing input to and review of the proposals as they are developed. Approximately 12 TPW/HRM staff are expected to participate and they will not require computer set-ups. TPW meeting space can be made available for the session.

7. Section 2.3.3.4 - Environmental field work is not required as part of the functional design work for the Highway 107 alignment.

8. Section 2.4.2 - The functional design of the Larry Uteck interchange is underway and is expected to be made available to the selected consultant in digital format at the time of project award.

Sincerely,

Janice Harland, M.A.Sc., P.Eng.
(902) 424-4206

Please note that the proposal closing date remains unchanged.

In your bid, please indicate that you have noted these changes by including the words " Included Addendum # 2.

Yours truly,

Terry Peitzsche

Procurement Group Supervisor

NOVA SCOTIA Procurement Services

Request for Proposal (RFP)

Tender Number: 60130901

Date Created:	Nov 29, 2006
Contact Person:	Terry Peitzsche
Telephone:	902-424-8069
Document Reference:	60130901

Tender Source:
TENDERS WEBSITE
WWW.GOV.NS.CA/TENDERS
6176 YOUNG ST
HALIFAX NS B3K 2A6

Bidders are responsible for ensuring that they are aware of and have complied with any Addenda by visiting the Procurement Website or contacting the Public Tenders Office.

Send Quotation To:
Public Tenders Office
6176 Young Street, Suite 200
Halifax, NS B3K 2A6
Ph. 902-424-3333, Fax 424-0622

Important Dates:
Closing Date: Jan 09, 2007
Closing Time: 2:00 pm
Bids are opened one half hour after tender closing

Deliver Goods\Services To:
Transportation & Public Works
Halifax NS

Delivery Requested By: 14/12/2007
(DD/MM/YYYY)

For information on other tenders refer to:
www.gov.ns.ca/tenders

Req`n 10021774

*
REQUEST FOR PROPOSALS:
TRANSPORTATION & PUBLIC WORKS
HIGHWAY 102 CORRIDOR TRANSPORTATION STUDY:
A TRANSPORTATION STUDY OF HIGHWAY 102 (BICENTENIAL HIGHWAY) AND THE PROPOSED EXTENSION OF HIGHWAY 107 TO HIGHWAY 102
CONTACT PERSON: JANICE HARLAND PH: 902-424-4206
DOCUMENTS ATTACHED
*
Pls Note: The pricing fields on page 1 and 2 of 2 (NSRFP) form, is not to be completed. A cost proposal is to be provided separately in a sealed envelope.
*

PRICES TO BE QUOTED TAX OUT ONLY

PLEASE COMPLETE THE UNIT, DELIVERY DATE, UNIT PRICE AND EXTENDED PRICE FIELDS

Item	Qty / Unit	Material / Description	Delivery date	ALL PRICES MUST BE EXTENDED AND TOTALLED: Unit Price	Extended Price
00001	1 Perf. unit	HYW 102- CORRIDOR TRANSPORTATION STUDY:			

PRICES TO BE QUOTED TAX OUT ONLY

PLEASE COMPLETE THE UNIT, DELIVERY DATE, UNIT PRICE AND EXTENDED PRICE FIELDS

Item	Qty / Unit	Material / Description	Delivery date	ALL PRICES MUST BE EXTENDED AND TOTALLED: Unit Price	Extended Price

The item covers the following services:

Item	Quanity	Unit	Description / Price/Unit
10	1	LOT	See Attachments

THE FOLLOWING INFORMATION MUST BE COMPLETED TO ENSURE TENDERACCEPTANCE **TOTAL:**

BIDDING COMPANY:

REPRESENTATIVE OF BIDDING COMPANY:

PRINT NAME:

PHONE#: FAX#: E-MAIL ADDRESS:

PO BOX: CITY: POSTAL CODE:

STREET: CITY: POSTAL CODE:

DELIVERY PROMISED: TERMS: FOB:

SIGNATURE:

All documents listed here can be found on our web site at www.gov.ns.ca/tenders/policy

If you do not have access to these documents via the Internet, please request a copy from Nova Scotia Procurement, 6176 Young St., PO Box 787, Halifax, NS B3J 2V2, phone (902)424-3333, fax (902)424-0622. Please request the document(s) by name.

NEED HELP? Suggestions and hints to help you reply to this tender are available from the above web page by selecting "Tendering Guides" then "Request for Quotations Completion Guide".

**********INSTRUCTIONS REGARDING THIS PURCHASE**********

By submitting a response to this tender, you acknowledge that you have read and complied with the applicable Nova Scotia Procurement documents. The following documents apply to this tender, and are available from the above web page by selecting "Terms & Conditions" then selecting the following:

Atlantic Standard Terms and Conditions (revised June 30, 2005)
Supplement - Request for Proposals (revised January 2005)

Req`n 10021774

Rev 060125

NOVA SCOTIA

Procurement Services
Public Tenders Office
6176 Young Street, Suite 200
Halifax, Nova Scotia B3K 2A6
Telephone: (902) 424-3333
Facsimile: (902) 424-0608 or 0622

REQUEST FOR PROPOSALS

Tender Number 60130901

Highway 102 Corridor Study

for the

Department of Transportation and Public Works

and the

Halifax Regional Municipality

THESE SPECIFICATIONS ARE NOT A COMPLETE TENDER DOCUMENT. IN ORDER FOR A TENDER RESPONSE TO BE COMPLETE AND ACCEPTABLE, THESE SPECIFICATIONS MUST ACCOMPANY A NOVA SCOTIA REQUEST FOR PROPOSALS (NSRFP) FORM, WHICH MUST BE COMPLETED AND SIGNED.

Facsimile bids **will not** be accepted for this Request for Proposals

At a minimum, the terms & conditions and supplements listed below apply to this procurement. These documents are available from the Tenders website as shown below. By submitting your response to this Request for Proposals, you acknowledge that you have read and complied with these documents. **Other instructions and supplements may also apply; see the NSRFP form for the complete list of applicable documents and how to obtain them.**

Atlantic Standard Terms and Conditions -and- Supplement-Request for Proposals (RFP)
These documents are available from www.gov.ns.ca/tenders - click on "Terms & Conditions"

Request for Proposals prepared by: Department of Transportation and Public Works

Table of Contents

1.0 Background and Situation Overview

Highway 102 is an intra-provincial, National Highway System highway that begins in Halifax as an extension of Bayers Road and ends in Truro at Highway 104. In addition to connecting to Highway 104, it intersects with other primary arterial highways: Highways 101, 103, 118 and 107(future). Accordingly, it connects the northern and eastern parts of the province with the Halifax Regional Municipality (HRM) and the western end of the province. This important link also serves HRM residents commuting between the urban core and suburban areas such as Hammonds Plains, Bedford, Sackville and Fall River. It is one of the busiest highways in the province with average annual daily traffic volumes in excess of 40,000 vehicles per day in some sections. In addition, development is growing in the communities it serves and has extended up to the right-of-way in many areas.

Highway 107 serves the Dartmouth area of HRM and currently extends from Musquodoboit Harbour to Preston and from the Loon Lake area in Westphal to Akerley Boulevard in Burnside Park. Planning is underway to continue the highway westward to Highway 102. The extension of Highway 107 from Burnside Park to Highway 102 is warranted due to existing traffic volumes on Trunk 7 (Magazine Hill) and the Bedford Bypass, which are approximately 30,000 vehicles per day. The Bedford Bypass was originally built as a temporary facility, required until Highway 107 was completed. A major component of the Highway 107 alignment approved in the early 1990s, included the now abandoned Second Lake Collector. In that plan, Highway 107 connected to Highway 102 at Exit 4C (Glendale/Duke) and continued as the Second Lake Collector to an interchange with Highway 101 west of Sackville. The approved Highway 107 alignment/design is being reconsidered due to the abandonment of the Second Lake Collector and the proximity of the Highway 101/102 interchange. It may be desirable to construct a new interchange in the area which would allow for direct flow of traffic between Highways 101, 102 and 107.

The Department of Transportation and Public Works (TPW) and HRM recognize both the importance of Highway 102 and its limited expansion potential and together are commissioning this study to forecast traffic needs and determine the ultimate expansion capacity and best use of the highway corridor. The section to be studied includes a portion of Bayers Road starting at Windsor Street and continuing to the start of Highway 102 and then along Highway 102 to Exit 5 in Fall River, as shown in Figure 1. Studying this section of Highway 102/Bayers Road as a corridor, rather than as individual sections or interchanges, will allow TPW and HRM to make long term planning decisions on how to best use the corridor and to determine what changes may be required to the interchanges and intersections that connect the highway with the rest of the transportation network. HRM has recently adopted a Regional Plan that will serve to focus development in areas where services, such as transportation, can be more efficiently provided and this study will be undertaken in consideration of the plan. A significant part of the corridor planning involves determining the location of the Highway 107 extension and the functional design of its interchange with Highway 102. This evaluation will include a benefit/cost evaluation of the options.

2.0 Requirements

2.1 Basic Requirements

The study has three primary objectives that are addressed by three separate project components.

- Component 1 - Traffic Projections: Create a calibrated model and develop long term (30 year) traffic projections for the Highway 102/Bayers Road corridor from Exit 5 (Fall River/Highway 118) to Windsor Street including the proposed Highway 107 extension and all other major existing and proposed intersecting roads.

- Component 2 - Highway 102 Upgrades: Determine the ultimate capacity of the Highway 102/Bayers Road corridor from north of Exit 4C (Glendale/Duke) to Windsor Street. Develop short and long term functional plans for expansion of the corridor, including interchanges, to full capacity. Develop functional plans to a level of detail that confirms the feasibility of the proposed designs and provides sufficient information to provide conceptual cost estimates for the proposals.

- Component 3 - Highway 107 Extension: Evaluate the two proposed options for extension of Highway 107 from Burnside Park to Highway 102 (see Figure 1). Perform benefit/cost analyses on the alignment and interchange options.

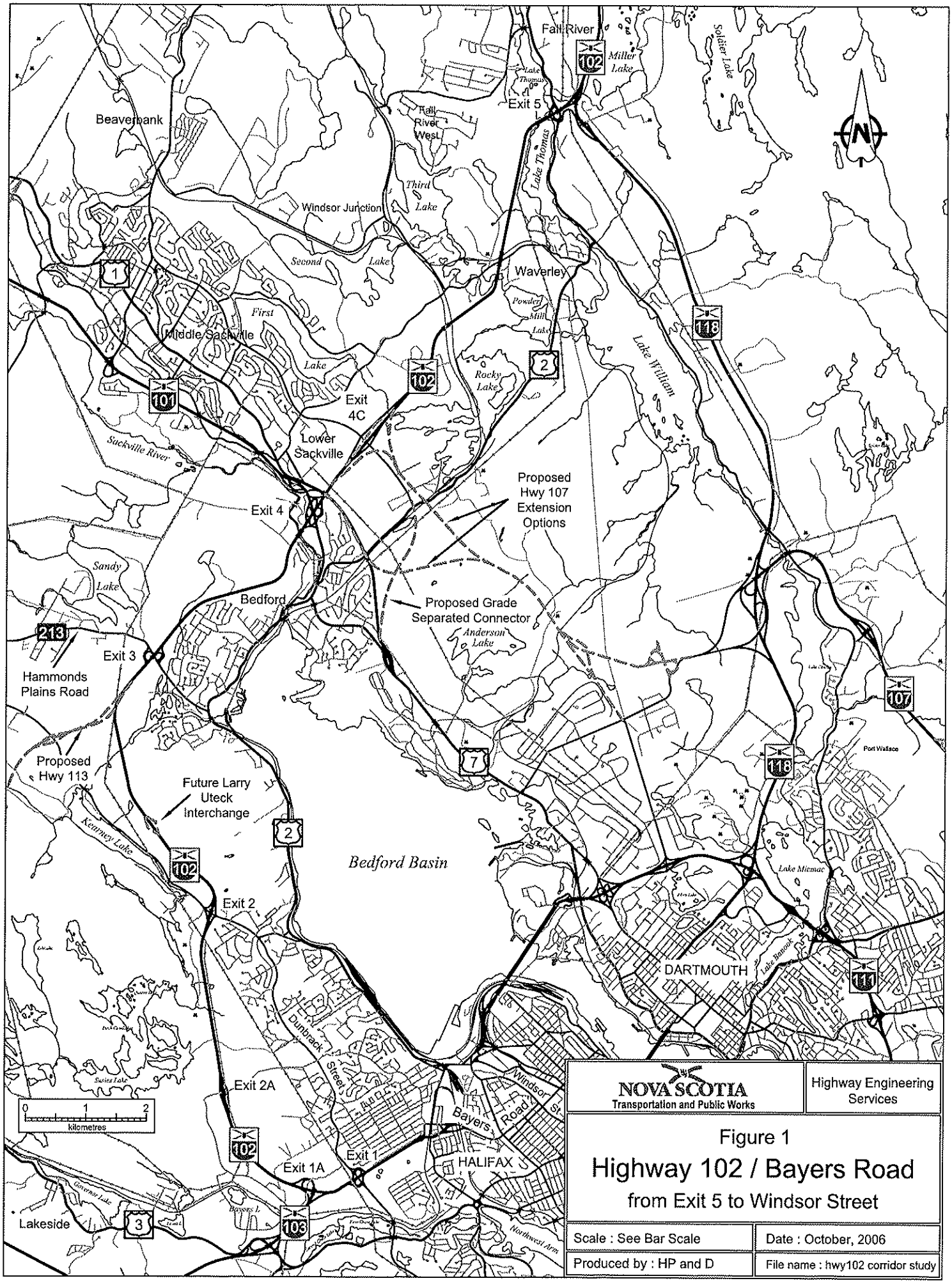
2.2 Project Scope and Time Frames

The general study area is outlined in Figure 1. A broader focus may be required to determine future traffic volumes and patterns. The time frame for all study components is 30 years with 2006 as the base year.

