Atlantic Road & Traffic Management

Traffic Engineering Specialists

Yarmouth Area Transportation Study

Prepared for

Nova Scotia Department of
Transportation and Infrastructure Renewal
and
Town of Yarmouth
and
Municipality of the District of Yarmouth

April 2008

This Report was prepared by

Atlantic Road & Traffic Management

in conjunction with:

GAALCO Traffic Engineering
Terrain Group Inc.

April 2008

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Executive Summary

Study Background - Yarmouth is the Western Gateway to Nova Scotia

The Town of Yarmouth and the Municipality of the District of Yarmouth serve as the commercial and service area for the western end of Nova Scotia. The area also includes a western Gateway to the Province with the Port of Yarmouth and the Bay Ferry services to Maine.

The area is served by Highway 101 and Highway 103, which are both part of the National Highway System. Since the two highways are not connected by a 100-series road, traffic between the Port and the National Highway System uses town streets.

The Department of Transportation and Infrastructure Renewal (NSTIR), Town of Yarmouth, and Municipality of the District of Yarmouth commissioned the *Yarmouth Area Transportation Study* to identify the 100 series highway connections, interchanges, and improvements to the primary street network needed to serve the area for the next 20 years.

Key Issues

The following key issues have been addressed in the Yarmouth Area Transportation Study:

- Need to define lands required through a functional design for the connection of Highways 101 and 103.
- Need for a defined National Highway System connection to the Port of Yarmouth.
- Municipal and public concerns for traffic congestion and safety.
- Need for improved and direct connections between the 100 series highways and the Port, Airport, Hospital, and Industrial Parks.
- Need for additional street capacity to serve traffic in the Starrs Road corridor.
- Need for a planned street network with connections to the 100 series highways to serve future development of Town and District lands between Starrs Road, Brooklyn Street and Hardscratch Road.

Objectives

The primary objectives of the Yarmouth Area Transportation Study are:

- Prepare a functional design for the connection of Highways 101 and 103 complete with appropriate connections to the Yarmouth Area.
- Identify the primary road network improvements that will provide connections of the Port, Airport, Hospital, and Industrial Parks to the 100 series highways.
- Identify additional secondary road improvements required to support the development of lands between Starrs Road, Brooklyn Road and Hardscratch Road.
- Develop an access management strategy for existing Study Area principal streets and roads, as well as access management principles and guidelines for future road networks.
- Prepare short and long term (20 years) road improvement strategies, complete with capital cost estimates.

Summary of Stakeholder Concerns and Recommendations

The general consensus of stakeholder concerns can be summarized by the following statements:

- Yarmouth Area is not served by any rail.
- Yarmouth Area is not served by any airlines.
- Yarmouth Area has daily bus service to Halifax by the South Shore route, however, there is no bus service from the Yarmouth area to the Annapolis Valley area.
- Roads provide the only transportation for businesses and residents.
- When road priority decisions are based on population and volume trends, lower population areas such as the Yarmouth Area often do not receive the funding needed.
- While Highway 101 and 103 are constructed to 100-series National Highway Standards in the Yarmouth Area, a considerable part of Highway 103 and about 25 km of Highway 101 are not controlled.
- Land sales have been lost in Hebron Industrial Park due to the lack of direct access to Highway 101. The park has the ability to develop additional land and attract new businesses, however, direct access to Highway 101 at the Greenville Road is needed before considering its development.
- The connection of Highway 101 to Highway 103 is required to serve industrial development which involves travel throughout the Yarmouth Area.
- Access to the Hospital could be achieved through existing streets which have been extended to intersect with the Highway 101 / 103 connector.
- While the Brooklyn Street and Herbert Street improvements will provide a means for some traffic from the north end of Yarmouth and beyond to avoid Starrs Road, improvements are also needed to serve traffic from the east.
- Once Highways 101 and 103 are connected at a Hardscratch Road interchange, Haley Road and Argyle Street should become the option for highway connection to the waterfront.
- Trunk 3 between the Hardscratch Road / Haley Road intersection and Chebogue Road is very busy during morning and afternoon peak periods. The existing 80 km/h speed limit should be reduced. Pavement should be widened to provide turning lanes and paved shoulders.

Review of Past Population Growth Trends

Census data were reviewed to gain insight into overall trends in population growth at the Provincial, County and Municipal levels. While the provincial population has increased from 899,942 to 913,462 (approximately +1.5%) between 1991 and 2006, Town, District, and County populations have all declined. Population declines in municipal populations between the 1991 and 2006 Census Periods include:

- Town (7,781 to 7,162) - 8.0%
- District (10,827 to 10,304) - 4.8%
- County (27,891 to 26,277) - 5.8%.

Declines in population from 1991 onward can be attributed to economic conditions such as the decline in the fishery and the closure of key local industries such as the Dominion Textile plant and the Rio Algom tin mine, which have resulted in out-migration.

Population Trends						
Area	1981	1986	1991	1996	2001	2006
Town of Yarmouth	7,475	7,617	7,781	7,568	7,561	7,162
District of Yarmouth	9,842	10,380	10,827	10,722	10,446	10,304
Yarmouth County	26,290	27,073	27,891	27,310	26,843	26,277
Source: Statistics Canada						

Traffic Volume Growth Trends

NSTIR generally has historic traffic volume data from the previous 20 to 30 years available in both published and unpublished formats. Linear regression has been completed for six locations where sufficient historical count data were available. Existing and projected traffic count information for these locations are included below.

Traffic Volume Growth Trends				
Location	Projected 2006 AADT [1]	Annual AADT Growth [2]	Annual Percent Growth	Projected 2026 AADT
Trunk 1 at Yarmouth Limit	6,800	60	0.9	8,000
Starrs Road - west of Hardscratch Rd.	13,800	250	1.8	18,800
Trunk 3 - east of Hardscratch Rd.	7,700	110	1.4	9,900
Highway 101 - east of Route 340	3,240	75	2.3	4,740
Highway 101 - Route 340 to Starrs Rd.	3,500	55	1.6	4,600
Highway 103 - east of Hardscratch Rd.	6,100	125	2.0	8,600
NOTES: 1. AADT (Annual Average Daily Traffic) volumes projected from the regression analyses of historical volumes 2. Annual AADT volume increase as 'vehicles per day per year' established from regression analyses				

Intersection Performance Review

Operational performance of five signalized intersections on Starrs Road have been reviewed using Synchro 6.0, an intersection evaluation compute model. The performance reviews indicate the following:

Starrs Road at Hardscratch Road / Haley Road currently operates well in both the AM and PM peak periods. With addition of exclusive left turn lanes on Hardscratch Road and Haley Road approaches, the intersection will continue to operate well with the projected 2026 traffic volumes.

Starrs Road at Highway 101 operates very good with very low user delay in both the AM and PM peak periods, and will continue to provide good levels of performance during 2026. While there is some queueing for through movements on Starrs Road, this could be addressed by adding through lanes on Starrs Road in the future.

Starrs Road at Pleasant Street operates with good levels of performance during the AM peak period, however, during the PM peak period some movements experience unsatisfactory levels of delay. Intersection performance can be improved by construction of a westbound right turn lane on Starrs Road and replacing the existing fixed time traffic signals with fully actuated signals.

Starrs Road at Brunswick Street and ***Starrs Road at Main Street*** intersections both operate with good levels of performance during both the AM and PM peak periods. The existing signal times work well in the peak periods, however, the amber and all red clearance intervals should be reviewed to ensure they are appropriate. Upgrading the signals to traffic actuated control should be considered and is expected to reduce delays at off-peak times when full phase lengths are not required because of lower traffic volumes.

Estimation of Volumes for the Highway 101 to Highway 103 Connector

A license plate match study of vehicles traveling directly from Highway 103 to Highway 101 indicated that for current traffic patterns the estimated traffic volume on a direct connection from Highway 101 to Highway 103 would be equal to about 2% of the two-way volume on Highway 103. It is estimated that the direct connection would have AADT volumes of about 250 vpd during 2006, increasing to about 350 vpd by 2026. It should be noted that these estimated volumes are based on current volumes and past volume growth trends, and do not include increases that could occur from changes in residential and industrial growth patterns, or from higher numbers of drivers currently making trips on local roads.

Areas Where Road Improvements are Needed

Several areas that require street, intersection or traffic control improvements were suggested by stakeholders and project steering committee members, or were observed during site visits.

- ***Trunk 3 - East of Hardscratch Road*** - The section of Trunk 3 for the first kilometer east of Hardscratch Road has almost continuous commercial development along the north side of the road. This section of road should be widened to provide an eastbound left turn lane. Also, a speed zone study should be completed with the intention of reducing the speed limit to 60 km/h.
- ***Trunk 3 / Chebogue Road Intersection*** - The Trunk 3 / Chebogue Road intersection is in a 50 km/h speed zone, with a sharp curve on Trunk 3 which is posted with a 30 km/h advisory speed tab. Within the next five years, the intersection should be reconstructed to increase the radius of the curve and to flatten the Chebogue Road intersection approach grade.
- ***Hardscratch Road / Greenville Road Intersection*** - Hardscratch Road intersects with Greenville Road about three kilometers north of Highway 103. There have been several collisions at the intersection which involved Hardscratch Road vehicles that failed to stop at the STOP sign. While the intersection appears to be

adequately signed with appropriate STOP signs, flashing lights, and advance warning signs, and has good visibility to the STOP signs, the following improvements are recommended:

- Bushes should be removed from the southeast quadrant to improve the sight triangle to Greenville Road east of the intersection.
- The Hardscratch Road southbound egress from the intersection has a broken, or skip, centerline. It is recommended that a solid yellow centerline be painted on Hardscratch Road south of Greenville Road to just south of the driveway for Old Mill Seafood.

- ***Trunk 1 / Greenville Road Intersection*** - Greenville Road intersects with Trunk 1 at a STOP sign controlled intersection. The intersection approach is downgrade with a very large radius turn from Greenville Road to Trunk 1. Further study is required to determine if the intersection can be reconstructed to include right turn channels. Also, as the Hebron Industrial Park develops further in the future, increased traffic at this intersection may also warrant construction of a left turn lane on Trunk 1.
- ***Chestnut Street / Main Street Intersection*** - Some members of the public have questioned the suitability of Chestnut Street as part of the North Yarmouth Collector street to connect the 100 series Highways to the Hospital. One concern mentioned has involved the Chestnut Street approach to the Main Street signalized intersection. A site visit indicates that the far-right or primary head display is missing for that approach. A mast arm with primary head display should be installed to face the Chestnut Street approach.

Current Improvements

Areas where the Town has made traffic improvements include:

- A network of ***Truck Routes*** was recently designated. The network includes a route from the intersection of Starrs Road and Hardscratch Road to Water Street at the Port utilizing Haley Road, Argyle Street and Hueston Street.
- ***Brooklyn Street*** has been constructed north from Starrs Road to connect with the Yarmouth Mall, Superstore - Wal-MART site, a reconstructed Herbert Street, as well as Oak Street and Elm Street. These new street connections should result in a considerable reduction in Starrs Road peak hour traffic volumes west of Brooklyn Street, as well as on Pleasant Street north of the Starrs Road intersection.
- The first 120 meters (400 feet) of ***Brooklyn Street Extension*** south of Starrs Road have been constructed and the Starrs Road / Brooklyn Street traffic signals have been installed. The future completion of the extension from Starrs Road to Clements Avenue will provide connections to both Parade Street and Forest Street.

Additional Town Street Connections to be Considered

Additional Town street connections that should be considered include:

- A ***North Yarmouth Collector*** road is needed to connect the north part of Town to the existing Highway 101 and Hardscratch Road near Highway 103. This road will provide the needed direct route from the 100-series highways to the Hospital, and with connections to Brooklyn Street, it will provide another access to the major retail area near the Starrs Road / Brooklyn Street intersection. The suggested route involves construction of about 1.5 kilometers of new street and five intersections from Hardscratch Road to meet Pleasant Street opposite the Chestnut Street intersection. Chestnut Street between Pleasant Street and Main Street will be upgraded to complete the collector road connection to the Main Street intersection.
- As development occurs in the north part of Town in future years, ***Brooklyn Street North*** should be considered to connect with Brooklyn Road near the Prospect Road intersection.
- A corridor should be reserved for future construction of ***Clements Avenue South*** from Forest Street to Argyle Street.

National Highway Connection to the Port of Yarmouth

The truck route to the Port of Yarmouth from the intersection of Starrs Road and Hardscratch Road to Water Street at the Port of Yarmouth utilizing Haley Road, Argyle Street and Hueston Street, should be designated as the National Highway Connector. Other street sections that also must be included in the National Highway designation are the section of Forest Street from Haley Road to the Yarmouth Airport, and a section of Water Street from Hueston Street to a point north of the Ferry Terminal sufficient to include traffic queuing for the Maine Ferry.

The street sections needed for the National Highway Connection should be upgraded to provide widened pavement of suitable strength for truck loadings allowed on the National Highway System.

Highway 101 to Highway 103 Connection Will be Needed

While traffic volume projections are low for trips directly between Highways 101 and 103, there are probably many other trips being made by alternate routes, such as, Hardscratch Road and Greenville Road. As industrial and commercial development continues at the Hebron Industrial Park and when an interchange is constructed at the Greenville Road, there will be an increased demand for a direct connection of the two highways. However, it should be noted that the Highway 101 to Highway 103 connector is a very long range plan which has been prepared so that right-of-way can be preserved.

The connection from Highway 101 to Highway 103 should provide free flow for travel between the two 100-series highways, and interchange connections should provide full access to Hardscratch Road from both highways so that trucks and other vehicles can readily have access to the Truck Route and the National Highway Connection to the Port.

Greenville Road Interchange Ramps on Highway 101

Hebron Industrial Park officials have advised that land sales have been lost due to the lack of direct access to Highway 101. While this area is well suited to industrial activity, and land is available for future development, without direct access to all weather highways, activity will be limited to seasonal operators.

Interchange plans should be prepared and land acquired within the next 12 months for construction of diamond interchange ramps within the next three to five years.

Definition of Access Management

Access management is the process of balancing the competing needs of traffic movement on a public road and land access to adjacent properties. The objective of access management is to provide safe and efficient access that meets accessibility needs of adjacent land and is consistent with the functional and operational requirements of the roadway.

Access management programs seek to limit and consolidate accesses along major roadways, while promoting supporting streets and on-site circulation systems developments. The basic principles of access management can be achieved by:

- Limiting the number of conflict points;
- Separating conflict areas;
- Reducing interference with through traffic;
- Providing adequate on-site traffic circulation and storage

Access Management Recommendations

The Report includes many suggestions and recommendations for access management improvements on existing developed sections of Starrs Road, Hardscratch Road, and Haley Road. The following are examples of access management techniques that have been suggested:

- Reduction in number of driveways for specific sites;
- Construction of cross-connections between adjacent sites;
- Construction of shared driveways for adjacent sites;
- Replacing a full-movement driveway with a right-in / right-out driveway;
- Curbing long lot frontages to control driveway location.

Recommended Guidelines for Intersection and Driveway Spacing for Existing Roads

While engineering judgement will be required in determining appropriate intersection and driveway spacings, the following spacings are recommended for future development on existing streets and roads:

- Major intersections requiring future traffic signals - 400 m
- Minor street or road intersections - 200 m
- Driveway spacing from an interchange ramp - 100 m
- High volume driveways (>200 vph PM peak) - 150 m
- Medium volume driveways (50 vph to 200 vph PM peak) - 125 m
- Low volume driveways (10 vph to 50 vph PM peak) - 75 m
- Minimum volume driveway (<10 vph PM peak) - 50 m.

Recommended Access Management for North Yarmouth Collector

The following access management is recommended for the North Yarmouth Collector between Hardscratch Road and Pleasant Street:

1. Do not permit any direct land access from the Collector other than one full movement intersection at the approximate mid-point of the 570 meter long section between Hardscratch Road and Highway 101, planned for traffic signal control.
2. Permit two full movement intersections on the approximately 900 meter long section between Highway 101 and Pleasant Street.
3. Provide left turn lanes on the Collector at all intersections between Hardscratch Road and Pleasant Street.

Recommended Changes to the Land Use By-law of the Town of Yarmouth

As a result access management suggestions and recommendations included in the Report, the following sections of the Land Use By-law of the Town of Yarmouth should be reviewed and revised as required:

- **5.16(A) 1) - Number of Accesses** - Developments on arterial and major collector streets should generally have only one driveway. Additional driveways may be permitted if the need is determined by a traffic engineering study. Development on a corner lot should access the minor street.
- ***5.16(A) 3) - Separation Distance between Accesses*** - Access spacing requirements should be based on the street classification and the projected traffic volume for the site access. Also, the minimum access spacing should not preclude the use of shared driveways by adjacent sites.
- ***5.16(A) 4) - Driveway Separation from an Intersection*** - Driveway separation has to be determined by intersection design so that traffic entering and exiting a driveway does not cross a turning lane or obstruct vehicles queuing in a turning lane.
- ***5.16(C) - Accesses for Commercial and Industrial Development*** - Adjacent commercial sites should be encouraged or required to share a common driveway provided that appropriate access easements are granted between or among property owners. The access separation and driveway design requirements in this by-law should be replaced by a by-law that encourages adjacent users to share a common driveway.
- ***5.27 - Drive-Thru Standards*** - While queuing space for six vehicles may be adequate for drive through lanes at some commercial sites, it is usually not adequate for popular coffee shops where queues often exceed 15 or 20 vehicles. Wording should be added to the by-law section to indicate that notwithstanding the six vehicle requirement, the development officer may require that the required queue length be determined by a traffic engineering study.
- ***Minimum Lot Frontages - Parts 8 to 22*** prescribe minimum lot frontages of from 40 feet (12.2 m) to 400 feet (121.9 m) based on a variety of land use zones. While the minimum lot frontages included in the Land Use By-law appear to be reasonable for existing conditions, they may not be suitable for new high volume

and higher speed collector and arterial roads that will be developed. It will be necessary to establish minimum lot frontages for commercial land uses based on road classification or for specific street sections. Engineering judgement and good land use planning principles will be required in determining appropriate minimum lot frontages.

Public Meeting - May 15, 2007

A Public Meeting was held in Yarmouth at the Grand Hotel on May 15, 2007. The meeting was held in a ballroom with theater type seating at the front of the room and tables for plan display at the entrance. Visitors were provided with a questionnaire to solicit comments, and fact sheet that summarized key issues that prompted the Study and preliminary recommendations for street and road improvements. After a PowerPoint presentation that included a NSTIR session describing benefits of roundabout intersections, there was a question period followed by 'one-on-one' discussions between the members of the public, and NSTIR officials and Consultant Team members.

About 85 to 100 people attended the Meeting, with 74 signing the guest book. Twenty seven completed questionnaires were returned immediately after the meeting, or by Fax. Primary concerns expressed in questionnaire responses included:

- Need to connect Highway 101 and 103
- Starrs Road congestion
- Safety of various roads and intersections
- Truck access to the Port of Yarmouth
- Loss of property and timing of property acquisition
- Schedule for construction

Summary - Immediate and Short Term Recommendations (2008 to 2010)

Planning and Design

1. Complete detailed design and acquire right of way for the construction of the Greenville Road interchange on Highway 101. **COST: $250,000, not including property**
2. Complete detailed design and acquire right of way for the North Yarmouth Collector from Hardscratch Road to Main Street, including a controlled access section from Hardscratch Road to Pleasant Street, extension of Brooklyn Street North, upgrading Chestnut Street, and five intersections. **COST: $400,000, not including property**
3. Prepare preliminary design and acquire right of way for the Highway 101 to Highway 103 direct connection. **COST: $500,000, not including property**
4. Complete design and acquire right of way for completion of Brooklyn Street South connection to Clements Avenue. **COST: $50,000, not including property**

5. Prepare design for widening the first kilometer of Trunk 3 east of Hardscratch Road, including preparation of access management plans for existing driveways.
   COST: $70,000, not including property
6. Prepare design drawings for intersection improvements:
   - Trunk 1 and Greenville Road
   - Trunk 3 and Chebogue Road
   - Starrs Road / Hardscratch Road / Haley Road (Add left turn lanes to both Hardscratch and Haley approaches; and a right turn lane to Starrs Road westbound approach).

   COST: $100,000, not including property (three intersections)

Intersection and Street Improvements

1. Design and reconstruct Haley Road, the east end of Forest Street, Argyle Street, Hueston Street and the south end of Water Street to about 250 m north of Forest Street, including pavement widening and strengthening, and access management of business entrances, to provide the National Highway Connection from the 100 series highways to the Airport and the Port (approximately 4.8 km).
   COST $1.5 million
2. Add a truss arm with a primary head display to the Chestnut Street approach to the Main Street signalized intersection.
   COST $10,000
3. Remove bushes from the southeast quadrant of the Hardscratch Road / Greenville Road intersection. Paint a solid yellow center line for both directions of travel on the Hardscratch Road northbound approach to the intersection.
   COST NIL (normal maintenance)
4. Obtain new traffic counts (May 2008) at the Starrs Road / Pleasant Street intersection; construct a westbound right turn lane on Starrs Road; replace the existing fixed time traffic signals with fully actuated signals.
   COST $250,000
5. Obtain new traffic counts (May 2008) and revise the timing of the existing fixed time controllers at the Starrs Road / Brunswick Street and Starrs Road / Main Street intersections. Update clearance intervals as required.
   COST $2000
6. NSTIR should complete a speed zone study for the section of Trunk 3 east of Hardscratch Road with the objective of reducing the speed limit to 60 km/h.
   COST NIL (normal review process)
7. The Town of Yarmouth should work with existing businesses on Starrs Road to prepare designs and implement access management improvements on Starrs Road.
   COST $100,000

Policy and Administration

1. NSTIR and the Town of Yarmouth should work together to establish access management guidelines for existing and future roads within the Town of Yarmouth that form parts of the regional primary road network and the National Highway Connection to the Port.
   COST NIL
2. NSTIR and the Municipality of the District of Yarmouth should work together to establish access management guidelines for existing and future roads in the Study Area that form parts of the regional primary road network.
   COST NIL
3. The Town of Yarmouth should make needed changes to the Land Use By-Law with regards to site accesses.
   COST NIL

Immediate and Short Term - 2008 to 2010
TOTAL ESTIMATED COST - $3.232 MILLION

Summary - Intermediate Term Recommendations (2011 to 2017)

Planning and Design

1. Complete detailed design and reserve right of way for Clements Avenue from Forest Street to Argyle Street (700 m).
   COST: $50,000, not including property
2. Complete detailed design and reserve right of way for Brooklyn Street North from the North Yarmouth Collector to meet Brooklyn Road near the Prospect Street intersection (approximately 1.0 km).
   COST: $75,000, not including property

Intersection and Street Improvements

1. Construct the Greenville Road interchange ramps on Highway 101.
   COST $2.5 million, not including property
2. Construct the North Yarmouth Collector from Hardscratch Road to Pleasant Street (1.5 km); upgrade Chestnut Street (800 m); construct Brooklyn Street North from Elm Street to the North Yarmouth Collector (250 m); construct five intersections, including four at intersecting roads and one west of Hardscratch Road.
   COST $3.8 million, not including property
3. Design and reconstruct Hardscratch Road from the North Yarmouth Collector / Highway 103 intersection to Starrs Road, including access management of wide paved entrances (750 m).
   COST $200,000
4. Reconstruct Trunk 3 east of Hardscratch Road to include an eastbound left turn lane and driveway access management.
   COST $700,000, not including property

5. Complete construction of the Brooklyn Street South connection to Clements Avenue (approximately 500 m).
   COST $500,000, not including property
6. Construct intersection improvements at the following intersections:
   - Trunk 1 and Greenville Road (Intersection channelization and a left turn lane on Trunk 1)
   - Trunk 3 and Chebogue Road (Improve horizontal and vertical alignment)
   - Starrs Road / Hardscratch Road / Haley Road (Add left turn lanes to NB and SB approaches; add a right turn lane to the WB approach; upgrade traffic signals as required).
     COST $1.0 million, not including property (three intersections)

Intermediate Term - 2011 to 2017
TOTAL ESTIMATED COST - $8.825 MILLION

Summary - Long Term Recommendations (2018 to 2027)

1. Construct the Highway 101 to Highway 103 direct connection.
   COST $10.0 million, not including property
2. Construct Clements Avenue from Forest Street to Argyle Street (approximately 700 m).
   COST $700,000, not including property
3. Construct Brooklyn Street North from the North Yarmouth Collector to meet Brooklyn Road near the Prospect Street intersection (approximately 1.0 km).
   COST $1.0 million, not including property

Long Term - 2018 to 2027
TOTAL ESTIMATED COST - $11.7 MILLION

Total Cost Estimates 2008 to 2027

Implementation of the 20-year road improvement plan for the Yarmouth area is estimated to cost $23,757,000, not including property acquisition costs.

Improvements have been recommended over the following three terms:

• Immediate and Short Term - 2008 to 2010	$3.232 Million
• Intermediate Term - 2011 to 2017	8.825 Million
• Long Term - 2018 to 2027	11.700 Million
TOTAL - 2008 to 2027	**$23.757 Million**

1.0 Introduction

1.1 Background

Yarmouth is the Western Gateway to Nova Scotia

The Town of Yarmouth and the Municipality of the District of Yarmouth serve as the commercial and service area for the western end of Nova Scotia. The area also includes a western Gateway to the Province with the Port of Yarmouth and the Bay Ferry services to Maine.

The area is served by Highway 101 and Highway 103, which are both part of the National Highway System. While the ends of the highways are only separated by approximately 0.7 km, they are not connected. Also, traffic between the Port and the National Highway System uses town streets and there is a need to define an appropriate National Highway System connection.

While the connection between Highway 101 and Highway 103 will probably not be constructed for several years, a functional plan for the highway, interchanges and connecting roadways is required now so the Town can plan for development and street network changes adjacent to the highways.

Starrs Road, a principal arterial street for the Town and the western terminus of Trunk 3, is heavily traveled and will soon reach a point where improvements will be required to increase capacity. An additional collector street in this area would relieve existing congestion and provide reserve capacity for future growth. Due to traffic congestion and limited areas for further development on Starrs Road between Hardscratch Road and Main Street, highway commercial development is spreading to Hardscratch Road and areas on Trunk 3 east of Hardscratch Road. Access management of those areas is required to ensure the capacities of those roads are not compromised by a proliferation of driveways.

Since there are no accesses to Highway 101 in the seven kilometer section between the Route 340 interchange and Starrs Road, traffic must use a series of local roads on either side of the highway to reach access points. The lack of interchange access in the Greenville Road area is considered an impediment to development in the Hebron Industrial Park on Greenville Road just west of the Highway 101 underpass.

The Department of Transportation and Infrastructure Renewal (NSTIR), Town of Yarmouth, and Municipality of the District of Yarmouth, commissioned the *Yarmouth Area Transportation Study* to identify the 100 series highway connections, interchanges, and improvements to the primary street network needed to serve the area for the next 20 years.

1.2 Definition of Study Area

The Study Area

The Study Area (Figure 1.1) includes the area from the Port approach streets in the southern part of the Town of Yarmouth northerly to the Highway 101 / Route 340 interchange, and from Main Street and Trunk 1 easterly to the intersection of Trunk 3 and Chebogue Road.

The Study Area includes the western termini of Highways 101 and 103, accesses to the Port of Yarmouth, and Yarmouth Airport. The Study Area also includes the majority of commercial and retail businesses serving the greater Yarmouth area.

1.3 Key Issues and Study Objectives

Key Issues

1. Need to define lands required through a functional design for the connection of Highways 101 and 103.
2. Need for a defined National Highway System connection to the Port of Yarmouth.
3. Municipal and public concerns for traffic congestion and safety.
4. Need for improved and direct connections between the 100 series highways and the Port, Airport, Hospital, and Industrial Parks.
5. Need for additional street capacity to serve traffic in the Starrs Road corridor.
6. Need for a planned street network with connections to the 100 series highways to serve future development of Town and District lands between Starrs Road, Brooklyn Street and Hardscratch Road.

Objectives

The primary objectives of the Yarmouth Area Transportation Study are:

1. Prepare a functional design for the connection of Highways 101 and 103 complete with appropriate connections to the Yarmouth Area.
2. Identify the primary road network improvements that will provide connections of the Port, Airport, Hospital, and Industrial Parks to the 100 series highways.
3. Identify additional secondary road improvements required to support the development of lands between Starrs Road, Brooklyn Road and Hardscratch Road.
4. Develop an access management strategy for existing Study Area principal streets and roads, as well as access management principles and guidelines for future road networks.
5. Prepare short and long term (20 years) road improvement strategies, complete with capital cost estimates.

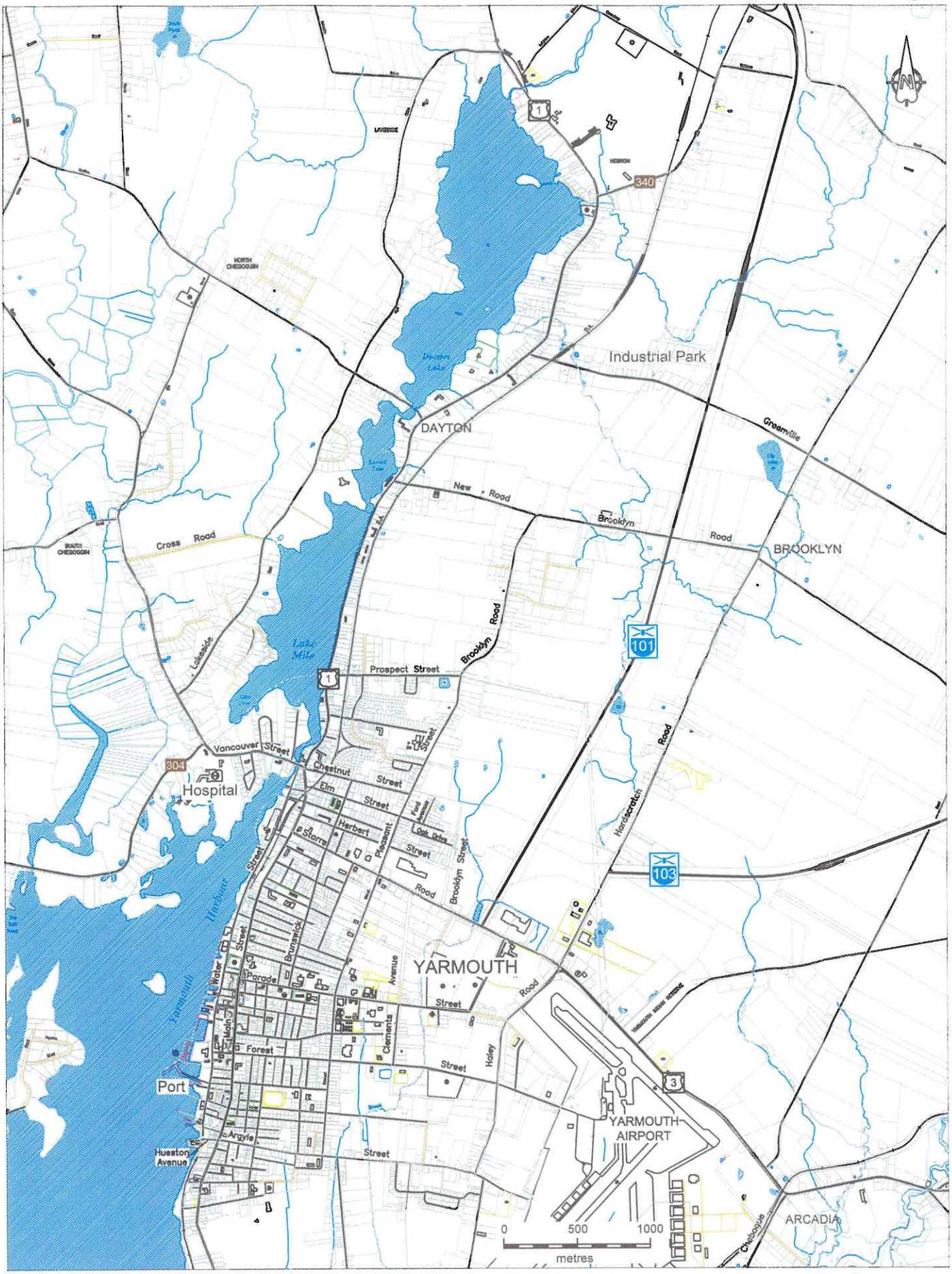

Figure 1.1 - Study Area

April 2008

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2.0 Stakeholder Contacts

Stakeholder Contacts

This Study has included contacts with an extensive list of about thirty stakeholders, including the following:

1. Mayor, Deputy Mayor and all Councillors (Town)
2. Warden, Deputy Warden and affected Councillors (District)
3. CAO Town
4. CAO District
5. Town Planner
6. Development Officer, District
7. Town Engineer and Traffic Authority
8. Chairman, Municipal Planning Advisory Committee
9. Director, South West Shore Development Authority
10. Manager, Yarmouth Airport Authority
11. President, Yarmouth Area Chamber of Commerce
12. Bay Ferries Limited
13. RCMP
14. Yarmouth County Community Health Board.

Discussions have been held with many people, and meetings were held to discuss development trends with both the Town and District Planners. Emails describing the study objectives and key issues (Section 1.3) were also sent to all stakeholders with a request for assistance in identification of the following:

- recognized road deficiencies in the Study Area
- concerns, issues, suggestions and recommendations with regards to the existing and future road network in the Study Area
- transportation issues, and possible solutions to those issues, that will affect development in the Study Area over the next 20 years.

Municipal Planning Advisory Committee

Contact with the Chairperson of the Yarmouth District Planning Advisory Committee indicated that the PAC considers the following items significant with regards to transportation in the Yarmouth area:

- The construction of the Greenville Road interchange is essential to the future growth of the Hebron Industrial Park.
- The connection of Highway 101 and Highway 103 is required for future industrial development. The connection is important to provide a more direct access for traffic between South Shore communities and the Hebron Industrial Park, as well as for fish trucks travelling from the South Shore to access Highway 101.
- Since Yarmouth is not served by rail or air, and has only minimal bus service to Halifax by a South Shore route, good quality roads are needed to connect to markets.
- Completion of Highways 101 and 103 are essential. While both highways are constructed to National Highway Standards in the Yarmouth Area, a considerable part of Highway 103 and about 25 km of Highway 101 are not up to National Highway Standards.

Rural RCMP Detachment

Discussions with officers in charge of the Yarmouth Rural RCMP Detachment indicate that roads which cause traffic concerns within the Study Area include the western ends of Highways 101 and 103, and Trunk 3, that funnel traffic onto Starrs Road which is in Yarmouth Town Detachment area. Traffic south of Town along the Chebogue Road has not changed in recent years, and traffic on Trunk 1 north of Town does not cause the level of congestion experienced on Starrs Road. The Rural Detachment recognized the following three areas of concern.

1. ***Trunk 3 (Airport Stretch)*** - The section of Trunk 3 between Chebogue Road and the Yarmouth Town Limit just east of Hardscratch Road / Haley Road intersection is referred to as the Airport Stretch. This section of road is very busy during morning and afternoon peak periods as it is the access route for all areas between Tusket and Yarmouth. The existing 80 km/h speed limit should be reduced due to traffic volumes and development along this stretch of road. Also, the pavement should be widened to provide turning lanes and paved shoulders as there have been several occasions where vehicles have dropped off the edge of the pavement. This section of road is illustrated on Photo 3.4.

2. ***Highway 101 and 103 Connection*** - Except for some traffic that uses Haley Road to access Parade Street or Forest Street, all Highway 103, Hardscratch Road and Trunk 3 east traffic must use Starrs Road areas west of Highway 101 which contributes to peak hour congestion. Traffic volumes on Starrs Road between Highway 101 and Hardscratch Road is compounded by through traffic which has destinations along Highway 101 or 103 but must use Starrs Road to connect between the two highways. One example is the fish trucks en route from south or west of Yarmouth to the Digby Ferry. While the Brooklyn Street and Herbert Street improvements will provide a means for some traffic from the north end of Yarmouth and beyond to avoid Starrs Road, improvements are also needed for traffic from the east. A full interchange connection should be provided between Highway 101 and 103 so that through traffic can properly and safely connect between the two highways while bypassing Starrs Road and reducing congestion on that street.

3. ***Highway 101 and 103 Passing Areas*** - Since sections of Highways 101 and 103 in Yarmouth County are generally flat, passing lanes are nearly non-existent which leads to congestion during busy traffic periods. This often leads to impatient drivers trying to pass with the resultant potential for serious collisions. Since construction of passing lanes or twinning of the Highways would solve this problem, future highway improvement plans should include twinning Highway 101 east to at least Hebron and Highway 103 from Hardscratch Road to Tusket.

South West Shore Development Authority and Yarmouth Area Industrial Commission

Officials at the South West Shore Development Authority (SWSDA) provided the following information and recommendations concerning impacts of transportation deficiencies on industrial growth in the Yarmouth area.

1. ***Issues that impede economic development and future growth*** - The South West Shore region which includes Shelburne and Yarmouth counties and the Municipality of Clare needs a strong and vibrant transportation system that is supported by good road, sea and air access to and from markets throughout the year. However, the transportation system in the region is challenged by the constant struggle to justify continued support from government when funding decisions are based on population size more than the impact on rural survival. The major industry in the area, the fishery, must ship almost all of its products out of the region to markets around the world. In addition, these products often are live, thus putting more pressure to get them to market quickly. The loss of ferry and airline services and the lack of improvements to area highways will continue to cause real losses. In addition, the difficulty of accessing the U.S. where much of the fish goes is increasing concern about the viability of the industry.

   Although ideally situated next to the biggest consumer market in North America, cuts in transportation options also impact on the viability of other industries such as tourism, manufacturing and boat building. Other related issues that create impediments to growth include: retaining a younger workforce to replace those that are ready to retire; the lack of higher education options in the region; centralization of government services with decisions made at regional offices away from the area; and an inability to attract companies that carry out R & D because of the lack of nearby university or research facilities.

2. ***Targets for commercial and industrial development during the next ten years*** - Over the next 10 years, the SWSDA will work with the private sector and government to increase the diversification of the area economy in response to a declining fishing effort and world trends in tourism travel. The Authority will continue to support new business activity that complements area citizens and their skills. Some of the opportunities include
   - composite manufacturing
   - incoming call centers
   - new fish product manufacturing
   - pleasure craft manufacturing
   - marine supplies manufacturing
   - new tourism product development
   - new R & D facility in the region.

3. ***Direct access to Highway 103 at Hebron Industrial Park*** - Growth of Hebron Industrial Park has been impeded by lack of direct access to Highway 101; land sales have been lost due to the lack of direct access to the Highway. Yarmouth Area Industrial Commission is trying to negotiate with a potential tenant that will have up to 125 commercial vehicles utilizing the park, as well as staff use with passenger vehicles, however, that business will need easy access to Highway 101. An additional 20 acres of serviced land is being prepared and another 25 acre section is being cleared to market to new industry. While these areas are well suited to industrial activity, without direct access to all weather highways, the type of activity will be limited to seasonal operators. The park has the ability to develop another 75 acres, but must have confirmation of direct access to Highway 101 before considering its development.

4. ***Connection of Highways 101 and 103*** - Highways 101 and 103 should be connected at the end of Highway 103 to access the truck route along Haley Road and down Argyle Street to Water Street. However, the convergence of Highways 101 and 103 should not limit access for local or non-truck traffic from either Highway 101 or 103 at Starrs Road. The connection of Highway 101 to Highway 103 at the Hardscratch Road intersection will accomplish several tasks, including provision of better access to the Airport and Yarmouth Industrial Park as well as the Port. It will also remove all non-local truck traffic from Starrs Road and Main Street.

Yarmouth Chamber of Commerce

The Transportation Committee of the Yarmouth and Area Chamber of Commerce provided the following information.

1. ***Connection of Highways 101 and 103 via Greenville Road*** - The committee agrees that a connection is required in some form preferably allowing traffic to move between Highways 101 and 103 without entering Starrs Road. One suggestion brought forward is to accomplish this connection at two points on the Greenville Road that intersects both highways. There are presently overpasses that could be upgraded to interchanges which would allow the movement of traffic between the highways well back from the town limits.

2. ***Highway 103 / Hardscratch Road interchange*** - Create an interchange at the intersection of Highway 103 and the Hardscratch Road, and extend Highway 103 to an interchange on Highway 101.

3. ***Ferry Terminal - Water Front connection*** - Once Highways 101 and 103 are connected at Hardscratch Road, Haley Road should become the option for connection to the waterfront via one or two of the existing streets, such as, Forest or Argyle Streets. Traffic

from both Highways 101 and 103 could then be directed to the Airport, Airport Industrial Park, and the Water Front, by Haley Road and connecting streets. Haley Road should then be upgraded to accept heavy traffic and should be regarded as core access to waterfront attracting Federal and Provincial funding accordingly.

4. ***Hospital access*** - Access to the Hospital could be achieved through existing streets which have been extended to intersect with the Highway 101 / 103 connector.

5. ***Widen Starrs Road*** - Starrs Road should be widened between Pleasant Street and the intersection at Hardscratch Road to allow greater turning opportunities.

6. ***Connector to Parade Street*** - A connection should be provided between Starrs Road near the former Subway restaurant and Parade Street to allow additional traffic options for Starrs Road traffic.

Summary of Stakeholder Concerns and Recommendations

The general consensus of stakeholder concerns can be summarized by the following statements:

- Yarmouth Area is not served by any rail.
- Yarmouth Area is not served by any airlines.
- Yarmouth Area has daily bus service to Halifax by the South Shore route, however, there is no bus service from the Yarmouth area to the Annapolis Valley area.
- Roads provide the only transportation for businesses and residents.
- When road priority decisions are based on population and volume trends, lower population areas such as the Yarmouth Area often do not receive the funding needed.
- While Highway 101 and 103 are constructed to 100-series National Highway Standards in the Yarmouth Area, a considerable part of Highway 103 and about 25 km of Highway 101 are not controlled.
- Land sales have been lost in Hebron Industrial Park due to the lack of direct access to Highway 101. The park has the ability to develop additional land and attract new businesses, however, direct access to Highway 101 at the Greenville Road is needed before considering its development.
- The connection of Highway 101 to Highway 103 is required to serve industrial development which involves travel throughout the Yarmouth Area.
- Access to the Hospital could be achieved through existing streets which have been extended to intersect with the Highway 101 / 103 connector.
- While the Brooklyn Street and Herbert Street improvements will provide a means for some traffic from the north end of Yarmouth and beyond to avoid Starrs Road, improvements are also needed for traffic from the east.

- Once Highways 101 and 103 are connected at a Hardscratch Road interchange, Haley Road and Argyle Street should become the option for highway connection to the waterfront.
- Trunk 3 between the Hardscratch Road / Haley Road intersection and Chebogue Road is very busy during morning and afternoon peak periods. The existing 80 km/h speed limit should be reduced. Pavement should be widened to provide turning lanes and paved shoulders.

3.0 Description of Study Area

3.1 Review of Previous Studies

Several traffic engineering, strategic planning, and staff reports were reviewed to gain background information for this Study.

Town of Yarmouth Growth Projections

This report was prepared by the Town Planner in 1997 using census data from 1961 to 1996 and Town building permit statistics from 1990 to 1996. While Town population was shown to be declining at about 1.8% per year, between 60 and 100 building permits were issued annually for various commercial, retail, and residential projects. Future growth is expected to be in the northern part of Town and into the District areas at the Town's northern boundary.

Truck Routes

A Truck Route designation report was prepared by the Town Planner and the Traffic Authority in April, 2005. The Report recommended designation of a series of truck routes and lateral connector streets leading from the Town boundaries to the industrial park area on Forest Street and the Port of Yarmouth. Haley Road and Argyle Street were identified as a route to connect the 100-series highways to the Port of Yarmouth.

Traffic Impact Study for Superstore, Wal-Mart and Kent (September 2004)

The *Traffic Impact Study - Superstore, Wal-Mart and Kent Development* was prepared by *Atlantic Road & Traffic Management* to evaluate traffic impacts of constructing Superstore and Wal-Mart. The Study recommended installation of traffic signals on Starrs Road near what was the principal entrance for the site development in 2004.

Starrs Road Corridor Traffic Study

The *Starrs Road Corridor Traffic Study* was prepared by *GAALCO Traffic Engineering* in November 2004 to evaluate traffic conditions on Starrs Road and adjacent streets. The Report recommended that Brooklyn Street be the designated signalized intersection on Starrs Road between the existing signalized intersections at Pleasant Street and Highway 101. The Report concluded that while Herbert Street and Elm Street would be a satisfactory east - west connector street to the planned section of Brooklyn Street north of Starrs Road, in the longer term Chestnut Street would provide the best network connection to allow traffic to divert from congested sections of Main Street and Starrs Road.

Traffic Evaluation Starrs Road

The *Traffic Evaluation - Starrs Road* was prepared by *Atlantic Road & Traffic Management* in January 2005 to review the previous *ARTM* and *GAALCO* reports and to evaluate Starrs Road traffic performance with signalized intersections at both the Superstore entrance and Brooklyn Street. The Report concluded that with properly timed and coordinated traffic signal installations, the Starrs Road corridor would provide good levels of traffic performance.

Strategic Plan: 2006 - 2011

The *Strategic Plan: 2006 - 2011* was prepared for the South West Shore Development Authority by *MacDonnell Group Consulting Limited* in February 2006. The study was based on consultations with councillors, business people, community groups, and residents who attended consultation sessions. Transportation was the number one concern of the 13 categories considered during the consultation process.

Road related transportation recommendations arising from the consultation process included:

- completion of Highway 103
- completion of Highway 101
- joining Highways 101 and 103
- upgrade secondary roads
- address traffic congestion on Starrs Road.

3.2 Population and Development Trends

Introduction

The magnitude and geographic distribution of future development is an important input in the transportation planning process. An understanding of past and future development trends forms a basis for infrastructure improvements to meet the demands of future growth. This section of the report presents an overview of potential future development within the Study Area and is based on:

- Discussions with planning staff of area municipalities (Gary Saunders - District Municipality of Yarmouth; Arthur MacDonald - Town of Yarmouth), and
- A review of documentation including internal growth projection documents, building permit data and planning regulations.

Review of Past Population Growth Trends

Census data were reviewed to gain insight into overall trends in population growth at the Provincial, County and Municipal levels. Between 1981 and 1991, Town, District, and County populations all increased, with a 10% increase realized in the District (Table 3.1). While the Province's population has increased from 899,942 to 913,462 (approximately +1.5%) between 1991 and 2006, Town, District, and County populations have all declined. Population declines in municipal populations between the 1991 and 2006 Census Periods include:

- Town (7,781 to 7,162) - 8.0%
- District (10,827 to 10,304) - 4.8%
- County (27,891 to 26,277) - 5.8%.

Declines in population from 1991 onward can be attributed to economic conditions such as the decline in the fishery and the closure of key local industries such as the Dominion Textile plant and the Rio Algom tin mine, which have resulted in out-migration.