- Component 1 - Traffic Projections includes the Highway 102/ Bayers Road corridor from Exit 5 (Fall River/Highway 118) to Windsor Street and the proposed Highway107 extension from Highway 102 to Highway 118.

- Component 2 - Highway 102 Upgrades includes Highway 102/Bayers Road corridor from north of Exit 4C (Glendale/Duke) to Windsor Street and includes the portions of all major intersecting roads that are within 500 metres of their interchange with the Highway 102/Bayers Road corridor. This includes proposed and potential future connections, such as the Larry Uteck interchange, the connection of Highway 113 and the Highway 107 interchange. The capacity study will consider two options for the connection of Highway 107: at Exit 4C; and at a redesigned Highway 102 Exit 4 interchange. (Two proposals for the redesign of the Highway 102 Exit 4 interchange are included in the consultant's scope of work.)

- Component 3 - Highway 107 Extension includes the two general Highway 107 alignment options and the Highway 102 interchange connections associated with each option.



NOVA SCOTIA
Transportation and Public Works

Highway Engineering Services

Figure 1

Highway 102 / Bayers Road

from Exit 5 to Windsor Street

Scale : See Bar Scale	Date : October, 2006
Produced by : HP and D	File name : hwy102 corridor study

2.3 Detailed Technical Requirements

2.3.1 Objective 1 - Traffic Projections

2.3.1.1 Meet with the Project Steering Committee in accordance with the requirements in Section 2.5 - Reporting Requirements and Procedures.

2.3.1.2 Become familiar with the study area including existing, proposed and potential road infrastructure, existing and proposed developments, historic development trends, traffic and transportation studies, regional development potential and municipal development plans.

2.3.1.3 Consider and incorporate HRM's Regional Plan, Active Transportation Plan and Transportation Demand Management Functional Plan (in progress) as they apply to the corridor and traffic projection assumptions.

2.3.1.4 Develop traffic projections. Base regional population growth predictions for 2016 and 2026 on the Regional Plan. Develop predictions for the time frame beyond the Regional Plan horizon (2026) to the study horizon year of 2036.

2.3.1.5 Obtain any traffic data required in addition to the information provided by TPW and HRM. Obtain all required demographic or other data required to develop population and traffic predictions.

2.3.1.6 Confirm population and traffic growth projections with Project Steering Committee.

2.3.1.7 Develop traffic models for the Highway 102 corridor and the proposed Highway 107 extension options. Calibrate HRM's regional QRSII traffic model to represent the 100 series highway network and expand the models to estimate traffic growth in the 2036 horizon year.

Traffic models are required to represent the base year 2006 for existing infrastructure only and the horizon years 2016, 2026 and 2036 for each of the following scenarios:

A - Existing infrastructure and the future Larry Uteck interchange;
B - Scenario A with Highway 113 and Highway 107 connecting at a point just north of Exit 4C (Duke Street); and
C - Scenario A with Highway 113 and Highway 107 connecting with Highway 101 at Exit 4, with a grade separated connection of Trunk 7 and Duke Street.

The models are to be calibrated to both AM and PM peak hours. It is expected that the calibrated models will represent road and ramp volumes within 15 percent of actual volumes. Traffic projections are to be displayed in both graphical and tabular format.

2.3.1.8 Identify highway system capacity constraints in the study area and estimate the time at which they will occur in each scenario.

2.3.1.9 Prepare a draft final report that includes a description of analyses/prediction methods, model results including calibration results and a description of system constraints for each scenario.

2.3.1.10 Consider feedback from Project Steering Committee and finalize report and models.

2.3.2 Objective 2 - Highway 102 Upgrades

2.3.2.1 Meet with the Project Steering Committee in accordance with the requirements specified in Section 2.5 - Reporting Requirements and Procedures.

2.3.2.2 Become familiar with the study area including, existing, proposed and potential road infrastructure and developments, land ownership, terrain and environmental issues.

2.3.2.3 Consider and incorporate HRM's Regional Plan, Active Transportation Plan and Transportation Demand Management Functional Plan (in progress) as they apply to the corridor.

2.3.2.4 Determine the ultimate physical expansion potential of the Highway 102/Bayers Road corridor given the constraints of roadside development. Consider the need for additional through lanes as well as ramp connections between interchanges.

2.3.2.5 Consider the potential uses of additional through lanes. Estimate the number of years the functionality of the corridor will be extended by implementing alternative uses. Identify any potential issues to be considered in implementing these measures. Recommend the appropriate use of all additional through lanes.

2.3.2.6 Develop functional design plans for the corridor. Allow for potential roadside measures in the cross-section and allow for a trail in areas where it is required as part of the Active Transportation Plan.

2.3.2.7 Determine the required functional design capacity of the interchanges and intersections consistent with the ultimate capacity of the corridor.

2.3.2.8 Develop functional plans for the upgrading of all existing and proposed interchanges and intersections along the corridor from Exit 4C (Glendale/Duke) to Windsor Street, including the Highway 101/102 interchange at Exit 4, that will meet the capacity requirements identified in 2.3.2.7. Provide interchange access management plans for minor roads, existing and future, within 500m of the interchange. Base functional designs on current TPW and HRM design standards and consider topography and grade issues. Present functional designs at 1:5000 or larger scales. [Please note: The functional design and access management plan recommendations for the Highway 102/Hammonds Plains Road interchange must be completed as soon as is possible and no later than August 3, 2007.]

2.3.2.9 Develop draft functional design concepts for the redesign of the Highway 101/102 interchange to accommodate connection of Highway 107 as part of a four-day working session to be held in Halifax with TPW and HRM staff. Provide design and technical staff along with necessary models, mapping, hardware, software, traffic and other data and materials required to lead the session and develop concepts towards completed functional designs. (The outcomes of the working session are expected to be two draft functional design options for the redesign of the Highway 101/102 interchange that include direct connection of Highway 107.)

2.3.2.10 Subsequent to the working session, confirm the feasibility of both draft functional design options and complete the functional designs. Present functional designs at 1:5000 or

larger scales. Present, in person, the completed designs to the participants of the working session held in 2.3.2.9.

2.3.2.11 Prepare an interim report that includes a description of research, analyses, recommendations and proposed functional design plans for review by the Project Steering Committee. Incorporate review comments.

2.3.2.12 Identify any right-of-way that is required for the functional designs.

2.3.2.13 Develop a schedule for upgrading the corridor, including interchanges. Identify the traffic volumes that should trigger the need for the improvements and estimate the year in which they will occur.

2.3.2.14 Provide cost estimates for the upgrading projects.

2.3.2.15 Update the traffic models produced in 2.3.1.7 for scenarios B and C to reflect the proposed corridor upgrades. Describe the changes in level of service and capacity of the corridor.

2.3.2.16 Estimate the year in which the ultimate capacity of the highway will be matched by demand.

2.3.2.17 Organize, staff and conduct a public information session. The purpose of the session will be to present the study findings and the proposed functional designs. The Consultant is responsible for all costs associated with the session, including the venue, advertising and invitations. All elected officials for the study area are to be invited by letter. Any property owner directly affected by the proposals is to be personally contacted prior to the event and invited. As a minimum, newspaper advertisements are to be placed in three separate editions of both the Chronicle Herald and the Daily News. Advertisements are to be of a size that provides for all necessary details including a brief description of the meeting purpose.

2.3.2.18 Prepare a final draft report and functional plans for review by the Project Steering Committee. The final draft report is to include a summary of the public information session. Be prepared to provide a second final draft report, if the Project Steering Committee determines it is required.

2.3.2.19 Provide a final report, functional plans and traffic models.

2.3.3 Objective 3 - Highway 107 Extension

2.3.3.1 Meet with the Project Steering Committee in accordance with the requirements specified in Section 2.5 - Reporting Requirements and Procedures.

2.3.3.2 Become familiar with the study area including, existing, proposed and potential road infrastructure and developments, land ownership, terrain and environmental issues.

2.3.3.3 Consider and incorporate HRM's Regional Plan, Active Transportation Plan and Transportation Demand Management Functional Plan (in progress) as they apply to the potential Highway 107 corridors.

2.3.3.4 Develop a functional design for the proposed Highway 107 alignment option that connects to Highway 102 at Highway 101. (The functional design of the extension option that terminates at Highway 102 Exit 4C has already been established by TPW and is to be used in completing the project.) Allow for potential roadside measures in the cross-section and allow for a trail in areas where it is required as part of the Active Transportation Plan and consider the need for incorporation of HOV/transit lanes in both design options. Base functional designs on current TPW and HRM design standards and consider topography and grade issues. Present functional designs at 1:5000 or larger scales.

2.3.3.5 Identify the right-of-way that is required for each of the functional designs.

2.3.3.6 Prepare an interim report that includes a description of research, analyses, recommendations and proposed functional design plans for review by the Project Steering Committee. Incorporate review comments.

2.3.3.7 Prepare functional plans for the Highway 107 alignment options for inclusion in the public information session to be held in accordance with item 2.3.2.17.

2.3.3.8 Perform MicroBENCOST or simlar benefit/cost analyses of the Highway 107 alignment/interchange options. This will entail consideration of three different scenarios: Highway 107 connecting to Highways 101 and 102 with two interchange configuration options; and Highway 107 connecting to a potentially redesigned Highway 102 Exit 4C.

2.3.3.9 Prepare a final draft report and functional plans for review by the Project Steering Committee. The final draft report is to include a report on the benefit/cost analyses. Be prepared to provide a second final draft report, if the Project Steering Committee determines it is required.

2.3.3.10 Provide a final report and functional plans.

2.3.3.11 Present the project findings (all three project components) to the project steering committee and other senior TPW and HRM staff.

2.4 TPW and HRM Responsibilities

2.4.1 Meet with the Consultant on an arranged schedule.

2.4.2 Provide the Consultant with the documentation listed below and any other available information that may assist in the completion of the project.

- Provincial ROW plans for Highway 102 corridor (hard copy)
- HRM ROW plans for Bayers Road
- Provincial topographic and property mapping (digital)
- HRM QRSII model
- HRM GIS mapping

- Regional Municipal Planning Strategy

- Active Transportation Plan (SGE Acres, 2006)

- As-built drawings for Highway 102 Corridor from beginning at Bayer's Road to Kearney Lake Road (hard copy, mid 1980s)

- Design Drawings (hard copy only)
  - Highway 107/Akerley interchange
  - Lacewood Drive - Chain Lake Drive to Highway 102, Proposed Traffic Improvements Phase 2 (HRM; 2003)
  - Highway 102 Interchange to Lacewood Drive, Upgrading of Lacewood Drive (TPW; 2002)
  - Highway 102/Route 213 Interchange (widening on Route 213 in approach to ramp terminals) (TPW; 2003)
  - Kearney Lake at Highway 102, Intersection Geometry Plan (intersection widening NB ramp terminals) (TPW; 2006)
  - Highway 102 at Kearney Lake Road, Geometry Layout and Road Signs (improvements to N-E/W ramp terminal and provision of turning lanes for E/W-S ramp) (TPW; 2003)
  - Highway 102 - Intersection of SB Ramps at Kearney Lake Road (TPW; 1991)

- HRM functional sketches: Bayers Road Six-Lane (End of Hwy 102 to Connaught) and Bayers Road Five-Lane (with Median Transit Lane)

- Highway 113 functional design plans (AutoCAD)

- Highway 107 extension (option connecting to Highway 102 at Exit 4C) functional design plans (AutoCAD)

- Other Studies
  - Governor Lake Area Transportation Plan (SGE Acres; 2003)
  - Highway 102 Interchanges Operational Assessment (Dillon; 2006)
  - Bayers Lake Interchange Traffic Study (ARTM; 1999)
  - Highway 113: A Demand and Strategic Context Focus Study (Delphi-MRC; 2006)
  - Final Report Traffic Impact Study, Prince's Lodge/Bedford South Master Plan (ARTM; 2000)
  - Wright Avenue Extension and Highway 118 Interchange Traffic and Functional Design Review (BA Group; 2004)
  - Bedford West Master Plan: Transportation Study (Delphi-MRC; 2004)
  - The Courtyards at Paper Mill Lake Traffic Impact Study (O'Halloran Campbell Consultants; 2004)
  - Northgate Development Traffic Impact Study (Terrain Group; 2006)
  - Butler Property Final Report Traffic Impact Study (Atlantic Road and Traffic Management; 2003)

- Traffic count information described in Attachment A which includes screenline data counted in 2006 for HRM's QRS II model.

2.4.3 Provide review comments and respond to questions in a timely manner.

2.5 Reporting Requirements and Procedures

The activities, schedules and outcomes of all three components of the study are interrelated and, where appropriate, certain activities should be combined for efficiency. However, the three project components (Traffic Projections, Highway 102 Upgrades and Highway 107 Extension) are to be reported separately. Each of the three final reports will be uniform in appearance, referenced as a set but each stand alone.

In person meetings will be required at the initiation of each study component, following the submission of each interim report and following the submission of each draft final report. For Component 1 - Traffic Projections, there will also be a meeting to confirm the traffic and population projections to be used in the models. For Component 2 - Highway 102 Upgrades, a four-day functional planning working session with TPW and HRM staff is to be scheduled along with two additional meetings: (1) post working session; and (2) pre-public consultation. Not including the four-day working session, this amounts to 11 (eleven) in person meetings throughout the course of the project although the schedule may allow for some meetings to be combined. All in person meetings will be held in HRM. The Consultant shall meet with the project Steering Committee within two weeks of notification of project award. The purpose of this initial meeting is to finalize the study requirements, data requirements, study methodologies, etc. It is expected to also serve as the Traffic Projections study component initiation meeting.

Written, biweekly progress updates are to be submitted to the Project Steering Committee Chair. These reports will review progress of the previous reporting period, forecast the work of the upcoming period, identify any changes to the schedule and highlight any issues that may have arisen during the period or are expected to arise.

The Consultant shall provide six (6) copies of each interim and draft final reports including drawings and sixteen (16) bound copies and one (1) unbound copy of each final report including drawings. All copies of the interim and final reports shall be on letter size paper and appropriately titled. The draft final reports must be submitted for comment and possible amendments before the final versions are submitted. The consultant must be prepared to submit second draft final reports if required. The Consultant shall provide two (2) electronic copies of each final report on CD compatible with WordPerfect 11 including all plans (compatible with AutoCAD 2000), tables, diagrams, figures, modelling data files and pictures. All interim, draft final and final reports, including tables, drawings, figures, pictures and diagrams, are to be submitted in PDF in addition to the above requirements.

Required copies of the interim and draft final reports shall be submitted 5 working days prior to the interim and final draft meetings. The final reports shall include executive summaries and reference lists. All reports shall contain copies of functional design plans as specified in Section 2.3 Detailed Technical Requirements. The Terms of Reference shall be attached as an appendix to the final reports.

2.6 Project Management

A Project Steering Committee will administer the technical and analytical work of the Consultant. The team will consist of representatives from TPW and HRM. The Consultant will report to the Project Steering Committee Chair, who will be responsible for overall administration of the study.

Acceptance and approval of the work will take place after the Project Steering Committee has been satisfied that the requirements, as specified in the contract, have been met.

2.7 Project Schedule

The Consultant shall meet with the Project Steering Committee within two (2) weeks of notification of contract award. The overall study shall be completed and the required copies of the final reports presented within twelve (12) months of contract award. Please note: The functional design and access management plan recommendations for the Highway 102/Hammonds Plains Road interchange must be completed as soon as is possible and no later than August 3, 2007.

2.8 Enquiry Contacts

All enquiries related to this Request for Proposal are to be directed to the following person. Information obtained from any other source is not official and may be inaccurate. Enquiries and responses may be recorded and may be distributed to all proponents at the Province's option.

Department Contact:
Janice Harland, P.Eng.
1672 Granville Street
Halifax, NS B3J 3Z8
Telephone: 902-424-4206
Fax: 902-424-0571
Email: harlanja@gov.ns.ca

Procurement Contact:
Terry Peitzsche, Procurement Group Supervisor
6176 Young Street, Suite 200
Halifax, NS B3K 2A6
Telephone: 902-424-8069
Fax: 902-424-0780
Email: peitzsct@gov.ns.ca

2.9 Contract

The standard legal contract that applies to services is available at: http://www.gov.ns.ca/tenders/policy/htm_files/contract.htm. This document will be updated (as a part of the award process) to include the vendor name, contact information, maximum amount payable, dates, etc. Schedule A will be updated to reference the tender documents (including addenda) and the Proposal submitted by the successful supplier, and may be expanded to reference any correspondence or clarifications. Schedule B will be updated to describe the payment/invoicing schedule and the project work plan (if any).

In addition to the above, the following changes will also apply to this standard contract.

Payment Schedule: Payments for professional services rendered will be made monthly in arrears upon receipt of invoices detailing work completed, and subject to the following conditions.
(a) Monthly payments will be issued for up to 90 percent of the amount invoiced. The remaining amount will be paid upon completion and acceptance of the work.
(b) Receipts shall be provided for all expenses if requested.

Insurance: The Consultant shall at his cost maintain such insurance and pay such assessments as will protect the Consultant and the Minister from any claims under the Worker's Compensation Act and from any other claims for damages for bodily injury, personal injury, sickness or disease, including death, or property damage which may arise from operations under the Agreement. The limits of such insurance shall not be less than $2,000,000.00 on an occurrence (not claims made) basis except where noted below. Coverages to be in form and content acceptable to the Minister. Insurance coverage shall include Commercial General Liability insurance covering premises and operations liability, with extensions of coverage to include:

- The Minister as an Additional Named Insured;
- Cross Liability Clause;
- Contractual Liability;
- Employers Liability;
- Completed Operations Liability maintained for a period of not less than twelve (12) months after the completion of the term of the Agreement;
- Non-owned Motor Vehicle Liability;
- Certification of coverage being applicable to the specific Work;
- Broad Form Property Damage;
- Contractors Protective Liability;
- Professional Liability Insurance in an amount not less than $2,000,000.00 insuring his liability for errors and omissions in the performance of his professional services including all Sub-consultant services (This may be on a claims-made basis.); and
- Automobile Liability insurance insuring all licensed vehicles owned, leased or operated by the Consultant in an amount not less than $1,000,000.00.

All insurance policies shall be endorsed to provide a minimum advance written notice of not less than 30 days, in the event of cancellation, termination or reduction in coverage or limits, such notice to be made by the Insurer to the Minister.

The Consultant shall not do or omit to do or suffer anything to be done or omitted to be done which will in any way impair or invalidate such policies or insurance.

Proponents who require any alteration to this standard agreement must indicate the specific changes required in their response, and the extent of the deviations from the standard contract will be taken into account when evaluating proposals. Proponents requesting multiple, major changes to the proposed contract risk having their score reduced, or even disqualification, so amendment requests should reflect vital changes only.

2.10 Consultant Expertise/Eligibility

The project team shall have considerable experience and knowledge in planning, transportation planning, traffic engineering, highway design (particularly interchange design experience) and benefit/cost analysis. The engineering principal shall be registered with the Association of Professional Engineers of Nova Scotia (APENS).

Prospective proponents are not eligible to submit a proposal if current or past corporate or other interests may, in the Province's opinion, give rise to a conflict of interest in connection with this project.

The successful proponent may be required to demonstrate financial stability and may be required to register to conduct business in Nova Scotia.

The Consultant must hold a Letter of Good Standing from an occupational health and safety organization which meets the requirements of the Nova Scotia Environment and Labour (NSEL) or the Workers' Compensation Board of Nova Scotia (WCB), regarding participation in the Occupational Health and Safety External Audit Program, leading to the issuance of a Certificate of Recognition jointly by the occupational health and safety organization and the NSEL or WCB.

The Letter of Good Standing must have a clear expiry date and must be signed by an official of the occupational health and safety organization. If the Letter of Good Standing expires before the completion of the Agreement, a further letter will be required before the time of expiration which indicates that the contracted party continues to actively participate in the occupational health and safety organization's Certificate of Recognition or Safety System Accreditation Program. If a further letter is not provided, this may be regarded as sufficient cause for voiding the Agreement.

The successful Proponent will be expected to develop a safety plan for the project, to be reviewed by the Project Management Team. This plan must deal with hazard recognition, assessment and control, provision of first aid services, and handling of emergencies and it must meet all requirements prescribed by the Occupational Health and Safety Act and regulations. The safety plan is to be reviewed and accepted by the Project Steering Committee prior to any field work commencing.

Prior to award, the selected consultant shall provide insurance documentation for review by the Department. Confirmation of acceptable coverage is required prior to award of the work.

2.11 Liability for Errors

While considerable effort to ensure the accuracy of the information in this Request for Proposal has been made, the information contained in this Request for Proposal is supplied solely as a guideline to Proponents. The information is not guaranteed or warranted, nor is it necessarily comprehensive or exhaustive.

2.12 Extra Work

The Consultant may be required to undertake additional work not specified in the contract. Prior to starting this additional work, the Consultant shall submit a detailed breakdown of the costs, including all expenses, to complete the extra work and obtain written approval from the project Steering Committee.

2.13 Addenda and Amendments

Amendments to the submitted offer will be permitted if received in writing prior to bid closing and if endorsed by the same party or parties who signed the original offer.

Addenda may be issued during the bidding period. All addenda become part of the contract documents. Proponents are responsible for receiving all addenda and including them in the submitted tender documents. All addenda are to accompany each proposal. Proposals that do not contain all the addenda may be immediately returned and the proponent eliminated from further consideration.

Any required addenda will be issued no later than five (5) working days before the date set for receipt of proposals. Verbal answers are only binding when confirmed by written addenda.

2.14 Post Performance Evaluation

The Department will be evaluating the performance of the selected consultant. The evaluation methodology and criteria will be provided to the selected consultant prior to project award.

3.0 Evaluation Criteria

Proposals shall be evaluated based on the "Government Procurement Process: Architects and Professional Services".

The criteria for evaluating proposals, based on technical and managerial merit, will be made based on the following categories and weights.

Qualification and Experience of Corporate Proponent and Individual Team Members on Similar Projects	40 points
Understanding of Objectives/Proposed Methodology	40 points
Project Management	5 points

Accepted proposals will first be evaluated on the basis of their technical and managerial merit and then on the basis of price. The technical submission shall be rated as shown above, out of 85 points, and the remaining 15 points shall be allotted based on price. Only those proposals achieving an aggregate score of 68/85 (80%) or greater will have their sealed cost envelopes opened. The lowest price shall be awarded 15 points (all prices within 5% will receive the same price points). The next lowest price (beyond 5%) will receive 12 points. Points for other submissions will be assigned with 3 fewer points for each successively higher priced price proposal. But again, each time the same score will be awarded if successive prices are within 5% of the last highest price. The proposal with the highest total points will be awarded the contract. Proposals not meeting the required 68/85 will have their unopened cost envelopes returned.

Notwithstanding the technical/managerial and price scores, the Department of Transportation and Public Works reserves the right to reject any proposal where prices are deemed unreasonable relative to other prices bid, typically a 25% variance from the average qualified bid (excluding the bid in question).

TPW reserves the right to negotiate any or all conditions of the Consultant's proposed work plan and reject all submitted proposals. Unsuccessful proponents may request a debriefing meeting following execution of a contract with the successful proponent.

4.0 Proposal Content and Response Guidelines

Failure to provide information outlined in this section may result in disqualification.

Six (6) copies of your proposal (fax copies are not acceptable) are to be delivered by 2:00 pm local time, Tuesday, January 9, 2007 to:

Public Tenders Office
6176 Young Street, Suite 200
Halifax NS B3K 2A6
Tender: 60130901

Proposals and their envelopes should be clearly marked with the name and address of the proponent, the Tender number, the project title and the closing date and time. A public opening will be held on, Tuesday, January 9, 2007 at 2:30 pm local time at the Public Tenders Office. Late proposals will not be accepted and will be returned to the proponent.

Proponents are solely responsible for their own expenses in preparing, delivering and presenting a proposal and for subsequent negotiations with the Province, if any. Proposals must be open for acceptance for at least 90 days after the closing date. Upon acceptance, prices will be firm for the entire contract period unless otherwise specified.

To facilitate efficient review of the proposals, proponents are requested to use the following format. The proposal shall be organized into four chapters and such chapters limited where indicated.

Chapter 1 - Introduction/Project Understanding

This chapter shall include a demonstration of project understanding and insight into its objectives, including potential issues and challenges.

Chapter 2 - Methodology

This chapter is to include the following information.

- List of all information and data sources available to the Consultant and expected to be used in the Study.
- Detailed work plans that identify proposed methodologies including field work. Each of the three project components (Traffic Projections, Highway 102 Upgrades and Highway 107 Extension) are to addressed separately and the interaction/coordination among the activities of the three components are to be identified.
- A single overall project schedule that incorporates the schedules for each of the three project components. The schedule for each component should be easily identifiable within the overall project schedule.
- A project team organization chart with the role of each team member in the study clearly described.

- Time commitment (based on an eight hour day) for each team member for each component of the project.

- Draft tables of contents for the final reports.

Chapter 3 - Project Management

This chapter is to include a discussion of the project management measures and practices that will be used in carrying out the project addressing items such as quality assurance/quality control, cost control and scheduling.

Chapter 4 - Qualifications

This chapter is to include the following information.

- Corporate profile(s) and client references. This shall be a maximum of five pages.

- A summary of relevant corporate (including sub-consultant) experience including project dates. This shall be a maximum of ten pages.

- A summary of project team members' (including sub-consultants') experience in areas related to these terms of reference. This summary shall be a maximum of four pages per team member, and focus on the team member's relevant education and experience. Education and experience descriptions must be supported with dates and a clear description of the person's role in the project experience. Curricula vitae of team members, may be included in an appendix but the proposal evaluation team is not obligated to review or consider this information.

- A brief statement (maximum of 4 pages) explaining why the Proponent is uniquely qualified for this project.

Copies of insurance and safety certification certificates are not required as part of the proposal, but shall be provided by the selected Consultant prior to award of the contract.

One copy of the cost proposal shall be provided, separately sealed in an envelope. The cost proposal shall separately identify the cost (labour and expenses) of each of the three project components as part of the total study cost. The costs for each of the three components shall be upset limit prices and include labour costs, related expenses, printing costs and professional services obtained outside of the firm. In order to assess level of effort and staff roles, time commitments for all team members (excluding labour costs) shall be included in the main body of the proposal. Prices quoted are to be in Canadian dollars and exclusive of federal and provincial taxes. Expenses shall not exceed Nova Scotia provincial rates ($0.3885/km, breakfast $6.00, lunch $12.00, supper $20.00, incidentals $5.00 per night).