Table 3.1 - Population Trends						
Area	1981	1986	1991	1996	2001	2006
Town of Yarmouth	7,475	7,617	7,781	7,568	7,561	7,162
District of Yarmouth	9,842	10,380	10,827	10,722	10,446	10,304
Yarmouth County	26,290	27,073	27,891	27,310	26,843	26,277
Source: Statistics Canada						

Town Development Trends

Development permit data for the Town of Yarmouth, tabulated in Table 3.2, indicate that the level of development activity increased between 2001 and 2005, however, the majority of this activity has been associated with renovations in the commercial and residential sectors. For the 10-year period beginning in 1996, construction of new single-family dwellings has generally ranged between five and twelve units per year, with higher development levels since 2001.

New commercial development has also followed a similar trend with higher levels of development activity in 2003 and 2004. Industrial building activity is mostly focussed on renovations to existing enterprises, with limited new industrial activity in 2000 and 2001.

Table 3.2 - Building Permit Data: Town of Yarmouth										
Land Use Type	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Single Family Dwelling	3	6	7	15	5	12	8	10	12	11
Residential Renovation	13	15	13	15	19	44	46	51	67	47
Commercial New	4	2	3	5	5	4	5	11	16	5
Commercial Renovation	24	20	19	16	12	24	26	23	32	22
Industrial New	0	0	0	0	1	1	0	0	0	0
Industrial Renovation	7	10	4	3	3	1	0	0	2	0
Demolition	5	9	10	5	8	13	7	11	7	7
Place Mini Home	7	1	3	0	2	0	0	0	1	1
Total Permits	63	63	59	59	55	99	92	106	137	93

District Development Trends

Data provided in Table 3.3 for the District are for the entire jurisdiction of the District Municipality and therefore include information for areas external to the Study Area, including outlying areas of Yarmouth County. On an average year between 20 and 30 permits are issued for the construction of new dwellings. Levels of commercial permit activity have increased since 2002, with between five and seven permits issued annually. Within the Municipality, industrial activity is relatively constant, generally ranging at two to three permits per year.

Table 3.3 - Building Permit Data: Municipality of the District of Yarmouth										
Land Use Type	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Residences (Year-round)	19	22	28	44	46	32	35	24	43	24
Commercial	3	3	3	3	1	1	5	5	5	7
Industrial	3	2	1	4	8	3	5	1	2	1
Totals	25	27	32	51	55	36	45	30	50	32

Future Residential Growth in the Study Area

Discussions were held with planning staff of the Town and District Municipality to gain insight into potential future growth in the Study Area. The majority of future development is envisioned in the northern portion of the Town and area north of the town boundary in the District.

Residential development is envisioned closer to Trunk 1, in the northern portion of the Town in the vicinity of the boundary with the District Municipality. Development proposals in this area include two separate developments containing 74 and 24 residential units. A key factor for new residential development in this area is Meadowlands Community School, located on Prospect Street.

As provided in the building permit information above, annual residential development volumes in the area are quite low. Some residential development has shifted from the Town to the District Municipality, but it is thought this trend may reverse with higher gas prices and the overall aging population. As a result of the lower level of residential building activity, annual uptake for new residential developments is slow. During discussions with area planning representatives, the example of Milo Estates was cited which was started in 1985. Of the 100 planned units in this development, approximately 60 have been built within the past 20 years.

From discussions with Planning Staff at the Town, the Town has a large rental market for a comparable sized municipality. The overall aging population may influence both the rental market and provide a market for condominium development as seniors from the Town and outlying areas may choose sell to their current dwelling and move into a dwelling that they own but where maintenance is provided through the condominium association. In 1991, 17% of the Town's population was 60 years of age and over, and this percentage increased to 19% in the 1996 and 2001 Census Years. Potential areas of multiple unit residential development include in fill projects within the Downtown and areas such as Hawthorne Street, Forest Street and Park Street. The potential also exists for multiple-unit residential development on the second and third stories of buildings in the downtown core.

Projected Commercial Growth

Future commercial development potential is a function of the Town's role as a service centre for the region, thus the overall regional population will serve to limit the amount of commercial development within the Town. Since 1992, new large-scale commercial development has occurred in the Starr's Road area including a new Superstore and Wal-Mart. Within the Highway 103 / Starrs Road / Highway 101 area, the potential exists for additional commercial development on the site of the NSTIR highway garage should this facility be moved to a different location, although the Broad Brook flood plain may pose a constraint to commercial expansion in this area. The potential also exists for the additional commercial development in the Clements Avenue area, however, higher density residential development may be a better use for this area.

Projected Industrial Growth

Recent industrial or business park development has included a new call centre in the Hebron Industrial Park employing between 75 and 125 employees. While fisheries has been a strong component of the region's economy, the issue exists as to what will happen to this industry should fish stocks be further depleted. In some area communities housing expenditures are down due to uncertainty regarding fishing stocks. Potential land for future development within the study area includes the Hebron Industrial Park which is maintained by the Yarmouth Area Industrial Commission, two vacant lots in the Forest Street Industrial Park, and the potential for commercial / light industrial development in the Haley Road / Hardscratch Road area. The Hebron Industrial Park is the only large-scale serviced area for industrial development, however, it has experienced limited growth in the past 14 years.

3.3 Roadway Details

Study Area Streets and Roads

The following street and road sections have been included in the site reviews and traffic count programs completed for this Study:

- Highway 101 - Route 340 interchange to Starrs Road
- Highway 103 - approach to Hardscratch Road intersection
- Trunk 1 (Main Street) - Starrs Road to Route 340
- Trunk 3 (Starrs Road) - Main Street to Chebogue Road intersection
- Route 340 - Trunk 1 to Highway 101 interchange
- Hardscratch Road - Starrs Road to Greenville Road
- Greenville Road - Hardscratch Road to Trunk 1
- Brooklyn Road - Hardscratch Road to Highway 101
- Pleasant Street - Chestnut Street to Starrs Road
- Brooklyn Street - Starrs Road to Elm Street
- Haley Road - Starrs Road to Argyle Street
- Parade Street - Haley Road to Pleasant Street
- Forest Street - Yarmouth Airport to Pleasant Street
- Argyle Street - Haley Road to Main Street
- Clements Avenue - existing and proposed (Starrs Rd. to Forest St.).

Intersection Traffic Control

While most intersections are controlled by STOP signs on minor street approaches, the following Study Area intersections are equipped with traffic signals:

- Starrs Road / Hardscratch Road / Haley Road
- Starrs Road / Superstore Driveway
- Starrs Road / Brooklyn Street (opened Summer 2007)
- Starrs Road / Pleasant Street
- Starrs Road / Brunswick Street
- Starrs Road / Main Street
- Main Street / Vancouver Street / Chestnut Street.

Description of Study Area Streets and Roads

Aside from the continuous left turn lane sections of Starrs Road and strategically located left turn lanes at various intersections, all Study Area roads are two lane roads. Roads vary from the 100 km/h controlled access 100-series highways, to rural two-lane local roads, to heavily travelled urban collector and arterial streets. Typical streets and roads in the Study Area are illustrated on the following photos.

Photo 3.1 - Highway 101 - Westbound approach to Greenville Rd overpass.

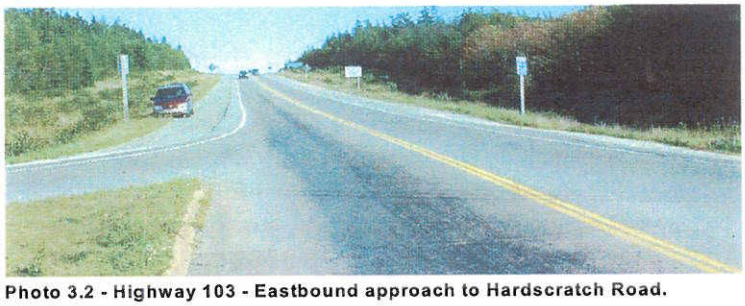

Photo 3.2 - Highway 103 - Eastbound approach to Hardscratch Road.

Photo 3.3 - Starrs Road - West of Highway 101 - Urban commercial area.

Photo 3.4 - Trunk 3 - East of Hardscratch Road - Highway commercial area.

Photo 3.5 - Hardscratch Road - North of Highway 103.

Photo 3.6 - Hardscratch Road - North of Starrs Road intersection.

Photo 3.7 - Haley Road - Northbound approach to Starrs Road intersection.

Photo 3.8 - Argyle Street - Between Haley Road and Pleasant Street.

3.4 Road Section Traffic Volumes

Traffic Volume Growth Trends

NSTIR generally has historic traffic volume data from the previous 20 to 30 years available in both published and unpublished formats. Traffic volume data is based on week-long mechanical traffic counts. Repeat counts are usually taken at the same locations for each count cycle so a historical record of counts is established. Linear regression (Appendix B, Tables B-1 to B-6) has been completed for six locations where sufficient historical count data were available. Existing and projected traffic count information for these locations are included in Table 3.4.

Table 3.4 - Traffic Volume Growth Trends

Location	Table / Figure	Estimated 2006 AADT [1]	Projected 2006 AADT [2]	Annual AADT Growth [3]	Annual Percent Growth [4]	Projected 2026 AADT [5]
Trunk 1 at Yarmouth Limit	B-1	6,850	6,800	60	0.9	8,000
Starrs Road - west of Hardscratch Road	B-2	12,300	13,800	250	1.8	18,800
Trunk 3 - east of Hardscratch Road	B-3	7,990	7,700	110	1.4	9,900
Highway 101 - east of Route 340	B-4	3,000	3,240	75	2.3	4,740
Highway 101 - Route 340 to Starrs Road	B-5	3,340	3,500	55	1.6	4,600
Highway 103 - east of Hardscratch Road	B-6	5,320	6,100	125	2.0	8,600

NOTES:
1. AADT is the Annual Average Daily Traffic estimated from 2006 counts using seasonal adjustment factors
2. AADT volumes projected from the regression analyses
3. Annual AADT volume increase as 'vehicles per day per year' established from regression analyses
4. Annual percentage increase in AADT based on the Annual AADT growth and the Projected 2006 AADT
5. Projected 2026 AADT calculated by adding 20 years of Annual AADT Growth to the Projected 2006 AADT

Hourly Volumes on Study Area Roads

Seven day 24 hour machine counts are available for 2000, 2003, and 2006 at several locations in the Study Area. Tabulated hourly volumes and graphical displays of average weekday volumes are included in Appendix B for the following locations:

- Trunk 1 - East of Yarmouth Line (Table B-7)
- Starrs Road - east of Pleasant Street (Table B-8)
- Starrs Road - west of Highway 101 (Table B-9)
- Starrs Road - west of Hardscratch Road (Table B-10)
- Trunk 3 - east of Hardscratch Road (Table B-11)
- Trunk 3 - west of Chebogue Road (Table B-12)
- Highway 101 - east of Route 342 (Table B-13)
- Highway 101 - east of Starrs Road (Table B-14)
- Highway 103 - east of Hardscratch Road (Table B-15)
- Route 340 - north of Highway 101 (Table B-16)

- Brooklyn Road - North and south of Highway 101 (Table B-17)
- Greenville Road - three locations (Table B-18)
- Hardscratch Road - north and south of Highway 103 (Table B-19).

3.5 Intersection Traffic Volumes

Manual Turning Movement Counts

Manual turning movement counts (Tables C-1 to C-15) were obtained at significant Study Area intersections (Figure C-1) during AM and PM peak periods. Turning movement counts (Tables C-16 and C-17) were also obtained during noon peak periods at most business entrances on Starrs Road between Pleasant Street and Highway 101, as well as at the Irving and Shopper Drug Mart driveways west of Pleasant Street. The following count data are tabulated in Appendix C:

- Table C-1 - Trunk 3 @ Chebogue Road
- Table C-2 - Starrs Road @ Hardscratch / Haley
- Table C-3 - Starrs Road @ Highway 101
- Table C-4 - Starrs Road @ Pleasant Street
- Table C-5 - Starrs Road @ Brunswick Street
- Table C-6 - Starrs Road @ Main Street
- Table C-7 - Main Street @ Vancouver / Chestnut
- Table C-8 - Hardscratch Road @ Highway 103
- Table C-9 - Hardscratch Road @ Brooklyn Road
- Table C-10 - Hardscratch Road @ Greenville Road
- Table C-11 - Greenville Road @ County Ave. (Hebron Ind. Park)
- Table C-12 - Trunk 1 @ Greenville Road
- Table C-13 - Route 340 @ Highway 101 EB Ramps
- Table C-14 - Route 340 @ Highway 101 WB Ramps
- Table C-15 - Trunk 1 @ Route 340
- Table C-16 - Noon Peak Hour Driveway Counts
- Table C-17 - PM Peak Hour Counts at Kent & Superstore Dwys

Diagrammatic Display of Intersection Design Hourly Volumes

Counted volumes at the fifteen intersections (Tables C-1 to C-15) have been used to estimate 2006 Design Hourly Volumes (DHVs). September AM peak hour volumes have been assumed to provide a reasonable estimate of AM DHVs and counted volumes have been increased by 10% to estimate PM DHVs. The 2006 DHVs, displayed diagrammatically for the four volume zones illustrated on Figure C-1, are illustrated in Figures C-2 to C-5, Appendix C).

Estimated 2026 DHVs have been produced by using 2006 DHVs and increasing with 1.5% annual growth rates for Volume Zones 2 and 4, and 2.0% for Volume Zones 1 and 3. The projected 2026 DHVs, displayed diagrammatically for the four volume zones illustrated on Figure C-1, are illustrated in Figures C-6 to C-9, Appendix C).

3.6 Starrs Road Intersection Performance Review

Operational performances of signalized intersections on Starrs Road between Hardscratch Road and Main Street have been reviewed using *Synchro 6.0*, an intersection evaluation compute model. Analyses were not completed at the Superstore driveway intersection because it has reasonably new fully actuated traffic signals, nor the Brooklyn Street intersection which was not finished when counts were obtained during the fall of 2006. The *Synchro 6.0* performance review worksheets are included in Appendix D, and analysis results are summarized in Tables 3.5 to 3.9 and results are discussed in the following paragraphs.

Summary of Results of the Performance Review

Starrs Road at Hardscratch Road / Haley Road (Table 3.5) currently operates well in both the AM and PM peak periods. Analysis was performed using volumes projected to year 2026 and providing for traffic that would be redistributed with the construction of the interchange connection between Highway 101 and Highway 103 shown in Figure 4.4. This analysis was used to determine intersection improvements required to accommodate future volumes. A westbound right turn lane for traffic travelling from Starrs Road to Hardscratch Road was shown to provide improvements to queueing and delays for the westbound approach as well as on the heavy eastbound left turn movement to Hardscratch Road. The proposed connection between Highways 101 and 103 is expected to increase the traffic travelling straight through in the north-south direction. Since these approaches currently only have one lane in each direction, construction of an additional lane to provide exclusive left turn lanes from Hardscratch Road and Haley Road to Starrs Road will become necessary. With these intersection improvements, the intersection will continue to operate well with the expected future traffic volumes.

Starrs Road at Highway 101 (Table 3.6) operates very good with very low user delay in both the AM and PM peak periods. An analysis performed using volumes projected to year 2026 and providing for traffic that would be redistributed with the construction of the interchange connection between Highway 101 and Highway 103 shown in Figure 4.4 indicated that the intersection will continue to operate well in the future. There is some queueing for through movements on Starrs Road which could be addressed by adding through lanes on Starrs Road in the future.

Starrs Road at Pleasant Street (Table 3.7) operates with good levels of performance during the AM peak period, with the exception of queueing on the westbound approach. During the PM peak period the westbound queueing increases and the southbound left turn to Starrs Road experiences unsatisfactory levels of performance. During off-peak periods, the longer cycle length and advanced left turn phases cause delays to traffic on Starrs Road. Intersection performance evaluation with addition of a westbound right turn lane on Starrs Road and fully

traffic actuated traffic signals indicated improved levels of service from increased intersection capacity and better utilization of available green times. The intersection should be upgraded to include a westbound right turn lane and full traffic actuated signals.

Starrs Road at Brunswick Street (Table 3.8) operates with very good levels of performance during both the AM and PM peak periods. The existing signal times work well in the peak periods, however, the amber and all red clearance intervals should be reviewed to ensure they are appropriate. Upgrading the signals to traffic actuated control should be considered and is expected to reduce delays at off-peak times when full phase lengths are not required because of lower traffic volumes.

Starrs Road at Main Street (Table 3.9) operates with very good levels of performance during both the AM and PM peak periods. The amber and all red clearance intervals should be reviewed at this intersection to ensure they are appropriate. Upgrading the signals to traffic actuated control should be considered and is expected to reduce delays at off-peak times when full phase lengths are not required because of lower traffic volumes.

Table 3.5 - Performance Review for Starrs Road / Hardscratch / Haley Intersection

LOS Criteria	Control Delay (sec/veh), LOS, v/c Ratio, and 95% Queue (m) by Intersection Movement											Intersection LOS
	EB-L	EB-TR	WB-L	WB-T	WB-R	NB-L	NB-T	NB-R	SB-L	SB-T	SB-R	
AM Peak Hour - 2006 existing volumes (Page D-1)												
Delay	8.1	6.1	22.2	20.8		19.6	5.9		21.4	5.2		14.2
LOS	A	A	C	C		B	A		C	A		B
v/c	0.31	0.19	0.48	0.56		0.27	0.16		0.45	0.47		-
Queue	16.8	19.4	41.3	65.1		25.8	9.1		46.6	16.7		-
AM Peak Hour - 2026 volumes with Highway 101 to Highway 103 Connector (Page D-5)												
Delay	8.8	7.4	27.9	22.9	8.5	24.7	21.4	5.9	22.5	25.4	7.7	17.2
LOS	A	A	C	C	A	C	C	A	C	C	A	B
v/c	0.31	0.21	0.64	0.59	0.14	0.24	0.19	0.22	0.21	0.53	0.50	-
Queue	20.1	26.1	67.4	86.4	12.5	17.2	27.3	11.9	22.7	70.1	27.6	-
PM Peak Hour - 2006 existing volumes (Page D-3)												
Delay	18.2	9.3	37.1	35.0		33.9	6.5		29.0	5.6		20.3
LOS	B	A	D	C		C	A		C	A		C
v/c	0.72	0.40	0.53	0.69		0.65	0.33		0.45	0.44		-
Queue	87.9	63.4	40.2	84.2		68.6	15.3		45.0	16.6		-
PM Peak Hour - 2026 volumes with Highway 101 to Highway 103 Connector (Page D-7)												
Delay	14.5	10.3	40.0	27.0	7.1	27.7	31.5	8.6	35.0	26.9	5.8	18.5
LOS	B	B	D	C	A	C	C	A	D	C	A	B
v/c	0.70	0.51	0.69	0.57	0.23	0.30	0.61	0.43	0.47	0.38	0.45	-
Queue	70.2	84.2	49.8	71.9	13.9	24.0	73.7	22.9	29.0	46.2	17.4	-

Table 3.6 - Performance Review for Starrs Road / Highway 101 Intersection

LOS Criteria	Control Delay (sec/veh), LOS, v/c Ratio, and 95% Queue (m) by Intersection Movement						Intersection LOS
	EB-L	EB-T	WB-T	WB-R	SB-L	SB-R	
AM Peak Hour - 2006 existing volumes (Page D-2)							
Delay	5.0	5.3	7.4	2.1	17.0	6.5	6.9
LOS	A	A	A	A	B	A	A
v/c	0.14	0.35	0.56	0.02	0.20	0.42	-
Queue	5.5	31.2	60.9	1.8	14.9	13.2	-
AM Peak Hour - 2026 volumes with Highway 101 to Highway 103 Connector (Page D-6)							
Delay	5.3	5.5	9.0	2.1	22.0	8.1	7.9
LOS	A	A	A	A	C	A	A
v/c	0.18	0.45	0.69	0.01	0.16	0.46	-
Queue	5.8	42.9	89.0	1.5	14.2	15.8	-
PM Peak Hour - 2006 existing volumes (Page D-4)							
Delay	6.5	6.6	5.4	1.2	21.5	8.6	6.4
LOS	A	A	A	A	C	A	A
v/c	0.37	0.60	0.51	0.06	0.19	0.30	-
Queue	15.9	72.5	54.2	2.9	13.5	10.5	-
PM Peak Hour - 2026 volumes with Highway 101 to Highway 103 Connector (Page D-8)							
Delay	9.5	6.9	5.7	1.2	27.3	10.8	6.9
LOS	A	A	A	A	C	B	A
v/c	0.50	0.66	0.59	0.04	0.02	0.34	-
Queue	22.7	95.8	74.0	2.3	12.6	12.4	-

Table 3.7 - Performance Review for Starrs Road / Pleasant Street Intersection

LOS Criteria	Control Delay (sec/veh), LOS, v/c Ratio, and 95% Queue (m) by Intersection Movement									Intersection LOS
	EB-L	EB-TR	WB-L	WB-T	WB-R	NB-L	NB-TR	SB-L	SB-TR	
AM Peak Hour - 2006 existing volumes and equipment (Page D-9)										
Delay	22.5	27.0	15.7	19.7		31.1	29.4	24.0	19.6	22.6
LOS	C	C	B	B		C	C	C	B	C
v/c	0.06	0.42	0.36	0.60		0.12	0.52	0.45	0.22	-
Queue	7.1	66.5	33.2	109.4		15.0	58.7	40.3	35.3	-
AM Peak Hour - 2006 volumes with westbound right turn lane, actuated controller and revised timing (Page D-16)										
Delay	21.7	24.3	14.5	14.5	2.9	25.1	26.2	16.5	13.2	16.9
LOS	C	C	B	B	A	C	C	B	B	B
v/c	0.04	0.37	0.34	0.36	0.20	0.15	0.60	0.43	0.23	-
Queue	6.7	62.6	31.7	63.8	10.8	13.0	50.1	31.9	28.0	-
PM Peak Hour - 2006 existing volumes (Page D-12)										
Delay	23.3	48.3	27.0	24.3		31.2	35.9	96.1	19.2	40.8
LOS	C	D	C	C		C	D	F	B	D
v/c	0.80	0.89	0.60	0.73		0.13	0.81	1.05	0.26	-
Queue	7.4	182.4	39.3	149.8		15.0	107.5	105.2	40.6	-
PM Peak Hour - 2006 volumes with westbound right turn lane, actuated controller and revised timing (Page D-19)										
Delay	19.1	41.7	19.9	16.9	3.5	32.8	45.8	64.7	19.6	33.6
LOS	B	D	B	B	A	C	D	E	B	C
v/c	0.05	0.87	0.57	0.52	0.21	0.15	0.90	0.94	0.27	-
Queue	6.4	153.4	27.9	87.7	12.6	15.4	115.8	100.9	41.9	-

Table 3.8 - Performance Review for Starrs Road / Brunswick Street Intersection

LOS Criteria	Control Delay (sec/veh), LOS, v/c Ratio, and 95% Queue (m) by Intersection Movement								Intersection LOS
	EB-L	EB-TR	WB-L	WB-TR	NB-TL	NB-R	SB-TL	SB-R	
AM Peak Hour - 2006 existing volumes and equipment (Page D-10)									
Delay	12.2	15.2	6.5	8.1	19.4	7.1	19.1	9.1	12.5
LOS	B	B	A	A	B	A	B	A	B
v/c	0.01	0.33	0.07	0.30	0.19	0.08	0.16	0.03	-
Queue	2.2	39.4	5.9	33.2	21.7	6.2	18.8	4.0	-
AM Peak Hour - 2006 volumes with existing equipment and revised timing (Page D-17)									
Delay	6.6	10.1	6.5	8.1	19.4	7.1	19.1	9.1	11.0
LOS	A	B	A	A	B	A	B	A	B
v/c	0.01	0.33	0.07	0.30	0.19	0.08	0.16	0.03	-
Queue	1.3	30.6	5.9	33.2	21.7	6.2	18.8	4.0	-
PM Peak Hour - 2006 existing volumes (Page D-14)									
Delay	12.4	19.9	7.3	9.5	18.9	5.9	18.5	11.4	14.1
LOS	B	B	A	A	B	A	B	B	B
v/c	0.01	0.60	0.18	0.44	0.14	0.14	0.11	0.01	-
Queue	2.2	76.4	9.6	31.5	16.9	8.3	14.1	2.2	-
PM Peak Hour - 2006 volumes with existing equipment and revised timing (Page D-21)									
Delay	7.6	15.6	7.3	9.5	18.9	5.9	18.5	11.4	12.4
LOS	A	B	A	A	B	A	B	B	B
v/c	0.01	0.60	0.18	0.44	0.14	0.14	0.11	0.01	-
Queue	0.7	76.2	9.6	51.5	16.9	8.3	14.1	2.2	-

Table 3.9 - Performance Review for Starrs Road / Main Street Intersection

LOS Criteria	Control Delay (sec/veh), LOS, v/c Ratio, and 95% Queue (m) by Intersection Movement						Intersection LOS
	WB-L	WB-R	NB-T	NB-R	SB-L	SB-T	
AM Peak Hour - 2006 existing volumes and equipment (Page D-11)							
Delay	18.0	4.1	14.4	3.5	9.0	8.6	10.8
LOS	B	A	B	A	A	A	B
v/c	0.41	0.25	0.37	0.16	0.31	0.28	-
Queue	38.0	10.5	37.8	8.0	16.7	28.2	-
AM Peak Hour - 2006 volumes with existing equipment and revised timing (Page D-18)							
Delay	17.8	3.7	17.4	3.9	7.8	7.8	11.0
LOS	B	A	B	A	A	A	B
v/c	0.45	0.27	0.38	0.17	0.25	0.25	-
Queue	46.7	7.5	44.7	9.0	16.7	28.2	-
PM Peak Hour - 2006 existing volumes (Page D-15)							
Delay	20.5	4.2	16.1	3.2	11.5	9.1	11.8
LOS	C	A	B	A	B	A	B
v/c	0.54	0.23	0.48	0.35	0.47	0.33	-
Queue	51.8	10.0	50.7	12.1	21.4	34.1	-
PM Peak Hour - 2006 volumes with existing equipment and revised timing (Page D-22)							
Delay	18.9	3.0	19.4	3.5	9.0	8.2	11.6
LOS	B	A	B	A	A	A	B
v/c	0.60	0.25	0.50	0.35	0.38	0.30	-
Queue	63.4	4.6	60.1	13.5	21.4	34.3	-

3.7 License Plate Match Study

Description of Study

A license plate match study was completed on Friday, September 15, 2006, to estimate direct non-stop traffic volumes traveling between Highway 103 and 101. License plate numbers were recorded for vehicles turning left from Highway 103 to Hardscratch Road and simultaneously for vehicles turning right from Starrs Road to Highway 101. Plate numbers were recorded in one minute intervals at each location for nine hours, including 7:00 AM to 10:00 AM, 11:00 AM to 2:00 PM and 3:00 PM to 6:00 PM. License plate numbers were matched to determine percentage of vehicles that traveled from Highway 103 to Highway 101 without stopping for any services.

Summary of Plate Match Study

The number of vehicles counted at each location and number of plate matches for each hour and each three hour survey period are summarized in Table C-18, Appendix C. The percentage of Highway 103 traffic that travels non-stop to Highway 101 includes:

- AM Period - 2.4%
- Noon Period - 1.1%
- PM Period - 1.5%
- Average for nine hours - 1.8%

If it is assumed that the reverse movement from Highway 101 to Highway 103 has similar characteristics, then it follows that about 2% of the Highway 103 two-way volume will provide a reasonable estimate of the projected two-way volume on the Highway 101 to Highway 103 Connector.

Estimated Connector Volumes

The license plate match study indicated that for current traffic patterns the estimated traffic volume on a direct connection from Highway 101 to Highway 103 would be equal to about 2% of the two-way volume on Highway 103. Estimated connector volumes for 2% have been calculated based on Highway 103 2006 AADT of 6100 and projected 2026 AADT of 8600 volumes (Table 3.4). Estimated Connector AADT volumes for 2% of Highway 103 AADT volume, as well as double the estimated connector usage to 4% of the Highway 103 volume to consider trips now made on local roads, include:

- 2006 - 2% (122 vpd) and 4% (244 vpd)
- 2026 - 2% (172 vpd) and 4% (344 vpd).

It is estimated that the Highway 101 to Highway 103 direct connection would have AADT volumes of about 250 vpd during 2006, increasing to about 350 vpd by 2026. It should be noted that these estimated volumes are based on current volumes and past volume growth trends, and do not include increases that could occur from changes in residential and industrial growth patterns, or from higher numbers of drivers currently making trips on local roads.

4.0 Roadway Network Improvements

4.1 Existing Areas Requiring Improvements

Several areas that require street, intersection or traffic control improvements were suggested by stakeholders and project steering committee members, or were observed during site visits.

Trunk 3 - East of Hardscratch Road

The section of Trunk 3 for the first kilometer east of Hardscratch Road has almost continuous commercial development along the north side of the road. This section of road, which is also known as the Airport Stretch, has a posted speed limit of 80 km/h with two paved lanes and a wide gravel shoulder as illustrated in Photo 4.1.

Photo 4.1 - Trunk 3 - the Airport Stretch - east of Hardscratch Road.

This section of road should be widened to provide an eastbound left turn lane. Also, a speed zone study should be completed with the intention of reducing the speed limit to 60 km/h.

Trunk 3 / Chebogue Road Intersection

The Trunk 3 / Chebogue Road intersection is in a 50 km/h speed zone, with a sharp curve on Trunk 3 which is posted with a 30 km/h advisory speed tab. Historically the grade on Trunk 3 and the intersection location were constrained by the railway line that crossed Trunk 3 immediately west of the intersection, however, the rails have been gone for many years. Within the next five years, the intersection should be reconstructed to increase the radius of the curve and to flatten the Chebogue Road intersection approach grade.

Hardscratch Road / Greenville Road Intersection

The Hardscratch Road intersects with Greenville Road about three kilometers north of Highway 103. The intersection is controlled by STOP signs on the Hardscratch Road approaches with a suspended warning light that flashes red to Hardscratch Road approaches and amber to the Greenville Road approaches. There have been several collisions at the intersection which involved Hardscratch Road vehicles that failed to stop at the STOP sign. The intersection approaches are relatively flat, there are oversized STOP AHEAD warning signs and good visibility of the STOP signs for both Hardscratch Road approaches. The following additional improvements illustrated in Figure 4.1 are recommended:

- Bushes should be removed from the southeast quadrant to improve the sight triangle to Greenville Road east of the intersection.
- The Hardscratch Road southbound egress from the intersection has a broken, or skip, centerline. It is recommended that a solid yellow centerline be painted on Hardscratch Road south of Greenville Road to just south of the driveway for Old Mill Seafood.

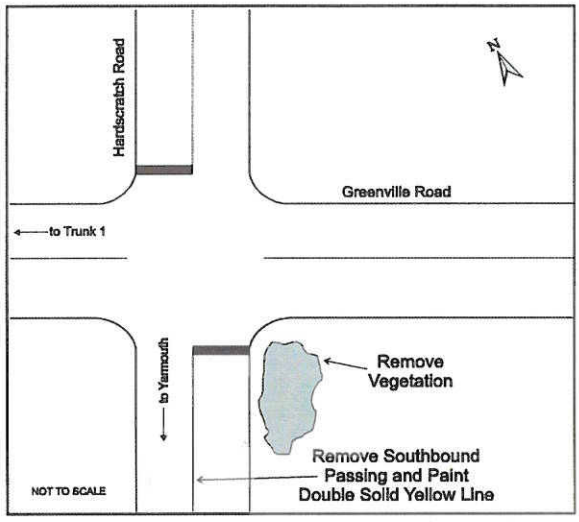

Figure 4.1 - Proposed improvements to the Greenville Road - Hardscratch Road Intersection

Trunk 1 / Greenville Road Intersection

Greenville Road intersects with Trunk 1 at a STOP sign controlled intersection between Dayton and Hebron about 1.2 kilometers south of the Route 340 intersection. The intersection approach is downgrade with a very large radius turn to Trunk 1. The STOP sign is at the Trunk 1 end of the turn so that it is not clearly visible to vehicles approaching on Greenville Road as illustrated in Photo 4.2.

Photo 4.2 -Greenville Road approach to Trunk 1 intersection.

Further study is required to determine if the intersection can be reconstructed to include right turn channels as illustrated in Figure 4.2. As the Hebron Business Park develops further in the future, increased

traffic at this intersection may also warrant construction of a left turn lane on Trunk 1.

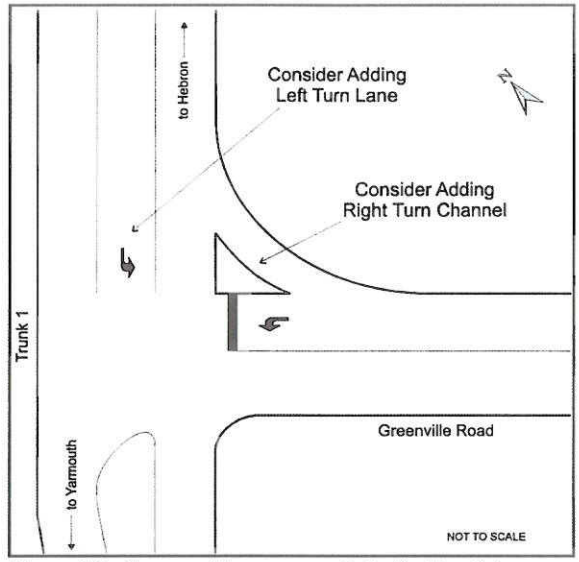

Figure 4.2 - Proposed improvements to the Trunk 1 - Greenville Road Intersection

Chestnut Street / Main Street Intersection

Some members of the public have questioned the suitability of Chestnut Street as part of the North Yarmouth Collector street to connect the 100 series Highways to the Hospital. One concern mentioned has involved the Chestnut Street approach to the Main Street signalized intersection illustrated in Photo 4.3. A site visit indicated that the far-right or primary head display is missing for that approach. A mast arm with primary head display should be installed to face the Chestnut Street approach.

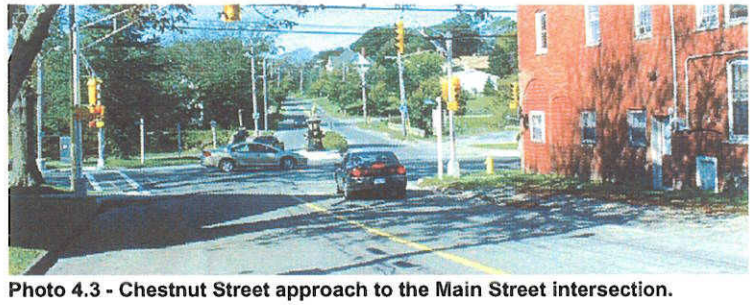

Photo 4.3 - Chestnut Street approach to the Main Street intersection.

4.2 Additional Study Area Roads

Areas Where Connection Improvements are Needed

Study objectives include:

- Identify the primary road network improvements that will provide connections of the Port, Airport, Hospital, and Industrial Parks to the 100 series highways; and
- Identify additional secondary road improvements required to support the development of lands between Starrs Road, Brooklyn Road and Hardscratch Road.

New or improved road connections are required to address the following concerns:

- While Highway 101 and Highway 103 are part of the National Highway System and end in Yarmouth, there is need to define a National Highway Connection to the Port of Yarmouth.
- All Emergency Health Service vehicles traveling between the 100-series highways and the Hospital must travel along congested sections of Starrs Road.
- All traffic between Highway 101 and the Port of Yarmouth must use sections of Starrs Road.
- The majority of future residential growth, and possibly industrial growth, in the Study Area is expected to occur in the north and northwest parts of Town and in the District near the Town's northern boundary. Much of the traffic from those areas must now use Starrs Road to access Highway 101 and Highway 103.

Current Improvements

Areas where the Town has made, or is currently making, traffic improvements include:

- A network of ***Truck Routes*** was recently designated. The network includes a route from the intersection of Starrs Road and Hardscratch Road to Water Street at the Port utilizing Haley Road, Argyle Street and Hueston Street. While street and intersection improvements will be required, the designated route should be adequate for a National Highway Connection.
- ***Brooklyn Street*** has been constructed north from Starrs Road to connect with the Yarmouth Mall, Superstore - Wal-MART site, a reconstructed Herbert Street, Oak Street and Elm Street (see Figure 4-3). These new street connections provide an alternate route for traffic from the north part of Town other than Pleasant Street, Brunswick Street and Starrs Road, to reach the Starrs Road retail area. This should result in a considerable reduction in Starrs Road peak hour traffic volumes west of Brooklyn Street, as well as on Pleasant Street just north of the Starrs Road intersection.
- The first 120 meters (400 feet) of ***Brooklyn Street Extension*** south of Starrs Road have been constructed and the Starrs Road / Brooklyn Street traffic signals were installed during Summer 2007. The future completion of the extension from Starrs Road to

Clements Avenue (see Figure 4.3) will provide connections to both Parade Street and Forest Street. This will provide an alternate route from the south part of Town for vehicles now using Brunswick Street and Pleasant Street to reach Starrs Road. This should reduce traffic volumes on both Brunswick Street and Pleasant Street south of their respective Starrs Road intersections.

Additional Town Street Connections to be Considered

Additional Town street connections that should be considered include:

- A ***North Yarmouth Collector*** road is needed to connect the north part of Town to the existing Highway 101 and Hardcratch Road near Highway 103. This road would provide the needed direct route from the 100-series highways to the Hospital, and with connections to Brooklyn Street, it would provide another access to the major retail area near the Starrs Road / Brooklyn Street intersection. A suggested route, utilizing Chestnut Street between Pleasant Street and Main Street, is illustrated on Figure 4.3.
- As development takes place in the north part of Town in future years, ***Brooklyn Street North*** should be considered to connect with Brooklyn Road near the Prospect Road intersection.
- A collector road will be required parallel to Highway 101 with connections to the North Yarmouth Collector and Brooklyn Street North. This will facilitate land development on the west side of Highway 101 between the proposed North Yarmouth Collector and Brooklyn Road.
- A corridor should be reserved for future construction of ***Clements Avenue South*** from Forest Street to Argyle Street.

National Highway Connection to the Port of Yarmouth

The truck route to the Port of Yarmouth from the intersection of Starrs Road and Hardscratch Road to Water Street at the Port of Yarmouth utilizing Haley Road, Argyle Street and Hueston Street, should be designated as the National Highway Connector. Other street sections that also must be included in the National Highway designation are the section of Forest Street from Haley Road to the Yarmouth Airport, and a section of Water Street from Huston Street to a point north of the Ferry Terminal sufficient to include traffic queuing for the Maine Ferry.

The street sections necessary to complete the National Highway Connection should be upgraded as needed to provide widened pavement of suitable strength for truck loadings allowed on the National Highway System.

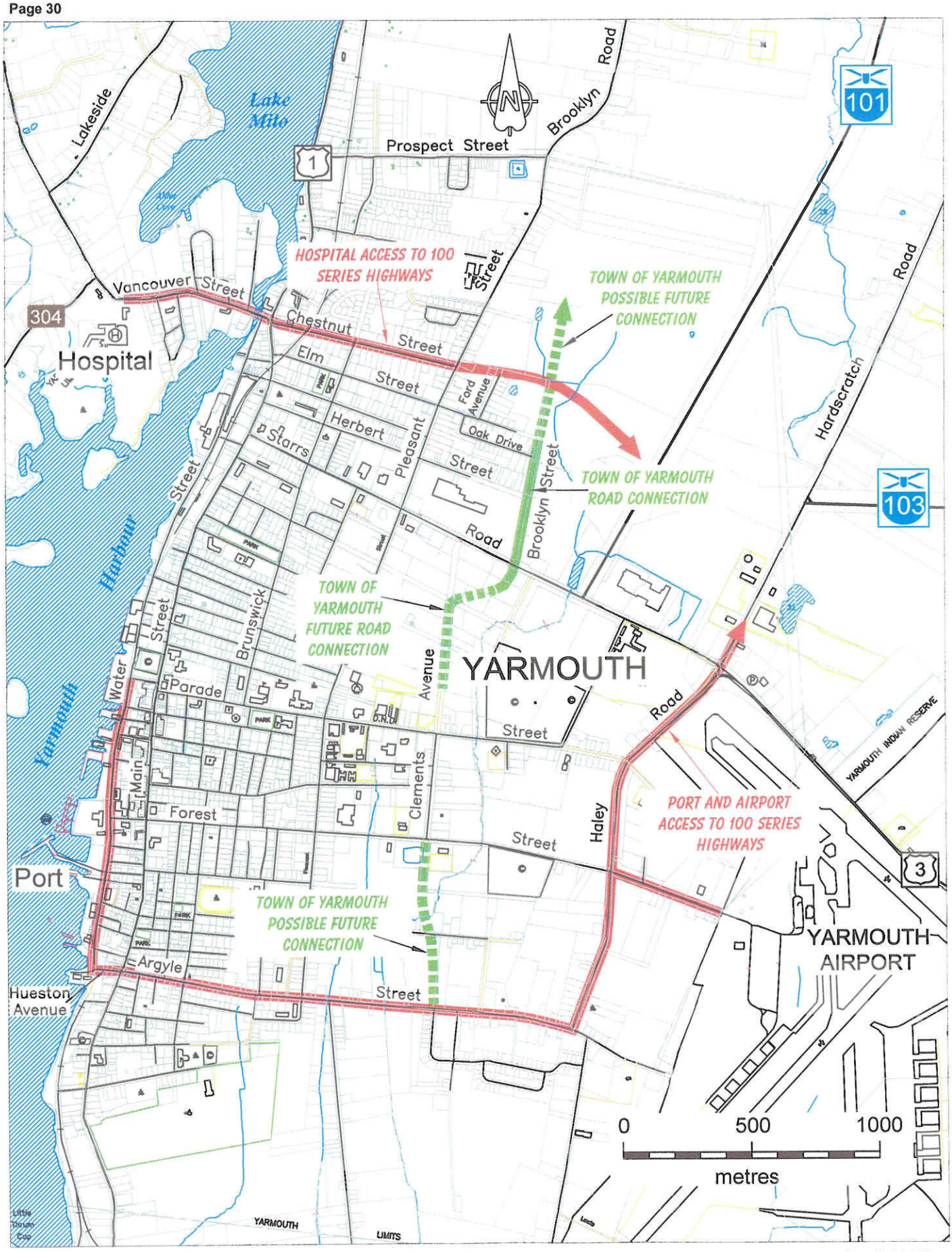

Figure 4.3 - Hospital and Port Access to 100 Series Highway System

April 2008

4.3 Highway 101 to Highway 103 Connection

Highway 101 to Highway 103 Connection Will be Needed

While the license plate match study completed as part of this Study indicates low traffic volumes travelling directly between Highways 101 and 103, there are probably many trips being made by alternate routes, possibly using Hardscratch Road and Greenville Road. As industrial and commercial development continues at the Hebron Industrial Park and when an interchange is constructed at the Greenville Road, there will be an increased demand for a direct connection of the two highways.

Haley Road and Argyle Street have been designated as a Truck Route and are considered appropriate to act as the National Highway Connection from the 100-series highways to the Port of Yarmouth and Yarmouth Airport. Therefore, a connection from Highway 101 to Highway 103 should provide full access to Hardscratch Road from both highways so that trucks and other vehicles can readily have access to the Truck Route and the National Highway Connection to the Port of Yarmouth.

Guiding Principles for Design of a Highway 101 / Highway 103 Connection

The following guidelines have been used to develop the functional design for the connection between Highway 101 and Highway 103:

- The connection should provide free flow for travel between the two 100-series highways.
- Diamond ramps are to be used, rather than loop ramps. Diamond ramps are usually used in Nova Scotia because they use less land and there is less potential for wrong way traffic movements with the widely spaced ramps typical of a diamond interchange compared to loop-type interchanges where an access is often positioned adjacent to an exit ramp.
- Directional ramps should have a minimum 70 km/h design speed.
- Both highways should have easy access and egress at Hardscratch Road.
- Both highways should have easy access to the North Yarmouth Collector Road that will provide access between Hardscratch Road, Brooklyn Street, and Pleasant Street, as well as reasonable connections to the Hospital.
- Highway 101 between the proposed Highway 103 connector and Starrs Road must continue to allow for two-way movements to Highway 101 east of the Highway 103 connector so that all of the traffic from both highways that is destined for Starrs Road is not forced through the Hardscratch Road / Starrs Road intersection.

Interchange and Connector Scenarios

The proposed functional plan for the Highway 101 to Highway 103 connector, the Hardscratch Road interchange, and the North Yarmouth Collector Road, is illustrated on Figure 4.4. It should be noted that the Highway 101 to Highway 103 connector is a very long range plan which has been prepared so that right-of-way can be preserved.

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Figure 4.4
PROPOSED HIGHWAY 101 & 103 INTERCHANGE CONFIGURATION

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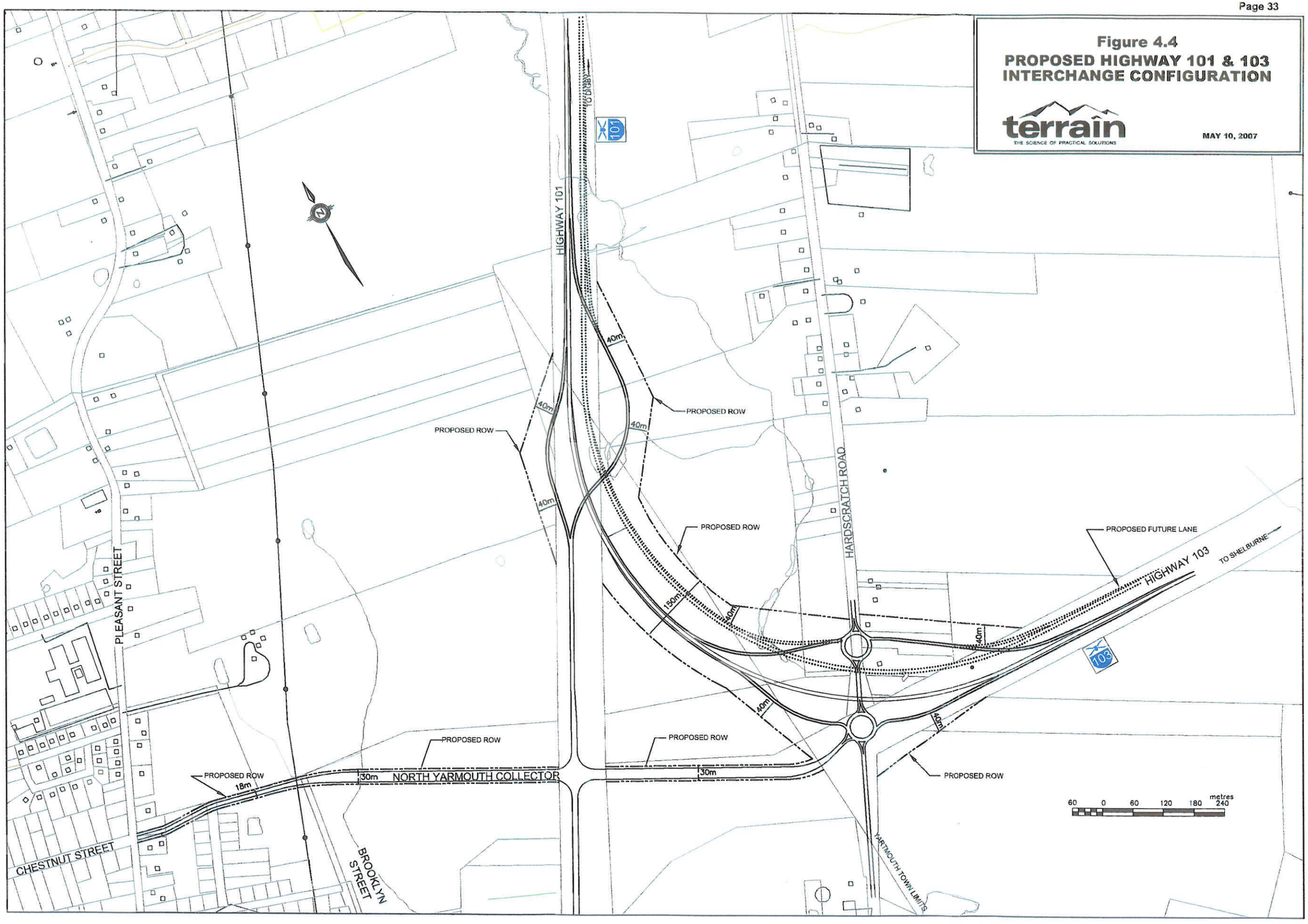
MAY 10, 2007



4.4 Greenville Road Interchange

An Interchange was once Considered by NSTIR

Approximately 20 years ago, NSTIR prepared a functional plan for a diamond interchange at Greenville Road overpass to serve a developing industrial park, as well as local traffic. While the site is well suited for construction of a diamond interchange, construction did not occur due to anticipated low traffic volumes and other government priorities.