By submitting a proposal, the proponent warrants that all components required to deliver the services requested have been identified in the proposal or will be provided by the Consultant at no additional charge. The technical proposal must be signed by the person(s) authorized to sign on behalf of the proponent and to bind the proponent to statements made in response to this Request for Proposal.

5.0 Proponent Checklist

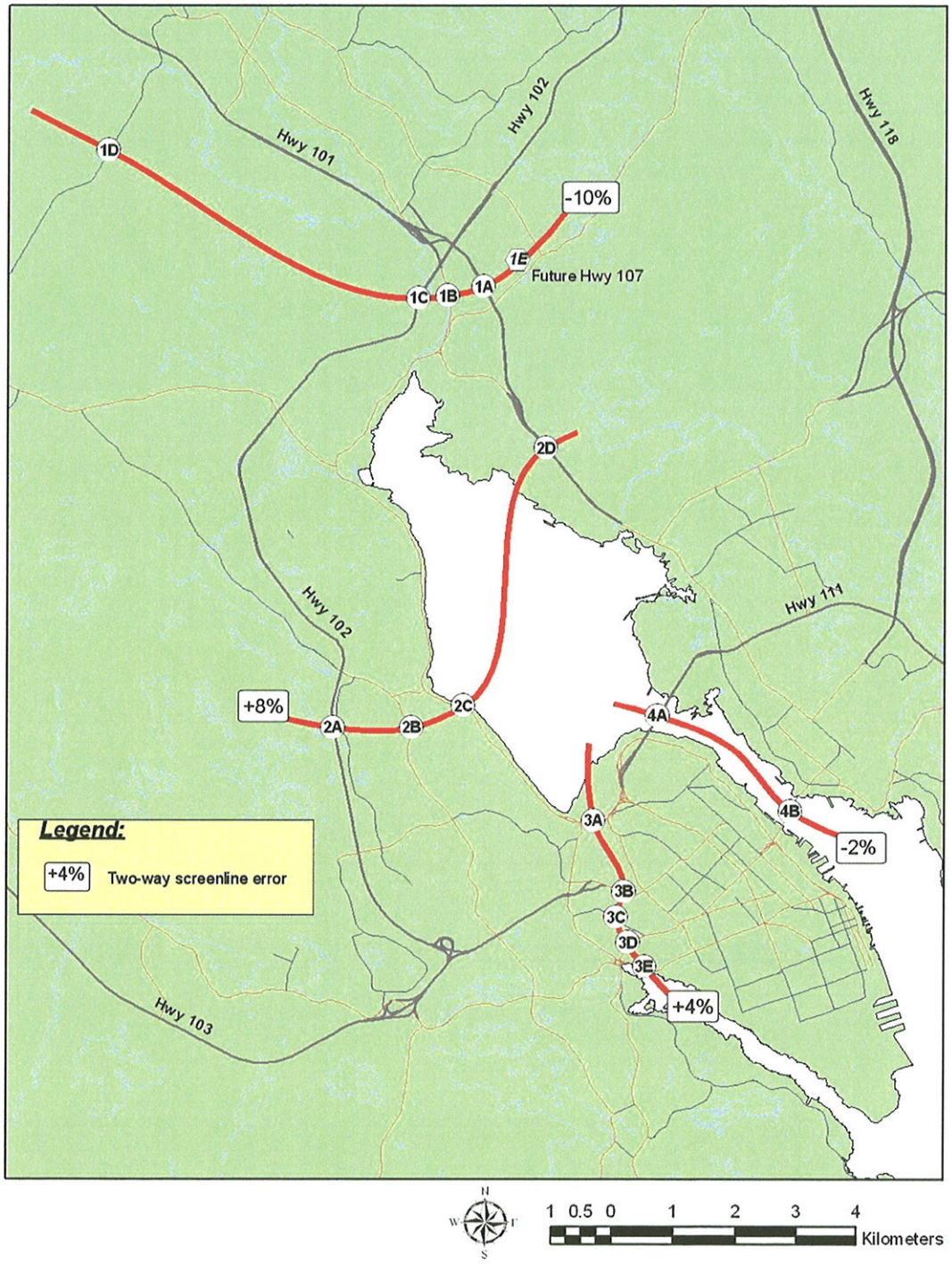
This checklist has been provided solely for the convenience of the proponent. Its use is not mandatory and it does not have to be returned with the proposal.

- ❑ The requirements of the Request for Proposal have been read and understood by everyone involved in putting together the proposal.
- ❑ The Nova Scotia Request for Proposals (RFP) form that is a part of the Request for Proposals has been signed and included with the Proposal documents.
- ❑ The proposal explicitly addresses everything asked for in the Request for Proposal.
- ❑ The proposal meets all the mandatory requirements of the Request for Proposal.
- ❑ Qualified Nova Scotia based products and services have been identified as an element of the proposal offering.
- ❑ The proposal clearly identifies the proponent, the project, and the Request for Proposal number.
- ❑ The proponent's name and the Request for Proposal number appear on the proposal envelope.
- ❑ The appropriate number of copies of the proposal have been made. (Proposals without the correct number of copies may be rejected.)
- ❑ Every care has been taken to make sure the proposals are at the closing location in plenty of time, as late proposals will be rejected.

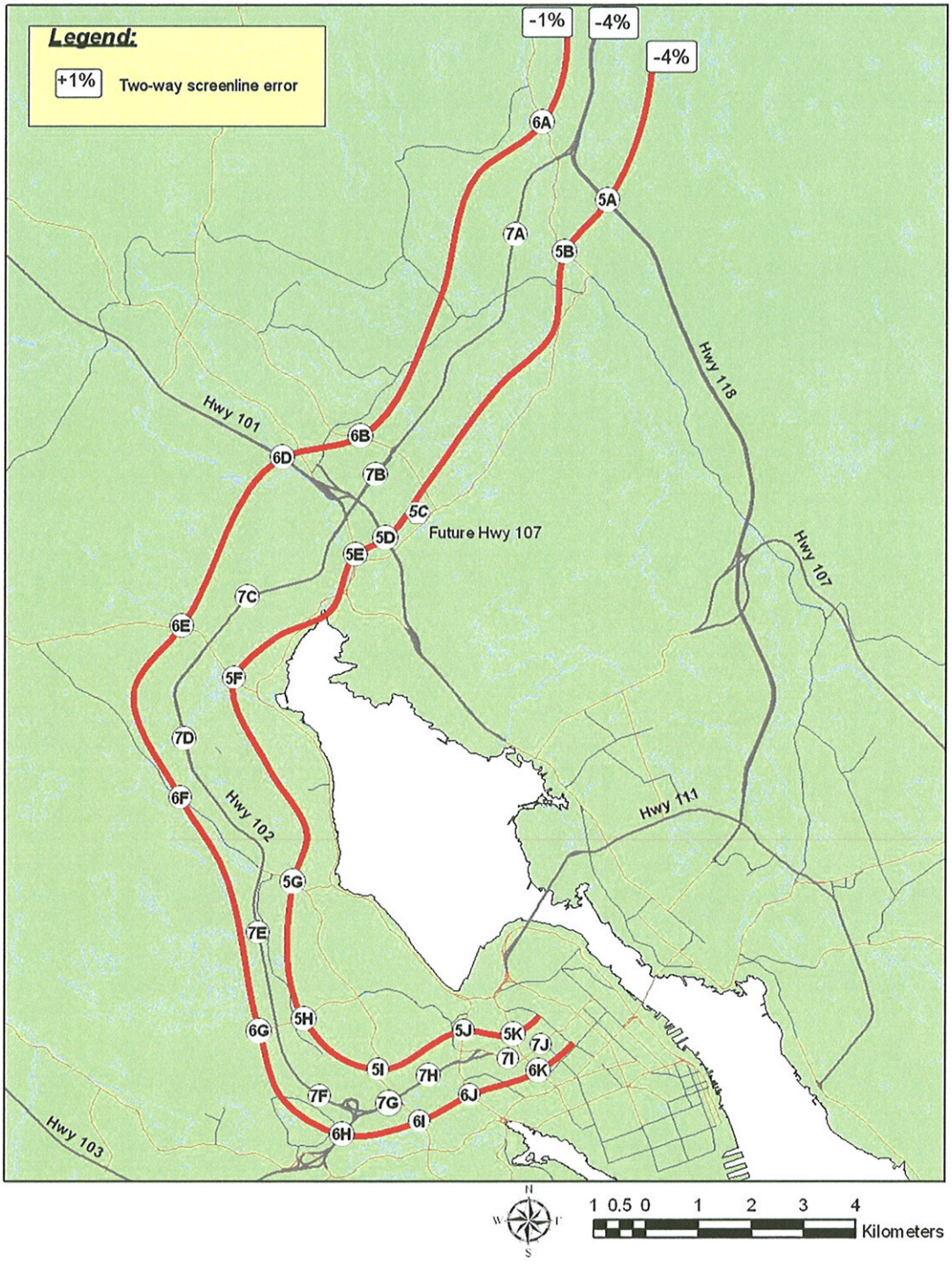
APPENDIX B

Baseline Model Calibration Results

2001 Baseline AM: Primary Screenline Results



2001 Baseline AM: Secondary Screenline Results



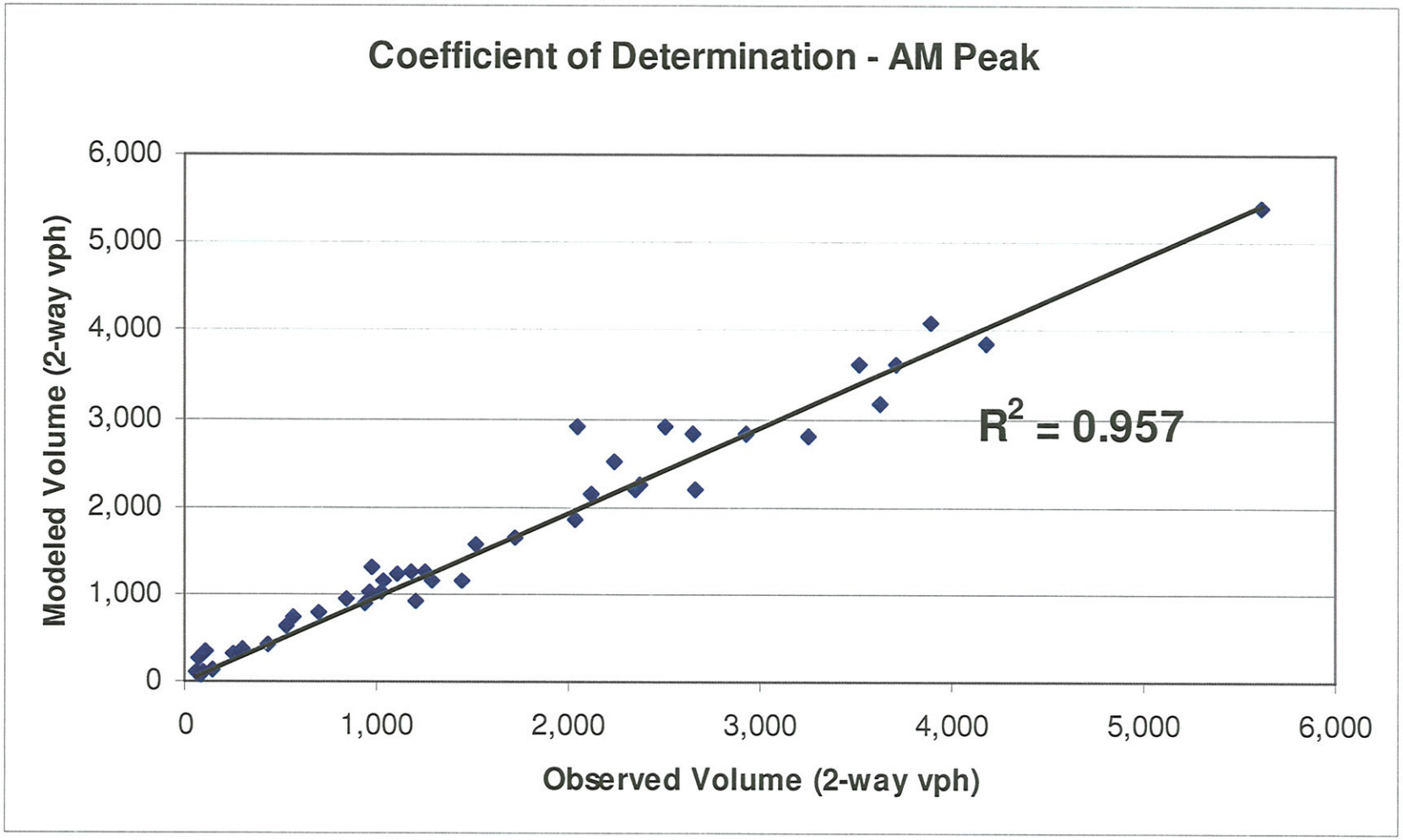

Coefficient of Determination - AM Peak
Modeled Volume (2-way vph)
6,000
5,000
4,000
3,000
2,000
1,000
0
0
1,000
2,000
3,000
4,000
5,000
6,000
Observed Volume (2-way vph)
R2 = 0.957

TABLE 1
AM PEAK MODEL CALIBRATION: Test 6 - May 2007

Screen Line Station	Location	Streets	Observed PM Peak Hour Volume			Model Results: AM Peak Hour Results			Modeled vs Observed Error: 2-way Error		
			Inbound	Outbound	Two-way	Inbound	Outbound	Two-way Model	Trips	%	GEH Statistic (<5=OK)
1. Bedford											
1A	Bedford By-Pass	Between Rocky Lake Rd and Hwy 102	2,193	468	2,661	1895	310	2,205	-456	-17%	4.6
1B	Bedford Highway	Between Hwy 102 and Oakmount Dr.	713	321	1,034	795	365	1,160	126	12%	1.9
1C	Highway 102	Between Highway 101 & Hammonds Plains	2,132	1,493	3,625	2010	1170	3,180	-445	-12%	3.8
1D	Lucasville Road	North of Hammonds Plains Rd.	246	191	437	215	195	410	-27	-6%	0.7
PRIMARY SCREENLINE 1			**5,284**	**2,473**	**7,757**	**4,915**	**2,040**	**6,955**	**-802**	**-10%**	**4.7**
2. Bedford Basin											
2A	Highway 102	Between Lacewood and Kearney	2,134	1,114	3,248	2050	760	2,810	-438	-13%	4.0
2B	Dunbrack Street	Between Kearney Lake Rd. & Ross St.	606	371	977	955	355	1,310	333	34%	4.9
2C	Bedford Highway	Between Bayview Road & Sherbrook Dr.	887	402	1,289	1075	90	1,165	-124	-10%	1.8
2D	Windmill Road	North of Akerley Boulevard	1,223	825	2,048	2455	445	2,900	852	42%	8.6
PRIMARY SCREENLINE 2			**4,850**	**2,712**	**7,562**	**6,535**	**1,650**	**8,185**	**623**	**8%**	**3.5**
3. Halifax Peninsula											
3A	Kempt Road	Between Fairview Overpass & Windsor St.	2,819	1,072	3,891	3585	510	4,095	204	5%	1.6
3B	Bayers Road	Between Pennington and Romans	2,028	622	2,650	2235	585	2,820	170	6%	1.6
3C	Mumford Road	Between Dutch Village Rd. and Stanford	333	196	529	510	130	640	111	21%	2.3
3D	Chebucto Road	Between Clinton Ave. and Roosevelt Drive/Simpsons Lane	861	314	1,175	1115	155	1,270	95	8%	1.4
3E	Quinpool Road	Between Armdale Rotary and Armview Ave.	1,967	379	2,346	1955	255	2,210	-136	-6%	1.4
PRIMARY SCREENLINE 3			**8,008**	**2,583**	**10,591**	**9,400**	**1,635**	**11,035**	**444**	**4%**	**2.1**
4. Harbour Bridges											
4A	AMM Bridge	MacKay Bridge	3,454	2,162	5,616	3590	1800	5,390	-226	-4%	1.5
4B	ALM Bridge	MacDonald Bridge	2,548	976	3,524	2785	825	3,610	86	2%	0.7
PRIMARY SCREENLINE 4			**6,002**	**3,138**	**9,140**	**6,375**	**2,625**	**9,000**	**-140**	**-2%**	**0.7**
PRIMARY SCREENLINE - TOTAL			**24,144**	**10,906**	**35,050**	**27,225**	**7,950**	**35,175**	**125**	**0%**	**0.3**

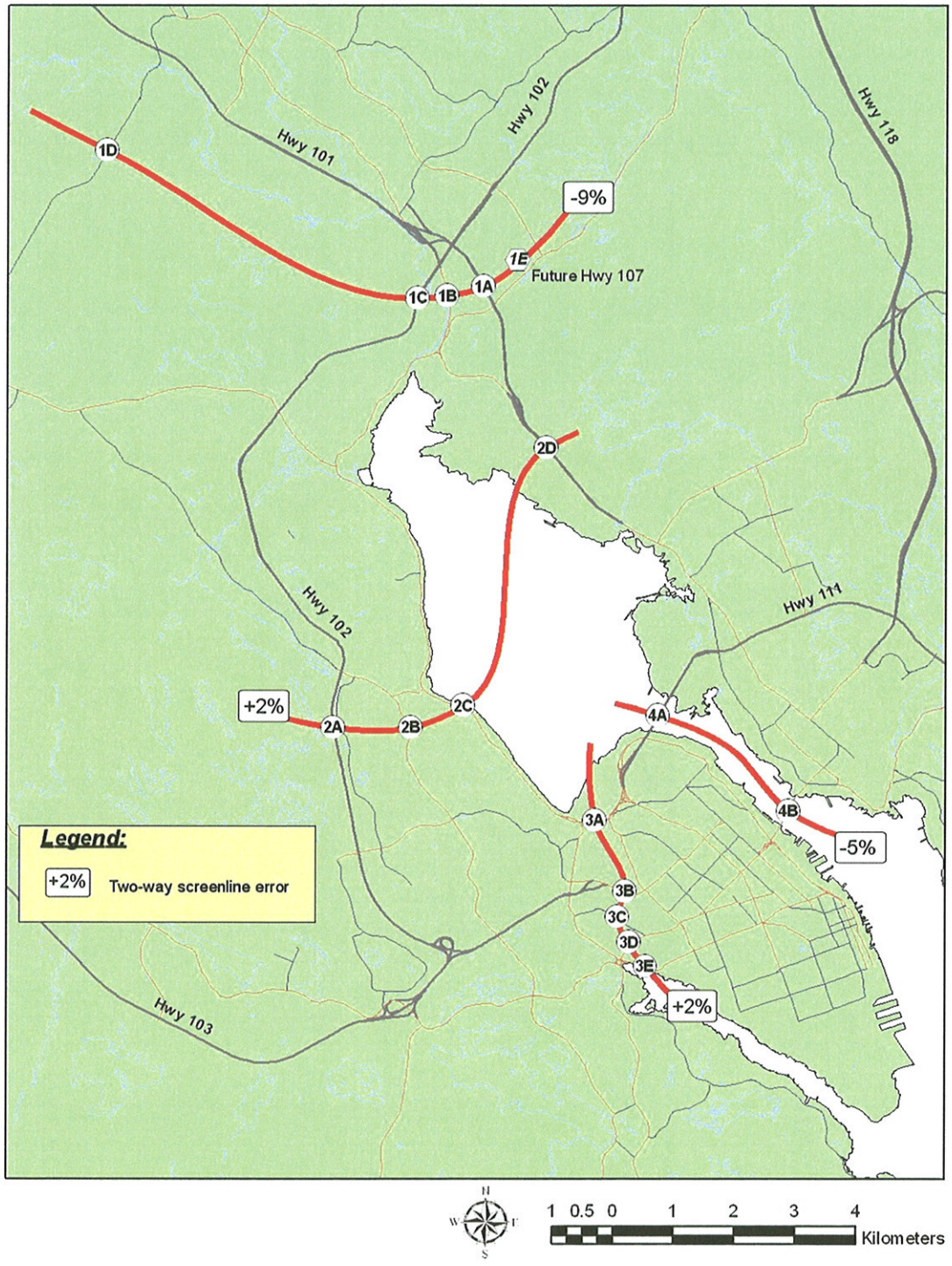
TABLE 1
AM PEAK MODEL CALIBRATION: Test 6 - May 2007

Screen Line Station	Location	Streets	Observed PM Peak Hour Volume			Model Results AM Peak Hour Results			Modeled vs Observed Error 2-way Error		
			Inbound	Outbound	Two-way	Inbound	Outbound	Two-way Model	Trips	%	GEH Statistic (<5=OK)
5. Highway 102 East											
5A	Highway 118	Between Hwy 107 & Hwy 102	1,499	880	2,379	1805	445	2,250	-129	-5%	1.3
5B	Lake Thomas Dr (Tk2)	Between Hwy 102 & Guysborough Lane	105	199	304	125	240	365	61	20%	1.7
5D	Bedford By-Pass	Between Rocky Lake & Hwy 102	2,193	468	2,661	1895	310	2,205	-456	-17%	4.6
5E	Bedford Highway	Between Hwy 102 & Oakmount Dr	713	321	1,034	795	365	1,160	126	12%	1.9
5F	Hammonds Plains Rd	Between Hwy 102 & Brookshire Ct	679	769	1,448	645	500	1,145	-303	-21%	4.2
5G	Kearney Lake Rd	Between Hwy 102 & Castle Hill	587	524	1,111	800	420	1,220	109	10%	1.6
5H	Lacewood Drive	Between Fairfax & Parkland Dr	423	545	968	400	620	1,020	52	5%	0.8
5K	Connaught Ave	Between Chisholm & Windsor St	338	507	845	410	525	935	90	11%	1.5
SECONDARY SCREENLINE 5			**6,537**	**4,213**	**10,750**	**6,875**	**3,425**	**10,300**	**-450**	**-4%**	**2.2**
6. Highway 102 West											
6A	Lake Thomas Dr (Tk2)	Between Hwy 102 & Miller Lake Rd	1,008	244	1,252	1225	40	1,265	13	1%	0.2
6B	Glendale Ave	Between Hwy 102 & Estate Dr	437	132	569	655	85	740	171	30%	3.3
6C	Bedford By-Pass	Between Rocky Lake & Hwy 102	2,193	468	2,661	1895	310	2,205	-456	-17%	4.6
6D	Highway 101	Between Tk 1 Overpass & Exit 2	1,794	325	2,119	1865	295	2,160	41	2%	0.4
6E	Hammonds Plains Rd	Between Hwy 102 & Smiths Rd	758	441	1,199	630	290	920	-279	-23%	4.3
6F	Kearney Lake Rd	West of Hamshaw Dr (70km/h zone)	686	255	941	760	130	890	-51	-5%	0.8
6G	Lacewood Drive	Between Hwy 102 & Chain Lake Dr	270	428	698	110	685	795	97	14%	1.8
6H	Highway 103	Between Hwy 102 & Exit 2 Beechville	1,912	594	2,506	2110	805	2,915	409	16%	3.9
6K	Connaught Ave	Between Bayers Rd & Young	1,253	467	1,720	1220	440	1,660	-60	-3%	0.7
SECONDARY SCREENLINE 6			**10,311**	**3,354**	**13,665**	**10,470**	**3,080**	**13,550**	**-115**	**-1%**	**0.5**
7. Highway 102 Links											
7A	Control Section 50	Between Lake Thomas Dr & Glendale Dr	696	824	1,520	745	820	1,565	45	3%	0.6
7B	Control Section 45	Between Glendale and Highway 101	1,069	962	2,031	1135	735	1,870	-161	-8%	1.8
7C	Control Section 40	Between Highway 101 & Hammonds Plains	2,132	1,493	3,625	2010	1170	3,180	-445	-12%	3.8
7D	Control Section 30	Between Hammonds Plains & Kearney Lake	1,202	1,040	2,242	1775	735	2,510	268	12%	2.7
7E	Control Section 25	Between Kearney Lake & Lacewood	2,134	1,114	3,248	2050	760	2,810	-438	-13%	4.0
7F	Control Section 20	Between Lacewood & Hwy 103	1,965	958	2,923	1890	950	2,840	-83	-3%	0.8
7G	Control Section 15	Between Hwy 103 & NW Arm Dr	3,255	931	4,186	3050	805	3,855	-331	-8%	2.6
7H	Control Section 10	Between NW Arm Dr & Joseph Howe	2,945	765	3,710	3005	600	3,605	-105	-3%	0.9
7I	Bayers Road 1	Between Pennington & Romans	2,028	622	2,650	2235	585	2,820	170	6%	1.6
7J	Bayers Road 2	Between Connaught & Connolly	731	292	1,023	765	260	1,025	2	0%	0.0
SECONDARY SCREENLINE 7			**18,157**	**9,001**	**27,158**	**18,660**	**7,420**	**26,080**	**-1078**	**-4%**	**3.3**
SECONDARY SCREENLINE - TOTAL			**35,005**	**16,568**	**51,573**	**36,005**	**13,925**	**49,930**	**-1643**	**-3%**	**3.6**
ALL SCREENLINES - TOTAL MODEL			**59,149**	**27,474**	**86,623**	**63,230**	**21,875**	**85,105**	**-1518**	**-2%**	**2.6**