Existing Hebron Industrial Park Employees Could Benefit from an Interchange

Register.com, a major tenant at Hebron Industrial Park, had 323 employees at the time of an employment number audit in April 2006. Places of residence for the employees are summarized in Table 4.1. While the place of residence information does not readily translate to ramp volumes and benefit cost ratios, it can be assumed that many of these employees would access Highway 101 at the Greenville Road location if there was an interchange available to them.

Table 4.1 - Place of Residence for Register.com Staff

Municipal Unit	Employment Number by Postal Code
Municipality of Yarmouth	122
Town of Yarmouth	107
Municipality of Argyle	47
Digby County	28
Shelburne County	17
Other	2
Total	323

Source: Employment numbers at Register.com, as of April 1, 2006

Future Park Development Requires Improved Access

Park officials have advised that land sales have been lost due to the lack of direct access to Highway 101. A new building has been constructed for another 70 call center jobs, with plans to expand up to 200 employees. The Park is negotiating with a possible tenant that will have up to 125 commercial vehicles utilizing the park, as well as staff use with passenger vehicles. While this area is well suited to industrial activity, and land is available for future development, without direct access to all weather highways, activity will be limited to seasonal operators.

Greenville Road and Hardscratch Road Volumes

Review of peak hour volumes on Greenville Road and Hardscratch Road (Figure C-4) reveals moderately high through volumes on both roads, as well as the turning movement volumes at the Greenville Road / Trunk 1 intersection. A significant portion of this traffic could possibly be using the 100-series highways if the Greenville Road interchange and Highway 101 / 103 connector and interchange were constructed.

Diamond Interchange Plan

A functional plan for a Greenville Road diamond interchange is included on Figure 4.5.

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Figure 4.5
PROPOSED GREENVILLE ROAD INTERCHANGE CONFIGURATION

terrain
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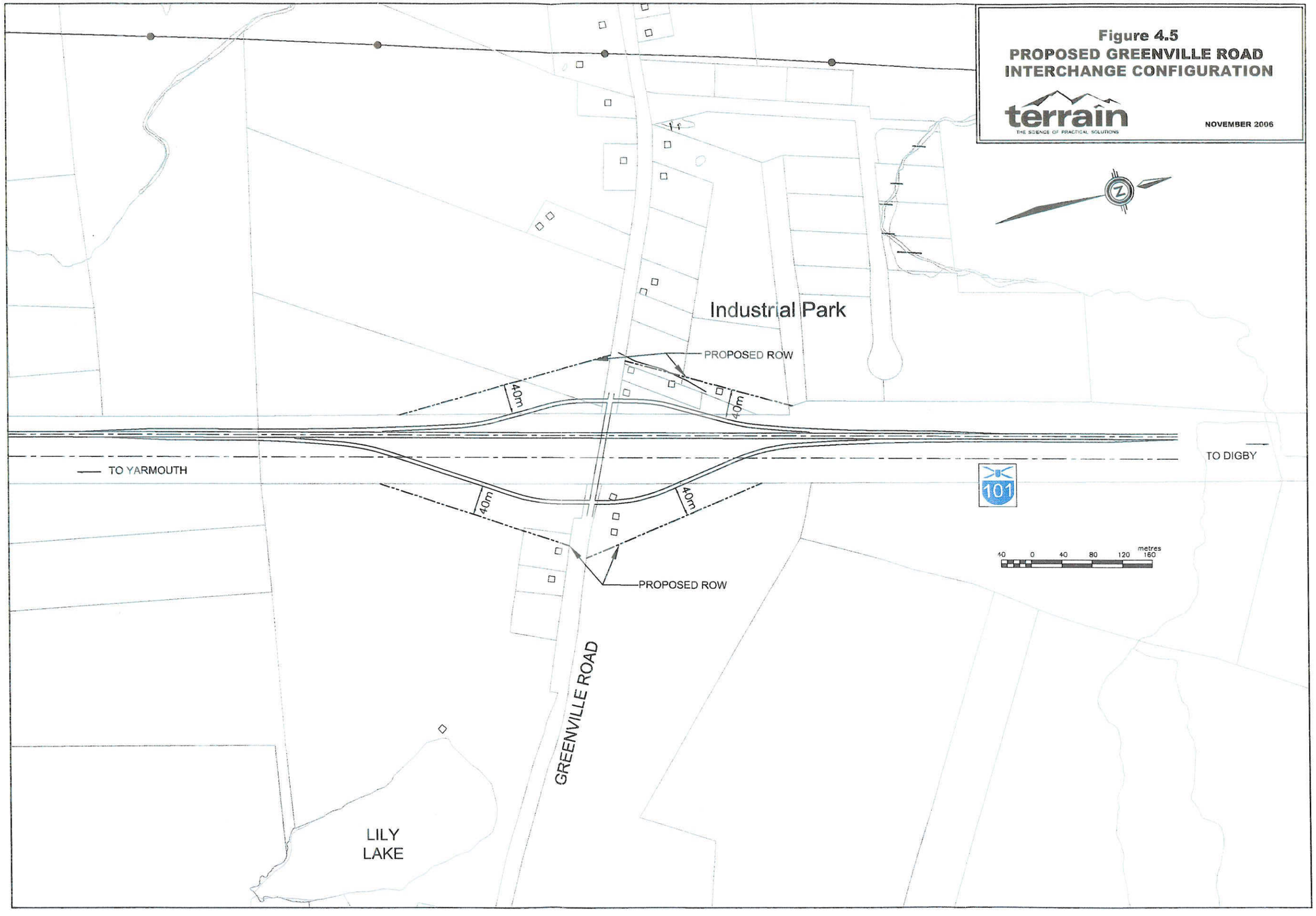
NOVEMBER 2006



5.0 Access Management

5.1 Introduction

Definition of Access Management

Access management is the process of balancing the competing needs of traffic movement on a public road and land access to adjacent properties. The objective of access management is to provide safe and efficient access that meets accessibility needs of adjacent land and is consistent with the functional and operational requirements of the roadway.

Roads often require upgrading or replacement because of functional obsolescence caused by high peak hour volumes and unacceptably high collision experience. Roadside development directly impacts this problem by reducing roadway capacity and increasing collision potential. Unregulated development results in strip commercial or residential development with numerous driveways. By adopting basic access management principles for all streets and roads, safety and capacity can be maintained, preventing or delaying the need for expensive major upgrading or reconstruction.

Benefits of Access Management

The benefits of effective access management include:

1. Improved safety; access related collisions can be reduced;
2. Roadway capacity can be increased;
3. The operational life of a roadway section will be increased;
4. Travel times and unnecessary delays will be reduced;
5. Fuel consumption and vehicle emissions will be reduced.

Benefits of good access management are realized by many diverse groups. While Table 5.1 does not contain a complete list, it should be sufficient to illustrate the main beneficiaries (stakeholders) and the benefits realized by each group.

Table 5.1 - Beneficiaries and Benefits of Good Access Management

Beneficiary Group	Benefits
Governments of Towns & Cities	Lower cost of delivering a safe and efficient road system
Community	Safer streets Less need for street widening Aesthetically pleasing streets
Businesses	More efficient roadway system creates a broader market area More predictable and consistent development environment
Drivers	Safer streets Fewer decision points and traffic conflicts Less congestion and delay
Cyclists	Fewer decision points and traffic conflicts More predictable motorists' behaviour
Pedestrians	Fewer and less frequent vehicle access points

5.2 Safety and Operational Issues

Substantial research concerning the effects of access management has been conducted in the past few decades. However, much of the studies and research appear to have concentrated on high speed major collector and arterial roads and highways. A notable study was *NCHRP Report 420: Impacts of Access Management Techniques*. The following points are largely drawn from this study.

Safety Issues

Safety benefits of good access management are attributable to improved access design, fewer traffic conflict locations, and increased driver response time to potential conflicts. It is accepted that:

1. The number of collisions is related to access density. The relative frequency of a collision to the number of access points per mile (or per kilometer) is illustrated in Table 5.2. For example, an increase in the number of access points from 6 to 25 per kilometer has been shown to approximately double the frequency of collisions.
2. Roadways with non-traversable medians are safer than undivided roadways or those with continuous two-way left-turn lanes. *NCHRP Report 420* concluded that the average collision rate on roadways with a non-traversable median is about 30% less than on those with a two-way left-turn lane. Although the conclusion of the study is unarguable, it would not be a good retro-fit for the presently built-up portion of Starrs Road nor for the section of Trunk 3 from Haley Road to Chebogue Road.
3. Medians improve pedestrian safety; properly designed medians provide a refuge for pedestrians to wait while crossing a street.

Table 5.2 - Comparison of Access Density and Collision Rate Indices

Number of Access Points		Collision Rate Indices	
per Mile	per Km	All Roads	Urban / Suburban Roads
10	6	1.0	1.0
20	12	1.3	1.4
30	19	1.7	1.8
40	25	2.1	2.1
50	31	2.8	2.3
60	37	4.1	2.5
70	43	N/A	2.9

Source: NCHRP Report 420, Transportation Research Board, 1999

Operational Issues

Studies of the effects of access management on roadway operations that addressed the effects of access spacing on travel time indicate that access management helps to maintain desired speeds and reduces delays; unsurprisingly, increasing the number of access points and signals along a roadway results in increased delay. Table 5.3 relates the reduction in free flow speed to the number of access points per mile and per

kilometer. Although free flow speeds on Starrs Road are not a particular concern to the Town of Yarmouth, speeds on the section of Trunk 3 east of Haley Road will be more of a concern as the area develops.

Table 5.3 - Access Points and Free Flow Speed

Number of Access Points		Reduction in Free Flow Speed	
per Mile	per Km	mph	km/h
0	0	0.0	0.0
10	6	2.5	4.0
20	12	5.0	8.0
30	19	7.5	12.1
40 +	25 +	10.0	16.1

Source: Highway Capacity Manual, Transportation Research Board, 1994

An increase in the number of traffic signals per kilometer is associated with reduced travel speeds which increase travel times. Table 5.4 relates the increase in travel time to the density of traffic signals; as shown doubling the number of signals per mile from 2 to 4 per mile increases travel times by 16 %; tripling the number of signals from 2 to 6 per mile increases travel times by 29 %.

Table 5.4 - Signal Density and Travel Times

Number of Traffic Signals		Increase in Travel Times (%)
per Mile	per Km	
2	1.2	0
3	1.9	9
4	2.5	16
5	3.1	23
6	3.7	29
7	4.3	34
8	5.0	39

Source: NCHRP Report 420, Transportation Research Board, 1999

Economic Effects

Studies of the economic effects of access management on businesses have largely focused on medians and the potential impacts of left turn restrictions on business activity. As reported in *NCHRP Report 420*, results of most studies indicate that median projects have little overall adverse impact on business activity. Some businesses report increases in sales, some report no change, and others report decreases. Destination-type businesses such as up-scale restaurants and specialty stores appear to be less sensitive to access changes than businesses that rely primarily on pass-by traffic, such as gasoline stations or convenience stores. However, the likelihood of left turns into a business declines as opposing traffic volumes increase so that medians will have relatively little effect on the number of customers making left turns into a business on high-volume roadways or during peak travel periods.

On a macro scale, closely spaced and poorly designed access connections result in reduced average travel speeds and increased travel times. Market area analysis demonstrates that increases in average travel times reduces the market area for businesses. On a micro scale minimizing the number of curb cuts, consolidating access driveways, constructing landscaped medians, and buffering parking lots from adjacent thoroughfares can create a visually pleasing and more functional corridor that, in turn, can help to attract new investment.

Environmental Effects

As noted previously, on a community scale protecting capacity on existing road ways reduces the need for new major roadways or bypass facilities and their associated adverse environmental impacts (and costs). On a corridor itself, fewer access connections increase the area for landscaping at the margin of the roadway and in the median of divided roadways which enhances the appearance of the street. Proper landscaping also helps to provide a visual cue for driveways and median openings. Median reconstruction projects, median landscaping, and median gateway treatments are an opportunity for community beautification and economic revitalization objectives.

Summary of Access Management Effects

Drawing from *NCHRP Report 420* the effects of access management are summarized in Table 5.5 which provides a ready reference for the implementation or continuation of an access management program.

Table 5.5 - Summary of Access Management Effects

Access Management Treatment	Access Management Treatment Effects		
	Collisions	Delay	Capacity
Two way left turn lane (TWLTL)	35% reduction	30% decrease	30% increase
Non-traversable median	35% reduction	30% decrease	30% increase
Replace TWLTL with a non-traversable median	15% - 57% reduction on 4-lane	not estimated	not estimated
Add a left-turn lane	up to 75% reduction at unsignalized	not estimated	25% increase
	25% - 50% reduction on 4-lane		
Left turn lane: painted Left turn lane: raised median	32% reduction 67% reduction		increased
Add a right turn lane	20% reduction		
Increase driveway speed from 5 mph to 10 mph	reduced	50% reduction	not estimated
Visual cue at driveways, driveway illumination	42% reduction	not estimated	not estimated
prohibition of on-street parking	20% - 40% reduction	not estimated	30% increase
Long signal spacing with limited access	not estimated	59% reduction	not estimated

5.3 Access Management Principles

The Transportation Research Board (TRB) states the purpose of access management is to provide vehicular access to land development in a manner that preserves the safety and efficiency of the transportation system. This is accomplished by the systematic control of the location, spacing, design, and operation of driveways, median openings, interchanges, and street connections to a roadway. It also involves roadway design applications, such as median treatments and auxiliary lanes, and the appropriate spacing of traffic signals.

Access Management Principles

The goals of access management are accomplished by applying the following principles:

1. Providing a specialized roadway system. Different types of roadways serve different functions; roadways should be designed and managed according to their primary function.
2. Limiting direct access to major roadways.
3. Promoting intersection hierarchy; designing a series of intersection types that range from the junction of two major arterial roadways to a residential driveway connecting to a local street.
4. Locating traffic signals to favor through movements. Long, uniform spacing of intersections and signals on major roadways enhances the ability to coordinate signals and ensure continuous movement of traffic at the desired speed.
5. Preserving the functional area of intersections and interchanges. Access connections too close to intersections or interchange ramps can cause serious traffic conflicts that impair their function.
6. Limiting the number of conflict points (access points). Drivers are more likely to make mistakes and have collisions when presented with the complex driving situations created by numerous accesses.
7. Separating conflict areas. Drivers need sufficient time to address one potential set of conflicts before meeting another. The necessary spacing between conflict areas increases as travel speed increases.
8. Removing turning vehicles from through-traffic lanes. Turning lanes allow drivers to decelerate out of the through lane and wait in a protected area for an opportunity to complete a turn.

Summary Access Management Guiding Principles

Access management programs seek to limit and consolidate accesses along major roadways, while promoting supporting streets and on-site circulation systems developments. The result is a roadway system that functions safely and efficiently for its useful life, as well as providing a more attractive corridor. In summary, the basic principles of access management can be achieved by:

1. Limiting the number of conflict points;
2. Separating conflict areas;
3. Reducing interference with through traffic;
4. Providing adequate on-site traffic circulation and storage.

5.4 Applications of Access Management in the Study Area

The preceding sections have outlined the principles of good access management and identified benefits to government (administration), communities, businesses, and road users. These principles have been applied to the Study Area with consideration of access management improvement possibilities for the following street and road sections:

1. Starrs Road - Main Street to Hardscratch Road / Haley Road
2. Hardscratch Road - Starrs Road to Highway 103
3. Trunk 3 - Hardscratch Road / Haley Road to Chebogue Road
4. Other existing roads (Hardscratch Road; Greenville Road; Trunk 1 - Greenville Road to Route 340; Haley Road / Argyle Street)
5. New collector and arterial streets.

Basic Access Management Principles for Existing Streets and Roads

The following general principles are basic to development of future accesses to existing collector streets and roads:

1. Commercial activity centers with unified access and circulation systems should be strongly encouraged as an alternative to strip mall development with individual driveways.
2. Properties under the same ownership, consolidated for development, or part of phased development plans, should be considered one property for the purposes of access management. Access points to such developments should be the minimum necessary to provide reasonable access.

While it is recognized that it is difficult to make significant access management changes along an existing street with substantial development, several access improvements are suggested in the following report sections.

5.4.1 Starrs Road Access Management

Starrs Road - Main Street to East of Brunswick Street

There is commercial development at the west end of Starr Road, however, driveway accesses are well separated from the Main Street signalized intersection (Photo 5.1). The section of Starrs Road easterly from here to east of the signalized Brunswick Street intersection is currently residential (Photo 5.2). There are also three residential properties on Starrs Road immediately east of Brunswick Street. As the residential properties on this section of Starrs Road are redeveloped in future years, access should be limited to one driveway per lot as illustrated in Figure 5.1. Access to the four corner lots should be from Brunswick Street, without access to Starrs Road. Shared driveways and cross property access easements should be encouraged wherever feasible, to reduce both the number of driveways and the total turning volumes, as illustrated in Figure 5.2. One driveway shared by two businesses will minimize the number of conflict points on the arterial street.

Photo 5.1 - Starrs Road westbound approach to Main Street

Photo 5.2 - Starrs Road west of Brunswick Street

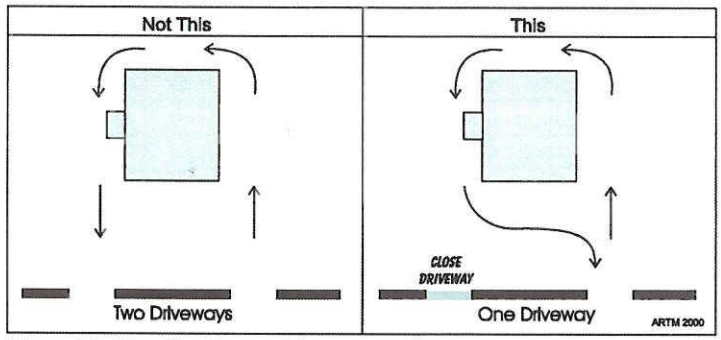


Figure 5.1 - Permit only one driveway per site.

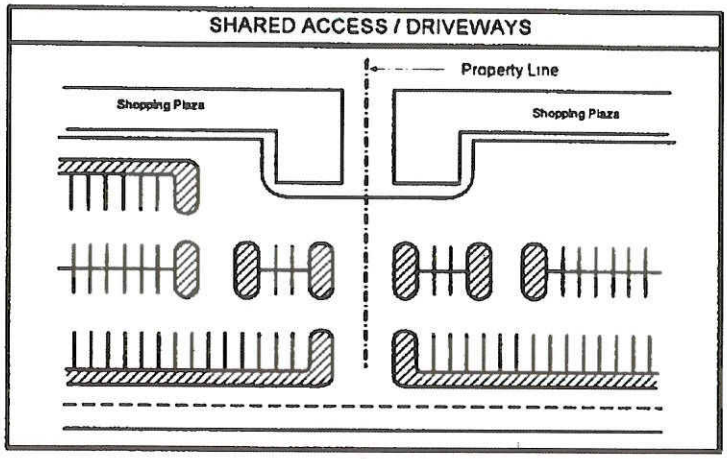


Figure 5.2 - Provide shared accesses and cross-connections.

Starrs Road - Brunswick Street to Highway 101

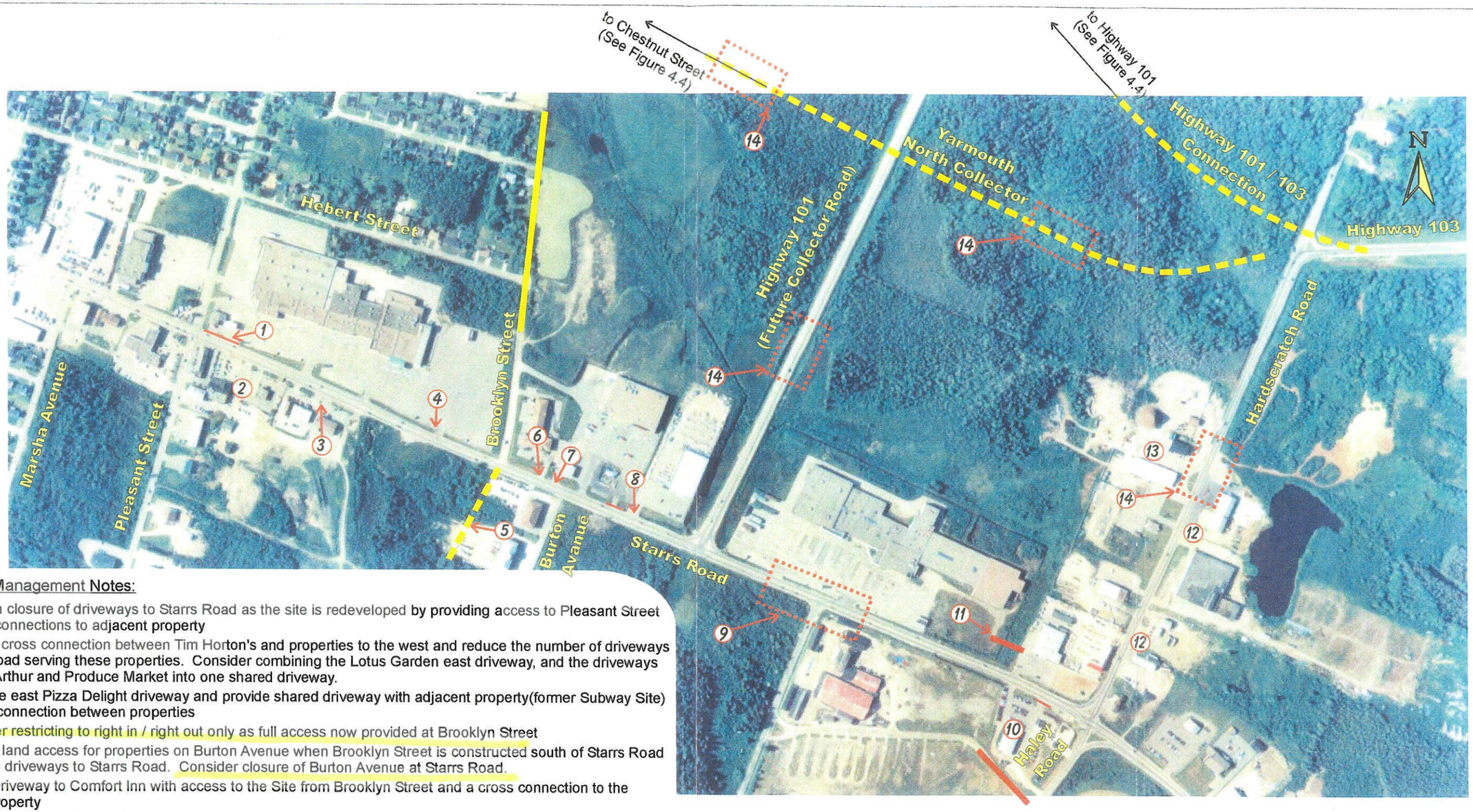
The 1.2 km section of Starrs Road from Brunswick Street to Highway 101 has 37 site access driveways, including the three residential driveways near Brunswick Street discussed above and the signalized Super Store entrance. There are also five street intersections, including the signalized Pleasant Street and Brooklyn Street intersections. Noon hour traffic counts and observations conducted at commercial accesses on Starrs Road between Pleasant Street and Highway 101, as well as at the Irving Mainway and Shoppers Drug Mart west of Pleasant Street, are included in Table 5.6.

There are a number of low volume accesses (strip mall driveways) on the south side of Starrs Road which do not significantly impact traffic operations on Starrs Road. However, other driveways, such as the former Subway driveway, were noted to have significant entering and exiting volumes during the noon peak period.

Table 5.6 - Noon Peak-Hour Driveway Volumes

Access Serving	Count Date	Maximum Volume at Driveway(s)										
		Time	Total vph	In				Out				
				East	West	Total	%	East	West	Total	%	
Goudeys Auto Sales	Sep 25 06	11:15	36	5	13	18	50	8	10	18	50	
Dollar Store & Vacant Store	Sep 12 06	11:45	39	10	4	14	36	21	4	25	64	
Jungle Jims Restaurant	Sep 12 06	11:00	33	11	16	27	82	1	5	6	18	
Hobbies, Electronics, Subway	Sep 11 06	11:45	113	26	37	63	56	40	10	50	44	
UPS, Vogue Optical, Styles	Sep 11 06	12:00	34	5	2	7	21	23	4	27	79	
Pizza Delight (shared access)	Sep 11 06	12:00	34	10	16	26	76	3	5	8	24	
Tim Hortons (2 driveways)	Sep 14 06	12:00	281	66	78	144	51	109	28	137	49	
Prince Arthur & Produce Market	Sep 25 06	11:45	61	15	19	34	56	26	1	27	44	
Lotus Gardens (2 driveways)	Sep 26 06	11:45	44			27	61			17	39	
Irving Mainway	Sep 25 06	11:45	41			16	39			25	61	
Kent Building Supplies	Sep 29 06	11:00	86	28	8	36	42	29	21	50	58	
WalMart, Staples, Superstore, Shell	Sep 29 06	11:45	771	119	233	352	46	158	261	419	54	
Shell (west driveway)	Sep 25 06	11:00	40	1	19	20	50	3	17	20	50	
Comfort Inn	Sep 25 06	12:00	5	1	1	2	40	0	3	3	60	
Yarmouth Mall (East access)	Sep 12 06	12:00	183	47	44	91	50	43	49	92	50	
Yarmouth Mall (centre access)	Sep 12 06	11:00	169	72	19	91	54	22	56	78	46	
Yarmouth Mall (West access)	Sep 11 06	11:00	174	29	66	95	55	25	54	79	45	
Shoppers Drug Mart	Sep 25 06	11:45	101			56	55			45	45	

The section of Starrs Road from Marsha Avenue to Highway 101 is included in the aerial photo reproduced in Figure 5.3. The photo is some what 'dated', however, it does provide an overview of this section of Starrs Road and indicates locations where access improvements are suggested in this section which continues on Page 49.



Access Management Notes:

1 - Maintain closure of driveways to Starrs Road as the site is redeveloped by providing access to Pleasant Street and cross connections to adjacent property

2 - Provide cross connection between Tim Horton's and properties to the west and reduce the number of driveways to Starrs Road serving these properties. Consider combining the Lotus Garden east driveway, and the driveways for Prince Arthur and Produce Market into one shared driveway.

3 - Combine east Pizza Delight driveway and provide shared driveway with adjacent property(former Subway Site) with cross connection between properties

4 - Consider restricting to right in / right out only as full access now provided at Brooklyn Street

5 - Provide land access for properties on Burton Avenue when Brooklyn Street is constructed south of Starrs Road and reduce driveways to Starrs Road. Consider closure of Burton Avenue at Starrs Road.

6 - Close Driveway to Comfort Inn with access to the Site from Brooklyn Street and a cross connection to the adjacent property

7 - Prohibit Left Turns out of Shell Driveway

8 - Consider restricting to right in / right out only as full access is possible at the signalized site driveway

9 - Consolidate land access in this area to one intersection with consideration for possible traffic signals

10 - Close east driveway on Starrs Road at Frenchy's and maintain cross connections between Frenchy's, Enterprise, and PetroCanada with driveways to Haley Road. Upgrade and improve maintenance of Mariner Center Driveway to Haley Road

11 - Provide a cross connection between Home Hardware and Empire Theaters

12 - Control wide open frontages at properties on Hardscratch Road

13 - The Department of Transportation and Public Works property has several driveways; consolidate driveways and curb wide open frontages

14 - Plan future land access in this area to connect at one intersection with consideration for possible traffic signals

0 500
meters

Figure 5.3 -
Possible Access Management Treatment
Starrs Road; Pleasant Street to Hardscratch Road
Hardscratch Road; Starrs Road to Highway 103

April 2008

Starrs Road - Brunswick Street to Highway 101 (Continued)

Immediately west of Marsha Avenue, Motor Mart has a long frontage with only one driveway to the south side of Starrs Road and the VW dealership has two driveways to the north side of Starrs Road. These examples of good access management are illustrated in Photo 5.3.

Photo 5.3 - Motor Mart and VW driveways west of Marsha Avenue.

Vacant Lot - Corner of Starrs Road and Pleasant Street

There is a vacant lot with chained entrances at the northeast corner of Starrs Road and Pleasant Street (Item 1, Figure 5.3). When this lot is redeveloped, Starrs Road driveways should remain closed and site access should be provided from Pleasant Street with cross connections to the adjacent property.

Lotus Garden, Prince Arthur, Produce Market, and Tim Hortons Entrances

Four properties on the south side of Starrs Road east of Pleasant Street have six driveways (Item 2, Figure 5.3):

1. Lotus Garden Restaurant has a driveway on Pleasant Street, and two driveways on Starrs Road, one on the west side of the building extremely close to the Pleasant Street intersection and one on the east side of the building about 35 m from Pleasant Street.
2. Prince Arthur Restaurant has a driveway.
3. The Produce Market has a poorly defined driveway.
4. Tim Hortons has two driveways. While driveway volumes are very high (Table 5.6) at noon due to their drive-through, there is sufficient stacking room on-site so that there is not a particular problem at this location.

The following access management actions are recommended:

- Restrict the Lotus Garden west driveway to right turn exit movements only;
- Consider combining the Lotus Garden east driveway, and the two driveways now serving Prince Arthur and Produce Market, to provide one shared driveway to serve the three sites.
- Create a cross connection from Tim Hortons to the adjacent Produce Market area.

Pizza Delight and former Subway Sites

The Pizza Delight and former Subway sites (Item 3, Figure 5.3) have three driveways as illustrated on Photo 5.4. The access to former Subway site, which also includes South Shore Hobbies and Aeros Electronics, had high volume at noon (Table 5.6) due to the Subway

drive-through. While it was noted that there was insufficient stacking room on-site for the Subway drive-through and that entering left- turn vehicles often had to wait in the two-way left turn lane on Starrs Road, the relocation of Subway may have eliminated this problem. It is recommended that the east driveway serving the Pizza Delight site and the driveway to the former Subway site be combined to create a shared driveway, with appropriate cross connections between the sites.

Photo 5.4 - Pizza Delight and former Subway driveways.

Yarmouth Mall - East Driveway

The completion of Brooklyn Street reconstruction and the installation of traffic signals at the Starrs Road intersection have provided an additional access opportunity for the Yarmouth Mall. Since left turning movements at the east Mall driveway (Item 4, Figure 5.3) will be better served by the signalized intersection at Brooklyn Street, consideration should be given to restricting the driveway to right-in / right-out movements.

DC Cabinets, Goudey Auto, Dollar Store and Jungle Jims

DC Cabinets has access to Burton Avenue and Goudey Auto has driveways to both Starrs Road and Burton Avenue. Dollar Store and Jungle Jims have two driveways to Starrs Road immediately west of the Brooklyn Street South alignment (Photo 5.5).

Photo 5.5 - Dollar Store and Jungle Jims driveways at Brooklyn Street.

When Brooklyn Street South is constructed (Item 5, Figure 5.3), it will be possible for the Goudey Auto and the east Dollar Store driveways be relocated to Brooklyn Street South. Also, accesses to properties on Burton Avenue could be relocated to Brooklyn Street South, and consideration given to either closure of Burton Avenue at Starrs Road or leaving Burton Avenue as a right-in / right-out intersection.

Comfort Inn Entrance

Since Comfort Inn (Item 6, Figure 5.3) has access to the newly reconstructed Brooklyn Street as well as a cross connection to the Superstore site, consideration should be given to restricting the Starrs Road driveway to right-in / right-out movements.

Shell Station

Since the Shell site (Item 7, Figure 5.3) has direct access to the signalized Superstore driveway, left turns should be prohibited at the Starrs Road driveway.

Kent Building Supplies

Since the Kent site (Item 8, Figure 5.3) has access to the signalized Superstore driveway, a cross connection easement should be negotiated and the existing Kent driveway restricted to right-in / right-out movements.

Starrs Road - Highway 101 to Hardscratch Road / Haley Road

This section of Starrs Road is quite heavily developed on the north side with a Canadian Tire Store, a redeveloped shopping mall site and a Home Hardware. The south side is not developed except for a car dealership and the Mariner Centre which access Starrs Road via Cottage Street. Land accesses, both existing and future near the Cottage Street intersection, (Item 9, Figure 5.3) should be consolidated to access Starrs Road at a signalized intersection that was recommended in a previous traffic study.

Near the corner of Starrs Road and Haley Road (Item 10, Figure 5.3) there are two driveways to Frenchy's on Starrs Road, and Enterprise Car Rental, Petro Canada (2 accesses) and Mariner Center driveways on Haley Road (Photo 5.6). The east Frenchy's driveway should be closed as it is near the Starrs Road left turn lane to Hardscratch Road. Cross connections to the Enterprise and Petro Canada sites should be maintained. Potential for driveway consolidation of the existing three Enterprise / Petro Canada driveways should investigated, with an additional cross connection to an improved Mariner driveway investigated.

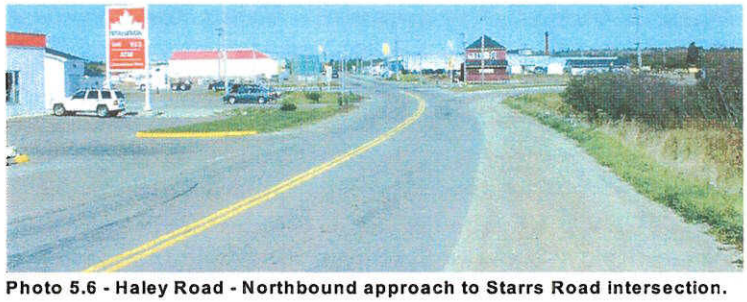


Photo 5.6 - Haley Road - Northbound approach to Starrs Road intersection.

Home Hardware and Empire Theater

A cross connection driveway should be provided between the Home Hardware and Empire Theater sites (Item 11, Figure 5.3).

5.4.2 Hardscratch Road Access Management

The approximately 750 meters long section of Hardscratch Road between Highway 103 and Starrs Road has about 16 site access driveways. Several of these driveways including the V & R Traps and NSTIR (Photo 5.7) and Auto Sales / Hardwood Flooring (Photo 5.8) have extremely wide uncontrolled paved entrances.

Photo 5.7 - V & R Traps and NSTIR driveways, Hardscratch Road.

Photo 5.8 - Wide uncontrolled paved entrance, Hardscratch Road.

Curbed entrances should be established to control the wide paved entrances (Item 12, Figure 5.3). The four accesses to the NSTIR site (Item 13, Figure 5.3) should be consolidated and narrowed with curbed entrance driveways.

5.4.3 Trunk 3 Access Management - Haley Road to Chebogue Road

This 2.3 km section of Trunk 3 illustrated on Figure 5.4 is beginning to develop and the time has arrived to establish good access management controls. The first 1.1 km of the section to about 300 m east of Reserve Road has almost continuous development along the north side of Trunk 3, while the last 1.2 km to Chebogue Road is undeveloped. While the photo is some what 'dated', it does provide an overview and a basis for further discussion of site accesses along this section of Trunk 3 which are continued on Page 55.

Access Management Notes:

1 - Close driveways to Trunk 3 for Frenchys and Winners Corner Store. Provide driveways to Reserve Road (Robinson Road). Upgrade intersection of Trunk 3 and Reserve Road and improve visibility of intersection.

0 500

meters

Figure 5.4 -
Possible Access Management Treatment
Trunk 3; Hardscratch Road to Chebouge Road

April 2008

Trunk 3 Access Management (Continued)

This section of Trunk 3 has posted speed limit of 80 km/h and the RCMP have recommended a reduction of the posted limit and pavement widening, including a left turn lane and paved shoulders. As illustrated in Photos 5.9 and 5.10, the existing pavement is narrow for a commercial area, however, there is a wide shoulder area that will provide a considerable part of the area needed for future widening.

Photo 5.9 - Trunk 3 just east of Haley Road and Hardscratch Road.

Photo 5.10 - Trunk 3 at Wilsons Gas, just west of Reserve Road.

Photo 5.11 - Reserve Road intersection and Frenchys entrance.

While most of the newer developments have only one driveway, sites between Wilsons Gas, Reserve Road and Frenchy's have wider paved openings with little access control. The following changes to access are recommended:

- The wide Wilson Gas entrances, illustrated on Photo 5.10, should be controlled by curbing.
- The wide Frenchy's entrance (Photo 5.11) could easily be relocated to Reserve Road (Item 1, Figure 5.4)
- The Winners Corner driveway which is immediately west of Reserve Road should also be relocated to Reserve Road.

Undeveloped Section of Trunk 3 between Reserve Road and Chebogue Road

The 1.2 km long section of Trunk 3 west of Chebogue Road is mostly undeveloped as illustrated in Photo 5.12. Access management recommendations for this short section of road are included in Section 5.4.4.

Photo 5.12 - Undeveloped section of Trunk 3 west of Chebogue Road.

5.4.4 Access Management on Other Existing Roads

Existing Roads will Continue to be Important Links in the Regional Transportation Network

In addition to the undeveloped section of Trunk 3 west of Chebogue Road introduced above, access on many other existing collector road sections must be managed to preserve capacity, safety and operational integrity. Existing road and street sections that warrant access management include, but are not limited to, the following:

- Trunk 3, 1.2 km section west of Chebogue Road
- Hardscratch Road, Highway 103 to Greenville Road
- Greenville Road, Hardscratch Road to Trunk 1, including the approaches to the future Highway 101 interchange ramps
- Trunk 1, Yarmouth Limit to Route 340
- Route 340, Trunk 1 to Highway 101 interchange
- Haley Road, Starrs Road to Argyle Street, including the Parade Street and Forest Street intersection areas
- Argyle Street / Hueston Street, Haley Road to Water Street.

Recommended Guidelines for Intersection and Driveway Spacing for Existing Roads

The undeveloped sections of streets and roads are in both urban and rural environments, have existing posted speed limits between 50 km/h and 80 km/h, and are generally short. While engineering judgement will be required in determining appropriate intersection and driveway spacings, the following spacings are recommended for future development on existing collector and arterial streets and roads:

- Major intersections requiring future traffic signals - 400 m
- Minor street or road intersections - 200 m
- Driveway spacing from an interchange ramp - 100 m
- High volume driveways (>200 vph PM peak) - 150 m
- Medium volume driveways (50 vph to 200 vph PM peak) - 125 m
- Low volume driveways (10 vph to 50 vph PM peak) - 75 m
- Minimum volume driveway (<10 vph PM peak) - 50 m.

5.4.5 Access Management on New Roads

Access Management Strategies should be Included in Planning for New Streets and Roads

New streets and roads have been recommended in this Study, and others will be developed over time. The following access management practices included in *NCHRP Report 420* should considered:

1. Public roadways should be classified according to function and designed and managed to preserve their functional integrity.
2. Allowable levels of access should be assigned to functionally classified roadways to preserve safety and efficiency.
3. Direct access to major regional roadways should be limited. Individual property access should not be provided to arterial roadways where alternative access is available.
4. Access to land development along major arterial roadways should be limited by use of parallel roads, side streets, and cross access easements connecting adjacent developments.
5. Access points to developments should be the minimum necessary to provide reasonable access, and not the maximum allowable for a property frontage.
6. Commercial activity centers with unified access and circulation systems should be strongly encouraged on major roadways as an alternative to strip mall development with individual driveways.
7. Driveway connections should not be permitted in the functional area of major intersections or interchanges.
8. Signalized access points should not be approved where they substantially disrupt the ability to coordinate signals and maintain effective traffic progression.
9. New residential subdivisions should include an internal street layout that connects to the streets of surrounding developments.
10. Residential subdivisions on arterial roadways should be designed so that street connections conform with access spacing standards for those roadways.

Recommended Access Management for North Yarmouth Collector

The following access management is recommended for the North Yarmouth Collector between Hardscratch Road and Pleasant Street:

1. Do not permit any direct land access from the Collector other than one full movement intersection at the approximate mid-point of the 570 meter long section between Hardscratch Road and Highway 101, planned for traffic signal control.
2. Permit two full movement intersections on the approximately 900 meter long section between Highway 101 and Pleasant Street.
3. Provide left turn lanes on the Collector at all intersections between Hardscratch Road and Pleasant Street.

Recommended Access Spacing for Other Future Collector Roads

Access to future new collector roads should only be permitted for major and minor intersections and high volume driveways. The following access spacing standards are recommended for future collector roads:

- Major intersections requiring future traffic signals on roads more

than five kilometers long - 800 m
- Major intersections requiring future traffic signals on roads less than five kilometers long - 400 m
- Minor street or road intersections - 200 m
- High volume driveways (>200 vph PM peak) - 200 m

5.5 Review of Land Use By-Law

General Provisions for all Zones

Part 5, General Provisions for All Zones, of the Land Use By-law of the Town of Yarmouth was reviewed with regards to sections dealing with access to property. As a result access management suggestions and recommendations included in previous sections of this Report, several By-law sections should be reviewed and revised as required.

Number of Accesses

5.16(A) 1) - "Maximum number of accesses shall be two, except in the case where a lot fronts on more than one street, where two accesses shall be permitted per frontage, to a total maximum number of four accesses per lot."

Developments on arterial and major collector streets should have only one driveway, as illustrated in Figure 5.1. Additional driveways may be permitted if the need is determined by a traffic engineering study. Development on a corner lot should access the minor street.

Separation Distance between Accesses

5.16(A) 3) "Minimum separation distance between accesses shall be forty (40) feet."

While a 40 foot (12 meter) access spacing may be acceptable for local streets with narrow lots, it is considerably less than that required for an arterial or major collector street as recommended above in Section 5.4.4. Access spacing requirements should be based on the street classification and the projected traffic volume for the site access. Also, the minimum access spacing should not preclude the use of shared driveways by adjacent sites as illustrated in Figure 5.2.

Driveway Separation from an Intersection

5.16(A) 4) "No access shall be located on a local street within fifty (50) feet of the limits of the rights-of-way at an intersection. No access shall be located on a collector or arterial street within seventy-five (75) feet of the limits of the rights-of-way at an intersection."

While these distances may have been satisfactory for lower volume streets, the separation distances are not great enough for high volume arterial and major collector streets that require left and right turn lanes. Driveway separation has to be determined by intersection design so that traffic entering and exiting a driveway does not cross a turning lane or obstruct vehicles queuing in a turning lane.

Accesses for Commercial and Industrial Development

5.16(C) - "In addition to the general standards outlined in Part 5.16(A), the following standards shall apply to any vehicular access or entranceway from a lot to a public street within any commercial (C-1, C-2, C-3, C-4, W-CI or CI-6) zone or within any industrial (M-1 or M-2) zone:

1) No access shall be located on a public street within five (5) feet of an abutting side lot line.

2) Entranceways shall be defined by a curb of concrete, rolled asphalt, open ditch, vegetation or other means so as to provide a definition between the street and the lot along the entire length of any lot line abutting a street."

Adjacent commercial sites should be encouraged or required to share a common driveway (Figure 5.2) provided that appropriate access easements are granted between or among property owners. The access separation and driveway design requirements in this by-law should be replaced by a by-law that encourages adjacent users to share a common driveway.

Drive-Thru Standards

5.27 - "Where a zone permits the establishment of a drive-thru, the following standards shall apply:

(5) The driveway leading to the serving area or window shall be sufficient to hold six (6) parking stalls, each having a minimum depth of twenty (20) feet (6.1 meters)."

While queuing space for six vehicles may be adequate for drive through lanes at some commercial sites, it is usually not adequate for popular coffee shops where queues often exceed 15 or 20 vehicles. Wording should be added to the by-law section to indicate that notwithstanding the six vehicle requirement, the development officer may require that the required queue length be determined by a traffic engineering study.

Minimum Lot Frontage

Minimum lot frontages are prescribed in Parts 8 to 22 of the Land Use By-law of the Town of Yarmouth based on a variety of zones. Minimum frontages vary from 40 feet (12.2 m) for semi-detached residential in Part 8; 175 feet (53.4 m) for a General Commercial C-2 zone in Part 16; and 400 feet (121.9 m) for Mobile Home Park (Part 12) and Residential Holding zones (Part 13).

While the minimum lot frontages included in the Land Use By-law appear to be reasonable for existing conditions, they may not be suitable for new high volume and higher speed collector and arterial roads that will be developed. It will be necessary to establish minimum lot frontages for commercial land uses based on road classification or for specific street sections. Engineering judgement and good land use planning principles will be required in determining appropriate minimum lot frontages.

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6.0 Public Consultation Session

Public Meeting - May 15, 2007

A Public Meeting was held in Yarmouth at the Grand Hotel on May 15, 2007. Publicity for the meeting included the following:

- Letters were sent to all elected officials, including Federal, Provincial, Town and Municipal officials;
- Letters were sent to all identified property owner who could be directly affected by proposed future road construction for the Highway 101 / 103 connector, the North Yarmouth Collector, and the Greenville Road Interchange;
- Newspaper advertisements were placed in the Vanguard, Trading Post, and Lobster Bay Shopper;
- Radio advertisements were placed on CJLS Radio.

Meeting Format

The meeting was held in a ballroom with theater type seating at the front of the room and tables for plan display at the entrance. Visitors were provided with a questionnaire to solicit comments, and fact sheet that summarized key issues that prompted the Study and preliminary recommendations for street and road improvements. After a PowerPoint presentation that included a NSTIR presentation describing benefits of roundabout intersections, there was a question period followed by 'one-on-one' discussions between the members of the public, and NSTIR officials and Consultant Team members.

About 85 to 100 People Attended the Meeting

About 85 to 100 people attended the Meeting, with 74 signing the guest book. Twenty seven completed questionnaires were returned immediately after the meeting, or by Fax. Responses are summarized in Table 6.1. Primary concerns expressed in questionnaire responses included:

- Need to connect Highway 101 and 103
- Starrs Road congestion
- Safety of various roads and intersections
- Truck access to the Port of Yarmouth
- Loss of property and timing of property acquisition
- Schedule for construction

Table 6.1 - Summary of Open House Questionnaire	
Do you live, operate a business, or own property in the study area?	Yes: 21 No: 6
*What is your **number one traffic concern** relative to this study?*	• Need to join Highways 101 and 103 (4) • What is the advantage of joining Highways 101 and 103 • Safety at current intersection of Highway 103 and Hardscratch Road (2) • Speed Limit on Hardscratch Road is too high • The two proposed rotaries on Hardscratch Road • Hardscratch Road being designated the Truck Route • Access to Water Street for Trucks • Safety at intersection of Main @ Chestnut / Vancouver • Starrs Road Traffic (2) • Traffic Congestion (2) • Safety of children on Greenville Road • Pedestrian Traffic • Loss of property • Access (2) • Development patterns at the Highway 101 / 103 connection
*What **other concerns** do you have relative to area traffic issues?*	• Time to complete project (2) • Possible need for sidewalks on Greenville Road • Starrs Road congestion (2) • Living next to a busy, noisy highway • Losing Neighbors • Flow and through traffic on Hardscratch Road • Argyle Street may need to be widened • High speeds on Hardscratch Road (2) • Property Values • Need to complete Highway 101 / 103 connection (2) • Map environmentally sensitive areas before doing preliminary alignments • Traffic volumes planned for Chestnut Street • Good flow of Trucks to the Port, without impacting tourist amenities • Cost of traveling through the swamp • Making sure businesses and homes are compensated for properties • Proposal seems excessive for Yarmouth, its not New York City • Pushing the province and federal governments for funding to get project completed soon
Please describe any thoughts, plans or recommendations that you have as solutions to these concerns.	• Setup a time line for start times for each phase and stick it so that construction does not drag on for years • Construct a roundabout on Highway 101 at the industrial park cul-de-sac and there would not be any need for an interchange at Greenville Road • Maybe offload large trucks at the airport and use smaller trucks to transport goods to local businesses • Develop a local transportation authority to operate Airport, Port, and land transportation needs of Yarmouth and Southwest Nova Scotia. One voice to lobby various levels of government • Limited access on the North Yarmouth collector • Establish wetlands to replace taken wetlands • Retain runoff before it gets into brook • Construct an overpass at Hardscratch Road instead of rotary so there is less impact on Hardscratch Road traffic • Make traffic on Chestnut Street one-way west to the hospital for emergency vehicle to get to the hospital quickly • Analyze options at intersection of Main @ Chestnut / Vancouver to ensure safety • Shifting alignment north of the bog would be common sense
Did the Public Meeting provide the information you needed or expected:	Yes: 19 No: 2 No Answer: 6

Table 6.1 is continued on the next page

Table 6.1 - Summary of Open House Questionnaire (Continued)	
What additional information would you have wanted today?	• Time line, when will property be acquired or construction occur? (3) • The number of vehicles that are using the industrial park. • The number of vehicles that want direct access between Highways 101 and 103. • More information on the configuration of access to the Port.
Additional Comments	• If plan is going to happen, get it done as soon as possible • Project is already 15 years late, don't let it drag on for another 15 years • Could the money be put to more important issues such as air passenger traffic service to Yarmouth? • What is the time line, what is a realistic expectation for completion? Do these project have the same time frame as the Barrington Bypass? • Great plan, how long before action? • If you bought land 30 years ago, why wait until now and cause commotion when you could have bought all this land • The map looks good • As a business owner, plans are on hold until improvements are done, get it done quickly • If you are needing to purchase property, do it now so that we can move on with our lives (2) • Lack of alternative transportation modes in the Yarmouth Area • Getting the project underway quicker would be better for those affected • Prioritize access to Water Street

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7.0 Summary of Recommendations

7.1 Immediate and Short Term (2008 to 2010)

Planning and Design

1. Complete detailed design and acquire right of way for the construction of the Greenville Road interchange on Highway 101.
   COST: $250,000, not including property

2. Complete detailed design and acquire right of way for the North Yarmouth Collector from Hardscratch Road to Main Street, including a controlled access section from Hardscratch Road to Pleasant Street, extension of Brooklyn Street North, upgrading Chestnut Street, and five intersections.
   COST: $400,000, not including property

3. Prepare preliminary design and acquire right of way for the Highway 101 to Highway 103 direct connection.
   COST: $500,000, not including property

4. Complete design and acquire right of way for completion of Brooklyn Street South connection to Clements Avenue.
   COST: $50,000, not including property

5. Prepare design for widening the first kilometer of Trunk 3 east of Hardscratch Road, including preparation of access management plans for existing driveways.
   COST: $70,000, not including property

6. Prepare design drawings for intersection improvements:
   - Trunk 1 and Greenville Road
   - Trunk 3 and Chebogue Road
   - Starrs Road / Hardscratch Road / Haley Road (Add left turn lanes to both Hardscratch and Haley approaches; and a right turn lane to Starrs Road westbound approach).

   COST: $100,000, not including property (three intersections)

Intersection and Street Improvements

1. Design and reconstruct Haley Road, the east end of Forest Street, Argyle Street, Hueston Street and the south end of Water Street to about 250 m north of Forest Street, including pavement widening and strengthening, and access management of business entrances, to provide the National Highway Connection from the 100 series highways to the Airport and the Port (approximately 4.8 km).
   COST $1.5 million

2. Add a truss arm with a primary head display to the Chestnut Street approach to the Main Street signalized intersection.
   COST $10,000

3. Remove bushes from the southeast quadrant of the Hardscratch Road / Greenville Road intersection. Paint a solid yellow center line for both directions of travel on the Hardscratch Road northbound approach to the intersection.
COST NIL (normal maintenance)

4. Obtain new traffic counts (May 2008) at the Starrs Road / Pleasant Street intersection; construct a westbound right turn lane on Starrs Road; replace the existing fixed time traffic signals with fully actuated signals.
COST $250,000

5. Obtain new traffic counts (May 2008) and revise the timing of the existing fixed time controllers at the Starrs Road / Brunswick Street and Starrs Road / Main Street intersections. Update clearance intervals as required.
COST $2000

6. NSTIR should complete a speed zone study for the section of Trunk 3 east of Hardscratch Road with the objective of reducing the speed limit to 60 km/h.
COST NIL (normal review process)

7. The Town of Yarmouth should work with existing businesses on Starrs Road to prepare designs and implement access management improvements on Starrs Road.
COST $100,000

Policy and Administration

1. NSTIR and the Town of Yarmouth should work together to establish access management guidelines for existing and future roads within the Town of Yarmouth that form parts of the regional primary road network and the National Highway Connection to the Port.
COST NIL

2. NSTIR and the Municipality of the District of Yarmouth should work together to establish access management guidelines for existing and future roads in the Study Area that form parts of the regional primary road network.
COST NIL

3. The Town of Yarmouth should make needed changes to the Land Use By-Law with regards to site accesses.
COST NIL

Estimated Costs 2008 to 2010

Immediate and Short Term - 2008 to 2010
TOTAL ESTIMATED COST - $3.232 MILLION

7.2 Intermediate Term Recommendations (2011 to 2017)

Planning and Design

1. Complete detailed design and reserve right of way for Clements Avenue from Forest Street to Argyle Street (700 m).
COST: $50,000, not including property

2. Complete detailed design and reserve right of way for Brooklyn Street North from the North Yarmouth Collector to meet Brooklyn Road near the Prospect Street intersection (approximately 1.0 km).
COST: $75,000, not including property

Intersection and Street Improvements

1. Construct the Greenville Road interchange ramps on Highway 101.
COST $2.5 million, not including property

2. Construct the North Yarmouth Collector from Hardscratch Road to Pleasant Street (1.5 km); upgrade Chestnut Street (800 m); construct Brooklyn Street North from Elm Street to the North Yarmouth Collector (250 m); construct five intersections, including four at intersecting roads and one west of Hardscratch Road.
COST $3.8 million, not including property

3. Design and reconstruct Hardscratch Road from the North Yarmouth Collector / Highway 103 intersection to Starrs Road, including access management of wide paved entrances (750 m).
COST $200,000

4. Reconstruct the first kilometer of Trunk 3 east of Hardscratch Road to include an eastbound left turn lane and driveway access management.
COST $700,000, not including property

5. Complete construction of the Brooklyn Street South connection to Clements Avenue (approximately 500 m).
COST $500,000, not including property

6. Construct intersection improvements at the following intersections:
   - Trunk 1 and Greenville Road (Intersection channelization and a left turn lane on Trunk 1)
   - Trunk 3 and Chebogue Road (Improve horizontal and vertical alignment)
   - Starrs Road / Hardscratch Road / Haley Road (Add left turn lanes to NB and SB approaches; add a right turn lane to the WB approach; upgrade traffic signals as required).

Town.

COST $1.0 million, not including property (three intersections)

Estimated Costs 2011 to 2017

Intermediate Term - 2011 to 2017
TOTAL ESTIMATED COST - $8.825 MILLION

7.3 Long Term Recommendations (2018 to 2027)

1. Construct the Highway 101 to Highway 103 direct connection.
   COST $10.0 million, not including property

2. Construct Clements Avenue from Forest Street to Argyle Street (approximately 700 m).
   COST $700,000, not including property

3. Construct Brooklyn Street North from the North Yarmouth Collector to meet Brooklyn Road near the Prospect Street intersection (approximately 1.0 km).
   COST $1.0 million, not including property

Estimated Costs 2018 to 2027

Long Term - 2018 to 2027
TOTAL ESTIMATED COST - $11.7 MILLION

7.4 Summary of Cost Estimates (2008 to 2027)

Total Cost Estimates 2008 to 2027

Implementation of the 20-year road improvement plan for the Yarmouth area is estimated to cost $23,757,000, not including property acquisition costs.

Improvements have been recommended over the following three terms:

• Immediate and Short Term - 2008 to 2010	$3.232 Million
• Intermediate Term - 2011 to 2017	8.825 Million
• Long Term - 2018 to 2027	11.700 Million
TOTAL - 2008 to 2027	**$23.757 Million**

Appendix A

Terms of Reference

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

Number 60128935

Yarmouth Area Transportation Study

for the

Department of Transportation and Public Works

and the

Town of Yarmouth

and the

Municipality of the District of Yarmouth

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: Janice Harland Department of Transportation and Public Works

Table of Contents

1.0 Background and Situation Overview

THE TOWN OF YARMOUTH AND THE SURROUNDING MUNICIPALITY OF THE DISTRICT OF YARMOUTH ARE LOCATED IN THE WESTERN END OF THE PROVINCE OF NOVA SCOTIA AND SERVE AS A COMMERCIAL AND SERVICE CENTRE FOR THE LARGER AREA OF SOUTHWESTERN NOVA SCOTIA. THE AREA IS ALSO A GATEWAY TO THE PROVINCE WITH PORT AND FERRY ACCESS TO THE STATE OF MAINE.

TWO PRIMARY ARTERIAL HIGHWAYS (HIGHWAY 101 AND HIGHWAY 103) ORIGINATE IN YARMOUTH BUT ARE NOT CONNECTED. WHILE IT IS DESIRABLE TO HAVE THESE TWO HIGHWAYS CONNECTED FOR CONTINUITY OF THE HIGHWAY SYSTEM, THIS LINK IS NOT CURRENTLY PLANNED TO BE CONSTRUCTED FOR SEVERAL YEARS. HOWEVER, A FUNCTIONAL PLAN IS PRESENTLY REQUIRED FOR THE HIGHWAY LINK, AND THE ASSOCIATED CONNECTION(S) TO THE LOCAL ROAD NETWORK, SO THAT THE TOWN CAN BETTER PLAN FOR THE UPGRADING AND EXPANSION OF THEIR STREET NETWORK. THE NOVA SCOTIA DEPARTMENT OF TRANSPORTATION AND PUBLIC WORKS (NSTPW), THE TOWN OF YARMOUTH AND THE MUNICIPALITY OF THE DISTRICT OF YARMOUTH ARE WORKING TOGETHER TO IDENTIFY THE 100-SERIES HIGHWAY LINK, THE PRIMARY STREET NETWORK FOR THE AREA AND THE APPROPRIATE INTERCHANGE CONNECTION(S). INCLUDED IN THIS WORK IS THE DEFINITION OF THE NATIONAL HIGHWAY SYSTEM INTERMODAL CONNECTOR TO THE PORT, ACCESS MANAGEMENT STRATEGIES FOR STARRS ROAD AND A PROPOSED FUTURE ROAD NETWORK THAT SUPPORTS THE CONTINUED EXPANSION OF DEVELOPMENT. THE STUDY AREA IS OUTLINED IN FIGURE 1.

2.0 REQUIREMENTS

2.1 BASIC REQUIREMENTS

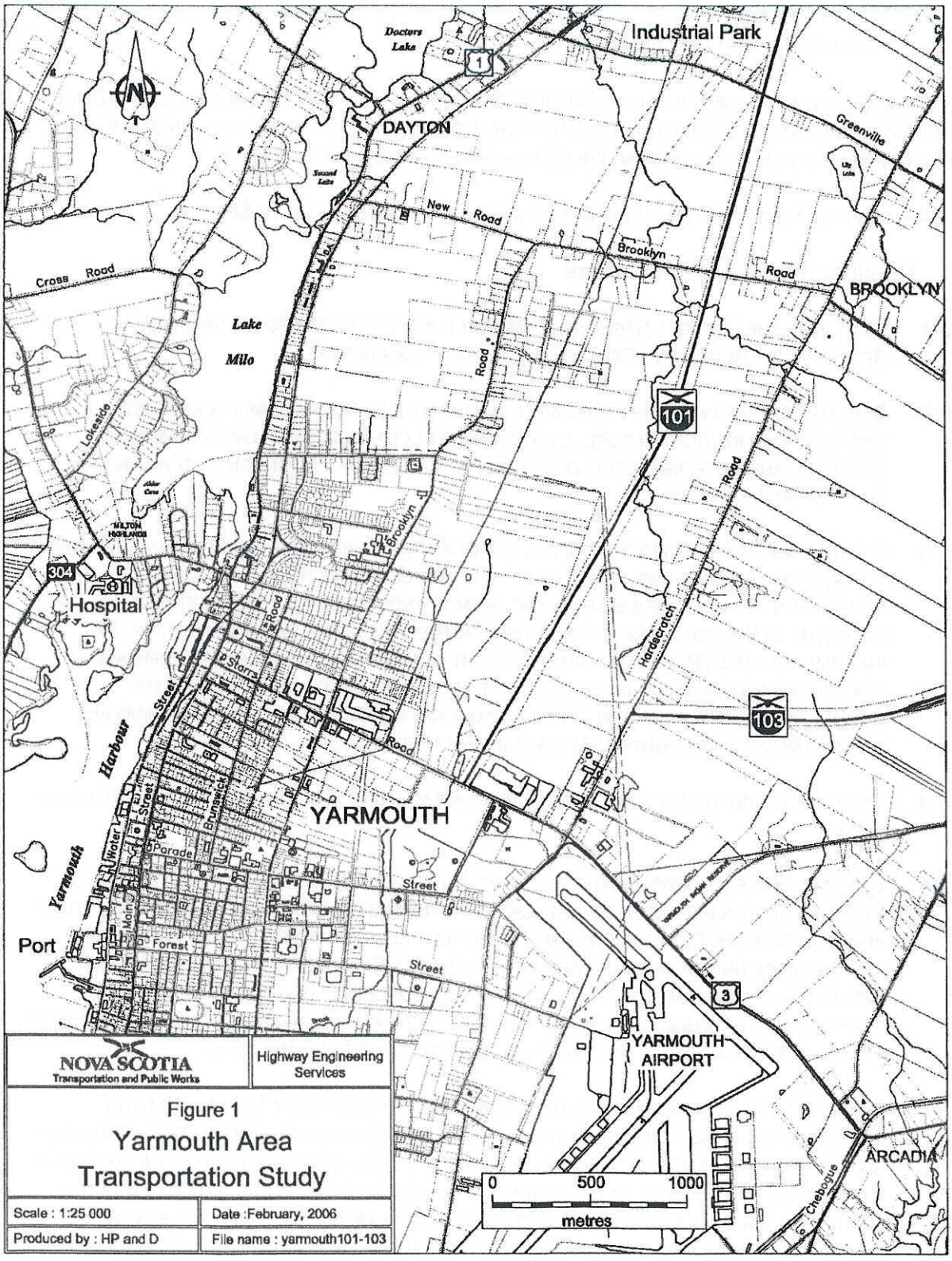
THE GENERAL STUDY AREA IS OUTLINED IN FIGURE 1. A BROADER FOCUS MAY BE REQUIRED TO DETERMINE FUTURE TRAFFIC VOLUMES AND PATTERNS. THE STUDY SHALL BE BASED UPON A TWENTY (20) YEAR TIME HORIZON.

THE PRIMARY OBJECTIVES OF THIS STUDY ARE TO:

- PREPARE FUNCTIONAL DESIGNS FOR A 100-SERIES HIGHWAY CONNECTION OF HIGHWAYS 101 AND 103 AND INTERCHANGE CONNECTION(S) TO THE AREA THAT RECOGNIZE EXISTING TOPOGRAPHY, ENVIRONMENTAL CONSTRAINTS, LAND OWNERSHIP AND LAND USES AND PROVIDE APPROPRIATE CONNECTIVITY TO THE YARMOUTH AREA.

- IDENTIFY THE PRIMARY ROAD NETWORK (EXISTING AND FUTURE INFRASTRUCTURE) IN THE TOWN OF YARMOUTH AND THE MUNICIPALITY OF THE DISTRICT OF YARMOUTH THAT WILL PROVIDE CONNECTION OF THE PORT, AIRPORT, THE HOSPITAL AND THE INDUSTRIAL PARKS TO THE 100-SERIES HIGHWAY NETWORK. IDENTIFY THE NATIONAL HIGHWAY SYSTEM INTERMODAL CONNECTION FROM THE 100-SERIES HIGHWAY SYSTEM TO THE YARMOUTH FERRY TERMINAL AND CONSIDER THE NEED AND POSSIBILITY FOR AN ADDITIONAL INTERCHANGE CONNECTION AT GREENVILLE ROAD.

- IDENTIFY ADDITIONAL SECONDARY ROADS REQUIRED TO SUPPORT THE CONTINUED DEVELOPMENT OF THE LAND BETWEEN STARRS ROAD, BROOKLYN ROAD AND HARDSCRATCH ROAD.
- PROVIDE RECOMMENDATIONS FOR ACCESS CONTROLS FOR STARRS ROAD AND TRUNK 3 (TO THE CHEBOGUE ROAD) AND ANY OTHER EXISTING ROAD THAT MAY BE PROPOSED FOR DIRECT CONNECTION TO THE 100-SERIES HIGHWAY SYSTEM.


Industrial Park
Doctors Lake
DAYTON
Greenville
New Road
Brooklyn Road
BROOKLYN
Cross Road
Lake Milo
Lakeside
Road
101
Hardscratch Road
103
304
Hospital
Harbour
Street
YARMOUTH
Water Street
Parade
Main Street
Forest Street
Port Yarmouth
YARMOUTH AIRPORT
3
ARCADIA
Chebogue
0 500 1000
metres
NOVA SCOTIA
Transportation and Public Works
Highway Engineering Services
Figure 1
Yarmouth Area
Transportation Study
Scale : 1:25 000
Date :February, 2006
Produced by : HP and D
File name : yarmouth101-103

2.2 Project Scope and Time Frames

The Consultant shall meet with the Project Steering Committee within two (2) weeks of notification of contract award. The study shall be completed and the required copies of the final report presented within five (5) months of award of contract.

The project scope is to be consistent with a project budget of up to **$80,000**.

2.3 Detailed Technical Requirements

2.3.1 Meet with the Project Steering Committee as per the schedule specified in Section 2.5 - Reporting Requirements and Procedures.

2.3.2 Become familiar with the study area including, but not necessarily limited to, existing road infrastructure, existing development, zoning, land ownership, approved and proposed developments, proposed road alignments, terrain and environmental issues.

2.3.3 Collect all road network, traffic, demographic, and other information required to estimate existing and future traffic volumes on key roads. Traffic forecasting shall consider historic trends and analysis of development potential in the local area. The Consultant shall obtain all required traffic information. (NSTPW staff and equipment is available to collect volume and classification counts and the cost of this service is to be included in the Consultant's cost proposal. The Consultant is responsible for obtaining any turning movement counts that may be required.)

2.3.4 Review all past transportation, traffic impact and land use studies for the study area.

2.3.5 Consult stakeholders identified by the project steering committee. The list of stakeholders is expected to include planning and development staff of the Town and Municipality, Department and Town traffic authorities, local commissions and agencies (including the Yarmouth and Area Chamber of Commerce), fire departments, emergency health service responders, area elected officials, ferry and other primary transportation companies/agencies and other groups or individuals identified by the Steering Committee as stakeholders.

2.3.6 Develop functional plans for the connection of Highways 101 and 103 and interchange connection(s) from the 100-series highway system to Yarmouth area roads. The result will be a plan for a primary road network that optimizes use of existing infrastructure and provides connection of the port, airport, hospital and industrial parks to the 100-series highway system. Included in this will be a definition of the National Highway System (NHS) intermodal connector from the

PORT TO THE EXISTING NHS AND CONSIDERATION OF THE NEED AND POSSIBILITY FOR AN ADDITIONAL INTERCHANGE CONNECTION AT GREENVILLE ROAD. ANTICIPATING THAT THERE MAY BE MORE THAN ONE OPTION FOR CONNECTING THE TWO HIGHWAYS AND PROVIDING AN INTERCHANGE AS PART OF THE CONNECTION, A MINIMUM OF TWO FUNCTIONAL DESIGN OPTIONS FOR THIS ASPECT OF THE PROJECT ARE TO BE CONSIDERED THE BASIS FOR THE CONSULTANT'S PROPOSAL. FUNCTIONAL DESIGNS ARE EXPECTED TO BE BASED ON MAPPING, PRESENTED AT 1:5000 OR 1:10,000 SCALES AND MUST REFLECT TOPOGRAPHIC, DEVELOPMENT AND ENVIRONMENTAL CONSTRAINTS ALONG WITH OTHER EXISTING CONDITIONS. A DETAILED ENVIRONMENTAL SCREENING IS NOT PART OF THIS SCOPE OF WORK.

2.3.7 IDENTIFY ANY INFRASTRUCTURE UPGRADING REQUIREMENTS ON EXISTING ROADS CREATED BY ANY NEW CONNECTIONS OF THE 100-SERIES HIGHWAYS. PROVIDE COST-EFFECTIVE RECOMMENDATIONS TO ADDRESS ANY PREDICTED DEFICIENCIES AT THE TIME OF CONNECTION OR IN THE FUTURE (STRUCTURAL MODIFICATIONS, LANE ADDITIONS, REALIGNMENTS, ALTERNATE ALIGNMENTS, INTERSECTION IMPROVEMENTS, ETC.) USE TRAFFIC PROJECTIONS BASED ON A 20 YEAR TIME HORIZON. DIAGRAMS ILLUSTRATING PROPOSED IMPROVEMENTS ARE EXPECTED TO BE PRESENTED AT 1:500 OR 1:1000 SCALES.

2.3.8 IDENTIFY ADDITIONAL SECONDARY ROADS REQUIRED TO SUPPORT THE CONTINUED DEVELOPMENT OF THE LAND BETWEEN STARRS ROAD, BROOKLYN ROAD AND HARDSCRATCH ROAD. FUNCTIONAL PLANS ARE EXPECTED TO BE BASED ON MAPPING AND PRESENTED AT 1:5000 OR 1:10,000 SCALES.

2.3.9 PROVIDE ACCESS MANAGEMENT RECOMMENDATIONS FOR STARRS ROAD AND TRUNK 3 (TO THE CHEBOGUE ROAD) AND ANY OTHER EXISTING ROAD THAT MAY BE PROPOSED FOR DIRECT CONNECTION TO THE 100-SERIES HIGHWAY SYSTEM. IDENTIFY OPPORTUNITIES TO CONSOLIDATE, LIMIT, RELOCATE OR RECONFIGURE EXISTING ACCESS POINTS AND IDENTIFY FUTURE ACCESS POINTS AS PART OF AN OVERALL PLAN. THE ACCESS MANAGEMENT PLAN IS TO PROVIDE DETAILS OF SPECIFIC IMPROVEMENTS AND RECOMMENDATIONS FOR GUIDELINES AND STANDARDS FOR FUTURE DEVELOPMENTS. DIAGRAMS ILLUSTRATING PROPOSED IMPROVEMENTS ARE EXPECTED TO BE PRESENTED AT 1:500 OR 1:1000 SCALES.

2.3.10 PREPARE AN INTERIM REPORT THAT INCLUDES A DESCRIPTION OF DATA COLLECTION ACTIVITIES, PROPOSED INTERCHANGE FUNCTIONAL PLANS, PRIMARY AND SECONDARY ROAD NETWORK OPTIONS AND ACCESS MANAGEMENT RECOMMENDATIONS.

2.3.11 ORGANIZE, CONDUCT AND STAFF A PUBLIC CONSULTATION SESSION. THE PURPOSE OF THE SESSION WILL BE TO PRESENT THE PROPOSED 100-SERIES HIGHWAY CONNECTION(S) AND PRIMARY ROAD NETWORK OPTIONS AND ACCESS MANAGEMENT RECOMMENDATIONS. THE CONSULTANT IS RESPONSIBLE FOR ALL COSTS ASSOCIATED WITH THE SESSION. THIS INCLUDES THE VENUE AND ALL 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 THE VANGUARD. ADVERTISEMENTS ARE TO BE OF A SIZE THAT PROVIDES FOR ALL NECESSARY DETAILS INCLUDING A BRIEF DESCRIPTION OF THE MEETING PURPOSE. IN ADDITION, A MINIMUM OF A 16 RADIO ADVERTISEMENTS ARE TO BE PLACED ON A LOCAL RADIO STATION(S).

2.3.12 CONSIDER FEEDBACK FROM THE PROJECT STEERING COMMITTEE AND THE CONSULTATION SESSION AND FINALIZE PROPOSED RECOMMENDATIONS INCLUDING COST ESTIMATES FOR ALL RECOMMENDED IMPROVEMENT MEASURES AND NEW INFRASTRUCTURE. IDENTIFY THE APPROPRIATE TIMING AND PHASING FOR THE IMPLEMENTATION OF THE RECOMMENDATIONS.

2.3.13 PREPARE A FINAL DRAFT REPORT FOR REVIEW BY THE PROJECT STEERING COMMITTEE. BE PREPARED TO PROVIDE A SECOND FINAL DRAFT, IF THE PROJECT STEERING COMMITTEE DETERMINES IT IS REQUIRED.

2.3.14 PROVIDE A FINAL REPORT SUMMARIZING ANALYSES AND RECOMMENDATIONS.

2.4 DEPARTMENT AND YARMOUTH TOWN AND MUNICIPALITY 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.

- TOWN OF YARMOUTH GENERALIZED LAND USE MAPPING
- PROVINCIAL TOPOGRAPHIC AND PROPERTY MAPPING, 1:10,000 SCALE

IN ADDITION, THE DEPARTMENT WILL REQUEST THAT AREA TRAFFIC IMPACT STUDIES BE MADE AVAILABLE TO THE SELECTED CONSULTANT.

2.4.3 PROVIDE REVIEW COMMENTS AND RESPOND TO QUESTIONS IN A TIMELY MANNER.

2.5 REPORTING REQUIREMENTS AND PROCEDURES

THE CONSULTANT SHALL MEET WITH THE PROJECT STEERING COMMITTEE IN PERSON FOR THE

PROJECT INITIATION, THE INTERIM REPORT REVIEW AND THE DRAFT FINAL REPORT REVIEW MEETINGS. OTHER MEETINGS WILL BE CONDUCTED BY CONFERENCE CALL AS REQUIRED. ALL IN PERSON MEETINGS WILL BE HELD IN THE TOWN OF YARMOUTH. THE CONSULTANT SHALL MEET WITH THE PROJECT STEERING COMMITTEE WITHIN TWO WEEKS OF NOTIFICATION OF AWARD OF CONTRACT. THE INITIAL MEETING WITH THE CONSULTANT WILL BE TO FINALIZE THE STUDY REQUIREMENTS, DATA REQUIREMENTS AND THE METHODOLOGIES TO BE USED.

THE FOLLOWING REPORTS SHALL BE REQUIRED:

THE CONSULTANT SHALL PROVIDE SEVEN (7) COPIES EACH OF THE INTERIM AND DRAFT FINAL REPORTS AND TWELVE (12) BOUND COPIES AND ONE (1) UNBOUND COPY OF THE FINAL REPORT. THE CONSULTANT SHALL ALSO HAVE A COPY ON HAND SHOULD ADDITIONAL COPIES BE REQUIRED AT SHORT NOTICE. ALL COPIES OF THE INTERIM AND FINAL REPORT SHALL BE ON LETTER SIZE PAPER AND APPROPRIATELY TITLED. THE DRAFT FINAL REPORT FOR THE STUDY MUST BE SUBMITTED FOR COMMENT AND POSSIBLE AMENDMENTS BEFORE THE FINAL VERSION IS SUBMITTED. THE CONSULTANT MUST BE PREPARED TO SUBMIT A SECOND DRAFT FINAL REPORT IF REQUIRED. THE CONSULTANT SHALL PROVIDE THREE (3) ELECTRONIC COPIES OF THE 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 FORMAT 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 REPORT SHALL INCLUDE AN EXECUTIVE SUMMARY AND A LIST OF REFERENCES. 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 REPORT.

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.

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 TRANSPORTATION AND PUBLIC WORKS, THE TOWN OF YARMOUTH AND THE MUNICIPALITY OF THE DISTRICT OF YARMOUTH. 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 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

2.8 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 % 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.

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.

2.9 CONSULTANT EXPERTISE/ELIGIBILITY

THE PROJECT TEAM SHALL HAVE EXPERIENCE AND KNOWLEDGE IN TRANSPORTATION PLANNING AS WELL AS TRAFFIC ENGINEERING AND HIGHWAY DESIGN. THE ENGINEERING PRINCIPAL SHALL BE A REGISTERED MEMBER OF 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.

2.10 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.

2.11 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.

2.12 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.

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.

UNDERSTANDING OF PROJECT AND OBJECTIVES	10 POINTS
EXPERIENCE AND EXPERTISE OF THE PROPONENT ON SIMILAR PROJECTS	10 POINTS
QUALIFICATION AND EXPERIENCE OF TEAM MEMBERS ON SIMILAR PROJECTS	25 POINTS
PROPOSED METHODOLOGY AND APPROACH	30 POINTS
PROJECT MANAGEMENT	5 POINTS
PROPOSAL QUALITY	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).
THE DEPARTMENT 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, THURSDAY, MAY 25, 2006 TO:

PUBLIC TENDERS OFFICE
6176 YOUNG STREET, SUITE 200
HALIFAX NOVA SCOTIA
B3K 2A6
TENDER: 60128935

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, THURSDAY, MAY 25, 2006 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, BUT NOT NECESSARILY BE LIMITED TO: BACKGROUND INFORMATION; A DESCRIPTION OF THE STUDY AREA; AND UNDERSTANDING OF THE PROJECT AND ITS OBJECTIVES, INCLUDING POTENTIAL KEY ISSUES.

CHAPTER 2 - QUALIFICATIONS

THIS CHAPTER SHALL INCLUDE:

- CORPORATE PROFILE(S) AND CLIENT REFERENCES. THIS SHALL BE A MAXIMUM OF THREE PAGES.
- A SUMMARY OF RELEVANT CORPORATE (INCLUDING SUB-CONSULTANT) EXPERIENCE WITHIN THE PAST 10 YEARS INCLUDING PROJECT DATES. THIS SHALL BE A MAXIMUM OF FIVE 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 THREE PAGES PER TEAM MEMBER, FOCUSING 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 2 PAGES) EXPLAINING WHY THE PROPONENT IS UNIQUELY QUALIFIED FOR THIS PROJECT.

CHAPTER 3 - METHODOLOGY

THIS CHAPTER SHALL INCLUDE, BUT NOT NECESSARILY BE LIMITED TO:

- A LIST OF ALL INFORMATION AND DATA SOURCES AVAILABLE TO THE CONSULTANT AND EXPECTED TO BE USED IN THE STUDY.
- A DETAILED WORK PLAN, IDENTIFYING PLANNED FIELD WORK AND INCLUDING INTENDED APPROACH, METHODOLOGY AND SCHEDULE FOR THE STUDY.
- A DRAFT TABLE OF CONTENTS FOR THE FINAL REPORT.

CHAPTER 4 - PROJECT MANAGEMENT

THIS CHAPTER SHALL INCLUDE, BUT NOT NECESSARILY BE LIMITED TO:

- A DISCUSSION OF QUALITY ASSURANCE/QUALITY CONTROL, COST CONTROL, SCHEDULING, INSURANCE, AND SAFETY CERTIFICATION. COPIES OF CERTIFICATES ARE NOT REQUIRED AS PART OF THE PROPOSAL, BUT SHALL BE PROVIDED BY THE SELECTED CONSULTANT PRIOR TO AWARD OF THE CONTRACT.
- 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.

ONE COPY OF THE COST PROPOSAL SHALL BE PROVIDED, SEPARATELY SEALED IN AN ENVELOPE, AND INCLUDE LABOUR COSTS, RELATED EXPENSES, PRINTING COSTS AND PROFESSIONAL SERVICES OBTAINED OUTSIDE OF THE FIRM. IN ORDER TO ASSESS LEVEL OF EFFORT, 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 THE 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

Road Section Volumes

Table B-1 - Traffic Growth Trend on Trunk 1 - Yarmouth Town Line

Year	AADT
1977	5480
1978	5390
1980	5310
1981	4900
1982	5220
1983	5740
1984	5310
1986	5730
1987	5510
1990	5780
1994	6030
1997	6190
2000	7030
2003	6270
2006	6850

Figure B-1 - Traffic Growth Trend 1978 to 2006
(Trunk 1 - 1.0 km East of Yarmouth Town Line)

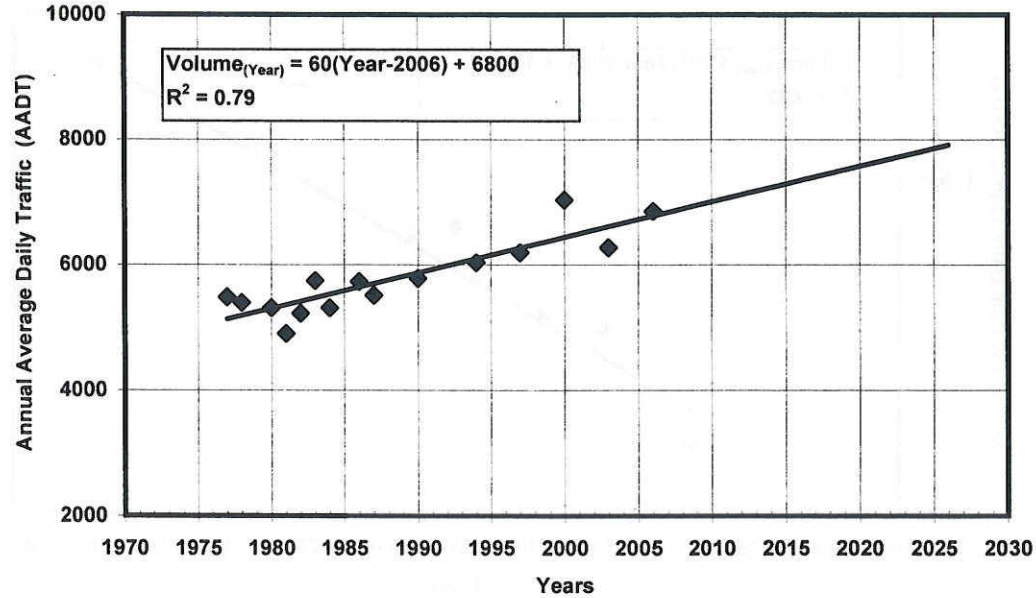


Table B-2 - Traffic Growth Trend on Trunk 3 (Starrs Road) - west of Hardscratch Rd.

Year	AADT
1984	7240
1987	8830
1990	10600
1994	10900
1997	11400
2000	13600
2003	13500
2006	12300

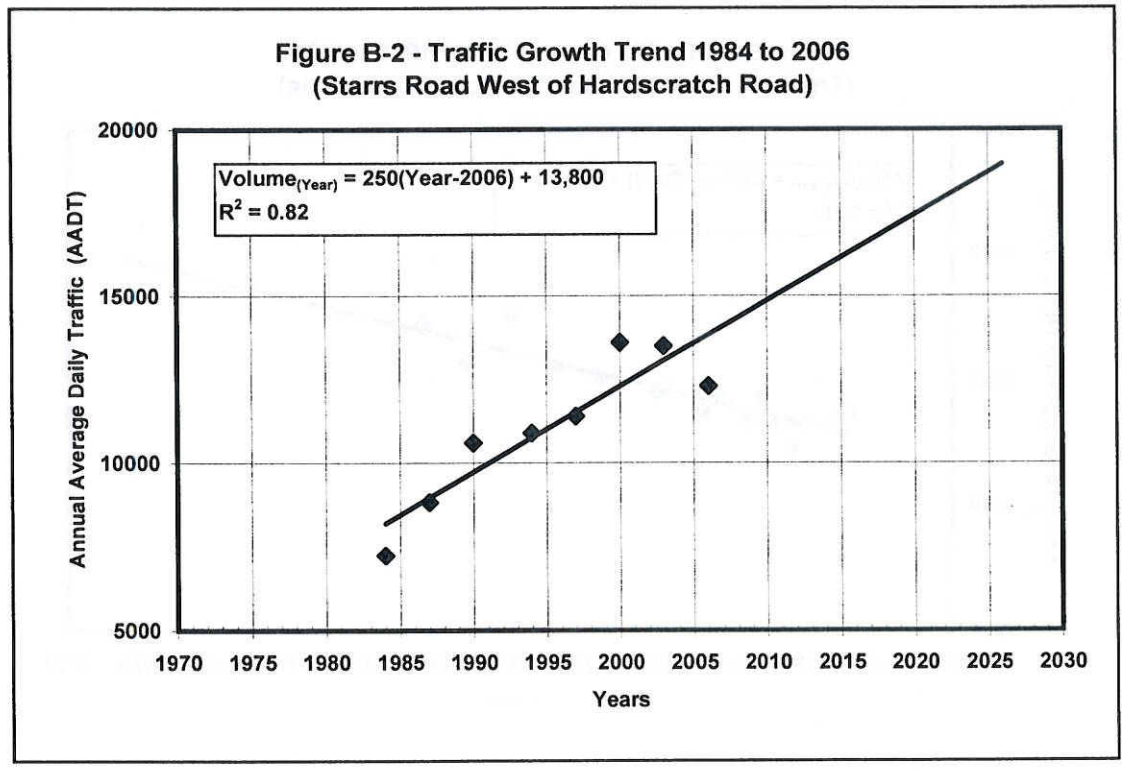


Table B-3 - Traffic Growth Trend on Trunk 3 (Starrs Road) - by Yarmouth Airport

Year	AADT
1975	5010
1976	4070
1977	4400
1978	4710
1980	4590
1981	4660
1982	4820
1983	4830
1984	5250
1986	5080
1987	5960
1990	6230
1994	6740
1997	6330
2000	8610
2003	7100
2006	7990

NOTE: Regression does not include 2000 volumes

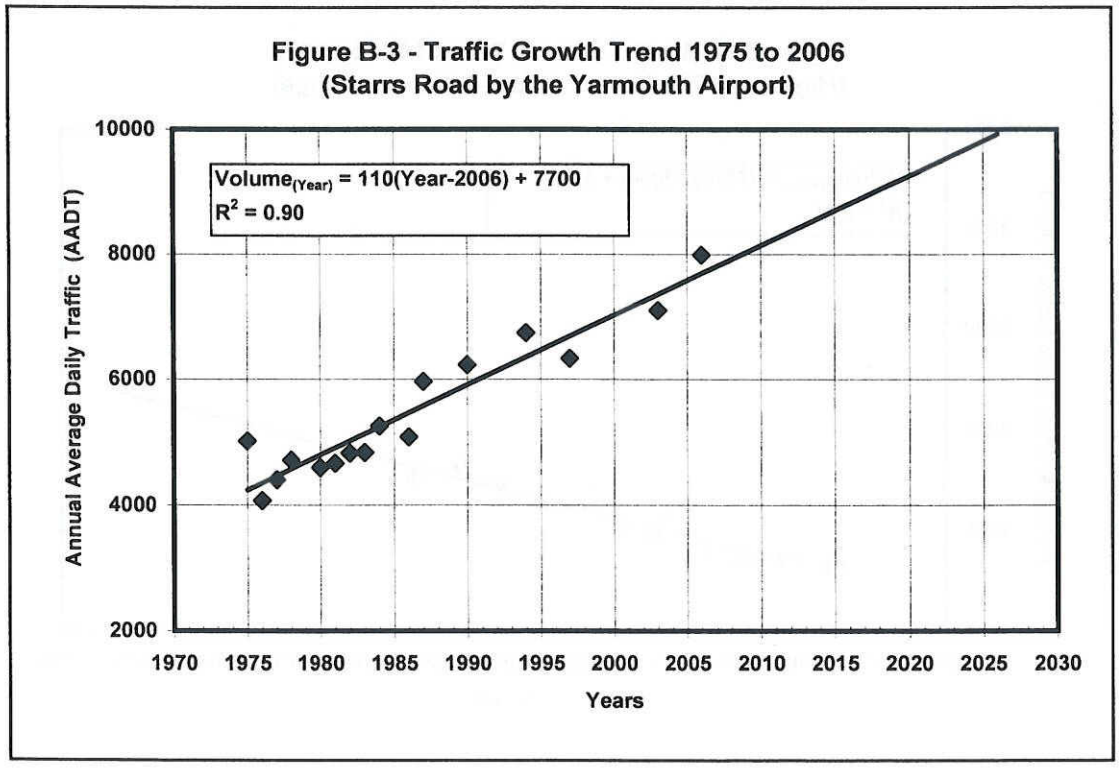


Table B-4 - Traffic Growth Trend on Highway 101 - East of Route 340 Interchange

Year	AADT
1977	1230
1978	1280
1980	1360
1981	1390
1983	1410
1984	1360
1986	1680
1989	2230
1990	1810
1992	2070
1995	2470
1997	2580
2000	2960
2003	3290
2006	3000

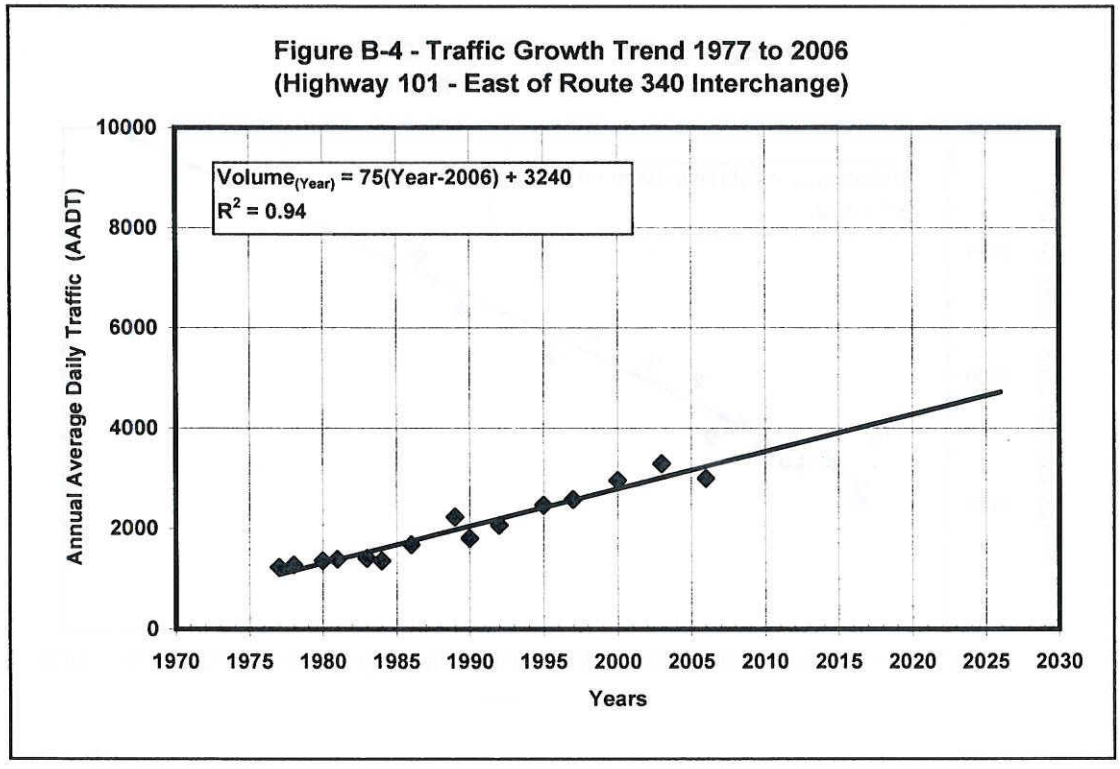


Table B-5 - Traffic Growth Trend on Highway 101 - Route 340 to Starrs Road

Year	AADT
1977	1750
1978	2020
1980	2220
1981	2110
1982	2020
1983	2260
1984	2110
1986	2220
1987	2340
1989	2940
1990	3020
1995	2620
1997	3010
2000	3380
2003	3280
2006	3340