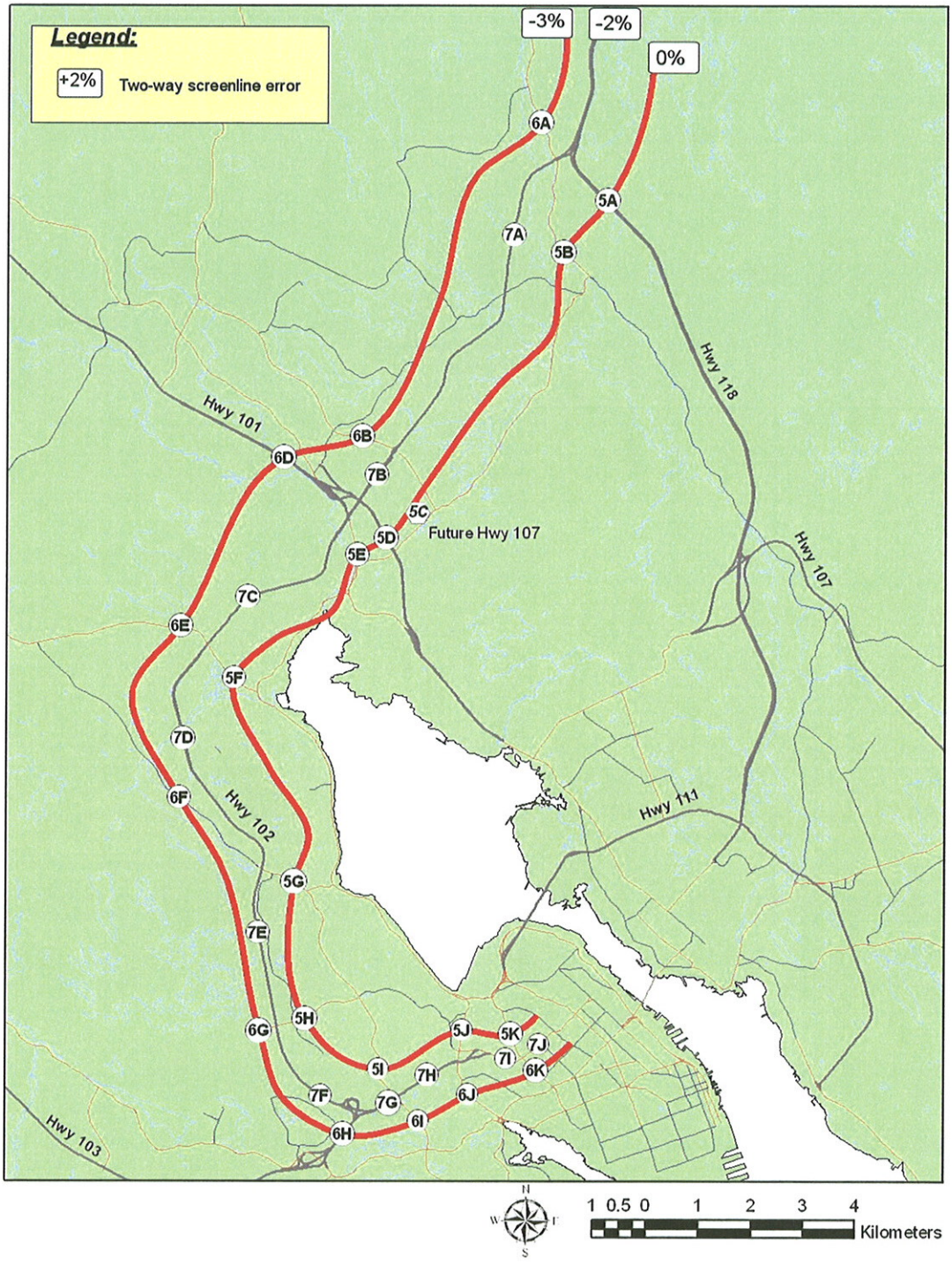
TABLE 1
AM PEAK MODEL CALIBRATION: Test 6 - May 2007

Screen Line Station	Location	Streets	Observed PM Peak Hour Volume			Model Results: AM Peak Hour Results			Modeled vs Observed Error: 2-way Error		
			Inbound	Outbound	Two-way	Inbound	Outbound	Two-way Model	Trips	%	GEH Statistic (<5=OK)
8. Tertiary Links											
8A	Lacewood (Exit 2A)	Northbound off-ramp	76	1	77	265		265	188	244%	7.2
8B	Lacewood (Exit 2A)	Northbound On-ramp	86	1	87	70		70	-17	-20%	1.0
8C	Lacewood (Exit 2A)	Southbound Off-ramp	75	1	76	265		265	189	249%	7.2
8D	Lacewood (Exit 2A)	Southbound On-ramp	60	1	61	105		105	44	72%	2.4
8E	Kearney Lake (Exit 2)	Southbound Off-ramp	248	1	249	310		310	61	24%	1.8
8F	Hammonds Plains (Exit 3)	Northbound to Eastbound Off-ramp	94	1	95	110		110	15	16%	0.7
8G	Tk 2 Fall River (Exit 5)	Northbound Off-ramp	147	1	148	135		135	-13	-9%	0.5
8H	Tk 2 Fall River (Exit 5)	Northbound On-ramp	103	1	104	340		340	236	227%	7.9
TOTAL TERTIARY LINKS			**889**	**8**	**897**	**1,600**	**0**	**1,600**	**703**	**78%**	**9.9**

2001 Baseline PM: Primary Screenline Results



2001 Baseline PM: Secondary Screenline Results



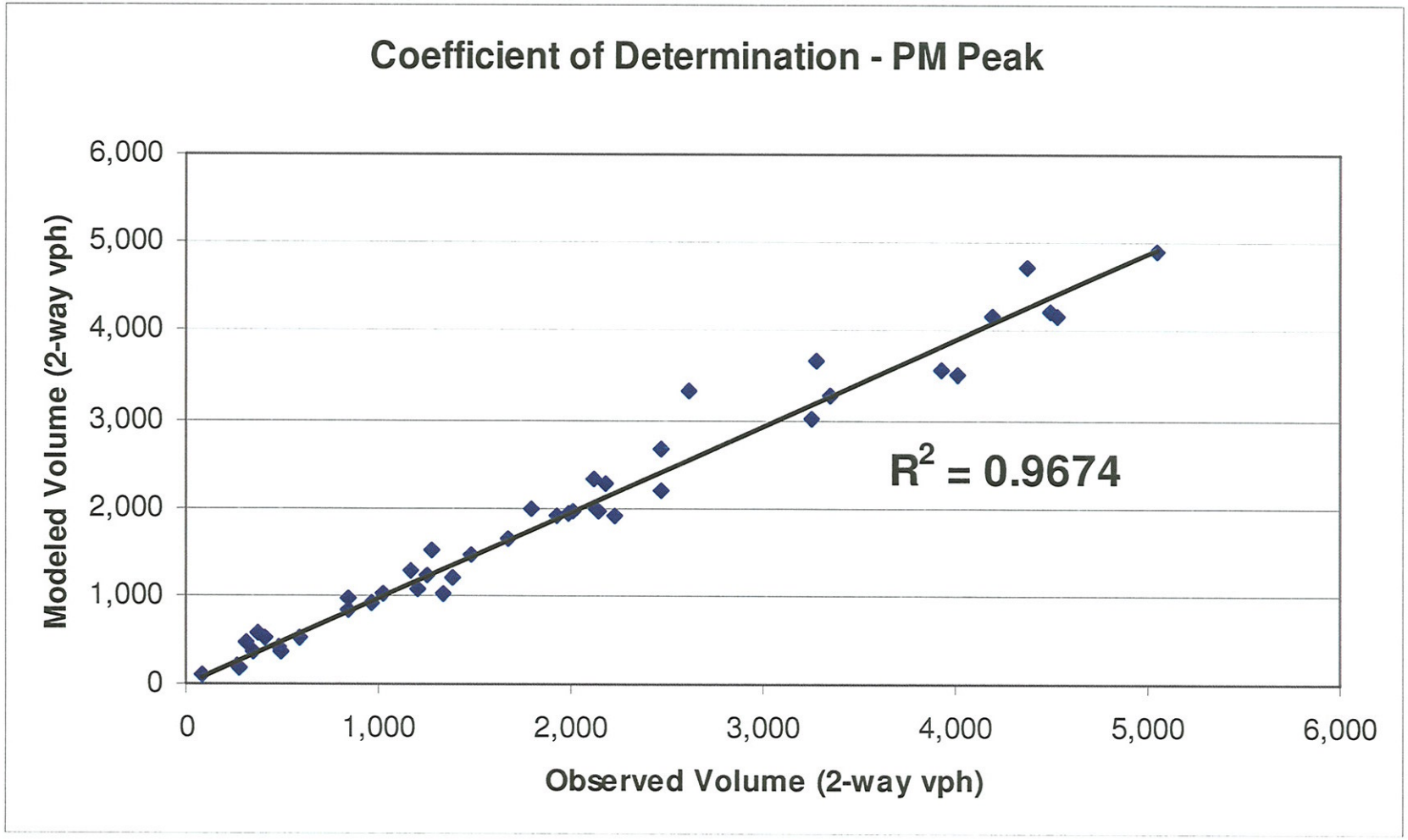

Coefficient of Determination - PM Peak
Modeled Volume (2-way vph)
6,000
5,000
4,000
3,000
2,000
1,000
0
0
1,000
2,000
3,000
4,000
5,000
6,000
Observed Volume (2-way vph)
R2 = 0.9674

TABLE 2
PM PEAK MODEL CALIBRATION: Test 11 - May 2007

Screen Line Station	Location	Streets	Observed PM Peak Hour Volume			Model Results			Modeled vs Observed Error		
						PM Peak Hour Results			2-way Error		
			Inbound	Outbound	Two-way	Inbound	Outbound	Two-way Model	Trips	%	GEH Statistic (<5=OK)
1. Bedford											
1A	Bedford By-Pass	Between Rocky Lake Rd and Hwy 102	580	1,570	2,150	420	1540	1,960	-190	-9%	2.1
1B	Bedford Highway	Between Hwy 102 and Oakmount Dr.	890	1,121	2,011	905	1070	1,975	-36	-2%	0.4
1C	Highway 102	Between Highway 101 & Hammonds Plains	1,720	2,290	4,010	1400	2110	3,510	-500	-12%	4.1
1D	Lucasville Road	North of Hammonds Plains Rd.	237	242	479	225	195	420	-59	-12%	1.4
PRIMARY SCREENLINE 1			**2,847**	**3,653**	**6,500**	**2,530**	**3,375**	**5,905**	**-595**	**-9%**	**3.8**
2. Bedford Basin											
2A	Highway 102	Between Lacewood and Kearney	1,583	2,343	3,926	1430	2130	3,560	-366	-9%	3.0
2B	Dunbrack Street	Between Kearney Lake Rd. & Ross St.	508	695	1,203	330	745	1,075	-128	-11%	1.9
2C	Bedford Highway	Between Bayview Road & Sherbrook Dr.	569	1,101	1,670	365	1290	1,655	-15	-1%	0.2
2D	Windmill Road	North of Akerley Boulevard	931	1,685	2,616	1005	2315	3,320	704	27%	6.5
PRIMARY SCREENLINE 2			**3,591**	**5,824**	**9,415**	**3,130**	**6,480**	**9,610**	**195**	**2%**	**1.0**
3. Halifax Peninsula											
3A	Kempt Road	Between Fairview Overpass & Windsor St.	1,543	2,949	4,492	1145	3085	4,230	-262	-6%	2.0
3B	Bayers Road	Between Pennington and Romans	1,280	1,997	3,277	1230	2430	3,660	383	12%	3.3
3C	Mumford Road	Between Dutch Village Rd. and Stanford	326	512	838	355	615	970	132	16%	2.2
3D	Chebucto Road	Between Clinton Ave. and Roosevelt Drive/Simpsons Lane	198	1,188	1,386	40	1155	1,195	-191	-14%	2.7
3E	Quinpool Road	Between Armdale Rotary and Armview Ave.	925	1,545	2,470	1205	1460	2,665	195	8%	1.9
PRIMARY SCREENLINE 3			**4,272**	**8,191**	**12,463**	**3,975**	**8,745**	**12,720**	**257**	**2%**	**1.1**
4. Harbour Bridges											
4A	AMM Bridge	MacKay Bridge	2,271	2,776	5,048	2205	2705	4,910	-138	-3%	1.0
4B	ALM Bridge	MacDonald Bridge	1,586	2,945	4,532	1420	2750	4,170	-362	-8%	2.7
PRIMARY SCREENLINE 4			**3,857**	**5,722**	**9,579**	**3,625**	**5,455**	**9,080**	**-499**	**-5%**	**2.6**
PRIMARY SCREENLINE - TOTAL			**14,567**	**23,390**	**37,957**	**13,260**	**24,055**	**37,315**	**-642**	**-2%**	**1.7**

TABLE 2
PM PEAK MODEL CALIBRATION: Test 11 - May 2007

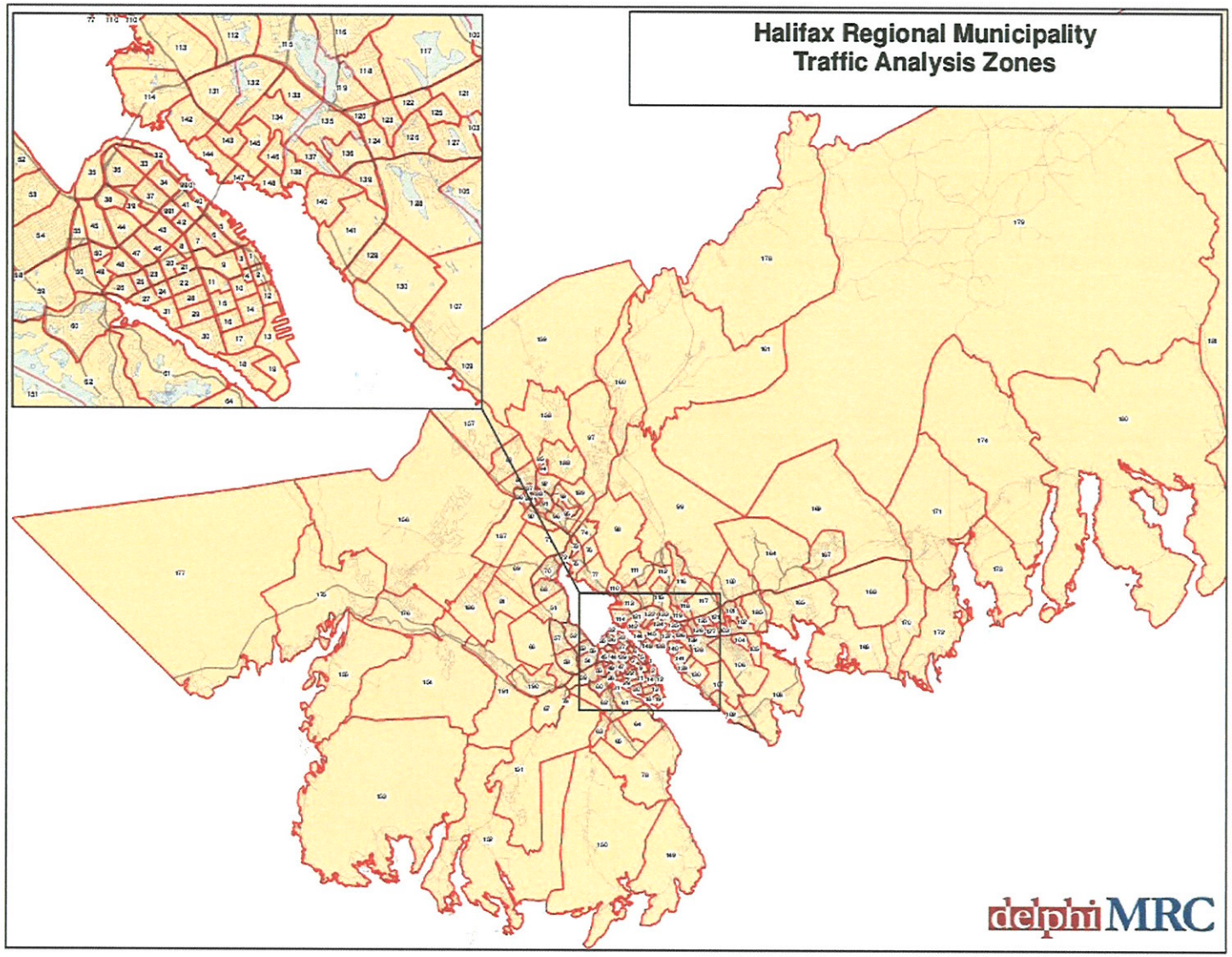
Screen Line Station	Location	Streets	Observed PM Peak Hour Volume			Model Results PM Peak Hour Results			Modeled vs Observed Error 2-way Error		
			Inbound	Outbound	Two-way	Inbound	Outbound	Two-way Model	Trips	%	GEH Statistic (<5=OK)
5. Highway 102 East											
5A	Highway 118	Between Hwy 107 & Hwy 102	826	1,292	2,118	815	1520	2,335	217	10%	2.3
5B	Lake Thomas Dr (Tk2)	Between Hwy 102 & Guysborough Lane	221	153	374	535	50	585	211	56%	4.8
5D	Bedford By-Pass	Between Rocky Lake & Hwy 102	580	1,570	2,150	420	1540	1,960	-190	-9%	2.1
5E	Bedford Highway	Between Hwy 102 & Oakmount Dr	890	1,121	2,011	905	1070	1,975	-36	-2%	0.4
5F	Hammonds Plains Rd	Between Hwy 102 & Brookshire Ct	760	727	1,487	625	840	1,465	-22	-1%	0.3
5G	Kearney Lake Rd	Between Hwy 102 & Castle Hill	679	653	1,332	390	620	1,010	-322	-24%	4.7
5H	Lacewood Drive	Between Fairfax & Parkland Dr	912	889	1,801	955	1035	1,990	189	10%	2.2
5K	Connaught Ave	Between Chisholm & Windsor St	555	464	1,019	495	515	1,010	-9	-1%	0.1
SECONDARY SCREENLINE 5			**5,423**	**6,869**	**12,292**	**5,140**	**7,190**	**12,330**	**38**	**0%**	**0.2**
6. Highway 102 West											
6A	Lake Thomas Dr (Tk2)	Between Hwy 102 & Miller Lake Rd	412	863	1,275	585	940	1,525	250	20%	3.3
6B	Glendale Ave	Between Hwy 102 & Estate Dr	384	581	965	290	615	905	-60	-6%	1.0
6C	Bedford By-Pass	Between Rocky Lake & Hwy 102	580	1,570	2,150	420	1540	1,960	-190	-9%	2.1
6D	Highway 101	Between Tk 1 Overpass & Exit 2	846	1,332	2,178	760	1510	2,270	92	4%	1.0
6E	Hammonds Plains Rd	Between Hwy 102 & Smiths Rd	596	658	1,254	510	710	1,220	-34	-3%	0.5
6F	Kearney Lake Rd	West of Hamshaw Dr (70km/h zone)	259	582	841	300	540	840	-1	0%	0.0
6G	Lacewood Drive	Between Hwy 102 & Chain Lake Dr	1,120	1,009	2,129	965	1035	2,000	-129	-6%	1.4
6H	Highway 103	Between Hwy 102 & Exit 2 Beechville	855	1,374	2,229	620	1295	1,915	-314	-14%	3.4
6K	Connaught Ave	Between Bayers Rd & Young	853	1,140	1,993	855	1080	1,935	-58	-3%	0.7
SECONDARY SCREENLINE 6			**5,905**	**9,109**	**15,014**	**5,305**	**9,265**	**14,570**	**-444**	**-3%**	**1.8**
7. Highway 102 Links											
7A	Control Section 50	Between Lake Thomas Dr & Glendale Dr	967	955	1,922	1005	910	1,915	-7	0%	0.1
7B	Control Section 45	Between Glendale and Highway 101	1,095	1,378	2,473	1020	1185	2,205	-268	-11%	2.8
7C	Control Section 40	Between Highway 101 & Hammonds Plains	1,720	2,290	4,010	1400	2110	3,510	-500	-12%	4.1
7D	Control Section 30	Between Hammonds Plains & Kearney Lake	1,051	2,197	3,248	1160	1850	3,010	-238	-7%	2.1
7E	Control Section 25	Between Kearney Lake & Lacewood	1,583	2,343	3,926	1430	2130	3,560	-366	-9%	3.0
7F	Control Section 20	Between Lacewood & Hwy 103	1,197	2,153	3,350	1290	1980	3,270	-80	-2%	0.7
7G	Control Section 15	Between Hwy 103 & NW Arm Dr	1,491	2,877	4,368	1675	3035	4,710	342	8%	2.5
7H	Control Section 10	Between NW Arm Dr & Joseph Howe	1,270	2,928	4,198	1605	2555	4,160	-38	-1%	0.3
7I	Bayers Road 1	Between Pennington & Romans	1,280	1,997	3,277	1230	2430	3,660	383	12%	3.3
7J	Bayers Road 2	Between Connaught & Connolly	437	732	1,169	190	1090	1,280	111	9%	1.6
SECONDARY SCREENLINE 7			**12,091**	**19,850**	**31,941**	**12,005**	**19,275**	**31,280**	**-661**	**-2%**	**1.9**
SECONDARY SCREENLINE - TOTAL			**23,419**	**35,828**	**59,247**	**22,450**	**35,730**	**58,180**	**-1067**	**-2%**	**2.2**
ALL SCREENLINES - TOTAL MODEL			**37,986**	**59,218**	**97,204**	**35,710**	**59,785**	**95,495**	**-1709**	**-2%**	**2.8**

TABLE 2
PM PEAK MODEL CALIBRATION: Test 11 - May 2007

			Observed PM Peak Hour Volume			Model Results PM Peak Hour Results			Modeled vs Observed Error 2-way Error		
Screen Line Station	Location	Streets	Inbound	Outbound	Two-way	Inbound	Outbound	Two-way Model	Trips	%	GEH Statistic (<5=OK)
8. Tertiary Links											
8A	Lacewood (Exit 2A)	Northbound off-ramp	489	1	490	375	1	376	-114	-23%	2.7
8B	Lacewood (Exit 2A)	Northbound On-ramp	585	1	586	530	1	531	-55	-9%	1.2
8C	Lacewood (Exit 2A)	Southbound Off-ramp	407	1	408	510	1	511	103	25%	2.4
8D	Lacewood (Exit 2A)	Southbound On-ramp	343	1	344	370	1	371	27	8%	0.7
8E	Kearney Lake (Exit 2)	Southbound Off-ramp	276	1	277	185	1	186	-91	-33%	3.0
8F	Hammonds Plains (Exit 3)	Northbound to Eastbound Off-ramp	260	1	261	220	1	221	-40	-15%	1.3
8G	Tk 2 Fall River (Exit 5)	Northbound Off-ramp	317	1	318	480	1	481	163	51%	4.1
8H	Tk 2 Fall River (Exit 5)	Northbound On-ramp	83	1	84	95	1	96	12	14%	0.6
TERTIARY SCREENLINE - TOTAL			**2,760**	**8**	**2,768**	**2,765**	**8**	**2,773**	**5**	**0%**	**0.0**

APPENDIX C

Forecast Demographics


Halifax Regional Municipality
Traffic Analysis Zones
delphi MRC

	HRM	Delphi-MRC Forecasts		
Centroid Number	2001 DU's	2016 DU's	2026 DU's	2036 DU's
1	7	25	54	59
2	154	188	200	218
3	459	471	501	546
4	24	40	71	78
5	321	371	394	430
6	1785	1785	1842	2008
7	1439	1439	1500	1635
8	565	598	635	693
9	139	202	214	234
10	811	950	1139	1242
11	234	265	308	336
12	550	649	690	753
13	443	492	523	570
14	3336	3380	3444	3756
15	1008	1225	1361	1484
16	1363	1400	1476	1609
17	802	867	921	1004
18	448	497	528	576
19	148	148	148	159
20	987	990	1036	1130
21	562	590	616	672
22	987	1000	1036	1130
23	454	479	509	555
24	212	245	270	294
25	344	376	400	436
26	654	675	707	771
27	233	260	291	317
28	934	934	984	1074
29	93	150	214	234
30	753	775	806	879
31	229	242	257	281
32	22	22	21	23
33	819	925	1045	1139
34	679	693	736	803
35	7	7	7	8
36	1181	1320	1403	1530
37	869	890	924	1008
38	133	155	164	179
39	376	411	437	477
40	34	34	34	37
41	259	292	310	339
42	548	561	596	650
43	127	150	179	195
44	755	775	809	882
45	920	750	1469	1602
46	1057	1057	1107	1207
47	822	840	875	954
48	427	456	484	528
49	138	158	168	183

	HRM	Delphi-MRC Forecasts		
Centroid Number	2001 DU's	2016 DU's	2026 DU's	2036 DU's
50	212	350	529	577
51	1336	2400	3228	3520
52	2537	2600	2721	2968
53	1854	1854	1852	1999
54	4608	4608	4603	4967
55	173	173	173	187
56	1054	1054	1053	1136
57	4063	4063	4230	4613
58	2172	3200	4163	4540
59	417	417	417	450
60	1684	1684	1682	1815
61	1325	1325	1324	1428
62	2205	2325	2471	2695
63	527	527	526	568
64	737	960	1020	1112
65	2058	2188	2326	2536
66	116	116	116	125
67	0	0	0	0
68	1492	1500	3901	4253
69	240	2500	5079	5539
70	2122	2462	2617	2853
71	74	74	74	80
72	952	1152	1224	1335
73	515	515	514	555
74	54	54	274	298
75	807	1000	1081	1178
76	25	25	25	27
77	154	154	154	166
78	850	1007	1071	1167
79	0	0	0	0
81	167	1500	2173	2369
83	469	469	469	506
84	1666	1714	1822	1987
85	255	255	255	275
86	333	333	333	359
87	351	351	351	379
88	203	203	203	219
89	467	467	467	503
90	557	732	778	849
91	1514	1622	1724	1880
92	1927	1927	1925	2077
93	818	818	817	882
94	220	220	220	237
95	566	813	864	942
96	1265	1463	1555	1696
97	1437	2200	3022	3295
98	140	140	140	151
99	853	853	890	970
100	636	636	635	686

	HRM	Delphi-MRC Forecasts		
Centroid Number	2001 DU's	2016 DU's	2026 DU's	2036 DU's
101	1218	1480	1573	1715
102	1717	1765	1876	2046
103	718	836	889	969
104	773	887	943	1028
105	124	124	124	134
106	2971	3250	4040	4406
107	341	750	1440	1570
108	1493	1682	1788	1950
109	1614	1795	1908	2081
110	156	156	156	168
111	0	0	0	0
112	0	500	1176	1282
113	0	506	538	586
114	183	2000	4354	4747
115	6	500	994	1084
116	2263	2263	2261	2439
117	1062	1510	1521	1659
118	785	827	879	959
119	488	488	488	526
120	11	11	11	12
121	1309	1500	1663	1813
122	262	340	362	394
123	433	615	653	712
124	400	584	621	677
125	445	445	445	480
126	684	848	901	983
127	1227	1227	1226	1323
128	977	2000	3910	4263
129	304	1008	1072	1168
130	271	271	271	292
131	2821	2821	2818	3041
132	1442	2220	2360	2573
133	818	2458	2613	2849
134	952	952	951	1026
135	1032	1456	1547	1687
136	658	658	657	709
137	673	673	672	725
138	578	815	866	944
139	617	689	733	799
140	1370	1370	1369	1477
141	573	573	572	618
142	1058	1058	1057	1141
143	533	533	532	575
144	1150	1150	1149	1240
144A	360	360	360	388
145	981	981	980	1058
146	1071	1367	1453	1585
147	310	310	310	334
148	484	1461	1553	1694

	HRM	Delphi-MRC Forecasts		
Centroid Number	2001 DU's	2016 DU's	2026 DU's	2036 DU's
149	392	392	392	422
150	1129	1245	1323	1442
151	996	996	1038	1132
152	1530	1711	1819	1983
153	726	926	985	1074
154	544	580	617	672
155	757	757	756	816
156	1824	1824	1822	1966
157	872	872	871	940
158	814	814	813	877
159	485	485	485	523
160	1063	1063	1062	1146
161	375	591	628	684
164	718	718	747	815
165	877	877	876	945
166	432	432	432	466
167	1136	1784	1896	2067
168	219	219	219	236
169	552	552	551	595
170	423	423	423	456
171	805	1500	2933	3198
172	371	371	371	400
173	353	353	353	381
174	335	335	335	361
175	1051	1200	1729	1885
176	930	930	929	1002
177	536	660	701	764
178	669	669	668	721
179	878	878	908	990
180	1116	1500	2102	2292
181	549	565	600	654
182	361	390	414	452
183	703	708	752	820
184	336	336	339	370
185	277	277	277	299
186	1026	1026	1025	1106
187	93	93	93	100
188	456	456	456	491
189	195	195	195	210
190	866	1200	2248	2451
191	2021	2100	2540	2769
990	24	24	24	26
991	273	305	324	354
	147662	**173612**	**199634**	**217138**