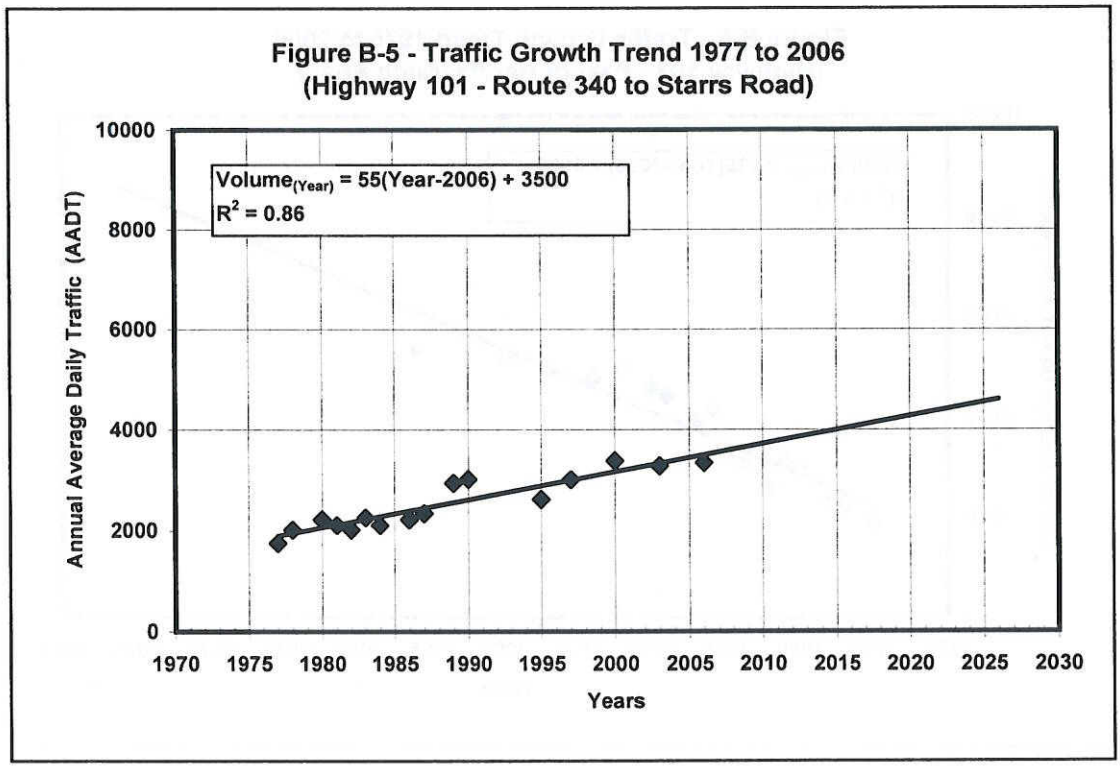


Table B-6 - Traffic Growth Trend on Highway 103 - East of Hardscratch Road

Year	AADT
1975	1870
1977	2170
1978	2320
1980	2960
1981	3080
1982	2570
1984	3030
1986	4120
1987	3910
1989	4420
1990	4550
1992	4980
1994	4750
1997	4950
2000	5200
2003	5650
2006	5320

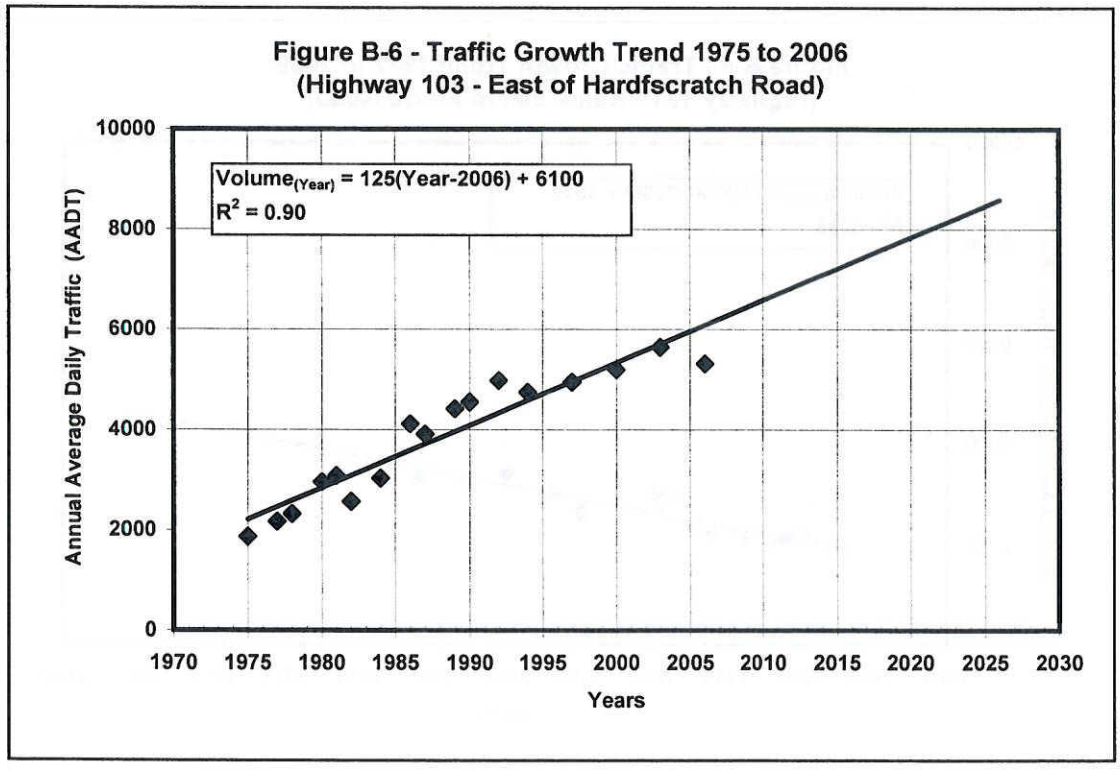


Table B-7A - Trunk 1 - Section 340 - July 12 to 19, 2000
(East of Yarmouth Town Line)

Hour	Days of the Week							Hourly Averages	
	Mon-17	Tue-18	Wed-19/12	Thu-13	Fri-14	Sat-15	Sun-16	Week	Weekday
0									
1	31	22	23	21	35	82	70	41	26
2	12	11	7	13	10	42	40	19	11
3	10	10	8	13	17	22	44	18	12
4	13	11	12	9	9	7	25	12	11
5	14	18	14	13	9	15	9	13	14
6	50	41	47	47	38	21	22	38	45
7	116	136	144	142	156	116	55	124	139
8	405	405	440	411	435	202	160	351	419
9	453	478	489	513	521	355	212	432	491
10	413	453	483	488	549	508	322	459	477
11	493	552	514	551	628	635	473	549	548
12	557	559	585	561	607	632	447	564	574
13	666	653	594	620	661	617	612	632	639
14	647	620	611	628	627	685	616	633	627
15	581	605	611	606	652	332	640	575	611
16	584	651	628	647	631	495	675	616	628
17	595	655	643	718	685	813	560	667	659
18	575	603	654	644	658	575	446	594	627
19	560	542	628	567	630	520	460	558	585
20	545	529	574	579	714	566	395	557	588
21	503	459	540	551	615	498	429	514	534
22	332	285	342	396	431	401	261	350	357
23	152	151	207	194	551	224	123	229	251
24	89	82	106	103	329	150	80	134	142
TOTALS	8396	8531	8904	9035	10198	8513	7176	8679	9013

Estimated 2000 AADT is 7030 vehicles per day

Table B-7B - Trunk 1 - Section 340 - September 9 to 15, 2003
(East of Yarmouth Town Line)

Hour	Days of the Week							Hourly Averages	
	Mon-15	Tue-09	Wed-10	Thu-11	Fri-12	Sat-13	Sun-14	Week	Weekday
0									
1	23	15	19	18	25	52	53	29	20
2	5	5	7	7	15	38	35	16	8
3	7	11	5	11	8	14	26	12	8
4	5	7	6	10	9	17	18	10	7
5	9	6	7	8	8	9	2	7	8
6	31	44	45	45	35	22	17	34	40
7	118	122	138	117	115	66	48	103	122
8	390	398	388	401	359	231	143	330	387
9	537	543	570	558	508	288	197	457	543
10	373	391	398	407	388	395	294	378	391
11	422	364	407	405	425	487	386	414	405
12	452	425	440	418	437	484	413	438	434
13	497	538	539	515	549	500	483	517	528
14	484	482	549	470	523	436	556	500	502
15	445	473	469	493	500	480	557	488	476
16	564	496	538	526	532	448	527	519	531
17	571	521	546	570	620	455	541	546	566
18	519	460	519	499	498	434	400	476	499
19	428	435	456	442	418	385	425	427	436
20	413	380	395	464	474	389	426	420	425
21	310	321	324	322	357	350	280	323	327
22	155	182	170	212	242	239	171	196	192
23	84	83	105	115	145	110	74	102	106
24	50	60	51	51	130	100	41	69	68
TOTALS	6892	6762	7091	7084	7320	6429	6113	6813	7030

NOTE: Volumes were obtained from a vehicle classification count. Estimated 2003 AADT is 6270 vehicles per day

Table B-7C - Trunk 1 - Section 340 - August 1 to 8, 2006
(East of Yarmouth Town Line)

Hour	Days of the Week							Hourly Averages	
	Mon-07	Tue-08/01	Wed-02	Thu-03	Fri-04	Sat-05	Sun-06	Week	Weekday
0									
1	37	40	32	58	58	70	82	54	46
2	19	18	30	18	14	35	40	25	20
3	9	11	15	6	7	32	36	17	10
4	5	7	5	8	12	10	31	11	8
5	20	11	12	18	7	7	12	11	12
6	24	34	32	39	46	23	16	32	37
7	100	101	124	117	129	62	60	99	114
8	277	387	382	388	457	250	165	345	400
9	318	532	542	540	566	274	228	459	542
10	384	435	506	485	494	445	317	445	471
11	462	551	529	485	566	504	438	518	536
12	479	630	583	551	660	606	507	595	611
13	522	662	668	634	648	629	588	642	655
14	536	673	678	702	598	678	660	666	665
15	522	635	631	638	635	656	611	634	635
16	508	634	616	652	635	571	564	615	634
17	484	721	671	713	779	554	587	678	721
18	475	674	580	662	641	510	576	617	646
19	468	507	516	557	524	503	506	517	522
20	477	435	534	531	523	519	560	505	492
21	362	446	491	490	423	492	432	460	459
22	221	292	346	368	277	354	300	318	315
23	111	153	173	189	185	219	153	175	171
24	76	107	106	131	154	150	91	121	121
TOTALS	6896	8696	8802	8980	9038	8153	7560	8561	8842

Monday was a Holiday; Week and weekday hourly average volumes were calculated using double Tuesday volumes
Estimated 2006 AADT is 6850 vehicles per day

Figure B-7 - Trunk 1 - East of Yarmouth Town Line
Average Weekday Hourly Volumes - 2000, 2003 and 2006

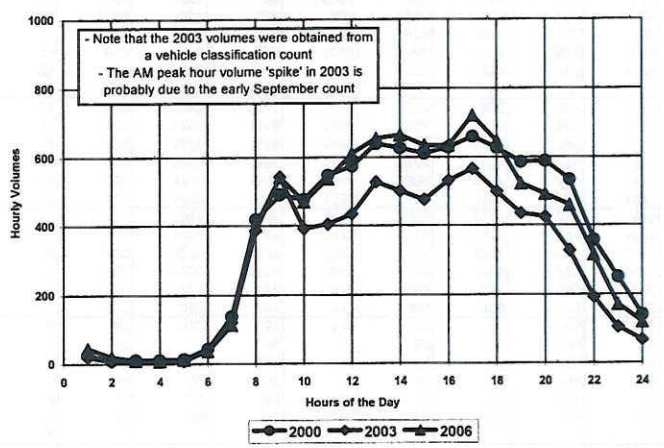


Table B-8A - Trunk 3 - Starrs Road - July 13 to 20, 2000
(East of Pleasant Street)

Hour	Days of the Week							Hourly Averages	
	Mon-17	Tue-18	Wed-19	Thu-20/13	Fri-14	Sat-15	Sun-16	Week	Weekday
0									
1	107	104	86	137	130	239	270	153	113
2	41	46	38	86	79	118	208	88	58
3	36	35	38	73	56	105	165	73	48
4	44	39	31	41	47	80	85	52	40
5	143	106	80	83	74	70	58	88	97
6	149	232	183	198	149	128	67	158	182
7	454	462	386	420	404	252	145	360	425
8	1257	1136	1068	1069	877	578	285	896	1081
9	1555	1349	1497	1272	1047	923	415	1151	1344
10	1443	1431	1401	1304	1206	1242	571	1228	1357
11	1755	1843	1529	1459	1389	1520	813	1473	1595
12	1989	1884	1590	1542	1494	1640	870	1573	1700
13	2110	2163	1779	1680	1581	1581	1053	1707	1863
14	2205	1959	1691	1604	1516	1505	1132	1659	1795
15	2028	1910	1701	1680	1658	1129	1138	1606	1795
16	1939	1784	1558	1716	1874	1695	1160	1675	1774
17	2045	1813	1702	1681	1659	1725	1072	1671	1780
18	1564	1485	1422	1435	1448	1219	1006	1368	1471
19	1378	1366	1459	1446	1433	1103	1113	1328	1416
20	1410	1189	1281	1173	1462	1147	987	1236	1303
21	1347	1281	1183	1182	1393	1278	1031	1242	1277
22	904	770	854	962	1025	934	672	874	903
23	461	384	498	527	819	615	352	522	538
24	255	235	255	326	762	500	270	372	367
TOTALS	26619	25006	23310	23094	23582	21326	14938	22554	24322

Estimated 2000 AADT is 20,000 vehicles per day

Table B-8B - Trunk 3 - Starrs Road - September 9 to 15, 2003
(East of Pleasant Street)

Hour	Days of the Week							Hourly Averages	
	Mon-15	Tue-09	Wed-10	Thu-11	Fri-12	Sat-13	Sun-14	Week	Weekday
0									
1	60	81	96	79	84	163	221	112	80
2	39	39	64	43	72	89	134	69	51
3	51	19	88	62	62	98	144	75	56
4	45	47	74	72	81	52	48	60	64
5	85	62	67	99	96	54	38	72	82
6	174	124	199	211	201	163	73	164	182
7	379	365	382	421	380	223	140	327	385
8	1019	923	1028	994	1003	570	310	835	993
9	1288	1309	1364	1354	1337	807	398	1122	1330
10	1192	1120	1227	1136	1158	1169	558	1080	1167
11	1222	1153	1187	1241	1210	1407	733	1165	1203
12	1281	1302	1340	1426	1386	1536	682	1279	1347
13	1452	1417	1535	1416	1571	1504	895	1399	1478
14	1413	1356	1386	1357	1514	1413	892	1333	1405
15	1329	1363	1343	1319	1441	1342	855	1285	1359
16	1404	1377	1475	1422	1587	1378	902	1364	1453
17	1605	1566	1542	1561	1668	1462	803	1458	1588
18	1277	1289	1383	1436	1486	1309	851	1290	1374
19	1110	1142	1269	1221	1393	1277	820	1176	1227
20	1161	1104	1215	1334	1456	1181	797	1178	1254
21	887	1003	922	1117	1272	1071	628	986	1040
22	493	621	633	694	749	759	429	625	638
23	282	273	349	356	457	545	223	355	343
24	152	204	179	199	301	456	114	229	207
TOTALS	19400	19259	20347	20570	21965	20028	11688	19037	20308

Estimated 2003 AADT is 17,900 vehicles per day

Table B-8C - Trunk 3 - Starrs Road - August 31 to September 6, 2006
(East of Pleasant Street)

Hour	Days of the Week							Hourly Averages	
	Mon-04	Tue-05	Wed-06	Thu-31	Fri-01	Sat-02	Sun-03	Week	Weekday
0									
1	72	83	92	109	121	172	188	121	98
2	42	32	60	54	65	83	131	65	49
3	18	22	46	50	59	78	139	59	40
4	20	30	23	57	54	66	55	45	39
5	18	41	53	55	56	29	29	43	49
6	47	122	131	140	122	84	43	109	127
7	117	293	281	317	309	194	83	253	299
8	273	802	772	842	852	522	286	697	814
9	380	1235	1358	1085	1056	769	423	1023	1194
10	493	1235	1227	1153	1118	1107	484	1080	1194
11	581	1454	1361	1417	1378	1312	674	1293	1413
12	733	1664	1498	1462	1498	1541	655	1426	1557
13	804	1782	1672	1523	1583	1482	867	1527	1668
14	934	1709	1570	1489	1634	1487	839	1491	1622
15	844	1642	1486	1462	1571	1530	784	1445	1561
16	870	1576	1568	1468	1599	1465	791	1435	1557
17	755	1757	1618	1580	1792	1545	858	1558	1701
18	659	1587	1437	1469	1577	1292	653	1372	1531
19	718	1307	1246	1312	1346	1254	733	1215	1304
20	736	1295	1170	1233	1385	1283	787	1207	1276
21	618	1145	958	1206	1346	1173	632	1086	1160
22	415	721	659	935	979	871	433	760	803
23	234	354	357	465	587	597	270	426	423
24	158	182	170	274	351	338	184	240	232
TOTALS	10539	22070	20813	21157	22438	20274	11021	19978	21710

Monday was a Holiday; Week and weekday hourly average volumes were calculated using double Tuesday volumes
Estimated 2006 AADT is 17,600 vehicles per day

Figure B-8 - Trunk 3 - Starrs Road - East of Pleasant Street
Average Weekday Hourly Volumes - 2000, 2003 and 2006

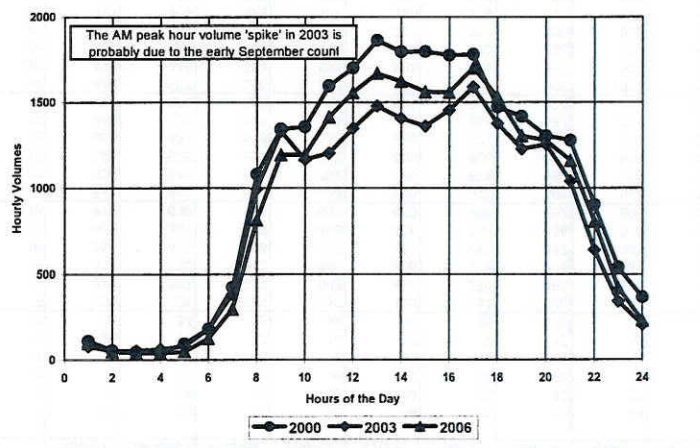


Table B-9A - Trunk 3 - Starrs Road - 2000 Counts not Available
(West of Highway 101)

Hour	Days of the Week							Hourly Averages	
	Mon-00	Tue-00	Wed-00	Thu-00	Fri-00	Sat-00	Sun-00	Week	Weekday
0									
1								0	0
2								0	0
3								0	0
4								0	0
5								0	0
6								0	0
7								0	0
8								0	0
9								0	0
10								0	0
11								0	0
12								0	0
13								0	0
14								0	0
15								0	0
16								0	0
17								0	0
18								0	0
19								0	0
20								0	0
21								0	0
22								0	0
23								0	0
24								0	0
TOTALS	0	0	0	0	0	0	0	0	0

Table B-9B - Trunk 3 - Starrs Road - September 3 to 10, 2003
(West of Highway 101)

Hour	Days of the Week							Hourly Averages	
	Mon-08	Tue-09	Wed-10/03	Thu-04	Fri-05	Sat-06	Sun-07	Week	Weekday
0									
1	54	57	60	83	84	94	211	92	68
2	63	32	41	48	29	68	105	55	43
3	47	23	45	42	33	60	100	50	38
4	63	32	75	64	42	66	32	53	55
5	86	71	80	88	65	51	34	68	78
6	141	109	148	115	125	94	44	111	128
7	388	402	419	444	384	227	79	335	407
8	1086	1034	1094	1036	944	528	317	863	1039
9	1406	1382	1367	1348	1333	789	390	1145	1367
10	1139	1114	1157	1230	1145	1149	570	1072	1157
11	1238	1153	1257	1323	1315	1416	702	1201	1257
12	1229	1217	1282	1284	1396	1506	784	1243	1282
13	1417	1281	1441	1440	1511	1519	849	1351	1418
14	1364	1288	1531	1368	1488	1554	920	1359	1408
15	1280	1301	1418	1335	1431	1392	922	1297	1353
16	1326	1363	1368	1349	1546	1400	857	1316	1390
17	1470	1472	1507	1466	1574	1472	750	1387	1498
18	1322	1234	1384	1335	1514	1197	804	1256	1358
19	1123	1093	1213	1189	1433	1175	722	1135	1210
20	1076	992	1145	1072	1436	1065	875	1094	1144
21	838	960	1045	882	1168	1118	637	950	979
22	504	556	557	513	808	662	425	575	588
23	252	219	276	253	502	388	207	300	300
24	116	173	154	153	247	281	129	179	169
TOTALS	19028	18558	20064	19460	21553	19271	11465	18486	19733

Estimated 2003 AADT is 16,300 vehicles per day

Table B-9C - Trunk 3 - Starrs Road - August 23 to 30, 2006
(West of Highway 101)

Hour	Days of the Week							Hourly Averages	
	Mon-28	Tue-29	Wed-30/23	Thu-24	Fri-25	Sat-26	Sun-27	Week	Weekday
0									
1	79	73	109	81	117	140	190	113	92
2	37	36	66	49	34	90	110	60	44
3	25	44	64	52	46	77	118	61	46
4	35	34	42	48	57	49	55	46	43
5	62	45	48	38	60	55	41	50	51
6	156	155	144	127	168	118	69	134	150
7	330	353	355	359	363	197	109	295	352
8	825	844	881	824	885	493	288	720	852
9	1105	1144	1146	1040	1083	829	392	963	1104
10	1106	1148	1081	987	1059	1078	489	993	1076
11	1356	1217	1272	1232	1281	1370	701	1204	1272
12	1407	1417	1403	1416	1371	1392	734	1306	1403
13	1538	1533	1405	1439	1546	1373	893	1390	1492
14	1475	1524	1369	1602	1486	1479	889	1403	1491
15	1427	1575	1420	1432	1507	1416	791	1367	1472
16	1435	1528	1507	1412	1557	1409	837	1384	1488
17	1454	1549	1514	1519	1631	1423	887	1425	1533
18	1317	1559	1435	1449	1491	1355	762	1338	1450
19	1201	1203	1207	1237	1395	1175	734	1165	1249
20	1012	1111	1081	1144	1314	1171	757	1084	1132
21	895	947	1054	1117	1241	1163	650	1010	1051
22	580	617	739	803	896	786	434	694	727
23	332	327	378	406	504	528	297	396	389
24	207	224	184	223	312	351	194	242	230
TOTALS	19396	20207	19903	20036	21404	19517	11421	18841	20189

Estimated 2006 AADT is 15,300 vehicles per day

Figure B-9 - Trunk 3 - Starrs Road - West of Highway 101
Average Weekday Hourly Volumes - 2003 and 2006

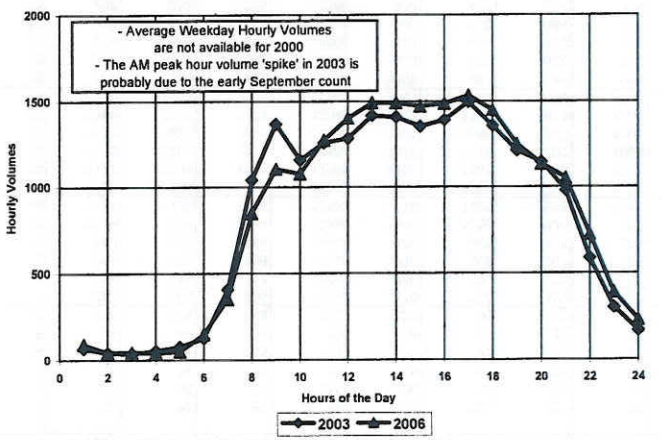


Table B-10A - Trunk 3 - Starrs Road - July 13 to 20, 2000
(West of Hardscratch Road)

Hour	Days of the Week							Hourly Averages	
	Mon-17	Tue-18	Wed-19	Thu-20/13	Fri-14	Sat-15	Sun-16	Week	Weekday
0									
1	56	66	61	65	89	187	194	103	67
2	23	29	28	46	61	91	113	56	37
3	20	28	24	49	33	70	117	49	31
4	29	26	23	34	40	55	64	39	30
5	56	77	70	71	51	41	36	57	65
6	92	139	114	117	81	81	45	96	109
7	282	277	296	329	365	222	93	266	310
8	817	775	775	841	807	439	207	666	803
9	872	876	930	912	876	630	326	775	893
10	900	899	974	943	998	1018	461	885	943
11	1030	1089	1116	1030	1086	1132	670	1022	1070
12	1078	1079	1052	1000	1142	1250	678	1040	1070
13	1189	1218	1134	1141	1117	1213	805	1117	1160
14	1214	1155	1122	1096	1133	1179	829	1104	1144
15	1172	1141	1143	1078	1108	928	773	1049	1128
16	1118	1081	1066	1117	1206	1223	772	1083	1118
17	1201	1160	1135	1175	1316	1265	700	1136	1197
18	985	1031	995	1073	1121	855	635	956	1041
19	885	868	964	1006	1074	784	693	896	959
20	849	760	856	866	1012	809	569	817	869
21	808	783	801	941	983	924	606	835	863
22	541	487	570	679	720	640	382	574	599
23	291	275	307	363	610	427	205	354	369
24	191	164	180	257	639	365	154	279	286
TOTALS	15699	15483	15736	16229	17668	15828	10127	15253	16163

Estimated 2000 AADT is 13,600 vehicles per day

Table B-10 - Trunk 3 - Starrs Road - September 3 to 10, 2003
(West of Hardscratch Road)

Hour	Days of the Week							Hourly Averages	
	Mon-08	Tue-09	Wed-10/03	Thu-04	Fri-05	Sat-06	Sun-07	Week	Weekday
0									
1	47	55	51	73	75	89	181	82	60
2	29	25	37	55	24	57	94	46	34
3	31	22	40	37	23	50	87	41	31
4	38	29	45	36	32	46	31	37	36
5	63	62	48	58	48	43	24	49	56
6	103	81	112	102	109	73	36	88	101
7	348	333	372	368	323	180	62	284	349
8	990	954	961	940	817	430	253	764	932
9	1203	1159	1146	1127	1093	687	344	966	1146
10	964	978	984	1026	969	952	509	912	984
11	982	971	1027	1063	1093	1143	658	991	1027
12	1003	987	1056	1075	1158	1159	689	1018	1056
13	1126	1075	1196	1185	1247	1125	813	1110	1166
14	1111	1047	1183	1085	1225	1198	803	1093	1130
15	1110	1042	1140	1060	1160	1127	811	1064	1102
16	1131	1130	1176	1159	1232	1123	765	1102	1166
17	1229	1269	1237	1205	1292	1173	683	1155	1246
18	1134	1081	1193	1099	1253	942	741	1063	1152
19	957	938	998	964	1088	941	677	938	989
20	904	824	926	839	1064	865	790	887	911
21	681	718	849	683	930	816	587	752	772
22	436	459	489	430	629	551	392	484	489
23	228	194	244	224	371	332	184	254	252
24	105	155	142	140	210	260	102	159	150
TOTALS	15953	15588	16652	16033	17465	15362	10316	15338	16338

Estimated 2003 AADT is13,500 vehicles per day

Table B-10C - Trunk 3 - Starrs Road - August 23 to 30, 2006
(West of Hardscratch Road)

Hour	Days of the Week							Hourly Averages	
	Mon-28	Tue-29	Wed-30/23	Thu-24	Fri-25	Sat-26	Sun-27	Week	Weekday
0									
1	59	85	82	54	98	128	150	94	76
2	28	30	51	35	26	77	91	48	34
3	16	26	49	42	45	55	100	48	36
4	23	25	35	41	41	40	46	36	33
5	34	40	35	32	39	57	31	38	36
6	116	134	119	122	124	96	66	111	123
7	263	280	295	301	310	176	113	248	290
8	728	746	782	740	766	404	226	627	752
9	910	971	956	892	919	692	301	806	930
10	884	959	914	880	880	868	435	831	903
11	1076	974	1034	1039	1048	1056	631	980	1034
12	1111	1156	1052	1133	1116	1120	653	1049	1114
13	1180	1196	1152	1193	1221	1061	784	1112	1188
14	1177	1193	1160	1256	1208	1167	774	1134	1199
15	1105	1205	1110	1166	1215	1118	701	1089	1160
16	1117	1222	1193	1166	1271	1069	719	1108	1194
17	1189	1217	1202	1254	1224	1108	821	1145	1217
18	1019	1285	1151	1146	1165	1025	683	1068	1153
19	964	931	981	974	1059	887	633	918	982
20	807	882	943	912	1058	870	626	871	920
21	678	683	833	880	921	838	558	770	799
22	486	458	564	640	697	570	364	540	569
23	258	283	295	326	404	401	264	319	313
24	166	189	157	182	265	264	150	196	192
TOTALS	15394	16170	16145	16406	17120	15147	9920	15186	16247

Estimated 2006 AADT is 12,300 vehicles per day

Figure B-10 - Trunk 3 - Starrs Road - West of Hardscratch Road
Average Weekday Hourly Volumes - 2000, 2003 and 2006

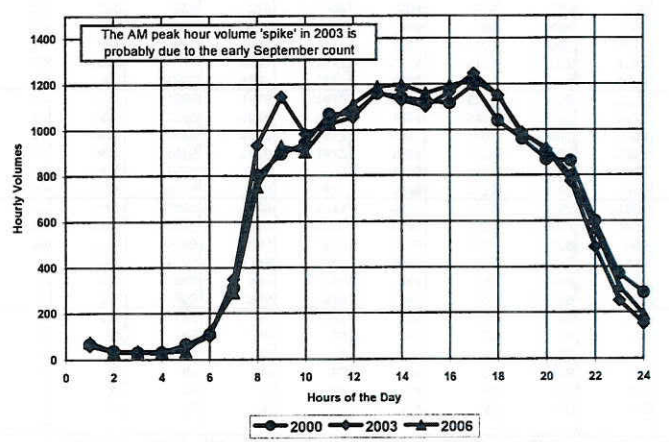


Table B-11A - Trunk 3 - Starrs Road - July 13 to 20, 2000
(East of Hardscratch Road)

Hour	Days of the Week							Hourly Averages	
	Mon-17	Tue-18	Wed-19	Thu-20/13	Fri-14	Sat-15	Sun-16	Week	Weekday
0									
1	40	50	41	54	68	132	131	74	51
2	12	20	20	26	35	65	69	35	23
3	7	13	11	18	11	42	81	26	12
4	14	11	11	19	16	27	37	19	14
5	39	48	47	52	25	25	24	37	42
6	46	68	53	68	38	29	31	48	55
7	162	163	188	198	193	127	63	156	181
8	502	505	488	534	505	220	127	412	507
9	498	565	557	534	536	385	205	469	538
10	505	520	591	544	560	570	289	511	544
11	636	570	649	604	663	639	462	603	624
12	649	658	601	600	701	735	430	625	642
13	745	740	661	688	720	668	612	691	711
14	802	670	704	683	752	783	623	717	722
15	703	678	727	717	694	560	605	669	704
16	679	679	691	697	737	758	572	688	697
17	783	679	723	720	859	759	526	721	753
18	679	655	644	699	708	550	462	628	677
19	572	610	616	680	687	520	502	598	633
20	568	543	557	599	673	561	380	554	588
21	550	530	490	597	636	568	402	539	561
22	390	353	403	493	457	425	306	404	419
23	230	182	199	266	470	277	168	256	269
24	133	96	132	150	454	247	117	190	193
TOTALS	9944	9606	9804	10240	11198	9672	7224	9670	10158

Estimated 2000 AADT is 8610 vehicles per day

Table B-11B - Trunk 3 - Starrs Road - September 3 to 10, 2003
(East of Hardscratch Road)

Hour	Days of the Week							Hourly Averages	
	Mon-08	Tue-09	Wed-10/03	Thu-04	Fri-05	Sat-06	Sun-07	Week	Weekday
0									
1	22	38	29	38	42	53	100	46	34
2	17	14	13	24	12	33	52	24	16
3	15	12	8	10	13	31	57	21	12
4	20	14	28	19	19	33	13	21	20
5	27	28	17	25	30	13	18	23	25
6	48	37	55	43	46	37	16	40	46
7	183	167	190	179	159	76	38	142	176
8	526	511	543	497	446	201	150	411	505
9	612	586	557	618	592	369	214	507	593
10	463	454	540	503	516	469	289	462	495
11	482	488	601	534	530	549	377	509	527
12	503	495	621	485	568	532	427	519	534
13	547	574	543	550	585	531	486	545	560
14	536	542	557	568	593	611	468	554	559
15	546	543	540	557	575	562	526	550	552
16	574	580	601	591	613	540	466	566	592
17	641	676	621	615	634	562	472	603	637
18	598	604	571	581	677	515	429	568	606
19	551	530	548	501	564	504	458	522	539
20	482	467	484	484	530	459	449	479	489
21	375	388	412	387	481	447	365	408	409
22	260	288	279	281	359	292	275	291	293
23	147	142	167	129	240	190	113	161	165
24	63	92	76	95	115	143	68	93	88
TOTALS	8238	8270	8601	8314	8939	7752	6326	8063	8472

NOTE: Volumes were obtained from a vehicle classification count. Estimated 2003 AADT is 7100 vehicles per day

Table B-11C - Trunk 3 - Starrs Road - August 23 to 30, 2006
(East of Hardscratch Road)

Hour	Days of the Week							Hourly Averages	
	Mon-28	Tue-29	Wed-30/23	Thu-24	Fri-25	Sat-26	Sun-27	Week	Weekday
0									
1	43	58	61	50	77	89	118	71	58
2	27	29	32	30	14	55	62	36	26
3	9	20	37	23	34	43	54	31	25
4	13	25	20	30	29	31	42	27	23
5	28	22	22	25	29	26	16	24	25
6	73	63	68	79	85	61	32	66	74
7	157	189	202	214	210	110	53	162	194
8	463	491	482	455	448	249	144	390	468
9	634	640	655	643	584	409	195	537	631
10	540	611	585	536	565	517	312	524	567
11	665	623	646	629	667	652	468	621	646
12	669	792	727	719	729	686	480	686	727
13	705	790	703	692	773	676	551	699	733
14	814	825	732	760	816	703	572	746	789
15	761	769	758	773	793	659	574	727	771
16	723	769	715	717	830	640	597	713	751
17	800	827	784	839	769	602	574	742	804
18	699	810	774	764	745	594	496	697	758
19	644	649	668	621	636	516	460	599	644
20	527	586	609	607	642	555	420	564	594
21	415	428	556	584	591	475	388	491	515
22	340	321	358	403	427	391	300	363	370
23	190	184	208	231	290	250	195	221	221
24	92	125	107	115	162	173	103	125	120
TOTALS	10031	10646	10509	10539	10945	9162	7206	9863	10534

Estimated 2006 AADT is 7990 vehicles per day

Figure B-11 - Trunk 3 - Starrs Road - East of Hardscratch Road
Average Weekday Hourly Volumes - 2000, 2003 and 2006

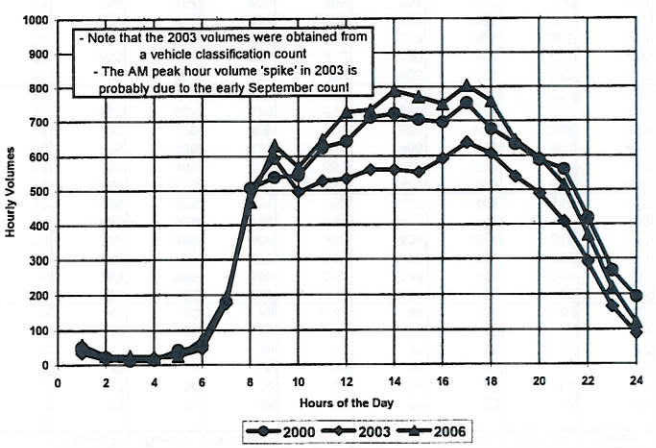


Table B-12A - Trunk 3 - Section 330 - 2000 Count Not Available
(West of Cheboque Road)

Hour	Days of the Week							Hourly Averages	
	Mon-00	Tue-00	Wed-00	Thu-00	Fri-00	Sat-00	Sun-00	Week	Weekday
0									
1								0	0
2								0	0
3								0	0
4								0	0
5								0	0
6								0	0
7								0	0
8								0	0
9								0	0
10								0	0
11								0	0
12								0	0
13								0	0
14								0	0
15								0	0
16								0	0
17								0	0
18								0	0
19								0	0
20								0	0
21								0	0
22								0	0
23								0	0
24								0	0
TOTALS	0	0	0	0	0	0	0	0	0

Table B-12B - Trunk 3 - Section 330 - 2003 Count Not Available
(West of Cheboque Road)

Hour	Days of the Week							Hourly Averages	
	Mon-00	Tue-00	Wed-00	Thu-00	Fri-00	Sat-00	Sun-00	Week	Weekday
0									
1								0	0
2								0	0
3								0	0
4								0	0
5								0	0
6								0	0
7								0	0
8								0	0
9								0	0
10								0	0
11								0	0
12								0	0
13								0	0
14								0	0
15								0	0
16								0	0
17								0	0
18								0	0
19								0	0
20								0	0
21								0	0
22								0	0
23								0	0
24								0	0
TOTALS	0	0	0	0	0	0	0	0	0

Table B-12C - Trunk 3 - Section 330 - August August 1 to 7, 2006
(West of Cheboque Road)

Hour	Days of the Week							Hourly Averages	
	Mon-07	Tue-01	Wed-02	Thu-03	Fri-04	Sat-05	Sun-06	Week	Weekday
0									
1	39	54	44	74	61	63	94	61	54
2	27	20	20	22	24	48	59	31	23
3	26	9	25	18	15	30	63	27	19
4	7	13	18	11	16	20	37	17	13
5	19	25	20	23	23	17	8	19	22
6	41	40	45	48	46	30	20	39	44
7	126	151	130	142	131	68	55	115	136
8	233	365	356	351	348	208	113	282	331
9	330	452	473	479	439	312	165	379	435
10	336	383	409	408	434	385	239	371	394
11	450	399	410	434	433	469	362	422	425
12	399	456	431	432	447	465	418	435	433
13	460	469	486	484	471	489	406	466	474
14	501	491	509	533	458	510	405	487	498
15	415	436	493	488	488	463	391	453	464
16	422	479	496	508	500	431	338	453	481
17	427	521	530	534	580	479	355	489	518
18	402	544	513	567	560	437	375	485	517
19	425	463	449	466	405	376	372	422	442
20	401	422	412	472	420	364	421	416	425
21	337	358	418	373	373	394	325	368	372
22	228	339	322	393	305	333	262	312	317
23	126	154	206	205	206	312	155	195	179
24	71	100	134	124	167	190	99	126	119
TOTALS	6248	7143	7349	7589	7350	6893	5537	6873	7136

Note that the 2006 volumes were obtained from a vehicle classification count
Estimated 2006 AADT is 6400 vehicles per day

Figure B-12 - Trunk 3 West of Cheboque Road
Average Weekday Hourly Volumes - 2006

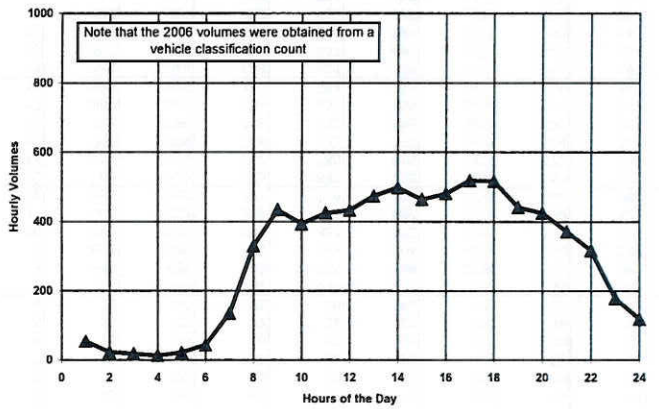


Table B-13A - Highway 101 Section 290 - July 13 to 20, 2000
(East of Route 340 - EXIT 34 - Interchange)

Hour	Days of the Week							Hourly Averages	
	Mon-17	Tue-18	Wed-19	Thu-20/13	Fri-14	Sat-15	Sun-16	Week	Weekday
0									
1	16	13	17	17	29	32	43	24	18
2	6	9	6	9	19	9	11	10	10
3	5	12	8	16	9	11	9	10	10
4	18	22	20	14	25	33	10	20	20
5	35	32	38	35	46	29	18	33	37
6	45	67	42	53	41	50	10	44	50
7	91	118	86	105	114	57	19	84	103
8	210	224	234	213	220	99	65	181	220
9	215	240	241	247	224	161	77	201	233
10	239	246	273	267	237	249	119	233	252
11	272	289	266	272	288	298	186	267	277
12	252	232	249	243	272	263	199	244	250
13	231	244	295	242	218	245	209	241	246
14	262	233	278	231	286	288	228	258	258
15	249	216	239	260	243	223	184	231	241
16	251	265	221	278	282	264	193	251	259
17	274	280	289	316	321	263	175	274	296
18	255	287	257	320	292	202	146	251	282
19	192	223	217	271	271	186	199	223	235
20	151	152	151	180	209	158	142	163	169
21	180	145	121	193	187	189	166	169	165
22	105	120	107	128	142	130	100	119	120
23	62	68	46	69	105	59	44	65	70
24	39	33	41	58	155	78	27	62	65
TOTALS	3655	3770	3742	4037	4235	3576	2579	3656	3888

Estimated 2000 AADT is 2960 vehicles per day

Table B-13B - Highway 101 Section 290 - September 10 to 17, 2003
(East of Route 340 - EXIT 34 - Interchange)

Hour	Days of the Week							Hourly Averages	
	Mon-15	Tue-16	Wed-17/10	Thu-11	Fri-12	Sat-13	Sun-14	Week	Weekday
0									
1	14	19	28	12	9	16	27	18	16
2	17	12	16	12	10	14	12	13	13
3	20	7	23	10	10	13	15	14	14
4	32	41	20	25	38	24	8	27	31
5	24	29	34	45	25	5	4	24	31
6	57	39	30	49	49	34	8	38	45
7	119	123	106	121	103	39	26	91	114
8	252	287	293	284	301	102	61	226	283
9	323	323	336	336	302	141	94	265	324
10	251	238	238	226	238	180	198	224	238
11	215	194	216	220	233	233	173	212	216
12	189	208	204	214	231	224	171	206	209
13	222	218	198	210	247	234	200	218	219
14	268	220	239	227	208	196	209	224	232
15	220	200	252	233	290	195	191	226	239
16	251	251	282	255	325	248	186	257	273
17	306	319	328	308	325	233	297	302	317
18	279	283	306	347	271	252	225	280	297
19	215	191	217	224	243	222	150	209	218
20	141	160	160	176	205	199	149	170	168
21	109	121	127	174	172	135	160	143	141
22	63	84	88	95	129	112	84	94	92
23	24	48	48	58	68	110	38	56	49
24	27	24	37	41	55	80	19	40	37
TOTALS	3638	3639	3826	3902	4087	3241	2705	3577	3818

Estimated 2003 AADT is 3290 vehicles per day

Table B-13C - Highway 101 Section 290 - August 1 to 8, 2006
(East of Route 340 - EXIT 34 - Interchange)

Hour	Days of the Week							Hourly Averages	
	Mon-07	Tue-08/01	Wed-02	Thu-03	Fri-04	Sat-05	Sun-06	Week	Weekday
0									
1	27	18	18	30	19	43	53	28	21
2	11	6	23	7	18	19	17	14	12
3	22	15	9	17	18	15	21	16	15
4	13	7	12	9	25	19	8	12	12
5	15	13	18	26	16	4	4	13	17
6	28	41	54	58	64	37	14	44	52
7	76	71	88	94	93	38	25	69	83
8	105	187	169	185	229	115	84	165	191
9	127	211	225	232	217	128	86	187	219
10	180	233	227	258	252	210	122	219	241
11	214	270	245	252	254	205	201	242	258
12	288	276	272	256	283	252	260	268	273
13	192	249	208	269	271	238	253	248	249
14	248	292	252	320	303	255	242	279	292
15	186	276	262	281	285	251	218	264	276
16	195	269	239	274	294	219	177	249	269
17	198	288	291	304	326	215	253	281	299
18	190	275	277	282	303	205	248	266	282
19	190	210	238	272	269	200	263	237	240
20	143	148	166	147	200	173	207	170	162
21	117	122	149	159	182	166	179	154	147
22	105	148	148	181	162	146	142	154	157
23	60	55	97	115	120	163	65	96	88
24	34	48	47	84	113	126	72	77	68
TOTALS	2964	3728	3734	4112	4316	3442	3214	3753	3924

Monday was a Holiday; Week and weekday hourly average volumes were calculated using double Tuesday volumes
Estimated 2006 AADT is 3000 vehicles per day

Figure B-13 - Highway 101 East of Route 340
Average Weekday Hourly Volumes - 2000, 2003, and 2006

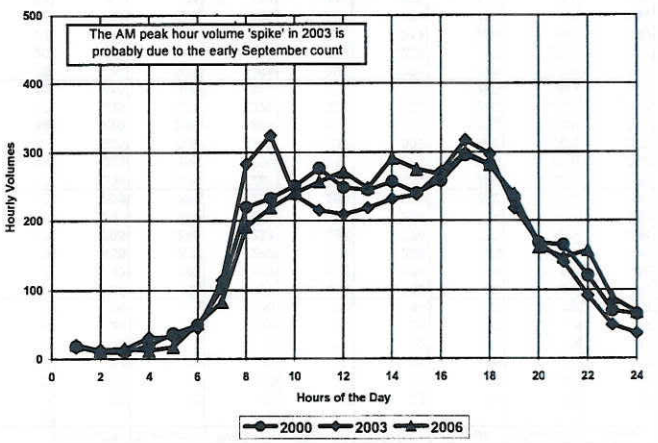


Table B-14A - Highway 101 Section 300 - July 13 to 20, 2000
(East of Trunk 3 - Starrs Road)

Hour	Days of the Week							Hourly Averages	
	Mon-17	Tue-18	Wed-19	Thu-20/13	Fri-14	Sat-15	Sun-16	Week	Weekday
0									
1	14	20	18	21	29	47	55	29	20
2	5	6	10	14	22	16	18	13	11
3	7	14	11	19	7	12	18	13	12
4	15	18	25	11	24	45	15	22	19
5	36	33	34	29	50	28	15	32	36
6	42	68	54	62	53	54	12	49	56
7	95	122	88	108	130	64	30	91	109
8	235	264	251	245	236	115	65	202	246
9	272	281	311	274	293	177	97	244	286
10	266	255	285	297	255	297	111	252	272
11	279	301	258	258	320	344	213	282	283
12	286	275	256	315	272	310	204	274	281
13	255	259	312	314	261	269	212	269	280
14	307	273	312	270	288	326	235	287	290
15	266	232	284	272	286	298	183	260	268
16	287	295	256	294	320	387	184	289	290
17	308	333	325	346	368	293	187	309	336
18	299	330	317	368	345	238	147	292	332
19	246	252	264	316	297	224	203	257	275
20	179	183	163	221	247	172	149	188	199
21	214	201	155	228	215	202	167	197	203
22	143	158	126	162	168	161	98	145	151
23	81	83	66	84	181	92	55	92	99
24	57	40	46	82	171	97	35	75	79
TOTALS	4194	4296	4227	4610	4838	4268	2708	4163	4433

Estimated 2000 AADT is 3380 vehicles per day

Table B-14B - Highway 101 Section 300 - September 3 to 10, 2003
(East of Trunk 3 - Starrs Road)

Hour	Days of the Week							Hourly Averages	
	Mon-08	Tue-09	Wed-10/03	Thu-04	Fri-05	Sat-06	Sun-07	Week	Weekday
0									
1	16	14	18	16	25	28	28	21	18
2	30	17	8	14	6	13	19	15	15
3	16	9	12	17	12	14	17	14	13
4	32	16	41	27	14	22	4	22	26
5	20	44	32	33	31	34	11	29	32
6	38	26	40	41	18	24	11	28	33
7	135	120	116	129	91	50	21	95	118
8	320	317	315	274	237	138	65	238	293
9	366	367	366	361	370	173	80	298	366
10	200	209	223	246	238	227	152	214	223
11	223	250	252	273	260	289	211	251	252
12	174	209	242	225	265	268	234	231	223
13	232	210	272	221	300	253	227	245	247
14	216	250	268	241	291	276	182	246	253
15	224	254	288	264	238	229	198	242	254
16	230	251	261	283	304	235	194	251	266
17	354	327	322	341	345	241	186	302	338
18	348	377	360	325	320	242	229	314	346
19	194	231	222	246	312	233	233	239	241
20	172	175	180	189	213	184	268	197	186
21	136	185	182	174	216	186	160	177	179
22	98	126	124	105	176	132	100	123	126
23	57	41	56	64	122	97	61	71	68
24	16	31	39	39	50	55	36	38	35
TOTALS	3847	4056	4239	4148	4454	3643	2927	3902	4149

Estimated 2003 AADT is 3280 vehicles per day

Table B-14C - Highway 101 Section 300 - August 1 to 8, 2006
(East of Trunk 3 - Starrs Road)

Hour	Days of the Week							Hourly Averages	
	Mon-07	Tue-08/01	Wed-02	Thu-03	Fri-04	Sat-05	Sun-06	Week	Weekday
0									
1	33	18	16	37	32	54	49	32	24
2	17	6	20	8	24	22	27	16	13
3	24	13	15	17	23	18	22	17	16
4	13	7	15	11	23	17	18	14	13
5	23	16	24	30	28	10	6	19	23
6	26	48	59	70	67	42	13	50	58
7	90	82	97	111	100	48	22	77	94
8	132	189	185	208	268	114	80	176	208
9	158	202	242	246	228	165	105	199	224
10	205	242	221	284	274	243	131	234	253
11	237	289	263	274	280	234	218	264	279
12	262	291	281	263	320	282	254	283	289
13	208	254	262	318	320	288	265	280	282
14	263	309	290	315	323	290	274	302	309
15	235	286	268	285	305	302	203	276	286
16	220	299	264	312	322	253	161	273	299
17	255	331	325	332	335	239	255	307	331
18	215	306	348	322	351	255	230	303	327
19	227	237	268	297	291	275	274	268	266
20	159	202	227	223	236	217	212	217	218
21	159	147	195	168	211	200	191	180	174
22	139	186	195	201	181	192	145	184	190
23	68	71	111	148	165	195	82	120	113
24	40	66	71	78	129	131	74	88	82
TOTALS	3408	4097	4262	4558	4836	4086	3311	4178	4370

Monday was a Holiday; Week and weekday hourly average volumes were calculated using double Tuesday volumes
Estimated 2006 AADT is 3340 vehicles per day

Figure B-14 - Highway 101 East of Starrs Road
Average Weekday Hourly Volumes - 2000, 2003 and 2006

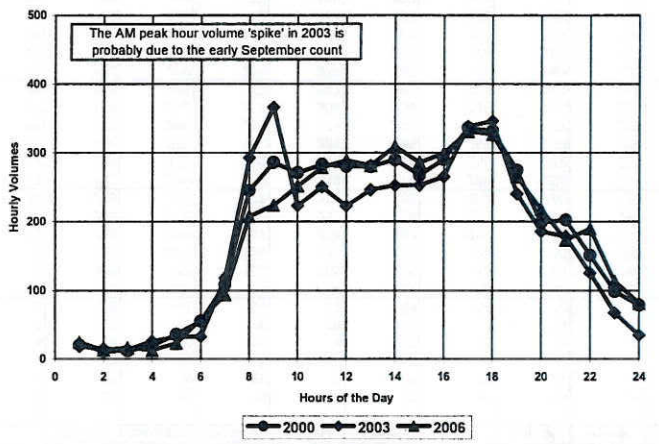


Table B-15A - Highway 103 Section 270 - July 27 to August 3, 2000
(East of Hardsractch Road)

Hour	Days of the Week							Hourly Averages	
	Mon-31	Tue-01	Wed-02	Thu-03/27	Fri-28	Sat-28	Sun-29	Week	Weekday
0									
1	29	37	60	43	34	57	116	54	41
2	15	7	21	20	20	41	88	30	17
3	26	9	13	14	18	28	73	26	16
4	18	17	10	21	10	18	23	17	15
5	31	28	22	22	32	12	20	24	27
6	45	57	53	56	50	54	18	48	52
7	134	132	120	122	142	78	40	110	130
8	384	392	354	344	377	174	92	302	370
9	425	451	431	398	431	263	134	362	427
10	446	460	439	439	409	342	211	392	439
11	471	469	510	511	476	429	334	457	487
12	467	447	464	465	480	428	317	438	465
13	454	458	468	470	486	450	342	447	467
14	460	467	497	507	561	453	386	476	498
15	437	474	451	504	529	405	325	446	479
16	473	460	520	489	524	420	339	461	493
17	556	585	529	553	631	394	331	511	571
18	459	504	451	543	547	360	356	460	501
19	362	379	369	440	452	385	282	381	400
20	270	326	265	338	363	334	269	309	312
21	259	311	250	310	290	358	269	292	284
22	259	265	238	230	282	257	191	246	255
23	133	191	141	145	189	232	107	163	160
24	101	172	163	78	135	166	81	128	130
TOTALS	6714	7098	6839	7062	7468	6138	4744	6580	7036

Estimated 2000 AADT is 5200 vehicles per day

Table B-15B - Highway 103 Section 270 - September 3 to 10, 2003
(East of Hardsractch Road)

Hour	Days of the Week							Hourly Averages	
	Mon-08	Tue-09	Wed-10/03	Thu-04	Fri-05	Sat-06	Sun-07	Week	Weekday
0									
1	29	15	24	24	31	53	78	36	25
2	9	13	22	28	14	24	42	22	17
3	11	6	23	23	2	18	32	16	13
4	19	12	19	20	16	17	16	17	17
5	29	30	22	32	13	33	13	25	25
6	54	40	42	52	44	30	23	41	46
7	152	128	144	137	125	81	31	114	137
8	489	477	448	460	392	192	94	365	453
9	647	577	587	569	555	264	133	476	587
10	417	457	440	460	426	352	196	393	440
11	376	418	423	452	447	411	321	407	423
12	420	445	446	481	439	468	305	429	446
13	445	464	494	444	487	465	329	447	467
14	467	476	579	496	525	502	351	485	509
15	509	455	496	442	548	515	329	471	490
16	501	510	534	499	555	454	301	479	520
17	595	586	629	628	650	482	292	552	618
18	587	547	574	522	586	383	360	508	563
19	391	425	408	450	484	410	282	407	432
20	289	314	338	313	443	364	325	341	339
21	261	337	312	254	344	352	250	301	302
22	169	179	210	178	267	248	197	207	201
23	95	75	99	88	188	148	78	110	109
24	38	73	50	47	84	118	38	64	58
TOTALS	6999	7059	7364	7099	7665	6384	4416	6712	7237

Estimated 2003 AADT is 5650 vehicles per day

Table B-15C - Highway 103 Section 270 - August 2 to 9, 2006
(East of Hardsractch Road)

Hour	Days of the Week							Hourly Averages	
	Mon-07	Tue-08	Wed-09/02	Thu-03	Fri-04	Sat-05	Sun-06	Week	Weekday
0									
1	36	26	33	72	53	70	99	54	42
2	10	16	17	19	19	44	40	24	17
3	12	15	13	12	18	23	42	20	15
4	5	8	16	26	9	18	13	14	13
5	16	11	15	22	21	15	9	15	16
6	20	55	52	60	68	48	15	50	58
7	89	104	128	128	136	62	49	102	120
8	246	334	366	368	403	198	150	308	361
9	268	429	442	436	384	249	150	360	424
10	306	402	385	401	437	321	186	362	405
11	389	474	420	440	466	401	323	428	455
12	410	454	452	478	458	434	326	437	459
13	346	464	460	498	500	491	327	458	477
14	420	505	488	517	502	446	378	477	503
15	393	482	479	503	561	478	351	477	501
16	358	489	473	495	499	454	281	454	489
17	375	521	610	616	598	470	355	527	573
18	345	513	517	507	575	413	346	483	525
19	356	379	435	448	455	403	328	404	419
20	246	281	327	371	359	299	291	316	324
21	236	272	305	321	330	342	321	309	300
22	199	222	271	334	309	288	249	271	272
23	77	92	200	205	217	287	108	172	161
24	59	91	124	116	160	189	110	126	116
TOTALS	5217	6639	7028	7393	7537	6443	4847	6647	7047

Monday was a Holiday; Week and weekday hourly average volumes were calculated using double Tuesday volumes
Estimated 2006 AADT is 5320 vehicles per day

Figure B-15 - Highway 101 East of Starrs Road
Average Weekday Hourly Volumes - 2000, 2003 and 2006

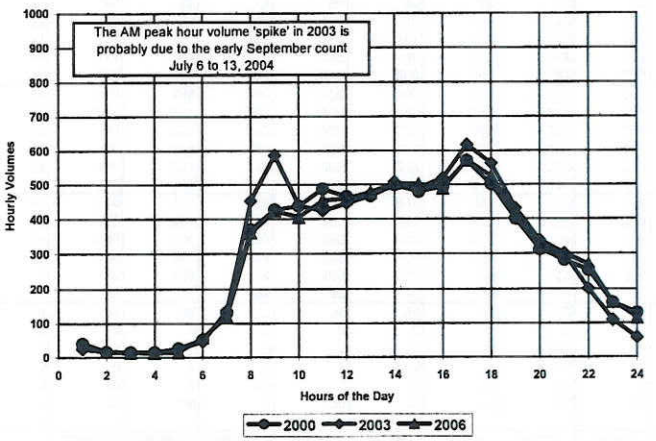


Table B-16A - Route 340 - Hebron - July 13 to 20, 2000
(1 km North of Highway 101)

Hour	Days of the Week							Hourly Averages	
	Mon-17	Tue-18	Wed-19	Thu-20/13	Fri-14	Sat-15	Sun-16	Week	Weekday
0									
1	9	12	6	14	14	34	36	18	11
2	2	3	1	7	4	19	15	7	3
3	1	2	4	2	1	6	12	4	2
4	3	2	6	5	8	7	6	5	5
5	11	8	5	5	6	10	3	7	7
6	12	12	14	19	13	7	9	12	14
7	92	86	81	93	95	39	24	73	89
8	207	184	225	231	197	94	53	170	209
9	170	189	212	183	209	150	72	169	193
10	145	160	161	170	176	195	112	160	162
11	170	161	132	180	201	214	159	174	169
12	171	173	158	173	202	237	154	181	175
13	215	200	189	194	200	246	224	210	200
14	230	183	179	190	197	266	193	205	196
15	204	182	195	177	227	182	244	202	197
16	206	211	223	233	223	221	235	222	219
17	247	277	298	287	289	247	192	262	280
18	241	264	270	280	267	191	157	239	264
19	211	228	223	219	239	197	191	215	224
20	207	227	199	219	204	168	158	197	211
21	193	175	156	187	207	173	165	179	184
22	145	134	123	161	140	148	108	137	141
23	69	59	64	89	186	108	55	90	93
24	46	35	35	49	181	73	32	64	69
TOTALS	3207	3167	3159	3367	3686	3232	2609	3204	3317

Estimated 2000 AADT is 2600 vehicles per day

Table B-16B - Route 340 - Hebron - June 3 to 10, 2003
(1 km North of Highway 101)

Hour	Days of the Week							Hourly Averages	
	Mon-09	Tue-10/03	Wed-04	Thu-05	Fri-06	Sat-07	Sun-08	Week	Weekday
0									
1	7	13	9	15	17	26	37	18	12
2	4	5	12	10	13	10	30	12	9
3	1	4	1	3	7	6	16	5	3
4	4	3	2	4	8	2	5	4	4
5	6	5	3	2	5	5	9	5	4
6	11	13	13	20	11	7	8	12	14
7	80	87	93	90	93	44	14	72	89
8	307	315	314	287	287	125	49	241	302
9	292	313	312	286	273	150	74	243	295
10	210	113	202	168	215	187	118	173	182
11	203	0	217	190	201	219	174	172	162
12	201	0	210	203	213	236	140	172	165
13	190	222	188	213	229	214	161	202	208
14	207	195	226	237	250	232	186	219	223
15	220	227	250	209	242	210	197	222	230
16	263	220	262	250	277	212	199	240	254
17	341	331	304	285	314	230	208	288	315
18	332	304	320	279	299	207	168	273	307
19	247	256	252	201	257	184	210	230	243
20	195	198	231	183	195	180	176	194	200
21	173	162	183	145	189	166	134	165	170
22	124	132	132	136	178	119	99	131	140
23	65	55	67	69	114	61	65	71	74
24	27	27	33	41	54	48	19	36	36
TOTALS	3710	3200	3836	3526	3941	3080	2496	3398	3643

Volumes were obtained from a vehicle classification count. Estimated 2003 AADT is 3260 vehicles per day

Table B-16C - Route 340 - Hebron - August 1 to 8, 2006
(1 km North of Highway 101)

Hour	Days of the Week							Hourly Averages	
	Mon-07	Tue-08/01	Wed-02	Thu-03	Fri-04	Sat-05	Sun-06	Week	Weekday
0									
1	18	20	9	20	19	27	34	21	18
2	10	4	10	3	6	11	24	9	5
3	6	6	7	1	6	9	13	7	5
4	3	1	2	1	6	4	11	4	2
5	4	8	8	3	5	3	5	6	6
6	13	16	17	19	28	14	12	17	19
7	55	54	68	86	81	40	23	58	69
8	116	155	174	185	199	78	51	142	174
9	146	207	194	215	204	119	83	176	205
10	145	130	182	155	212	181	104	156	162
11	195	161	165	182	191	210	175	178	172
12	178	189	176	159	217	217	177	189	186
13	185	180	212	192	213	249	211	205	195
14	190	232	213	203	217	242	238	225	219
15	193	174	197	220	214	293	247	217	196
16	193	211	212	203	222	199	217	211	212
17	211	237	254	264	246	223	200	237	248
18	202	284	240	279	262	170	176	242	270
19	183	205	227	224	209	201	193	209	214
20	184	193	172	187	146	176	223	184	178
21	138	166	169	156	167	170	177	167	165
22	108	108	161	147	113	154	118	130	127
23	40	65	78	94	98	99	60	80	80
24	30	36	45	57	63	61	31	47	47
TOTALS	2746	3042	3192	3255	3344	3150	2803	3118	3175

Monday was a Holiday; Week and weekday hourly average volumes were calculated using double Tueday volumes
Estimated 2006 AADT is 2500 vehicles per day

Figure B-16 - Route 340 - North of Highway 101
Average Weekday Hourly Volumes - 2000, 2003, and 2006

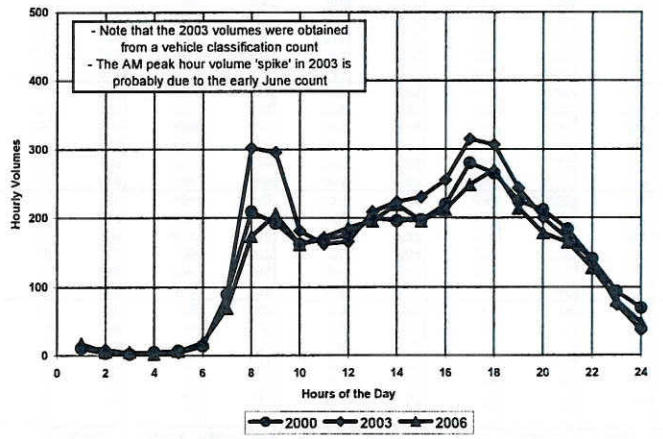


Table B-17A - Brooklyn Road - 2000 Counts not Available
(South of Highway 101)

Hour	Days of the Week							Hourly Averages	
	Mon-00	Tue-00	Wed-00	Thu-00	Fri-00	Sat-00	Sun-00	Week	Weekday
0									
1								0	0
2								0	0
3								0	0
4								0	0
5								0	0
6								0	0
7								0	0
8								0	0
9								0	0
10								0	0
11								0	0
12								0	0
13								0	0
14								0	0
15								0	0
16								0	0
17								0	0
18								0	0
19								0	0
20								0	0
21								0	0
22								0	0
23								0	0
24								0	0
TOTALS	0	0	0	0	0	0	0	0	0

Table B-17B - Brooklyn Road - August 27 to September 3, 2003
(South of Highway 101)

Hour	Days of the Week							Hourly Averages	
	Mon-01	Tue-02	Wed-03/27	Thu-28	Fri-29	Sat-30	Sun-31	Week	Weekday
0									
1	3	1	4	7	2	4	11	4	3
2	2	0	6	1	2	3	8	3	2
3	0	0	2	1	2	4	1	1	1
4	1	0	1	1	0	5	7	2	0
5	2	1	0	1	1	1	0	1	1
6	1	3	3	6	4	2	2	3	4
7	3	14	13	9	9	2	5	9	12
8	19	50	49	48	55	15	13	40	50
9	16	61	79	52	53	29	18	50	61
10	19	37	43	57	40	30	29	39	43
11	27	47	61	60	56	42	41	51	54
12	28	59	53	34	61	42	35	49	53
13	44	60	69	57	59	58	35	57	61
14	37	68	61	68	55	41	43	58	64
15	43	50	72	57	68	56	44	57	59
16	52	81	70	53	47	51	50	62	66
17	36	79	72	87	88	54	48	72	81
18	38	77	68	50	82	25	40	60	71
19	41	54	49	56	56	42	38	50	54
20	44	50	55	64	47	41	36	49	53
21	36	50	46	38	46	25	38	42	46
22	22	31	31	26	33	19	21	27	30
23	9	10	16	12	12	15	10	12	12
24	9	11	11	11	12	9	12	11	11
TOTALS	532	894	934	856	890	615	585	810	894

Monday was a Holiday; Week and weekday hourly average volumes were calculated using double Tueday volumes

Table B-17C - Brooklyn Road - August 2 to 9, 2006
(South of Highway 101)

Hour	Days of the Week							Hourly Averages	
	Mon-07	Tue-08	Wed-09/02	Thu-03	Fri-04	Sat-05	Sun-06	Week	Weekday
0									
1	3	2	4	6	4	7	4	4	4
2	6	1	1	2	4	2	6	2	2
3	0	0	0	2	2	2	3	1	1
4	1	1	0	0	0	1	5	1	0
5	0	1	4	1	0	0	3	1	1
6	2	4	1	2	2	4	2	3	3
7	5	3	5	10	8	5	5	6	6
8	22	32	40	30	45	18	11	30	36
9	29	46	50	42	47	25	19	39	46
10	33	38	45	63	32	40	25	40	43
11	34	41	55	52	43	51	40	46	46
12	36	41	55	63	61	56	46	52	52
13	53	68	61	57	57	60	56	61	62
14	64	71	71	75	67	60	71	69	71
15	58	77	69	69	65	63	50	67	71
16	53	56	53	66	69	55	51	58	60
17	55	51	89	86	84	62	46	67	72
18	59	108	74	100	77	43	38	78	93
19	49	76	55	62	38	56	62	61	61
20	42	62	37	60	61	35	45	52	56
21	36	73	46	56	34	50	50	55	56
22	21	30	36	41	25	28	35	32	32
23	11	13	20	16	13	21	14	16	15
24	6	8	9	8	11	13	4	9	9
TOTALS	678	903	880	969	849	757	691	850	901

Monday was a Holiday; Week and weekday hourly average volumes were calculated using double Tuesday volumes
Estimated 2006 AADT is 680 vehicles per day

Figure B-17 - Brooklyn Road - South of Highway 101
Average Weekday Hourly Volumes - 2003 and 2006

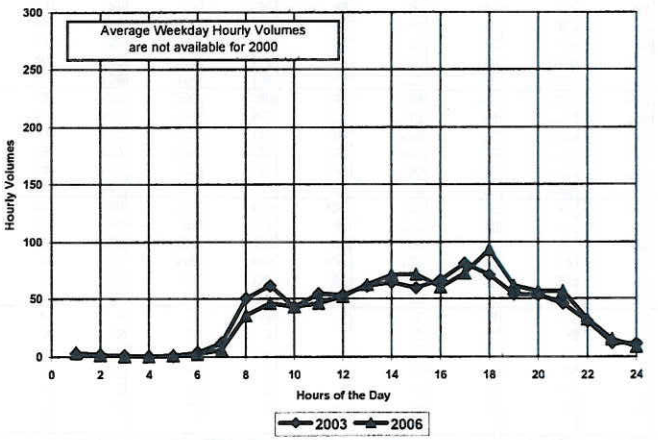


Table B-18A - Greenville Road - April 19 to 26, 2005
(just South of Trunk 1)

Hour	Days of the Week							Hourly Averages	
	Mon-25	Tue-26/19	Wed-20	Thu-21	Fri-22	Sat-23	Sun-24	Week	Weekday
0									
1	8	11	12	8	10	17	19	12	10
2	5	3	4	2	2	4	10	4	3
3	4	6	4	5	5	9	9	6	5
4	2	1	4	3	3	5	7	4	3
5	6	10	7	7	7	3	1	6	7
6	15	13	15	14	14	16	4	13	14
7	39	35	51	40	37	10	13	32	40
8	140	127	138	122	124	35	26	102	130
9	198	223	219	195	216	68	56	168	210
10	115	130	112	140	134	101	79	116	126
11	118	114	137	99	145	91	99	115	123
12	150	140	132	146	185	103	92	135	151
13	152	181	153	175	182	103	104	150	169
14	191	159	159	146	190	94	134	153	169
15	175	198	185	159	181	95	135	161	180
16	156	170	197	176	179	104	146	161	176
17	193	190	202	194	211	110	170	181	198
18	204	207	186	186	212	95	152	177	199
19	161	172	172	153	174	72	148	150	166
20	141	123	129	114	128	75	118	118	127
21	101	87	80	91	116	78	68	89	95
22	60	59	61	64	51	29	48	53	59
23	35	39	26	47	41	26	28	35	38
24	16	17	21	18	15	25	15	18	17
TOTALS	2385	2415	2406	2304	2562	1368	1681	2160	2414

Estimated 2005 AADT is 2200 vehicles per day

Table B-18B - Greenville Road - April 19 to 26, 2005
(just North of Highway 103)

Hour	Days of the Week							Hourly Averages	
	Mon-25	Tue-26/19	Wed-20	Thu-21	Fri-22	Sat-23	Sun-24	Week	Weekday
0									
1	6	5	4	3	6	7	20	7	5
2	2	4	1	1	0	2	8	3	2
3	1	2	0	3	2	7	6	3	2
4	2	3	2	3	2	2	2	2	2
5	7	9	5	3	6	5	1	5	6
6	14	12	10	14	10	12	1	10	12
7	22	32	33	21	23	5	3	20	26
8	70	78	75	72	74	19	11	57	74
9	90	100	96	92	91	42	18	76	94
10	65	64	51	46	58	48	36	53	57
11	48	48	53	37	43	50	47	47	46
12	47	63	70	49	59	62	56	58	58
13	47	71	58	63	65	54	72	61	61
14	74	68	65	58	79	57	84	69	69
15	75	74	51	81	95	47	80	72	75
16	75	83	73	80	83	45	95	76	79
17	87	110	101	96	96	49	90	90	98
18	89	90	87	107	99	55	89	88	94
19	84	85	87	62	89	39	104	79	81
20	63	58	71	54	61	45	76	61	61
21	66	42	40	37	51	37	35	44	47
22	45	39	33	31	31	20	25	32	36
23	17	14	15	31	18	8	12	16	19
24	11	15	10	9	15	19	8	12	12
TOTALS	1107	1169	1091	1053	1156	736	979	1042	1115

Estimated 2005 AADT is 1060 vehicles per day

Table B-18C - Greenville Road - August 2 to 9, 2006
(South of Highway 101)

Hour	Days of the Week							Hourly Averages	
	Mon-07	Tue-08	Wed-09/02	Thu-03	Fri-04	Sat-05	Sun-06	Week	Weekday
0									
1	8	14	6	14	8	12	18	12	11
2	2	7	5	3	5	13	11	7	5
3	6	10	1	8	6	7	8	7	7
4	0	1	0	4	3	3	7	3	2
5	3	3	3	1	3	0	4	2	3
6	3	3	36	5	5	4	7	9	10
7	32	27	117	25	28	7	16	35	45
8	84	97	138	97	106	32	25	85	107
9	80	118	100	126	132	57	33	98	119
10	108	105	92	92	79	77	44	85	95
11	81	92	101	97	113	80	77	93	99
12	99	115	115	122	107	115	81	110	115
13	111	123	125	132	120	105	115	120	125
14	115	140	137	141	130	116	144	135	138
15	122	111	121	125	112	116	117	116	116
16	107	130	123	105	119	96	117	117	121
17	117	138	160	173	173	84	115	140	156
18	163	205	186	185	155	105	131	167	187
19	128	134	118	123	112	76	100	114	124
20	110	119	116	117	91	100	113	111	112
21	92	83	93	95	79	80	108	89	87
22	55	70	88	72	60	71	61	70	72
23	28	27	37	49	30	45	22	34	34
24	18	18	36	27	26	28	18	24	25
TOTALS	1672	1890	2053	1938	1802	1429	1492	1785	1915

Monday was a Holiday; Week and weekday hourly average volumes were calculated using double Tueday volumes
Estimated 2006 AADT is 1430 vehicles per day

Figure B-18 - Greenville Road - Trunk 1 to Highway 103
Average Weekday Hourly Volumes - 2005 and 2006

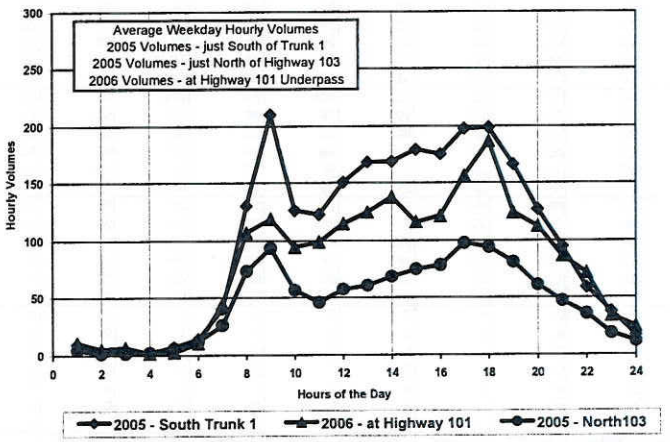


Table B-19A - Hardscratch Road - August 2 to 9, 2006
(North of Highway 103)

Hour	Days of the Week							Hourly Averages	
	Mon-07	Tue-08	Wed-09/02	Thu-03	Fri-04	Sat-05	Sun-06	Week	Weekday
0									
1	14	12	18	32	19	44	34	24	19
2	16	4	7	5	8	30	31	13	6
3	4	6	5	9	15	8	24	10	8
4	1	3	6	4	12	9	8	6	6
5	7	8	7	11	10	6	8	8	9
6	24	24	18	13	17	9	9	16	19
7	68	73	104	93	85	38	30	71	86
8	136	171	185	175	189	106	49	149	178
9	193	274	274	266	257	171	88	229	269
10	220	270	253	235	215	226	80	221	249
11	207	270	245	272	274	276	158	252	266
12	247	255	270	277	302	256	165	254	272
13	269	293	289	295	298	308	181	280	294
14	304	319	308	294	315	296	216	295	311
15	275	298	276	311	321	284	188	282	301
16	256	286	295	317	308	284	183	280	298
17	284	321	312	385	373	282	230	318	342
18	246	329	357	378	316	251	176	305	342
19	244	259	275	264	232	189	154	233	258
20	198	230	240	224	221	190	237	225	229
21	158	222	218	179	189	237	157	203	206
22	104	142	175	187	181	153	142	160	165
23	48	82	95	120	115	125	64	98	99
24	43	49	79	88	60	88	33	64	65
TOTALS	3566	4200	4311	4434	4332	3866	2645	3998	4295

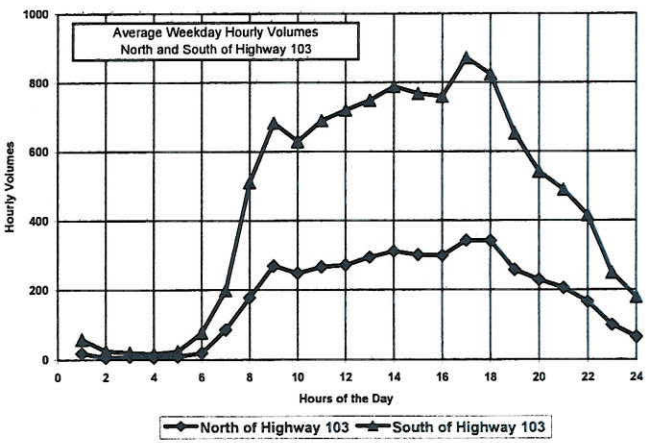
Monday was a Holiday; Week and weekday hourly average volumes were calculated using double Tueday volumes
Estimated 2006 AADT is 3200 vehicles per day

Table B-19B - Hardscratch Road - August 2 to 9, 2006
(South of Highway 103)

Hour	Days of the Week							Hourly Averages	
	Mon-07	Tue-08	Wed-09/02	Thu-03	Fri-04	Sat-05	Sun-06	Week	Weekday
0									
1	47	39	49	95	70	110	124	75	58
2	26	25	24	23	28	68	59	36	25
3	17	18	17	19	29	31	63	28	20
4	6	9	18	29	19	25	23	19	17
5	24	22	21	30	24	21	18	23	24
6	45	80	69	74	85	57	23	67	78
7	141	173	223	216	209	99	77	167	199
8	383	475	528	510	563	287	191	433	510
9	448	699	686	681	643	412	228	578	682
10	477	637	615	618	639	522	266	562	629
11	546	710	647	667	707	633	471	649	688
12	666	706	711	715	757	701	459	679	719
13	577	744	714	770	765	732	485	708	747
14	669	798	762	789	793	744	545	747	788
15	619	748	725	785	831	718	504	723	767
16	588	746	733	780	789	709	422	704	759
17	622	809	876	934	931	720	554	805	872
18	549	814	820	838	837	627	479	747	825
19	594	597	680	708	675	568	450	611	651
20	431	506	556	576	564	485	501	528	542
21	376	465	518	495	500	552	458	493	489
22	284	336	432	511	462	439	355	410	415
23	116	166	292	300	321	393	161	257	249
24	95	135	205	207	216	270	139	187	180
TOTALS	8346	10457	10921	11370	11457	9923	7055	10234	10932

Monday was a Holiday; Week and weekday hourly average volumes were calculated using double Tueday volumes
Estimated 2006 AADT is 8190 vehicles per day

Figure B-19 - Hardscratch Road - near Highway 103
Average Weekday Hourly Volumes - 2006



Appendix C

Intersection Volumes

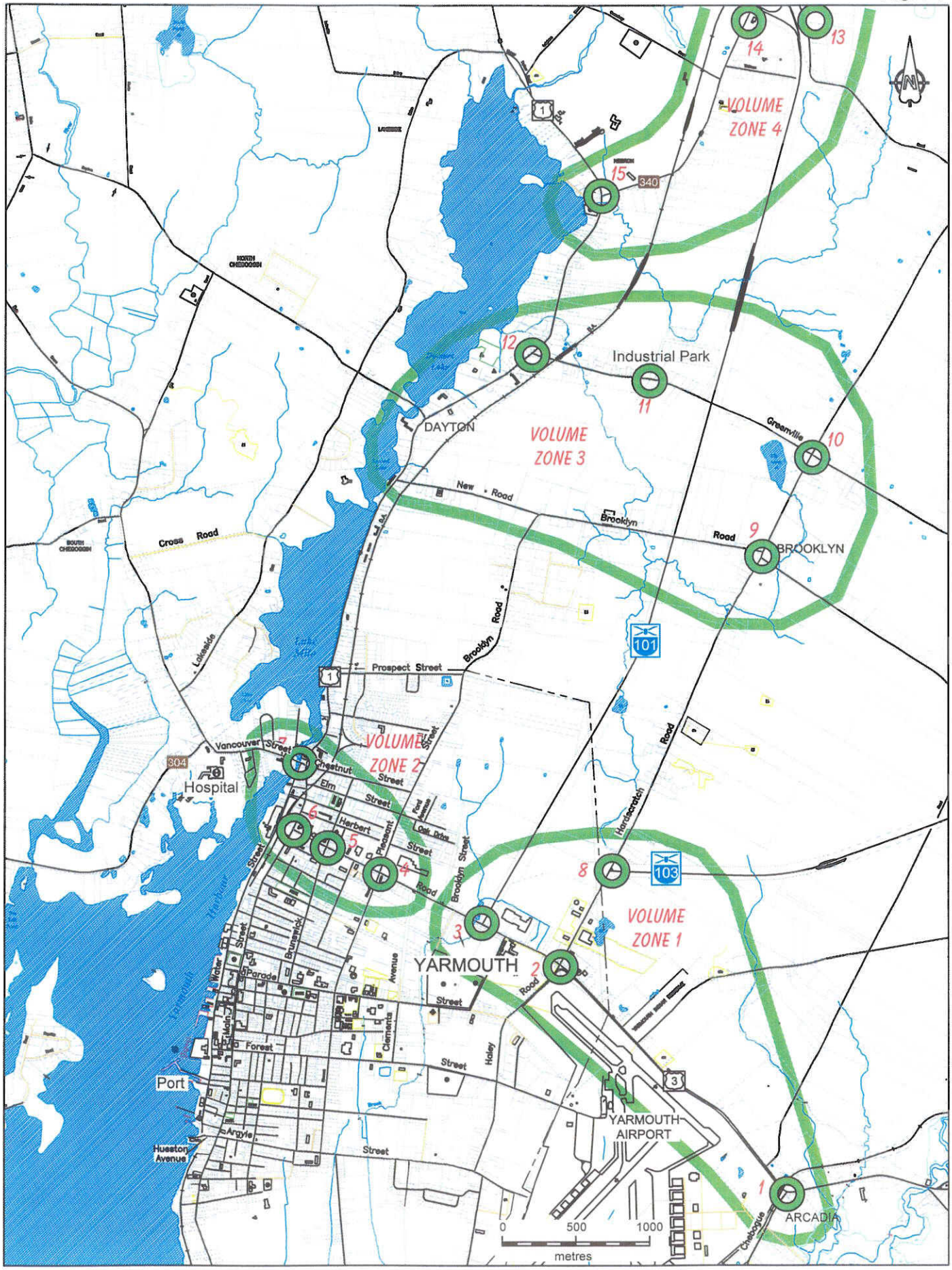


Figure C-1 - Turning Movement Counts Acquired

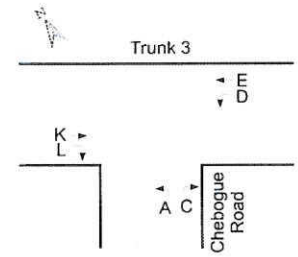
November 2006

Table C-1

Trunk 3
@
Chebogue Road

Yarmouth County, Nova Scotia

Friday, September 29, 2006



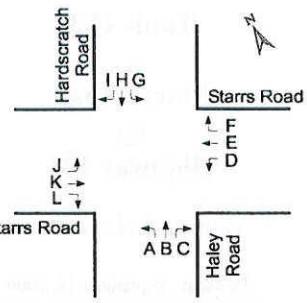
Time	Chebogue Road Northbound Approach		Trunk 3 Westbound Approach		Trunk 3 Eastbound Approach		Total Vehicles
	A	C	D	E	K	L	
07:00-07:15	3	2	2	35	6	5	53
07:15-07:30	4	2	1	54	18	6	85
07:30-07:45	4	5	0	71	17	8	105
07:45-08:00	9	5	5	100	33	11	163
08:00-08:15	13	3	4	74	22	7	123
08:15-08:30	7	3	1	84	35	3	133
08:30-08:45	10	5	3	87	28	7	140
08:45-09:00	14	1	3	54	36	5	113
07:00 to 08:00	20	14	8	260	74	30	406
08:00 to 09:00	44	12	11	299	121	22	509
AM Peak Hour	39	16	13	345	118	28	559
11:00-11:15	12	7	4	52	42	6	123
11:15-11:30	8	3	4	41	32	6	94
11:30-11:45	12	4	2	48	55	15	136
11:45-12:00	4	4	5	57	48	15	133
12:00-12:15	11	2	2	49	55	9	128
12:15-12:30	7	5	6	56	55	12	141
12:30-12:45	15	3	2	54	40	12	126
12:45-13:00	9	3	5	56	58	14	145
11:00 to 12:00	36	18	15	198	177	42	486
12:00 to 13:00	42	13	15	215	208	47	540
Noon Peak Hour	42	13	15	215	208	47	540
15:30-16:45	2	2	2	62	63	15	146
15:45-16:00	10	1	9	48	61	9	138
16:00-16:15	15	4	6	48	66	11	150
16:15-16:30	17	1	6	51	78	7	160
16:30-16:45	13	5	3	54	94	12	181
16:45-17:00	6	3	1	62	86	6	164
17:00-17:15	12	6	7	54	104	11	194
17:15-17:30	10	2	3	44	66	14	139
15:30 to 16:30	44	8	23	209	268	42	594
16:30 to 17:30	41	16	14	214	350	43	678
PM Peak Hour	48	15	17	221	362	36	699

Table C-2

Starrs Road
@
Hardscratch Road / Haley Road

Yarmouth, Nova Scotia

Wednesday, September 13, 2006



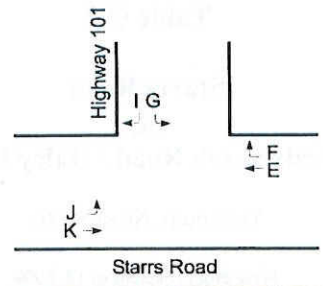
Time	Haley Road Northbound Approach			Starrs Road Westbound Approach			Hardscratch Road Southbound Approach			Starrs Road Eastbound Approach			Total Vehicles
	A	B	C	D	E	F	G	H	I	J	K	L	
07:00-07:15	6	10	4	14	34	0	2	10	36	37	18	4	175
07:15-07:30	5	7	8	13	40	5	5	23	63	18	17	5	209
07:30-07:45	7	20	14	26	60	5	9	19	81	32	16	4	293
07:45-08:00	5	14	17	28	63	8	22	37	84	33	29	7	347
08:00-08:15	10	16	20	46	53	14	13	44	83	35	35	6	375
08:15-08:30	12	19	19	45	74	11	11	58	90	41	34	12	426
08:30-08:45	12	16	23	51	64	10	4	37	56	21	34	9	337
08:45-09:00	9	13	19	32	73	15	9	41	78	38	39	6	372
07:00 to 08:00	23	51	43	81	197	18	38	89	264	120	80	20	1024
08:00 to 09:00	43	64	81	174	264	50	37	180	307	135	142	33	1510
AM Peak Hour	43	64	81	174	264	50	37	180	307	135	142	33	1510
11:00-11:15	19	22	23	23	56	16	14	20	61	37	47	11	349
11:15-11:30	19	14	15	15	42	12	9	19	66	56	48	12	327
11:30-11:45	12	22	24	23	66	9	8	30	60	45	57	10	366
11:45-12:00	17	15	18	22	41	8	18	17	65	49	52	9	331
12:00-12:15	31	18	23	22	64	17	4	24	49	67	65	20	404
12:15-12:30	26	24	18	23	52	5	10	27	53	63	60	14	375
12:30-12:45	16	23	22	18	50	14	6	22	50	61	74	14	370
12:45-13:00	23	17	29	35	58	8	8	17	53	60	71	6	385
11:00 to 12:00	67	73	80	83	205	45	49	86	252	187	204	42	1373
12:00 to 13:00	96	82	92	98	224	44	28	90	205	251	270	54	1534
Noon Peak Hour	96	82	92	98	224	44	28	90	205	251	270	54	1534
15:30-16:45	23	24	19	19	52	8	12	22	59	76	58	17	389
15:45-16:00	24	23	40	20	34	11	8	20	57	75	87	18	417
16:00-16:15	25	37	29	22	53	13	6	16	36	86	68	12	403
16:15-16:30	17	46	27	16	44	11	13	18	46	74	83	13	408
16:30-16:45	19	41	49	36	56	18	11	33	61	102	71	10	507
16:45-17:00	17	37	30	29	47	14	13	22	64	83	87	11	454
17:00-17:15	14	58	44	24	63	18	9	27	57	117	93	8	532
17:15-17:30	17	34	30	19	47	13	14	26	51	101	86	12	450
15:30 to 16:30	89	130	115	77	183	43	39	76	198	311	296	60	1617
16:30 to 17:30	67	170	153	108	213	63	47	108	233	403	337	41	1943
PM Peak Hour	67	170	153	108	213	63	47	108	233	403	337	41	1943

Table C-3

Starrs Road @ Highway 101

Yarmouth, Nova Scotia

Thursday, September 14, 2006



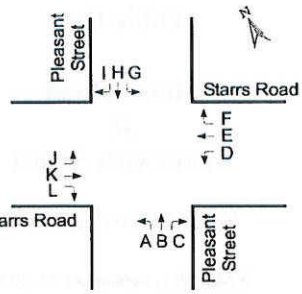
Time	Starrs Road Westbound Approach		Highway 101 Southbound Approach		Starrs Road Eastbound Approach		Total Vehicles
	E	F	G	I	J	K	
07:00-07:15	66	4	4	15	12	29	130
07:15-07:30	83	5	5	24	12	67	196
07:30-07:45	126	5	6	37	10	91	275
07:45-08:00	188	4	14	54	6	118	384
08:00-08:15	153	7	16	53	15	89	333
08:15-08:30	176	6	21	33	15	112	363
08:30-08:45	144	5	13	38	12	94	306
08:45-09:00	138	9	6	34	14	107	308
07:00 to 08:00	463	18	29	130	40	305	985
08:00 to 09:00	611	27	56	158	56	402	1310
AM Peak Hour	661	22	64	178	48	413	1386
11:00-11:15	139	7	8	22	17	129	322
11:15-11:30	159	11	8	22	24	114	338
11:30-11:45	137	5	7	20	8	150	327
11:45-12:00	159	8	7	14	18	111	317
12:00-12:15	180	11	9	13	18	147	378
12:15-12:30	121	6	3	16	22	142	310
12:30-12:45	128	18	6	14	18	148	332
12:45-13:00	158	10	9	17	18	156	368
11:00 to 12:00	594	31	30	78	67	504	1304
12:00 to 13:00	587	45	27	60	76	593	1388
Noon Peak Hour	587	45	27	60	76	593	1388
15:30-16:45	147	11	4	10	27	165	364
15:45-16:00	143	9	6	11	23	167	359
16:00-16:15	138	16	6	17	19	185	381
16:15-16:30	126	10	11	14	27	164	352
16:30-16:45	167	20	9	27	35	165	423
16:45-17:00	141	15	9	20	26	168	379
17:00-17:15	168	18	17	13	37	211	464
17:15-17:30	132	10	6	15	38	169	370
15:30 to 16:30	554	46	27	52	96	681	1456
16:30 to 17:30	608	63	41	75	136	713	1636
PM Peak Hour	608	63	41	75	136	713	1636

Table C-4

Starrs Road @ Pleasant Street

Yarmouth, Nova Scotia

Friday, September 15, 2006



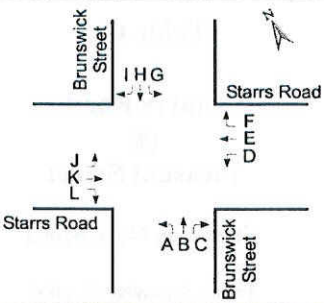
Time	Pleasant Street Northbound Approach			Starrs Road Westbound Approach			Pleasant Street Southbound Approach			Starrs Road Eastbound Approach			Total Vehicles
	A	B	C	D	E	F	G	H	I	J	K	L	
07:00-07:15	2	6	13	11	51	11	8	9	2	0	21	1	135
07:15-07:30	2	9	23	18	81	21	9	5	6	0	45	3	222
07:30-07:45	2	13	21	29	57	22	21	6	1	2	52	1	227
07:45-08:00	11	23	29	47	103	38	45	23	4	2	52	4	381
08:00-08:15	3	26	28	29	84	51	47	34	4	3	57	3	369
08:15-08:30	15	30	30	51	77	65	46	38	5	5	67	1	430
08:30-08:45	6	22	38	44	78	22	25	33	5	7	65	7	352
08:45-09:00	11	20	44	32	92	35	25	19	4	2	81	3	368
07:00 to 08:00	17	51	86	105	292	92	83	43	13	4	170	9	965
08:00 to 09:00	35	98	140	156	331	173	143	124	18	17	270	14	1519
AM Peak Hour	35	101	125	171	342	176	163	128	18	17	241	15	1532
11:00-11:15	5	18	53	36	95	28	34	18	5	1	66	6	365
11:15-11:30	9	20	38	24	78	49	55	22	5	1	81	7	389
11:30-11:45	8	23	64	39	86	30	56	19	7	1	85	6	424
11:45-12:00	10	20	68	48	76	47	52	44	16	7	81	9	478
12:00-12:15	7	21	72	30	103	29	49	20	12	3	106	3	455
12:15-12:30	23	32	52	40	108	27	39	18	13	7	71	8	438
12:30-12:45	14	34	56	31	91	41	57	41	11	6	85	5	472
12:45-13:00	7	40	56	41	105	35	31	45	9	3	117	2	491
11:00 to 12:00	32	81	223	147	335	154	197	103	33	10	313	28	1656
12:00 to 13:00	51	127	236	142	407	132	176	124	45	19	379	18	1856
Noon Peak Hour	51	127	236	142	407	132	176	124	45	19	379	18	1856
15:30-16:45	5	30	57	37	104	30	40	28	5	5	108	6	455
15:45-16:00	11	19	65	33	104	33	56	15	13	2	110	3	464
16:00-16:15	5	22	67	39	104	38	62	38	10	4	121	2	512
16:15-16:30	6	22	74	39	98	44	64	33	10	3	116	1	510
16:30-16:45	10	20	79	36	108	28	57	30	10	2	136	1	517
16:45-17:00	9	17	63	28	102	46	61	21	11	4	112	7	481
17:00-17:15	6	20	78	29	107	43	60	29	8	4	121	4	509
17:15-17:30	11	19	66	26	117	30	60	25	5	3	133	1	496
15:30 to 16:30	27	93	263	148	410	145	222	114	38	14	455	12	1941
16:30 to 17:30	36	76	286	119	434	147	238	105	34	13	502	13	2003
PM Peak Hour	30	81	283	142	412	156	244	122	41	13	485	11	2020