	HRM		Delphi-MRC Forecasts					
	2001		2016		2026		2036	
Centroid Number	Retail Revised	Non-retail Revised	Retail Revised	Non-retail Revised	Retail Revised	Non-retail Revised	Retail Revised	Non-retail Revised
1	1889	3556	1889	3589	1874	3785	1921	3879
2	1361	8028	1361	8028	1353	8407	1387	8617
3	2442	4734	2442	4743	2419	5002	2479	5127
4	978	1740	978	1808	976	1906	1000	1954
5	0	3000	18	3105	19	3275	19	3357
6	246	724	248	875	261	922	268	945
7	332	668	328	820	346	865	354	886
8	133	157	142	318	150	336	154	344
9	333	852	329	1000	347	1055	355	1081
10	1131	1449	1134	2149	1196	2266	1226	2323
11	1195	980	1135	1126	1197	1187	1227	1217
12	157	1912	180	2190	190	2310	195	2367
13	63	332	78	510	83	538	85	551
14	659	966	649	1263	685	1332	702	1365
15	6537	1338	6537	2099	6534	2214	6697	2269
16	107	633	129	898	136	947	139	971
17	674	91	659	366	695	386	713	396
18	104	176	117	357	124	376	127	386
19	0	0	0	0	0	0	0	0
20	359	121	350	249	369	263	378	270
21	691	129	660	257	696	271	714	278
22	478	627	461	745	486	786	499	805
23	172	68	175	197	184	208	189	213
24	155	75	159	204	167	215	171	221
25	35	30	47	160	49	168	51	173
26	233	82	232	211	244	222	250	228
27	0	65	14	195	15	205	16	210
28	202	308	203	434	214	458	219	470
29	3084	181	3084	442	3070	466	3147	478
30	241	29	240	161	253	169	259	174
31	19	306	24	366	26	386	26	396
32	518	877	518	877	511	906	524	929
33	15	95	14	95	15	99	16	101
34	17	103	31	241	32	254	33	260
35	1	189	1	189	1	195	1	200
36	117	383	163	882	172	930	176	954
37	102	558	110	688	116	725	119	743
38	789	696	789	753	786	794	805	814
39	1095	760	1095	885	1095	933	1123	957
40	0	1300	0	1300	0	1344	0	1377
41	3	3397	15	3449	16	3637	17	3728
42	321	549	313	656	330	692	338	710
43	852	1481	852	1568	853	1653	874	1695
44	5	485	19	610	20	643	20	660
45	13	262	129	823	136	868	139	889
46	72	248	81	378	86	398	88	408
47	126	119	132	251	139	265	142	272
48	2	128	16	260	17	274	18	281
49	3100	887	3100	937	3065	988	3141	1013
50	37	23	145	521	153	550	157	564
51	356	204	511	216	539	228	552	234
52	930	345	888	515	937	543	960	556
53	111	419	111	419	109	433	112	444
54	1222	603	1222	603	1205	623	1235	639
55	2151	950	2151	950	2121	982	2174	1007

	HRM		Delphi-MRC Forecasts					
	2001		2016		2026		2036	
Centroid Number	Retail Revised	Non-retail Revised	Retail Revised	Non-retail Revised	Retail Revised	Non-retail Revised	Retail Revised	Non-retail Revised
56	731	2162	731	2162	721	2235	739	2291
57	398	294	391	465	412	490	423	502
58	1260	477	1284	1092	1354	1151	1388	1180
59	1	69	1	69	1	72	1	74
60	135	360	135	360	133	373	136	382
61	479	126	479	126	472	130	484	134
62	941	384	941	469	933	495	956	507
63	30	95	30	95	29	99	30	101
64	30	70	32	161	34	170	35	175
65	446	424	446	509	445	537	456	550
66	3054	500	3001	500	3164	517	3244	530
67	0	75	0	367	0	387	0	397
68	475	165	508	487	536	514	549	527
69	68	1487	197	1733	208	1828	213	1873
70	835	345	813	647	858	682	879	699
71	0	0	0	0	0	0	0	0
72	482	286	500	376	527	396	540	406
73	1686	516	1686	516	1663	534	1704	547
74	110	820	1138	820	1200	848	1230	869
75	139	191	179	282	189	298	194	305
76	0	0	0	0	0	0	0	0
77	0	159	0	159	0	164	0	168
78	22	68	21	68	22	71	22	72
79	0	0	0	0	0	0	0	0
81	0	0	0	25	0	27	0	28
83	15	180	14	180	15	186	16	191
84	0	495	84	495	88	522	91	535
85	0	0	0	0	0	0	0	0
86	20	20	19	20	20	21	20	21
87	11	69	11	69	10	72	11	74
88	515	0	515	0	508	0	521	0
89	294	16	294	16	290	17	297	17
90	111	19	202	210	213	221	218	227
91	1480	430	1482	613	1563	646	1602	663
92	3	242	3	242	3	250	3	256
93	327	773	327	773	322	799	330	819
94	0	0	0	0	0	0	0	0
95	118	197	159	288	168	304	172	311
96	958	372	945	460	997	485	1021	497
97	146	249	183	440	193	464	198	476
98	1	84	1	84	1	87	1	89
99	69	56	74	65	78	69	80	70
100	16	99	15	99	16	103	17	105
101	47	43	83	82	87	87	90	89
102	242	498	231	582	243	614	249	629
103	393	147	393	237	392	250	402	256
104	46	34	48	127	50	133	52	137
105	47	23	47	23	47	24	48	25
106	1327	418	1327	419	1323	442	1356	453
107	10	1090	23	1177	25	1241	25	1272
108	364	971	392	1167	413	1231	424	1262
109	119	1181	163	1373	172	1448	176	1484
110	1438	3293	1438	3293	1418	3404	1454	3489
111	807	2747	807	2747	796	2840	816	2911
112	2309	5256	2365	9251	2494	9756	2556	10000

	HRM		Delphi-MRC Forecasts					
	2001		2016		2026		2036	
Centroid Number	Retail Revised	Non-retail Revised	Retail Revised	Non-retail Revised	Retail Revised	Non-retail Revised	Retail Revised	Non-retail Revised
113	1458	2955	1457	3288	1536	3468	1575	3555
114	206	654	238	1525	251	1609	257	1649
115	0	0	3793	726	4000	766	4100	785
116	164	331	164	331	162	343	166	351
117	176	34	188	137	199	143	204	147
118	146	184	140	243	147	256	151	262
119	9	181	8	181	9	187	9	192
120	1719	516	1719	751	1695	792	1737	812
121	351	89	349	127	368	134	377	138
122	5	210	7	268	8	283	8	290
123	98	27	98	26	97	28	99	29
124	688	22	688	266	678	281	695	288
125	40	45	38	44	40	47	41	48
126	60	115	60	115	59	119	60	121
127	97	193	97	193	96	199	98	204
128	1021	49	1020	225	1075	237	1102	243
129	127	73	154	573	162	605	167	620
130	15	385	14	475	15	501	16	514
131	406	634	406	634	400	655	410	672
132	131	24	178	141	188	148	193	152
133	1461	39	1547	2032	1631	2143	1672	2197
134	43	127	41	127	43	131	44	135
135	219	161	250	560	264	591	271	605
136	1047	163	1047	405	1033	427	1058	438
137	39	216	39	216	38	223	39	229
138	409	506	450	1130	474	1192	486	1222
139	0	0	28	264	29	279	30	286
140	239	661	223	661	236	683	241	700
141	1894	2223	1771	2686	1868	2833	1914	2903
142	309	176	309	176	305	182	313	187
143	231	364	231	364	228	376	234	386
144	173	527	173	527	171	545	175	558
144A	323	633	323	633	318	654	326	671
145	433	187	433	187	427	193	437	198
146	201	134	278	982	294	1036	301	1062
147	667	473	667	473	657	489	674	501
148	842	1828	1033	4108	1090	4333	1117	4441
149	50	0	50	0	49	0	51	0
150	35	50	58	52	61	55	62	56
151	192	153	188	153	199	159	204	163
152	72	118	76	117	80	124	82	127
153	748	242	724	242	764	253	783	259
154	50	0	51	5	54	5	56	5
155	59	96	59	96	58	100	59	102
156	55	175	55	175	54	181	56	186
157	135	0	135	0	133	0	136	0
158	25	120	23	120	25	125	25	128
159	169	201	169	201	166	208	170	213
160	0	290	0	290	0	300	0	307
161	0	5695	94	6563	99	6921	101	7094
164	28	387	28	397	29	418	30	429
165	330	0	330	0	326	0	334	0
166	20	0	19	0	20	0	20	0
167	72	78	100	140	105	147	108	151
168	0	0	0	269	0	284	0	291

	HRM		Delphi-MRC Forecasts					
	2001		2016		2026		2036	
Centroid Number	Retail Revised	Non-retail Revised	Retail Revised	Non-retail Revised	Retail Revised	Non-retail Revised	Retail Revised	Non-retail Revised
169	30	45	30	44	29	47	30	48
170	0	0	0	0	0	0	0	0
171	40	65	103	191	108	201	111	206
172	0	0	0	0	0	0	0	0
173	0	0	0	0	0	0	0	0
174	0	210	0	210	0	217	0	223
175	293	317	461	507	486	535	499	548
176	112	376	112	376	110	388	113	398
177	110	12	196	110	207	116	212	118
178	0	130	187	130	198	0	203	0
179	0	0	28	29	29	31	30	32
180	750	750	795	1029	838	1086	859	1113
181	0	700	14	701	15	739	16	758
182	0	385	4	413	4	435	4	446
183	0	810	38	833	40	878	41	900
184	0	385	8	385	9	399	9	409
185	151	114	151	114	149	118	153	120
186	0	45	0	44	0	47	0	48
187	0	0	0	0	0	0	0	0
188	64	91	64	91	63	94	64	96
189	0	0	0	0	0	0	0	0
190	43	807	133	1130	141	1191	144	1221
191	26	399	67	399	70	417	72	428
990	0	1500	0	1500	0	1551	0	1590
991	62	323	70	435	74	459	76	471
	77688	**106701**	**84845**	**136242**	**86739**	**142960**	**88910**	**146536**

APPENDIX D

Freeway Mid-Block Volume Forecast

Freeway Mid-block Volume Forecasts - AM Peak Hour (peak direction only)

	Scenario A			Scenario B			Scenario C		
Mid-Block Section	**2016**	**2026**	**2036**	**2016**	**2026**	**2036**	**2016**	**2026**	**2036**
Windsor - Connaught	1600	1900	2200	1400	1800	2000	1400	1800	2000
Connaught - Joe Howe	3000	3600	4000	2700	3300	3600	2700	3300	3600
Jow Howe - NW Arm Dr.	3800	4300	4700	3300	4000	4200	3400	4000	4300
NW Arm Dr - Hwy 103	3700	4200	4500	3200	3900	4100	3300	3900	4100
Hwy 103 - Lacewood	2200	2500	2700	2000	2400	2500	2000	2300	2500
Lacewood - Kearney Lake	2600	3100	3300	2400	2900	3100	2400	2900	3100
Kearney Lake - Larry Uteck	2700	3300	3500	2400	3000	3300	2400	3000	3300
Larry Uteck - Hwy 113	1900	2200	2400	2000	2400	2600	2000	2400	2500
Hwy 113 - Hammonds Pl.	1900	2200	2400	2200	2600	2800	2100	2600	2700
Hammonds Pl. - Hwy 101	2000	2100	2200	2000	2100	2200	1800	1900	2000
Hwy 101 - Duke/Glendale	1100	1100	1200	1800	1900	2200	1300	1400	1600
Duke/Hwy 107 - Tk 2	900	1000	1100	900	1000	1200	900	1000	1200

Freeway Mid-block Volume Forecasts - PM Peak Hour (peak direction only)

	Scenario A			Scenario B			Scenario C		
Mid-Block Section	**2016**	**2026**	**2036**	**2016**	**2026**	**2036**	**2016**	**2026**	**2036**
Windsor - Connaught	1200	1300	1400	1100	1200	1200	1100	1200	1300
Connaught - Joe Howe	2800	3300	3600	2500	2900	3200	2600	3000	3400
Jow Howe - NW Arm Dr.	3000	3600	3900	2500	3100	3400	2700	3200	3600
NW Arm Dr - Hwy 103	3400	4000	4300	3000	3600	3800	3100	3700	4000
Hwy 103 - Lacewood	2200	2600	2800	2000	2400	2500	2100	2500	2600
Lacewood - Kearney Lake	2500	3000	3200	2200	2700	2800	2300	2800	3000
Kearney Lake - Larry Uteck	2700	3400	3500	2400	3100	3300	2400	3100	3400
Larry Uteck - Hwy 113	2200	2600	2800	2300	2800	3000	2300	2800	3000
Hwy 113 - Hammonds Pl.	2200	2600	2800	2700	3200	3400	2700	3200	3300
Hammonds Pl. - Hwy 101	2500	2800	2900	2400	2900	3100	2540	2900	3000
Hwy 101 - Duke/Glendale	1200	1500	1500	2200	2600	2700	1100	1400	1500
Duke/Hwy 107 - Tk 2	900	1000	1100	1100	1100	1100	900	900	900