Table C-5

Starrs Road @ Brunswick Street

Yarmouth, Nova Scotia

Wednesday, September 27, 2006



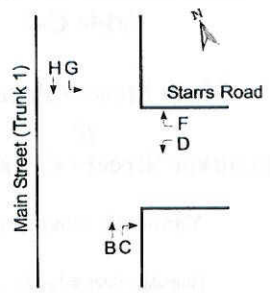
Time	Brunswick Street Northbound Approach			Starrs Road Westbound Approach			Brunswick Street Southbound Approach			Starrs Road Eastbound Approach			Total Vehicles
	A	B	C	D	E	F	G	H	I	J	K	L	
07:00-07:15	0	0	6	4	58	2	1	2	0	0	32	2	107
07:15-07:30	0	3	1	4	53	0	2	5	2	0	49	1	120
07:30-07:45	2	9	6	2	86	0	1	6	1	0	41	0	154
07:45-08:00	3	9	7	6	68	3	9	10	4	1	64	2	186
08:00-08:15	4	18	5	10	71	3	2	13	5	2	42	6	181
08:15-08:30	5	25	10	12	68	2	5	29	4	1	59	2	222
08:30-08:45	0	22	10	12	80	1	1	15	6	0	70	2	219
08:45-09:00	3	19	11	8	72	2	2	11	1	1	56	2	188
07:00 to 08:00	5	21	20	16	265	5	13	23	7	1	186	5	567
08:00 to 09:00	12	84	36	42	291	8	10	68	16	4	227	12	810
AM Peak Hour	12	84	36	42	291	8	10	68	16	4	227	12	810
11:00-11:15	3	10	17	6	91	1	5	8	3	0	82	2	228
11:15-11:30	2	5	17	9	83	4	4	11	2	1	90	1	229
11:30-11:45	7	19	19	9	106	5	4	17	3	3	96	7	295
11:45-12:00	9	11	27	15	110	1	9	12	4	0	87	7	292
12:00-12:15	15	25	24	9	121	2	4	22	1	5	100	8	336
12:15-12:30	5	12	18	12	100	5	4	3	2	0	95	15	271
12:30-12:45	4	16	11	7	107	4	2	11	0	4	104	10	280
12:45-13:00	6	22	19	28	82	0	3	18	2	1	122	10	313
11:00 to 12:00	21	45	80	39	390	11	22	48	12	4	355	17	1044
12:00 to 13:00	30	75	72	56	410	11	13	54	5	10	421	43	1200
Noon Peak Hour	30	75	72	56	410	11	13	54	5	10	421	43	1200
15:30-16:45	5	18	20	10	93	2	3	12	1	0	108	2	274
15:45-16:00	3	13	15	14	91	2	4	6	1	1	94	6	250
16:00-16:15	3	8	10	19	88	6	1	10	3	2	102	3	255
16:15-16:30	2	17	16	18	98	1	6	11	0	0	88	2	259
16:30-16:45	5	11	20	12	88	7	3	11	1	2	101	7	268
16:45-17:00	2	14	15	19	102	2	1	11	0	0	82	3	251
17:00-17:15	3	21	22	9	74	1	0	12	1	1	79	6	229
17:15-17:30	1	11	19	9	70	0	6	8	2	0	74	5	205
15:30 to 16:30	13	56	61	61	370	11	14	39	5	3	392	13	1038
16:30 to 17:30	11	57	76	49	334	10	10	42	4	3	336	21	953
PM Peak Hour	12	50	61	68	376	16	11	43	4	4	373	15	1033

Table C-6

Starrs Road @ Main Street (Trunk 1)

Yarmouth, Nova Scotia

Friday, September 29, 2006



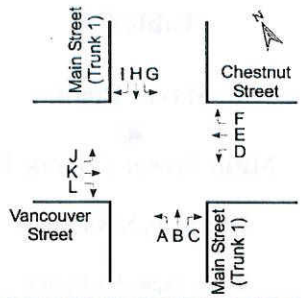
Time	Main Street (Trunk 1) Northbound Approach		Starrs Road Westbound Approach		Main Street (Trunk 1) Southbound Approach		Total Vehicles
	B	C	D	F	G	H	
07:00-07:15	33	16	31	20	13	32	145
07:15-07:30	43	19	37	30	31	40	200
07:30-07:45	37	17	44	34	18	66	216
07:45-08:00	60	21	50	46	33	58	268
08:00-08:15	57	19	63	27	36	58	260
08:15-08:30	70	34	58	34	34	71	301
08:30-08:45	64	33	47	36	40	70	290
08:45-09:00	54	23	52	39	31	67	266
07:00 to 08:00	173	73	162	130	95	196	829
08:00 to 09:00	245	109	220	136	141	266	1117
AM Peak Hour	251	107	218	143	143	257	1119
11:00-11:15	57	54	54	51	25	57	298
11:15-11:30	64	41	53	35	34	55	282
11:30-11:45	43	40	79	38	48	72	320
11:45-12:00	73	51	76	35	34	67	336
12:00-12:15	68	63	70	41	51	74	367
12:15-12:30	73	54	69	34	55	77	362
12:30-12:45	77	57	66	34	44	79	357
12:45-13:00	74	62	64	35	45	78	358
11:00 to 12:00	237	186	262	159	141	251	1236
12:00 to 13:00	292	236	269	144	195	308	1444
Noon Peak Hour	292	236	269	144	195	308	1444
15:30-16:45	57	61	58	33	41	79	329
15:45-16:00	76	59	67	31	39	64	336
16:00-16:15	69	63	55	27	49	72	335
16:15-16:30	77	55	86	25	41	72	356
16:30-16:45	79	56	58	35	42	67	337
16:45-17:00	69	68	60	35	43	60	335
17:00-17:15	74	37	55	37	40	54	297
17:15-17:30	53	53	80	34	32	54	306
15:30 to 16:30	279	238	266	116	170	287	1356
16:30 to 17:30	275	214	253	141	157	235	1275
PM Peak Hour	301	233	266	118	171	275	1364

Table C-7

Main Street (Trunk 1) @ Vancouver Street / Chestnut Street

Yarmouth, Nova Scotia

Thursday, September 28, 2006



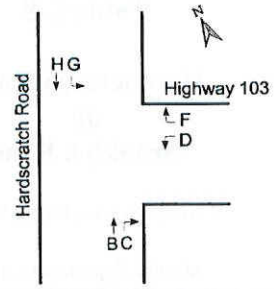
Time	Main Street (Trunk 1) Northbound Approach			Chestnut Street Westbound Approach			Main Street (Trunk 1) Southbound Approach			Vancouver Street Eastbound Approach			Total Vehicles
	A	B	C	D	E	F	G	H	I	J	K	L	
07:00-07:15	40	6	1	0	1	0	0	31	15	7	2	25	128
07:15-07:30	65	13	0	1	7	1	1	51	22	9	3	30	203
07:30-07:45	60	25	2	0	2	1	3	65	21	10	2	36	227
07:45-08:00	77	43	5	0	11	0	4	62	33	15	8	42	300
08:00-08:15	77	31	3	2	3	0	2	99	26	37	4	49	333
08:15-08:30	47	37	5	0	5	1	1	105	32	26	6	60	325
08:30-08:45	66	51	9	0	5	1	3	88	22	25	5	51	326
08:45-09:00	74	47	7	3	5	1	2	68	24	10	1	48	290
07:00 to 08:00	242	87	8	1	21	2	8	209	91	41	15	133	858
08:00 to 09:00	264	166	24	5	18	3	8	360	104	98	16	208	1274
AM Peak Hour	267	162	22	2	24	2	10	354	113	103	23	202	1284
11:00-11:15	88	58	4	2	7	1	4	55	13	20	9	53	314
11:15-11:30	73	46	11	0	1	0	3	64	9	26	7	36	276
11:30-11:45	71	51	5	5	3	2	1	67	9	31	10	33	288
11:45-12:00	69	38	2	5	11	5	6	88	17	35	4	51	331
12:00-12:15	67	50	13	2	6	2	5	77	8	28	12	61	331
12:15-12:30	66	65	12	2	6	4	6	66	12	32	8	57	336
12:30-12:45	71	57	6	2	7	1	3	68	13	31	6	51	316
12:45-13:00	71	54	3	3	11	3	4	67	20	20	7	39	302
11:00 to 12:00	301	193	22	12	22	8	14	274	48	112	30	173	1209
12:00 to 13:00	275	226	34	9	30	10	18	278	53	111	33	208	1285
Noon Peak Hour	273	210	33	11	30	12	20	299	50	126	30	220	1314
15:30-16:45	74	61	5	1	7	8	6	62	17	30	8	39	318
15:45-16:00	59	48	4	3	5	5	7	71	8	28	10	43	291
16:00-16:15	53	70	1	2	6	0	0	61	14	50	15	41	313
16:15-16:30	72	66	4	3	3	3	6	79	8	35	9	55	343
16:30-16:45	84	83	5	2	3	2	4	63	11	42	4	35	338
16:45-17:00	40	53	4	0	3	1	4	54	9	41	4	35	248
17:00-17:15	71	78	2	3	3	3	4	66	5	32	6	30	303
17:15-17:30	55	51	3	1	2	1	5	49	12	17	3	23	222
15:30 to 16:30	258	245	14	9	21	16	19	273	47	143	42	178	1265
16:30 to 17:30	250	265	14	6	11	7	17	232	37	132	17	123	1111
PM Peak Hour	249	272	14	7	15	6	14	257	42	168	32	166	1242

Table C-8

Hardscratch Road @ Highway 103

Yarmouth Co., Nova Scotia

Tuesday, September 12, 2006



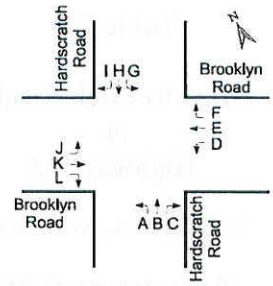
Time	Hardscratch Road Northbound Approach		Highway 103 Westbound Approach		Hardscratch Road Southbound Approach		Total Vehicles
	B	C	D	F	G	H	
07:00-07:15	11	27	50	0	0	26	114
07:15-07:30	17	27	59	1	2	30	136
07:30-07:45	22	32	77	4	5	50	190
07:45-08:00	22	33	106	5	1	59	226
08:00-08:15	25	46	102	2	3	45	223
08:15-08:30	26	44	125	2	3	40	240
08:30-08:45	26	35	88	4	2	38	193
08:45-09:00	19	37	89	2	1	44	192
07:00 to 08:00	72	119	292	10	8	165	666
08:00 to 09:00	96	162	404	10	9	167	848
AM Peak Hour	99	158	421	13	9	182	882
11:00-11:15	20	29	54	1	1	28	133
11:15-11:30	27	39	57	2	0	19	144
11:30-11:45	38	43	52	3	0	24	160
11:45-12:00	19	41	49	2	0	32	143
12:00-12:15	36	44	54	6	1	33	174
12:15-12:30	25	36	48	1	2	37	149
12:30-12:45	22	39	60	0	0	33	154
12:45-13:00	33	63	64	2	1	30	193
11:00 to 12:00	104	152	212	8	1	103	580
12:00 to 13:00	116	182	226	9	4	133	670
Noon Peak Hour	116	182	226	9	4	133	670
15:30-16:45	25	69	91	3	8	34	230
15:45-16:00	32	70	39	8	0	33	182
16:00-16:15	42	92	45	0	1	33	213
16:15-16:30	44	80	49	1	3	24	201
16:30-16:45	58	89	66	6	1	33	253
16:45-17:00	41	79	62	7	4	40	233
17:00-17:15	62	95	54	3	3	32	249
17:15-17:30	28	83	60	3	2	20	196
15:30 to 16:30	143	311	224	12	12	124	826
16:30 to 17:30	189	346	242	19	10	125	931
PM Peak Hour	205	343	231	17	11	129	936

Table C-9

Hardscratch Road @ Brooklyn Road

Yarmouth Co., Nova Scotia

Monday, September11, 2006



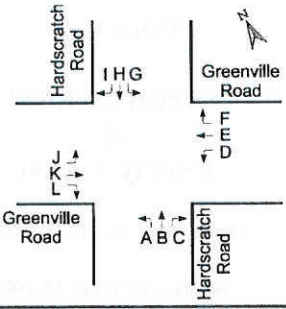
Time	Hardscatch Road Northbound Approach			Brooklyn Road Westbound Approach			Hardscratch Road Southbound Approach			Brooklyn Road Eastbound Approach			Total Vehicles
	A	B	C	D	E	F	G	H	I	J	K	L	
07:00-07:15	1	12	0	2	0	0	0	11	4	2	1	0	33
07:15-07:30	1	16	1	1	1	2	0	30	7	0	1	4	64
07:30-07:45	3	19	1	5	1	0	2	43	12	2	0	2	90
07:45-08:00	0	13	1	2	1	0	0	47	12	6	1	3	86
08:00-08:15	6	18	1	2	1	1	0	47	14	6	3	7	106
08:15-08:30	3	13	0	4	1	0	0	30	9	8	0	6	74
08:30-08:45	3	16	5	4	2	1	1	30	6	3	2	5	78
08:45-09:00	2	13	5	1	1	1	1	31	4	3	0	7	69
AM Peak Hour	12	63	3	13	4	1	2	167	47	22	4	18	356
15:30-16:45	5	39	0	3	0	0	0	25	8	9	1	9	99
15:45-16:00	3	22	3	1	0	0	0	14	3	8	1	5	60
16:00-16:15	7	34	2	0	0	0	1	26	1	10	1	3	85
16:15-16:30	3	32	3	0	0	0	1	16	1	8	1	4	69
16:30-16:45	4	36	3	0	0	0	1	23	7	9	2	6	91
16:45-17:00	6	37	2	3	1	1	0	24	4	4	0	5	87
17:00-17:15	4	39	3	2	0	0	1	33	8	4	2	2	98
17:15-17:30	1	35	2	5	1	1	1	20	7	8	0	1	82
PM Peak Hour	15	147	10	10	2	2	3	100	26	25	4	14	358

Table C-10

Hardscratch Road @ Greenville Road

Yarmouth Co., Nova Scotia

Monday, September 11, 2006



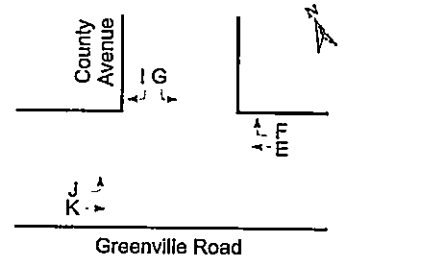
Time	Hardscatch Road Northbound Approach			Greenville Road Westbound Approach			Hardscratch Road Southbound Approach			Greenville Road Eastbound Approach			Total Vehicles
	A	B	C	D	E	F	G	H	I	J	K	L	
07:00-07:15	2	11	1	0	7	2	5	12	4	4	2	1	51
07:15-07:30	1	10	0	6	2	2	7	27	4	5	3	4	71
07:30-07:45	6	15	6	8	7	0	5	40	2	4	10	4	107
07:45-08:00	4	8	4	7	18	3	6	47	3	3	8	12	123
08:00-08:15	9	16	3	7	14	7	5	34	10	2	2	12	121
08:15-08:30	9	13	2	7	13	3	8	28	3	0	5	4	95
08:30-08:45	4	9	4	6	5	1	4	26	5	2	3	9	78
08:45-09:00	6	10	4	4	8	8	6	25	4	0	1	10	86
AM Peak Hour	28	52	15	29	52	13	24	149	18	9	25	32	446
15:30-16:45	6	26	6	9	5	5	3	20	1	5	5	4	95
15:45-16:00	6	23	6	3	5	1	6	12	0	5	4	5	76
16:00-16:15	8	25	6	6	4	1	5	9	3	3	9	10	89
16:15-16:30	7	29	8	3	2	4	1	11	2	1	12	7	87
16:30-16:45	13	23	8	6	12	7	2	19	2	2	12	6	112
16:45-17:00	8	31	4	9	5	4	6	17	0	6	10	5	105
17:00-17:15	9	28	9	8	5	1	2	21	1	6	15	15	120
17:15-17:30	11	31	5	4	6	1	5	15	3	8	16	9	114
PM Peak Hour	41	113	26	27	28	13	15	72	6	22	53	35	451

Table C-11

Greenville Road @ County Avenue

Yarmouth Co., Nova Scotia

Tuesday, September 12, 2006



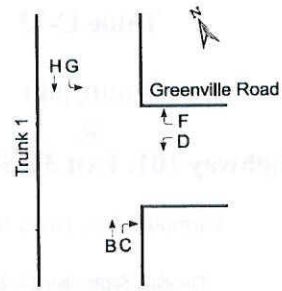
Time	Greenville Road Westbound Approach		County Avenue Southbound Approach		Greenville Road Eastbound Approach		Total Vehicles
	E	F	G	I	J	K	
07:00-07:15	6	3	0	1	3	8	21
07:15-07:30	5	4	2	1	8	6	26
07:30-07:45	7	5	2	2	6	8	30
07:45-08:00	15	11	0	0	16	18	60
08:00-08:15	16	6	1	1	15	9	50
08:15-08:30	22	3	2	0	13	10	58
08:30-08:45	14	5	1	2	13	12	47
08:45-09:00	13	6	2	6	19	7	53
07:00 to 08:00	36	23	4	4	33	40	140
08:00 to 09:00	66	19	6	16	60	41	208
AM Peak Hour	71	24	4	10	57	52	218
11:00-11:15	10	3	0	6	3	13	35
11:15-11:30	9	1	1	6	2	9	28
11:30-11:45	10	5	2	12	7	11	47
11:45-12:00	5	0	1	8	9	15	38
12:00-12:15	11	1	4	3	3	11	33
12:15-12:30	15	7	1	6	7	10	46
12:30-12:45	8	3	7	6	14	18	56
12:45-13:00	16	4	4	4	9	11	48
11:00 to 12:00	34	9	4	32	21	48	148
12:00 to 13:00	50	10	16	28	33	50	187
Noon Peak Hour	50	10	16	28	33	50	187
15:30-16:45	8	1	2	1	10	13	35
15:45-16:00	8	2	1	6	5	20	42
16:00-16:15	16	2	5	17	4	18	62
16:15-16:30	11	6	4	2	4	13	40
16:30-16:45	11	4	4	12	7	23	61
16:45-17:00	24	3	3	3	5	30	66
17:00-17:15	15	2	21	2	7	20	86
17:15-17:30	15	3	2	10	5	19	52
15:30 to 16:30	43	11	12	26	23	64	179
16:30 to 17:30	65	10	30	46	22	92	265
PM Peak Hour	65	10	30	46	22	92	265

Table C-12

Trunk 1
@
Greenville Road

Yarmouth Co., Nova Scotia

Monday, September 25, 2006



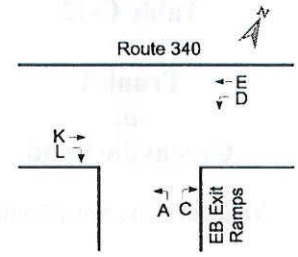
Time	Trunk 1 Northbound Approach		Greenville Road Westbound Approach		Trunk 1 Southbound Approach		Total Vehicles
	B	C	D	F	G	H	
07:00-07:15	9	8	9	2	5	46	79
07:15-07:30	11	8	6	4	4	48	81
07:30-07:45	25	6	11	1	15	72	130
07:45-08:00	22	22	24	7	22	83	180
08:00-08:15	48	17	22	6	7	120	220
08:15-08:30	32	14	22	7	12	76	163
08:30-08:45	43	12	16	8	24	92	195
08:45-09:00	33	15	15	8	7	66	144
AM Peak Hour	145	65	84	28	65	371	758
15:30-16:45	78	19	3	6	6	50	162
15:45-16:00	73	11	14	5	8	42	153
16:00-16:15	77	14	15	10	5	38	159
16:15-16:30	66	20	10	15	4	39	154
16:30-16:45	87	16	15	10	7	55	190
16:45-17:00	69	9	19	10	10	45	162
17:00-17:15	102	25	22	18	2	50	219
17:15-17:30	72	18	16	9	8	38	161
PM Peak Hour	330	68	72	47	27	188	732

Table C-13

Route 340
@
Highway 101, Exit 34, EB Ramps

Yarmouth Co., Nova Scotia

Tuesday, September 26, 2006



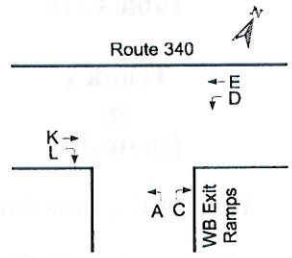
Time	Exit Ramp Northbound Approach		Route 340 Westbound Approach		Route 340 Eastbound Approach		Total Vehicles
	A	C	D	E	K	L	
07:00-07:15	0	1	2	14	4	2	23
07:15-07:30	1	0	1	44	3	1	50
07:30-07:45	0	3	2	53	13	1	72
07:45-08:00	0	2	3	57	8	5	75
08:00-08:15	1	1	0	61	9	9	81
08:15-08:30	4	3	2	41	13	5	68
08:30-08:45	3	1	0	56	11	6	77
08:45-09:00	0	4	1	25	17	4	51
AM Peak Hour	8	7	5	215	41	25	301
15:30-16:45	2	5	1	21	35	8	72
15:45-16:00	0	11	1	27	23	10	72
16:00-16:15	2	17	1	21	21	11	73
16:15-16:30	1	11	2	20	33	15	82
16:30-16:45	1	12	2	35	43	9	102
16:45-17:00	4	19	0	21	37	15	96
17:00-17:15	3	15	2	22	42	4	88
17:15-17:30	3	19	3	19	24	4	72
PM Peak Hour	9	57	6	98	155	43	368

Table C-14

Route 340
@
Highway 101, Exit 34, WB Ramps

Yarmouth Co., Nova Scotia

Tuesday, September 26, 2006



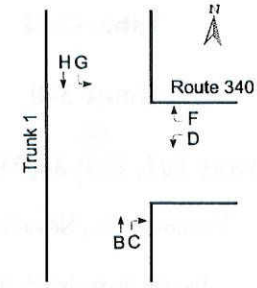
Time	Exit Ramp Northbound Approach		Route 340 Westbound Approach		Route 340 Eastbound Approach		Total Vehicles
	A	C	D	E	K	L	
07:00-07:15	2	2	2	11	4	0	21
07:15-07:30	10	1	11	29	3	3	57
07:30-07:45	16	3	16	32	10	4	81
07:45-08:00	17	3	24	30	10	6	90
08:00-08:15	18	0	15	56	19	4	112
08:15-08:30	7	2	7	29	19	2	66
08:30-08:45	13	1	16	41	16	4	91
08:45-09:00	6	2	13	17	9	3	50
AM Peak Hour	55	6	62	156	64	16	359
15:30-16:45	4	3	4	14	34	3	62
15:45-16:00	4	0	5	21	32	4	66
16:00-16:15	4	0	4	16	33	4	61
16:15-16:30	2	5	4	16	37	3	67
16:30-16:45	6	2	4	31	49	4	96
16:45-17:00	2	2	3	19	51	3	80
17:00-17:15	6	0	2	20	49	2	79
17:15-17:30	3	0	6	15	27	6	57
PM Peak Hour	16	9	13	86	186	12	322

Table C-15

Trunk 1
@
Route 340

Yarmouth Co., Nova Scotia

Monday, September 25, 2006



Time	Trunk 1 Northbound Approach		Route 340 Westbound Approach		Trunk 1 Southbound Approach		Total Vehicles
	B	C	D	F	G	H	
07:00-07:15	5	5	19	1	0	26	56
07:15-07:30	10	6	29	3	1	26	75
07:30-07:45	15	12	52	6	0	30	115
07:45-08:00	13	7	52	1	1	46	120
08:00-08:15	24	16	56	3	3	45	147
08:15-08:30	25	15	40	15	6	50	151
08:30-08:45	31	12	49	10	6	56	164
08:45-09:00	28	13	24	3	3	35	106
AM Peak Hour	93	50	197	29	16	197	582
15:30-16:45	37	28	22	1	2	20	110
15:45-16:00	28	29	23	1	2	28	111
16:00-16:15	39	39	19	5	6	20	128
16:15-16:30	37	32	20	2	4	18	113
16:30-16:45	43	52	25	4	5	26	155
16:45-17:00	44	34	20	5	6	27	136
17:00-17:15	48	49	25	1	2	21	146
17:15-17:30	37	39	18	4	3	20	121
PM Peak Hour	172	174	88	14	16	94	558

Table C-16 - Noon Peak-Hour Driveway Volumes

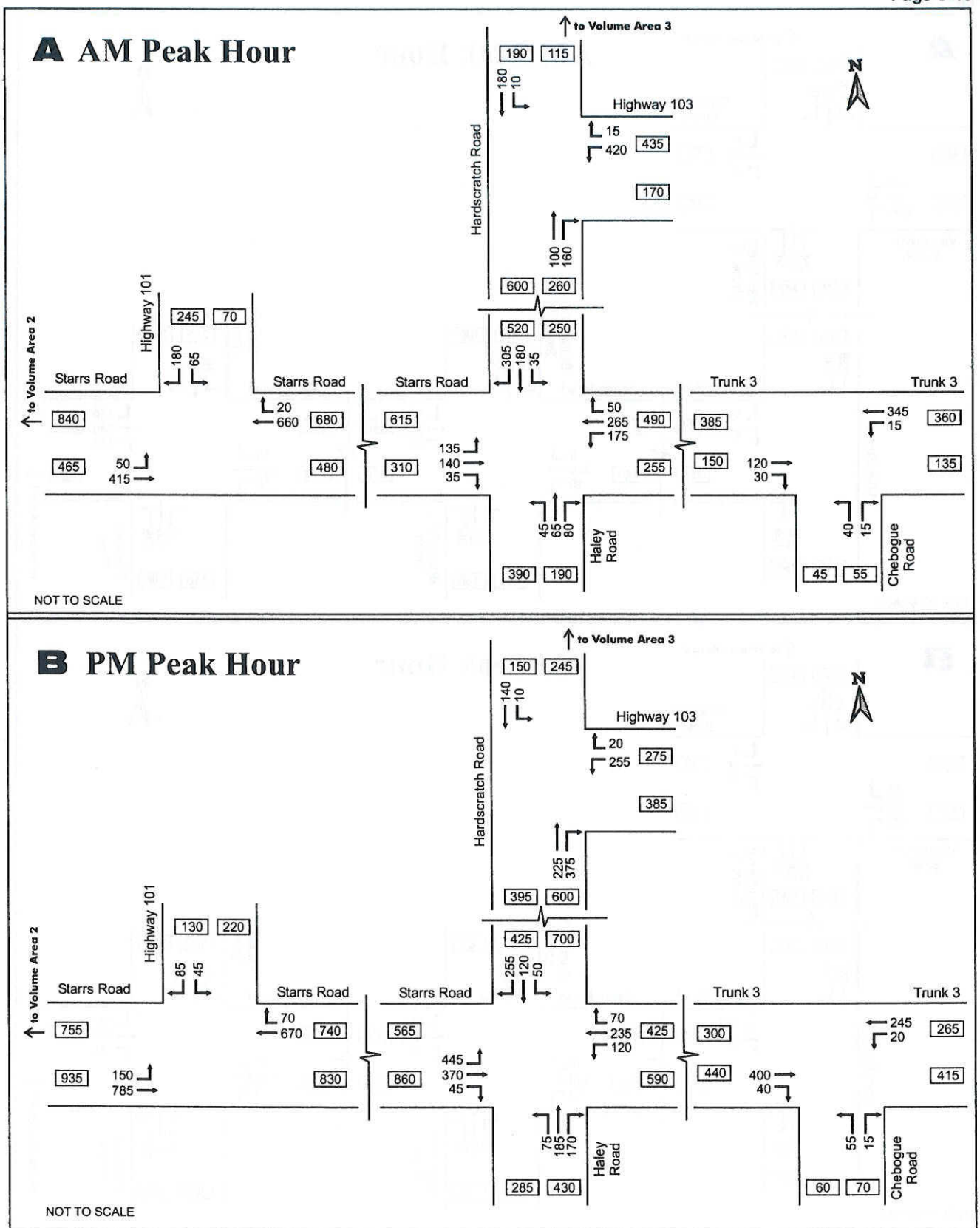
Access Serving	Count Date	Maximum Volume at Driveway(s)									
		Time	Total vph	In				Out			
				East	West	Total	%	East	West	Total	%
Goudeys Auto Sales	Sep 25 06	11:15	36	5	13	18	50	8	10	18	50
Dollar Store & Vacant Store	Sep 12 06	11:45	39	10	4	14	36	21	4	25	64
Jungle Jims Restaurant	Sep 12 06	11:00	33	11	16	27	82	1	5	6	18
Hobbies, Electronics, Subway	Sep 11 06	11:45	113	26	37	63	56	40	10	50	44
UPS, Vogue Optical, Styles	Sep 11 06	12:00	34	5	2	7	21	23	4	27	79
Pizza Delight (shared access)	Sep 11 06	12:00	34	10	16	26	76	3	5	8	24
Tim Hortons (2 driveways)	Sep 14 06	12:00	281	66	78	144	51	109	28	137	49
Red Knight, Produce Market	Sep 25 06	11:45	61	15	19	34	56	26	1	27	44
Lotus Gardens (2 driveways)	Sep 26 06	11:45	44			27	61			17	39
Irving Mainway	Sep 25 06	11:45	41			16	39			25	61
Kent Building Supplies	Sep 29 06	11:00	86	28	8	36	42	29	21	50	58
WalMart, Staples, Superstore, Shell	Sep 29 06	11:45	771	119	233	352	46	158	261	419	54
Shell (west driveway)	Sep 25 06	11:00	40	1	19	20	50	3	17	20	50
Comfort Inn	Sep 25 06	12:00	5	1	1	2	40	0	3	3	60
Yarmouth Mall (East access)	Sep 12 06	12:00	183	47	44	91	50	43	49	92	50
Yarmouth Mall (centre access)	Sep 12 06	11:00	169	72	19	91	54	22	56	78	46
Yarmouth Mall (West access)	Sep 11 06	11:00	174	29	66	95	55	25	54	79	45
Shoppers Drug Mart	Sep 25 06	11:45	101			56	55			45	45

Table C-17 - Afternoon Peak-Hour Driveway Volumes

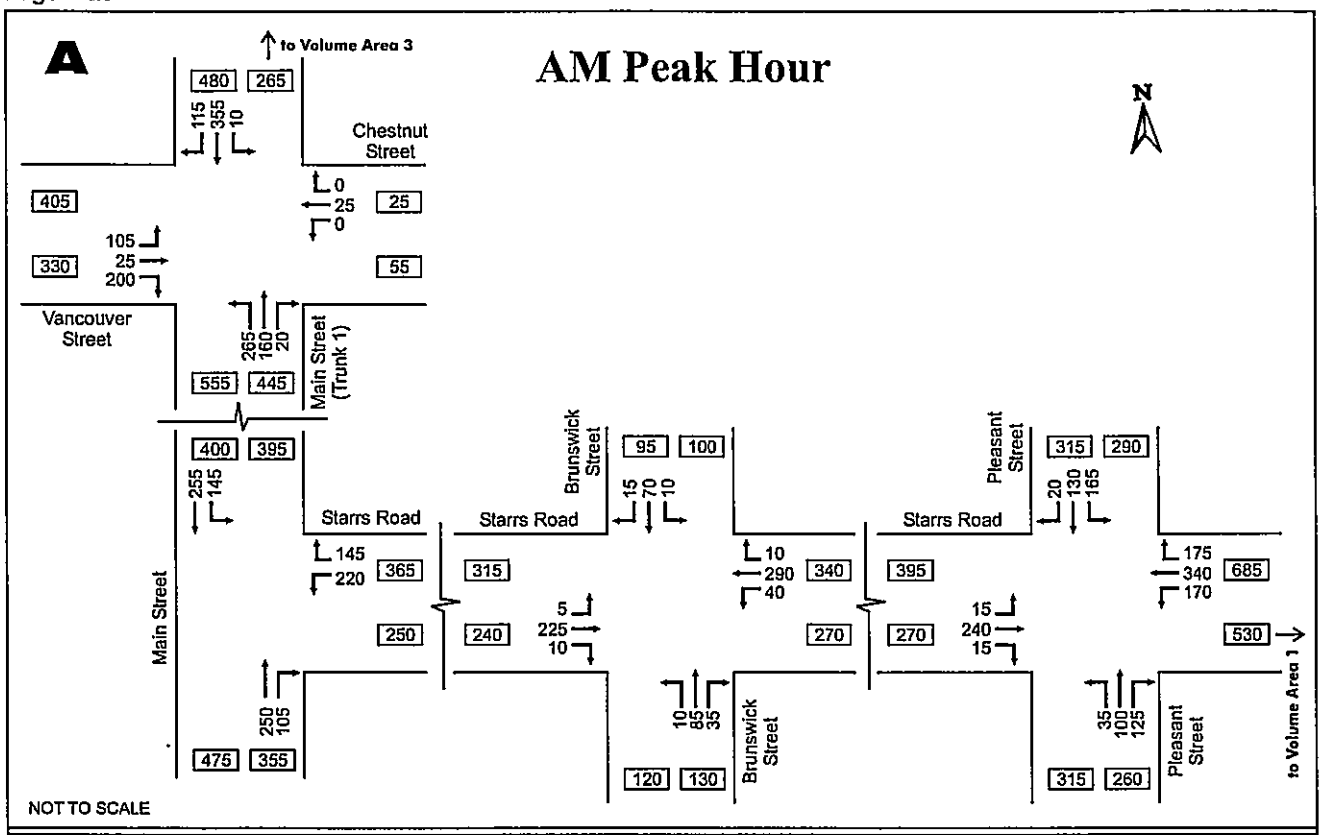
Access Serving	Count Date	Maximum Volume at Driveway(s)									
		Time	Total vph	In				Out			
				East	West	Total	%	East	West	Total	%
Kent Building Supplies	Sep 29 06	3:30	86	27	12	39	45	33	14	47	55
WalMart, Staples, Superstore, Shell	Sep 29 06	4:15	894	123	292	415	46	234	245	479	54

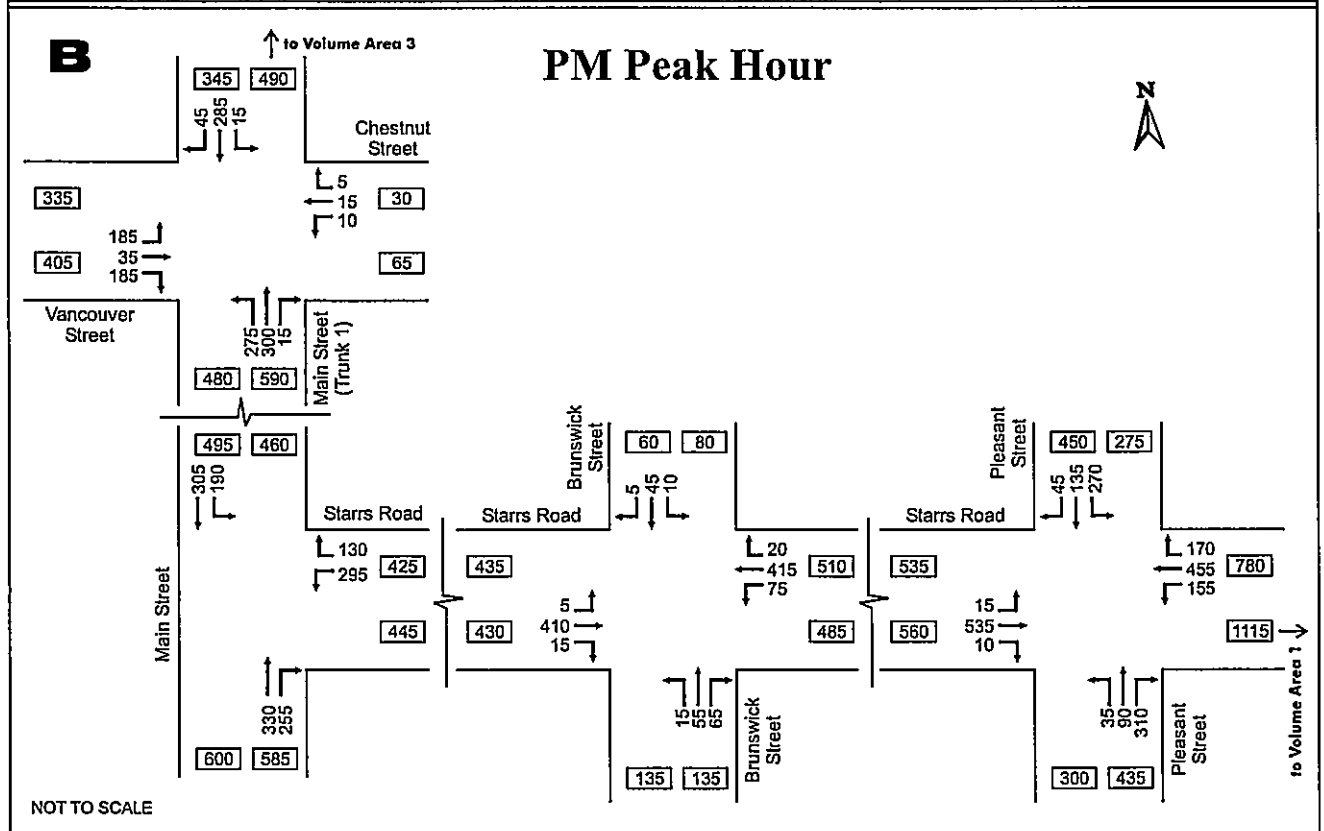
Table C-18 - Licence Plate Match Study - Trips from Highway 103 to Highway 101 - September 15, 2006

Time Period	Vehicles at Highway 101		Vehicles at Highway 101		Plate Match		Percent Matches	
	20 Minutes	Hour	20 Minutes	Hour	20 Minutes	Hour	at Hwy 103	At Hwy 101
07:00-07:20	63		3		1			
07:40-07:40	112		12		6			
07:40-08:00	140	315	8	23	4	11	3.5	47.8
08:00-08:20	160		10		2			
08:20-08:40	114		14		2			
08:40-09:00	104	378	9	33	2	6	1.6	18.2
09:00-09:20	75		10		1			
09:20-09:40	89		17		2			
09:40-10:00	87	251	14	41	3	6	2.4	14.6
AM Totals		944		97		23	2.4	23.7
11:00-11:20	80		14		2			
11:20-11:40	66		15		1			
11:40-12:00	53	199	17	46	0	3	1.5	6.5
12:00-12:20	72		15		0			
12:20-12:40	80		16		2			
12:40-01:00	74	226	11	42	0	2	0.9	4.8
01:00-01:20	51		9		0			
01:20-01:40	70		13		2			
01:40-02:00	66	187	15	37	0	2	1.1	5.4
Noon Totals		612		125		7	1.1	5.6
03:00-03:20	78		15		0			
03:20-03:40	81		15		1			
03:40-04:00	67	226	13	43	1	2	0.9	4.7
04:00-04:20	53		16		3			
04:20-04:40	87		21		1			
04:40-05:00	85	225	26	63	0	4	1.8	6.3
05:00-05:20	76		22		1			
05:20-05:40	65		15		2			
05:40-06:00	84	225	11	48	1	4	1.8	8.3
PM Totals		676		154		10	1.5	6.5
9 Hour Totals		**2232**		**376**		**40**	**1.8**	**10.6**

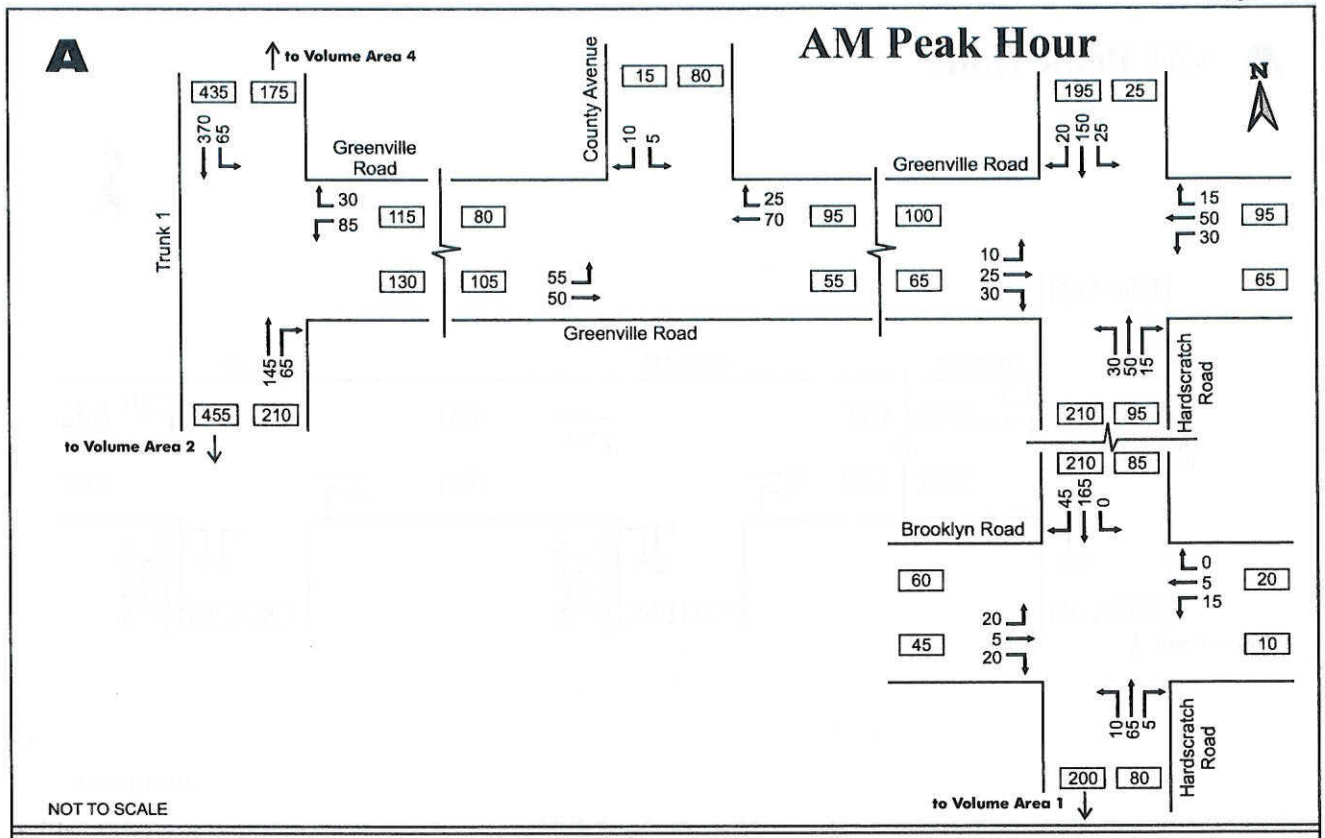


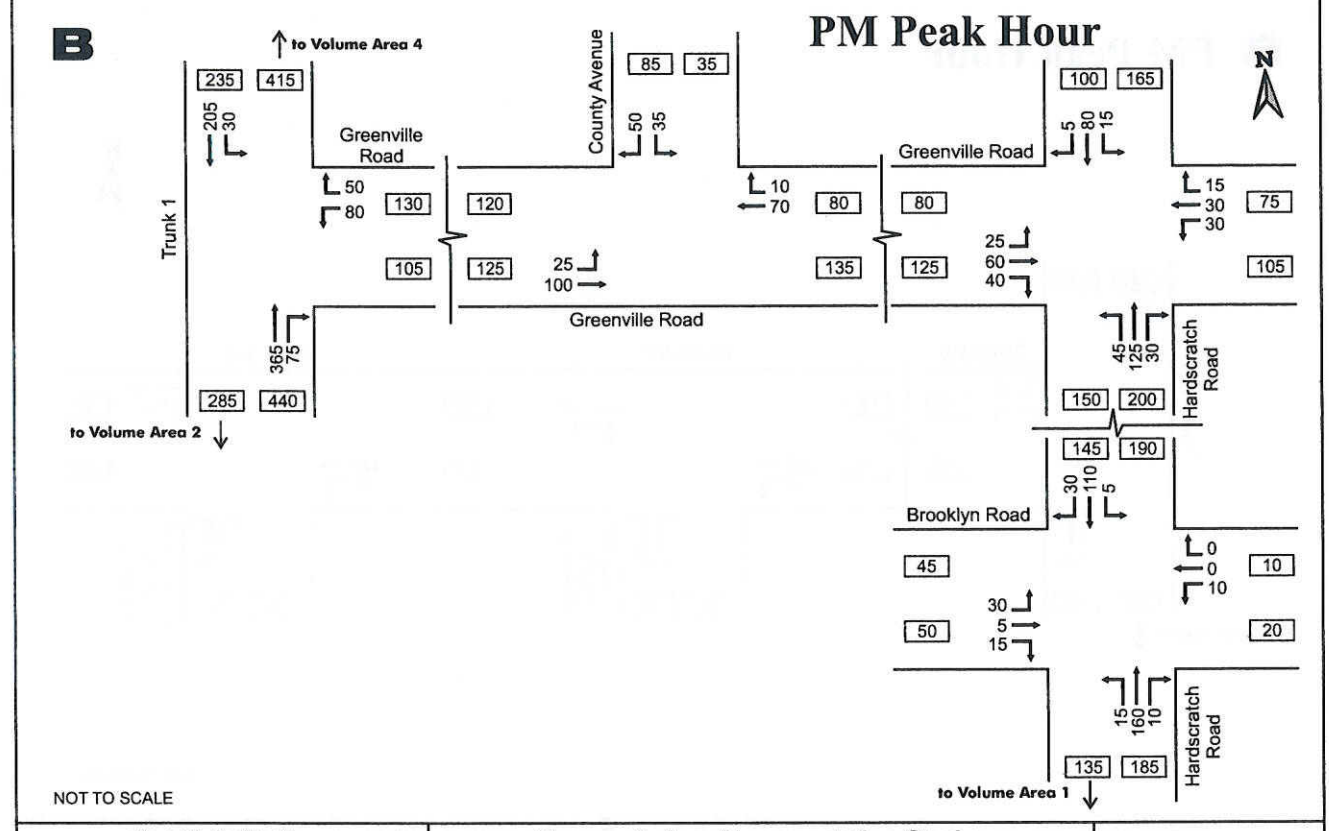
Atlantic Road & Traffic Management *Traffic Engineering Specialists*	**Yarmouth Area Transportation Study** **Nova Scotia**	**Figure C-2**
	2006 Design Hourly Volumes for Volume Area 1	**November 2006**





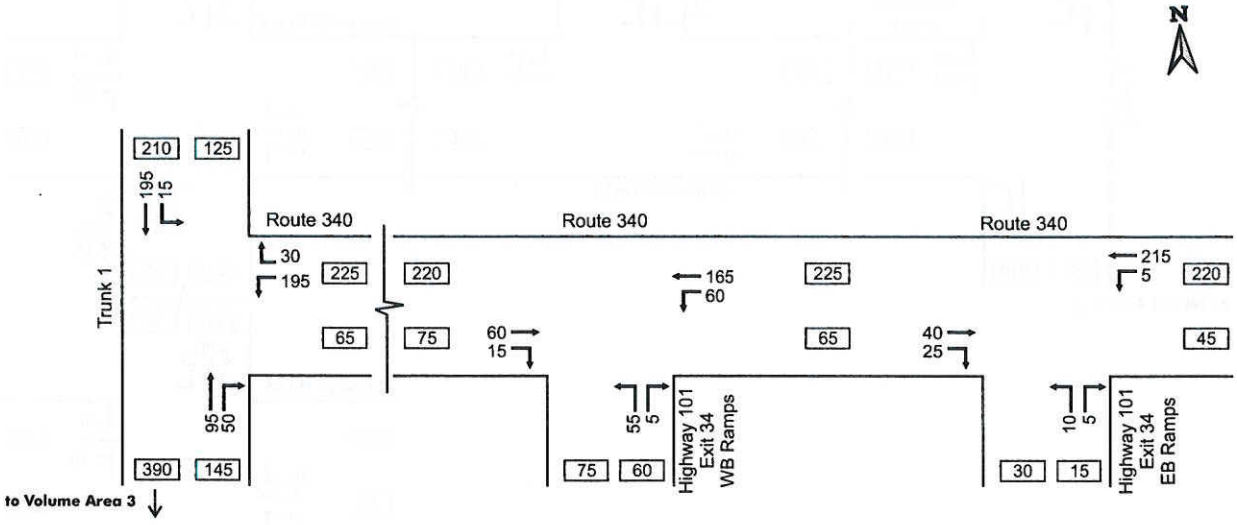
Atlantic Road & Traffic Management — Traffic Engineering Specialists	Yarmouth Area Transportation Study Nova Scotia	Figure C-3
	2006 Design Hourly Volumes for Volume Area 2	November 2006





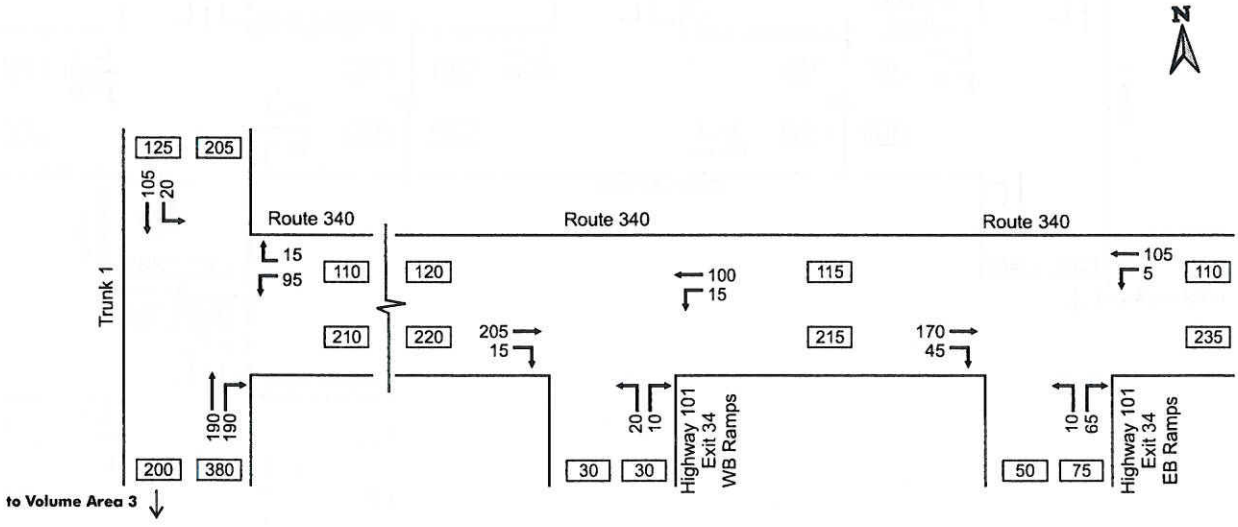
Atlantic Road & Traffic Management *Traffic Engineering Specialists*	**Yarmouth Area Transportation Study** **Nova Scotia**	**Figure C-4**
	2006 Design Hourly Volumes for Volume Area 3	**November 2006**

A AM Peak Hour



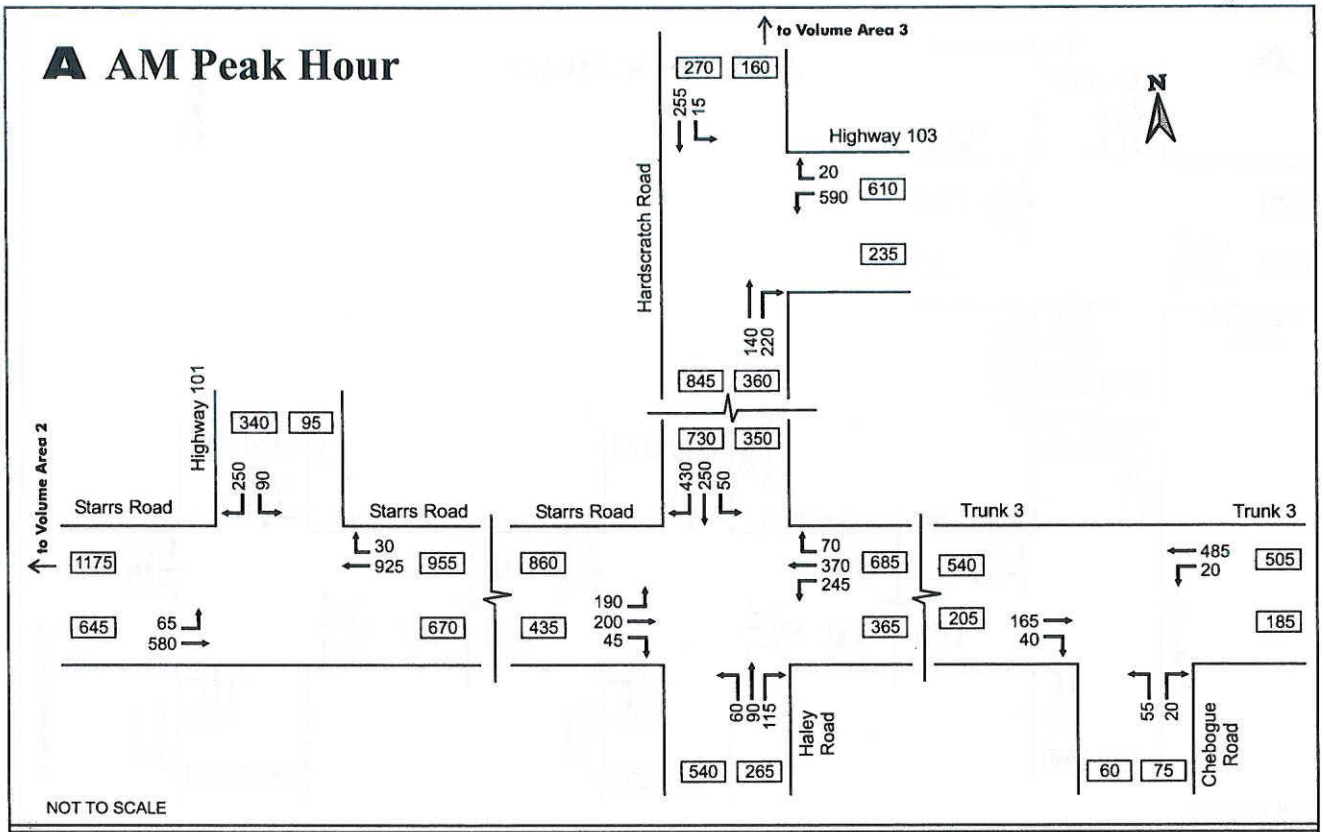
NOT TO SCALE

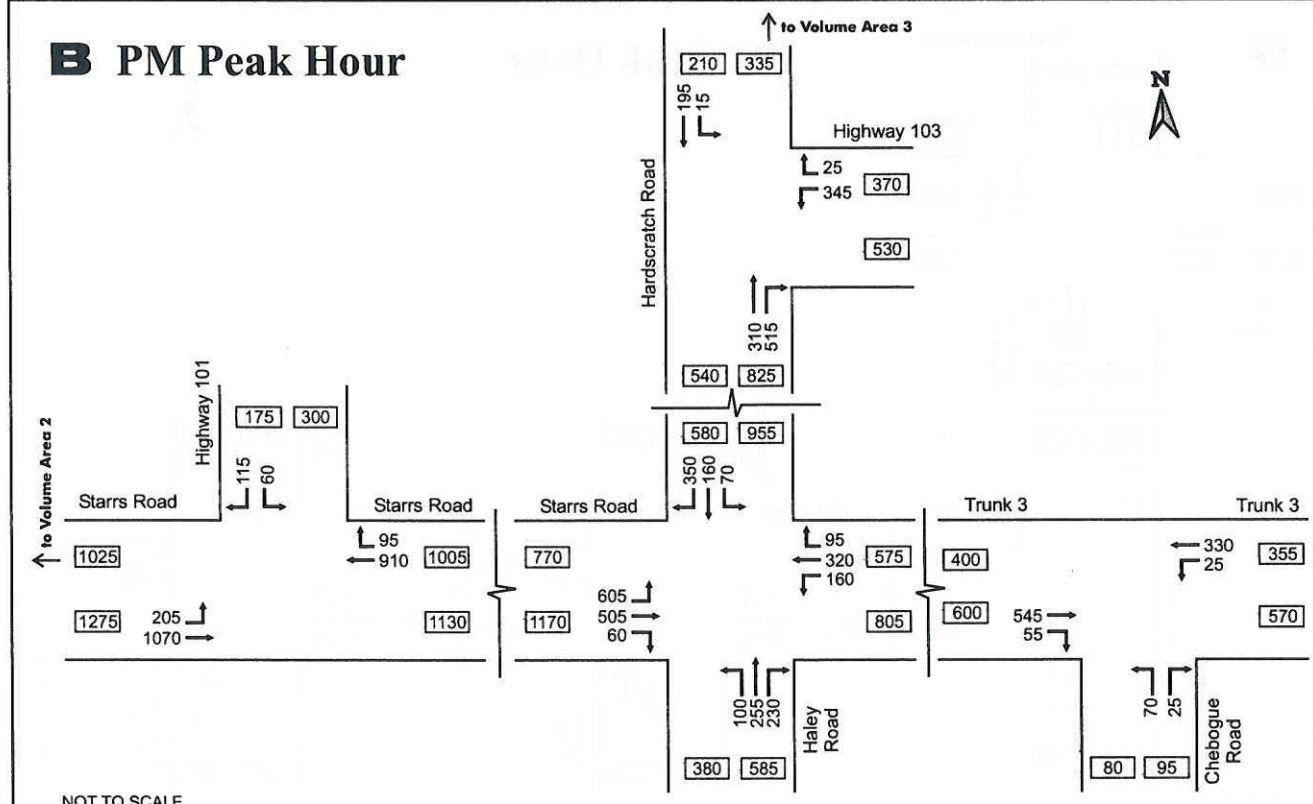
B PM Peak Hour



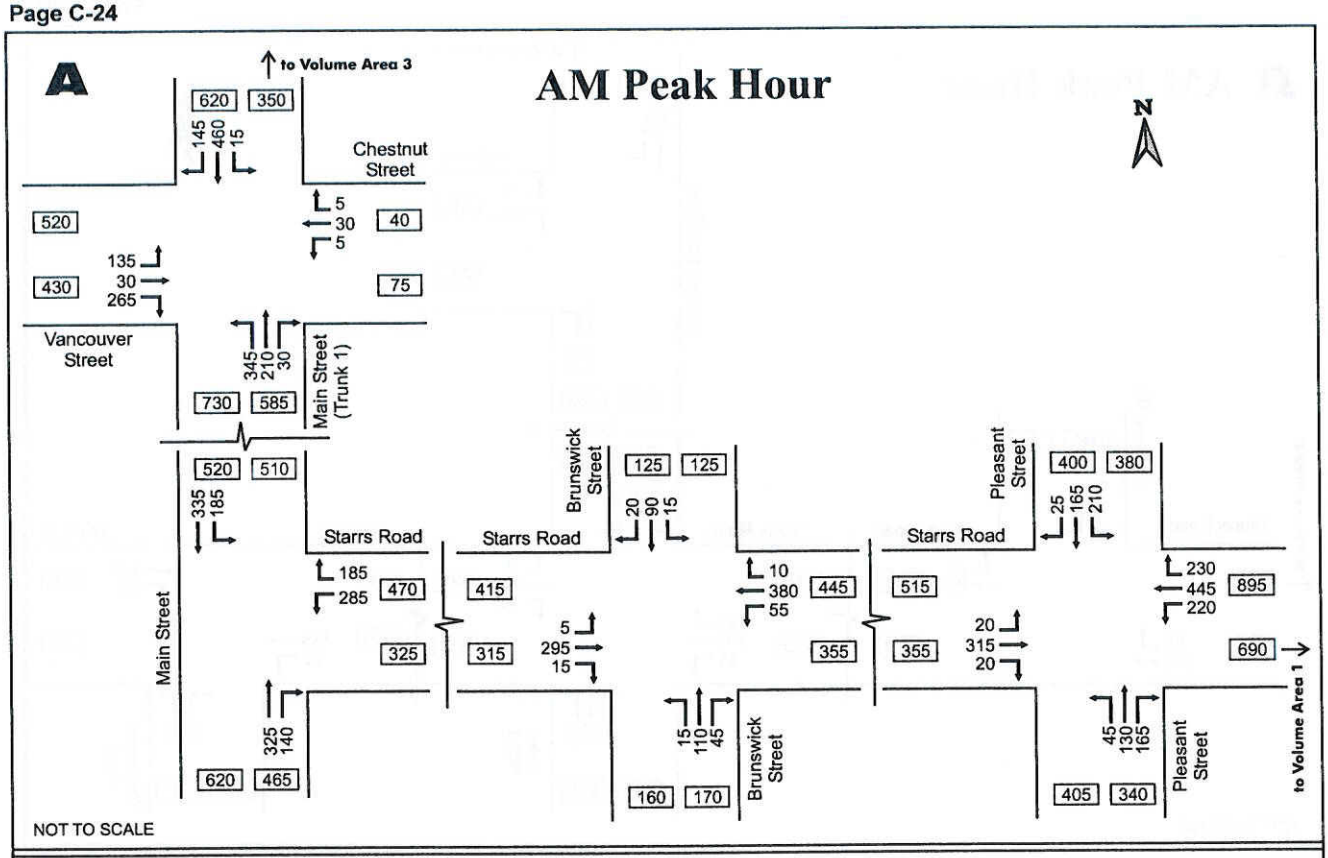
NOT TO SCALE

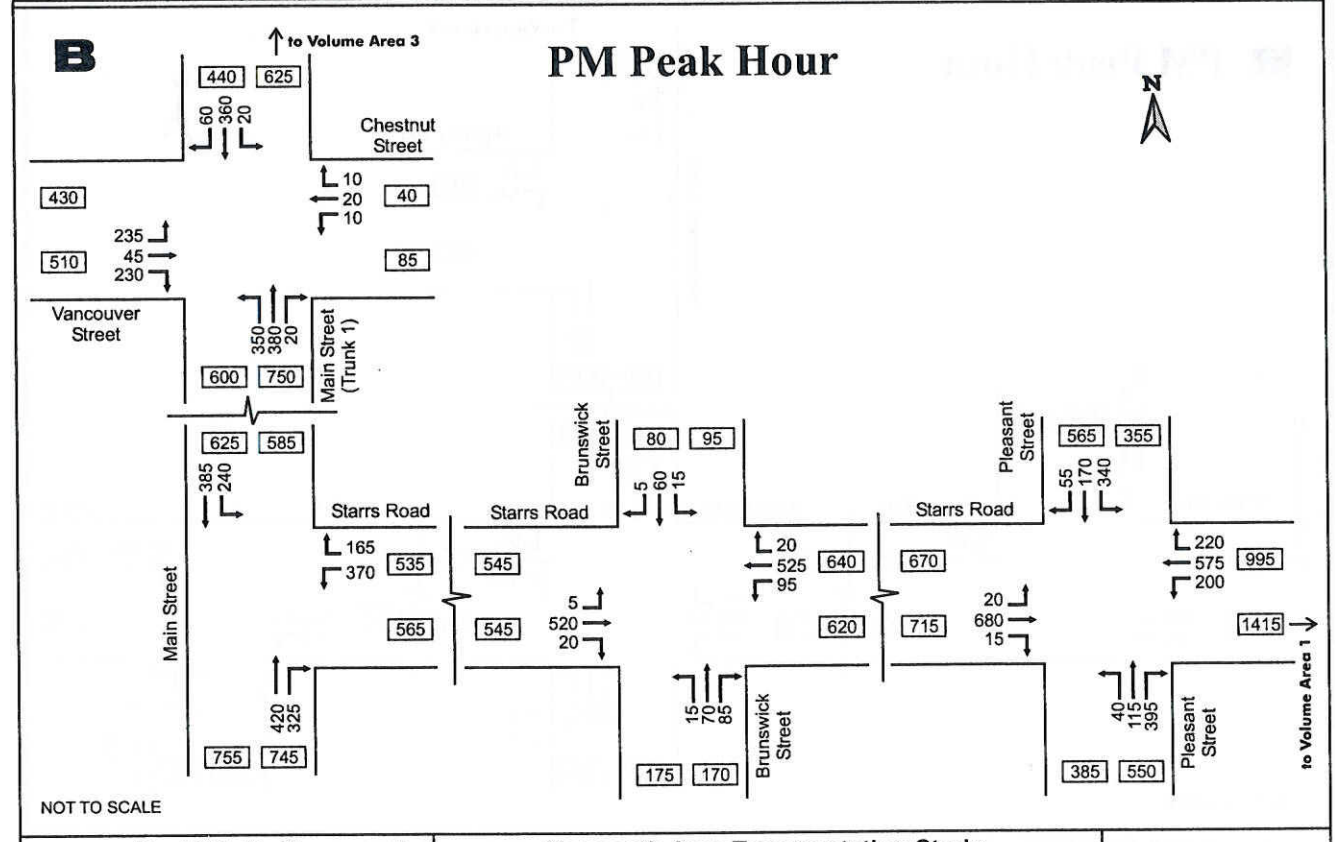
Atlantic Road & Traffic Management Traffic Engineering Specialists	Yarmouth Area Transportation Study Nova Scotia	Figure C-5
	2006 Design Hourly Volumes for Volume Area 4	November 2006



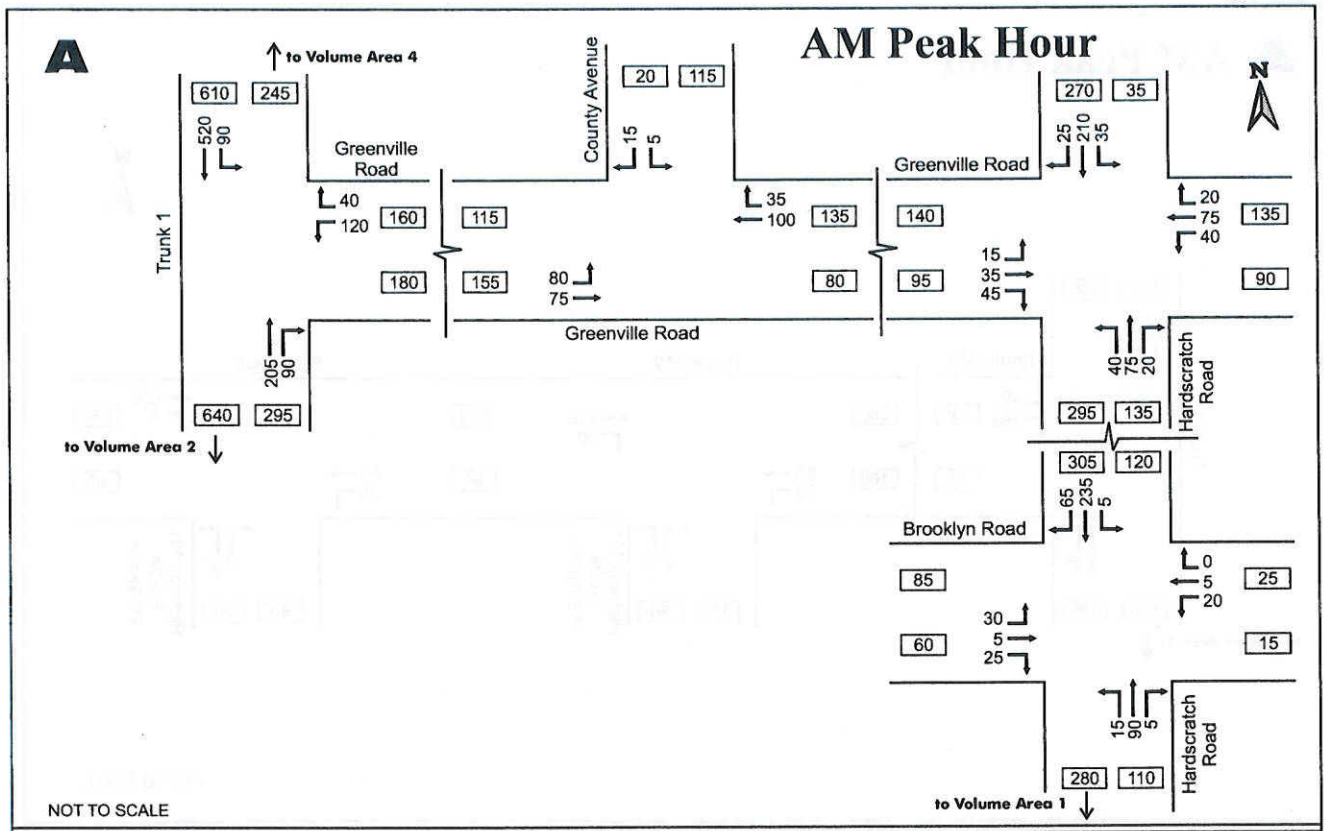


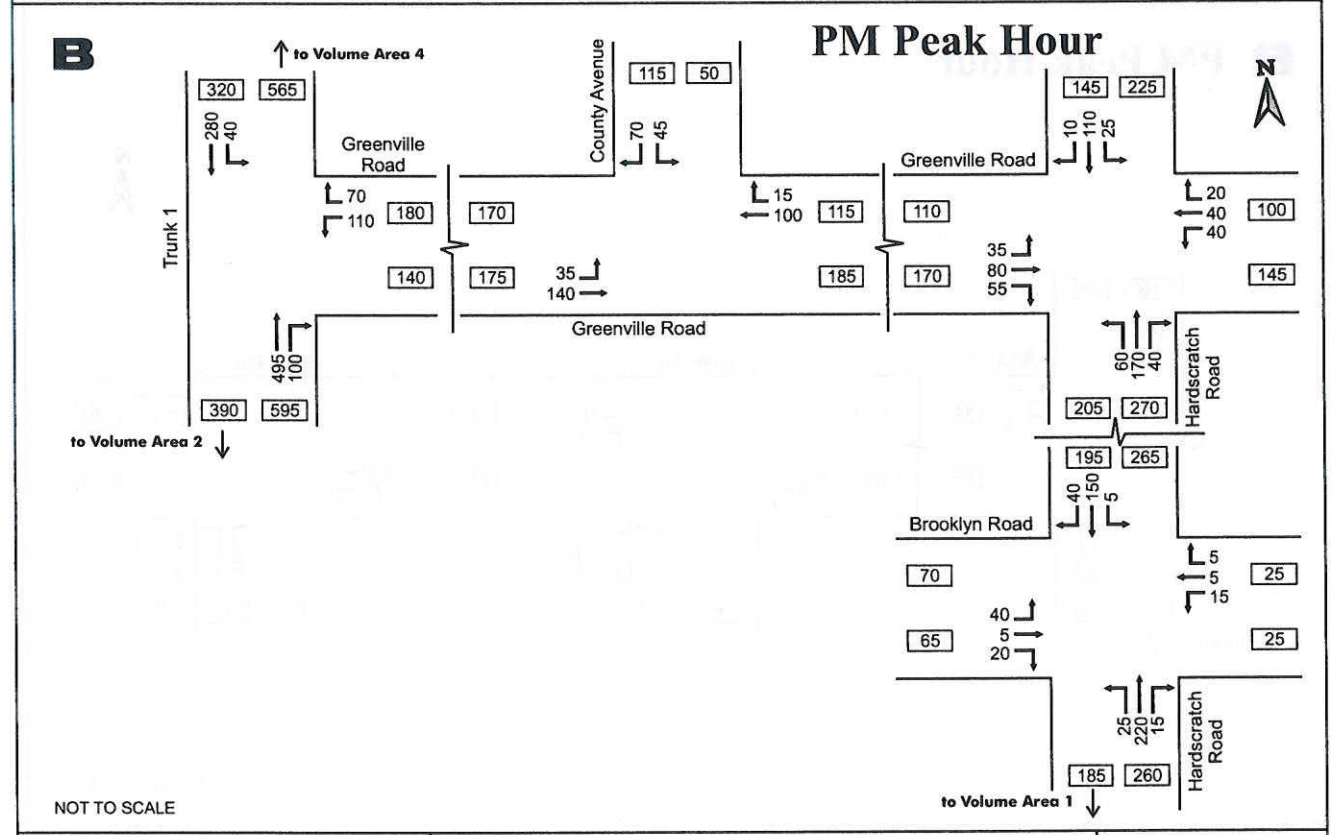
Atlantic Road & Traffic Management Traffic Engineering Specialists	Yarmouth Area Transportation Study Nova Scotia	Figure C-6
	2026 Design Hourly Volumes for Volume Area 1	November 2006





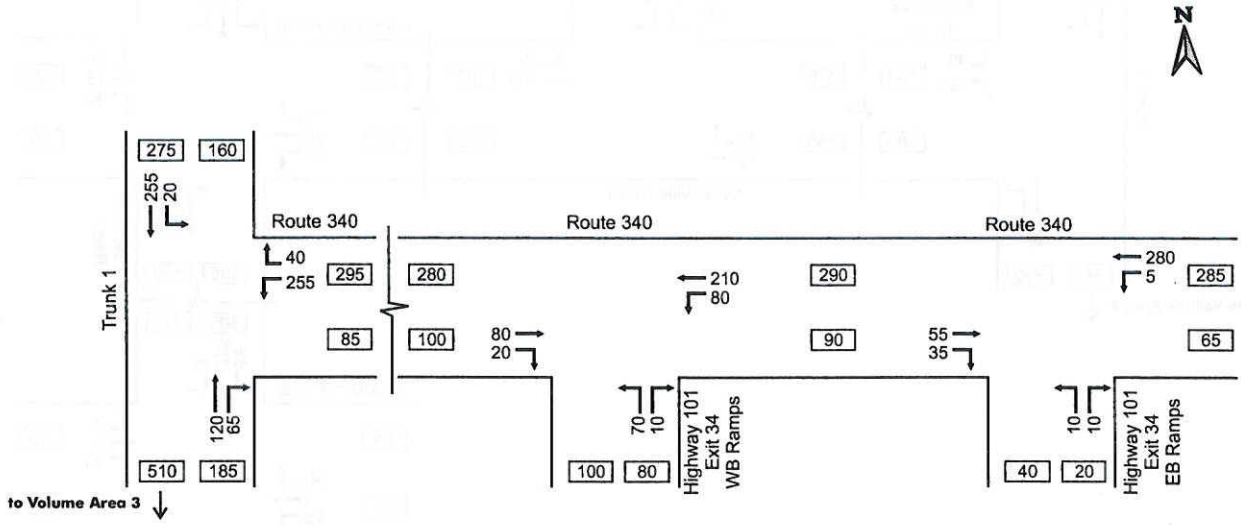
Atlantic Road & Traffic Management *Traffic Engineering Specialists*	Yarmouth Area Transportation Study Nova Scotia	Figure C-7
	2026 Design Hourly Volumes for Volume Area 2	November 2006





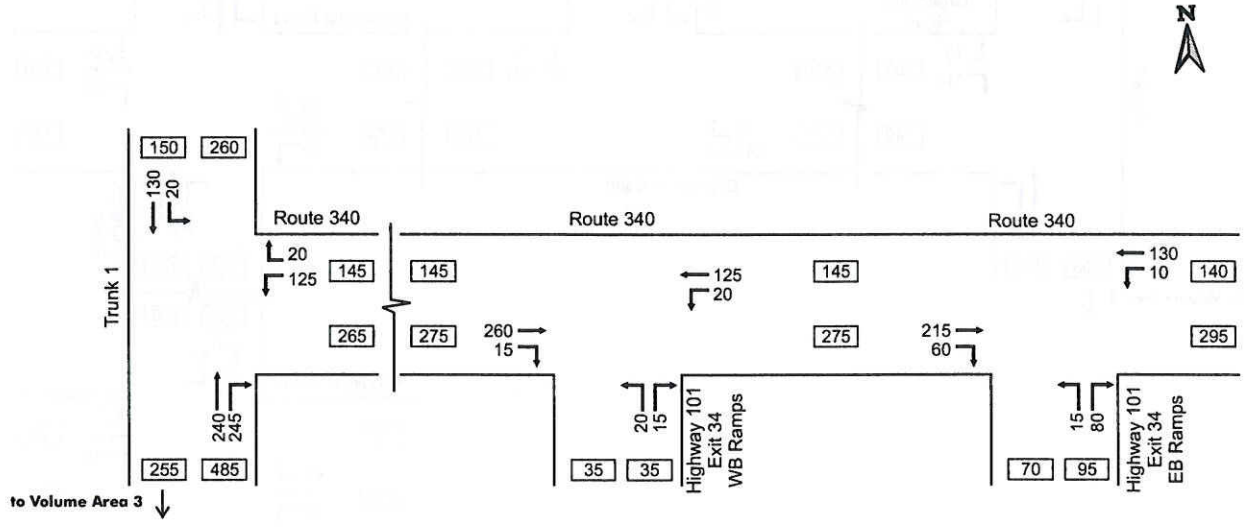
Atlantic Road & Traffic Management *Traffic Engineering Specialists*	**Yarmouth Area Transportation Study** **Nova Scotia**	**Figure C-8**
	2026 Design Hourly Volumes **for Volume Area 3**	**November 2006**

A AM Peak Hour



NOT TO SCALE

B PM Peak Hour



NOT TO SCALE

Atlantic Road & Traffic Management *Traffic Engineering Specialists*	**Yarmouth Area Transportation Study** **Nova Scotia**	**Figure C-9**
	2026 Design Hourly Volumes **for Volume Area 4**	**November 2006**

Appendix D

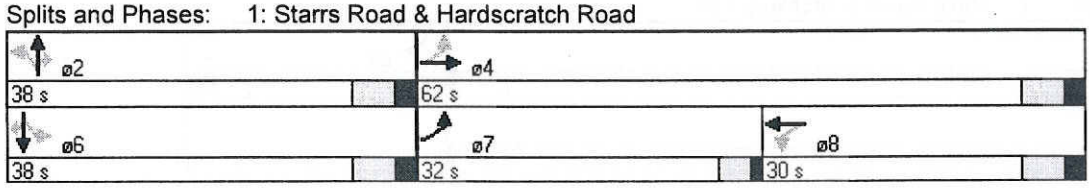
Intersection Performance Review

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Satd. Flow (prot)	1789	1827	0	1789	1838	0	0	1846	1601	0	1868	1601
Flt Permitted	0.234			0.638				0.814			0.939	
Satd. Flow (perm)	441	1827	0	1202	1838	0	0	1533	1601	0	1769	1601
Satd. Flow (RTOR)		21			9				87			332
Volume (vph)	135	140	35	175	265	50	45	65	80	35	180	305
Lane Group Flow (vph)	147	190	0	190	342	0	0	120	87	0	234	332
Turn Type	pm+pt			Perm			Perm		Perm	Perm		Perm
Protected Phases	7	4			8			2			6	
Permitted Phases	4			8			2		2	6		6
Total Split (s)	32.0	62.0	0.0	30.0	30.0	0.0	38.0	38.0	38.0	38.0	38.0	38.0
Act Effct Green (s)	27.9	28.0		17.3	17.3			15.3	15.3		15.3	15.3
Actuated g/C Ratio	0.51	0.53		0.33	0.33			0.29	0.29		0.29	0.29
v/c Ratio	0.31	0.19		0.48	0.56			0.27	0.16		0.45	0.47
Control Delay	8.1	6.1		22.2	20.8			19.6	5.9		21.4	5.2
Queue Delay	0.0	0.0		0.0	0.0			0.0	0.0		0.0	0.0
Total Delay	8.1	6.1		22.2	20.8			19.6	5.9		21.4	5.2
LOS	A	A		C	C			B	A		C	A
Approach Delay		7.0			21.3			13.8			11.9	
Approach LOS		A			C			B			B	
Queue Length 50th (m)	5.4	6.3		14.0	25.1			8.7	0.0		18.1	0.0
Queue Length 95th (m)	16.8	19.4		41.3	65.1			25.8	9.1		46.6	16.7
Internal Link Dist (m)		582.0			233.7			218.4			259.4	
Turn Bay Length (m)	35.0			60.0					30.0			30.0
Base Capacity (vph)	740	1316		532	818			757	835		874	959
Starvation Cap Reductn	0	0		0	0			0	0		0	0
Spillback Cap Reductn	0	0		0	0			0	0		0	0
Storage Cap Reductn	0	0		0	0			0	0		0	0
Reduced v/c Ratio	0.20	0.14		0.36	0.42			0.16	0.10		0.27	0.35

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 52.7
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.56
Intersection Signal Delay: 14.2 Intersection LOS: B
Intersection Capacity Utilization 55.1% ICU Level of Service B
Analysis Period (min) 15

Splits and Phases: 1: Starrs Road & Hardscratch Road

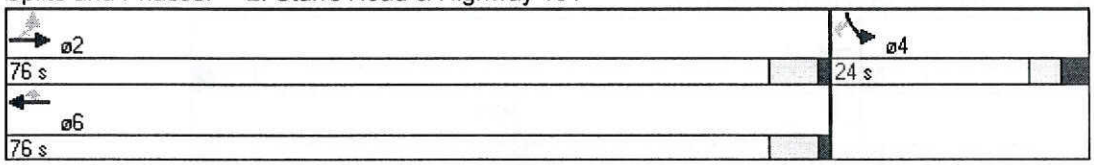


Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Satd. Flow (prot)	1789	1883	1883	1601	1789	1601
Flt Permitted	0.313				0.950	
Satd. Flow (perm)	590	1883	1883	1601	1789	1601
Satd. Flow (RTOR)				20		196
Volume (vph)	50	415	660	20	65	180
Lane Group Flow (vph)	54	451	717	22	71	196
Turn Type	Perm			Perm		Perm
Protected Phases		2	6		4	
Permitted Phases	2			6		4
Total Split (s)	76.0	76.0	76.0	76.0	24.0	24.0
Act Effct Green (s)	33.3	33.3	33.3	33.3	10.0	10.0
Actuated g/C Ratio	0.68	0.68	0.68	0.68	0.19	0.19
v/c Ratio	0.14	0.35	0.56	0.02	0.20	0.42
Control Delay	5.0	5.3	7.4	2.1	17.0	6.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	5.0	5.3	7.4	2.1	17.0	6.5
LOS	A	A	A	A	B	A
Approach Delay		5.2	7.3		9.3	
Approach LOS		A	A		A	
Queue Length 50th (m)	1.3	13.3	26.1	0.1	3.6	0.0
Queue Length 95th (m)	5.5	31.2	60.9	1.8	14.9	13.2
Internal Link Dist (m)		358.1	582.0		185.9	
Turn Bay Length (m)	60.0			30.0		50.0
Base Capacity (vph)	497	1585	1585	1351	608	673
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.11	0.28	0.45	0.02	0.12	0.29

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 49.3
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.56
Intersection Signal Delay: 6.9 Intersection LOS: A
Intersection Capacity Utilization 52.5% ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 2: Starrs Road & Highway 101

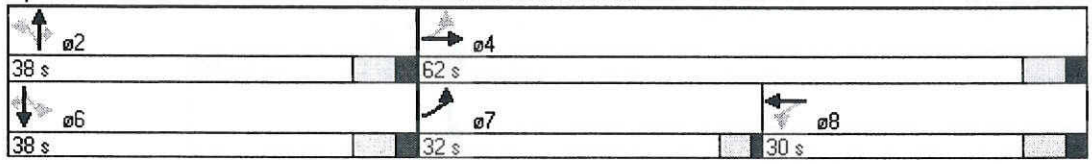


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Satd. Flow (prot)	1789	1853	0	1789	1819	0	0	1857	1601	0	1857	1601
Flt Permitted	0.249			0.502				0.854			0.797	
Satd. Flow (perm)	469	1853	0	945	1819	0	0	1608	1601	0	1501	1601
Satd. Flow (RTOR)		10			14				176			277
Volume (vph)	445	370	45	120	235	70	75	185	170	50	120	255
Lane Group Flow (vph)	484	451	0	130	331	0	0	283	185	0	184	277
Turn Type	pm+pt			Perm			Perm		Perm	Perm		Perm
Protected Phases	7	4			8			2			6	
Permitted Phases	4			8			2		2	6		6
Total Split (s)	32.0	62.0	0.0	30.0	30.0	0.0	38.0	38.0	38.0	38.0	38.0	38.0
Act Effct Green (s)	45.9	45.9		19.4	19.4			20.4	20.4		20.4	20.4
Actuated g/C Ratio	0.61	0.61		0.26	0.26			0.27	0.27		0.27	0.27
v/c Ratio	0.72	0.40		0.53	0.69			0.65	0.33		0.45	0.44
Control Delay	18.2	9.3		37.1	35.0			33.9	6.5		29.0	5.6
Queue Delay	0.0	0.0		0.0	0.0			0.0	0.0		0.0	0.0
Total Delay	18.2	9.3		37.1	35.0			33.9	6.5		29.0	5.6
LOS	B	A		D	C			C	A		C	A
Approach Delay		14.0			35.6			23.1			14.9	
Approach LOS		B			D			C			B	
Queue Length 50th (m)	33.9	28.7		17.4	44.4			39.5	1.1		24.1	0.0
Queue Length 95th (m)	87.9	63.4		40.2	84.2			68.6	15.3		45.0	16.6
Internal Link Dist (m)		582.0			233.7			218.4			259.4	
Turn Bay Length (m)	35.0			60.0					30.0			30.0
Base Capacity (vph)	742	1249		313	612			637	740		594	801
Starvation Cap Reductn	0	0		0	0			0	0		0	0
Spillback Cap Reductn	0	0		0	0			0	0		0	0
Storage Cap Reductn	0	0		0	0			0	0		0	0
Reduced v/c Ratio	0.65	0.36		0.42	0.54			0.44	0.25		0.31	0.35

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 75.2
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.72
Intersection Signal Delay: 20.3 Intersection LOS: C
Intersection Capacity Utilization 77.6% ICU Level of Service D
Analysis Period (min) 15

Splits and Phases: 1: Starrs Road & Hardscratch Road

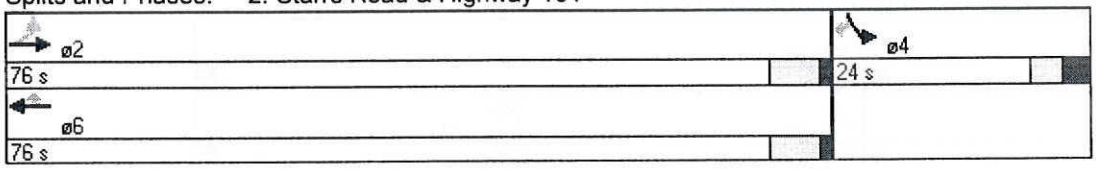


Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Satd. Flow (prot)	1789	1883	1883	1601	1789	1601
Flt Permitted	0.308				0.950	
Satd. Flow (perm)	580	1883	1883	1601	1789	1601
Satd. Flow (RTOR)				66		92
Volume (vph)	150	785	670	70	45	85
Lane Group Flow (vph)	163	853	728	76	49	92
Turn Type	Perm			Perm		Perm
Protected Phases		2	6		4	
Permitted Phases	2			6		4
Total Split (s)	76.0	76.0	76.0	76.0	24.0	24.0
Act Effct Green (s)	53.1	53.1	53.1	53.1	10.2	10.2
Actuated g/C Ratio	0.76	0.76	0.76	0.76	0.14	0.14
v/c Ratio	0.37	0.60	0.51	0.06	0.19	0.30
Control Delay	6.5	6.6	5.4	1.2	21.5	8.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	6.5	6.6	5.4	1.2	21.5	8.6
LOS	A	A	A	A	C	A
Approach Delay		6.6	5.0		13.1	
Approach LOS		A	A		B	
Queue Length 50th (m)	5.1	35.0	26.7	0.2	3.7	0.0
Queue Length 95th (m)	15.9	72.5	54.2	2.9	13.5	10.5
Internal Link Dist (m)		358.1	582.0		185.9	
Turn Bay Length (m)	60.0			30.0		50.0
Base Capacity (vph)	490	1591	1591	1363	472	490
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.33	0.54	0.46	0.06	0.10	0.19

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 70.1
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.60
Intersection Signal Delay: 6.4 Intersection LOS: A
Intersection Capacity Utilization 56.9% ICU Level of Service B
Analysis Period (min) 15

Splits and Phases: 2: Starrs Road & Highway 101

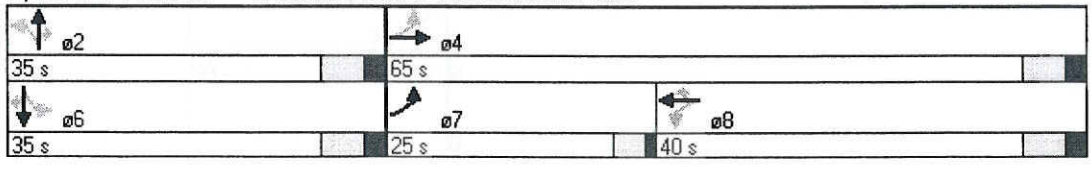


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Satd. Flow (prot)	1789	1853	0	1789	1883	1601	1789	1883	1601	1789	1883	1601
Flt Permitted	0.295			0.625			0.396			0.677		
Satd. Flow (perm)	556	1853	0	1177	1883	1601	746	1883	1601	1275	1883	1601
Satd. Flow (RTOR)		11				62			125			300
Volume (vph)	140	175	20	245	360	80	50	100	115	75	275	320
Lane Group Flow (vph)	152	212	0	266	391	87	54	109	125	82	299	348
Turn Type	pm+pt			Perm		Perm	Perm		Perm	Perm		Perm
Protected Phases	7	4			8			2			6	
Permitted Phases	4			8		8	2		2	6		6
Total Split (s)	25.0	65.0	0.0	40.0	40.0	40.0	35.0	35.0	35.0	35.0	35.0	35.0
Act Effct Green (s)	33.4	33.6		22.0	22.0	22.0	18.7	18.7	18.7	18.7	18.7	18.7
Actuated g/C Ratio	0.52	0.54		0.35	0.35	0.35	0.30	0.30	0.30	0.30	0.30	0.30
v/c Ratio	0.31	0.21		0.64	0.59	0.14	0.24	0.19	0.22	0.21	0.53	0.50
Control Delay	8.8	7.4		27.9	22.9	8.5	24.7	21.4	5.9	22.5	25.4	7.7
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	8.8	7.4		27.9	22.9	8.5	24.7	21.4	5.9	22.5	25.4	7.7
LOS	A	A		C	C	A	C	C	A	C	C	A
Approach Delay		8.0			23.0			15.3			16.6	
Approach LOS		A			C			B			B	
Queue Length 50th (m)	6.9	9.4		24.5	35.1	1.8	4.6	9.2	0.0	6.9	28.3	3.9
Queue Length 95th (m)	20.1	26.1		67.4	86.4	12.5	17.2	27.3	11.9	22.7	70.1	27.6
Internal Link Dist (m)		582.0			233.7			218.4			259.4	
Turn Bay Length (m)	35.0			60.0		30.0	50.0		30.0	50.0		30.0
Base Capacity (vph)	647	1303		584	934	825	329	832	777	563	832	875
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.23	0.16		0.46	0.42	0.11	0.16	0.13	0.16	0.15	0.36	0.40

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 62.2
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.64
Intersection Signal Delay: 17.2 Intersection LOS: B
Intersection Capacity Utilization 57.8% ICU Level of Service B
Analysis Period (min) 15

Splits and Phases: 1: Starrs Road & Hardscratch Road

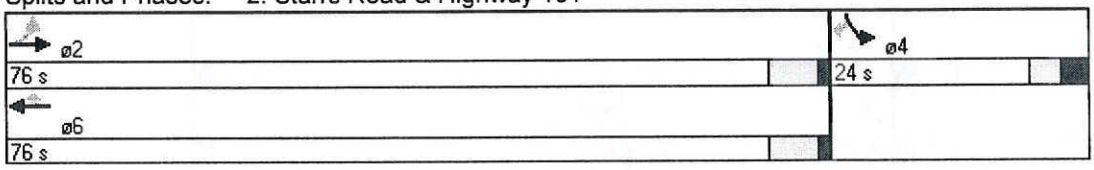


Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Satd. Flow (prot)	1789	1883	1883	1601	1789	1601
Flt Permitted	0.228				0.950	
Satd. Flow (perm)	429	1883	1883	1601	1789	1601
Satd. Flow (RTOR)				11		201
Volume (vph)	50	530	815	15	45	185
Lane Group Flow (vph)	54	576	886	16	49	201
Turn Type	Perm			Perm		Perm
Protected Phases		2	6		4	
Permitted Phases	2			6		4
Total Split (s)	76.0	76.0	76.0	76.0	24.0	24.0
Act Effct Green (s)	37.9	37.9	37.9	37.9	9.4	9.4
Actuated g/C Ratio	0.68	0.68	0.68	0.68	0.17	0.17
v/c Ratio	0.18	0.45	0.69	0.01	0.16	0.46
Control Delay	5.3	5.5	9.0	2.1	22.0	8.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	5.3	5.5	9.0	2.1	22.0	8.1
LOS	A	A	A	A	C	A
Approach Delay		5.5	8.9		10.8	
Approach LOS		A	A		B	
Queue Length 50th (m)	1.4	18.3	37.0	0.2	3.1	0.0
Queue Length 95th (m)	5.8	42.9	89.0	1.5	14.2	15.8
Internal Link Dist (m)		358.1	582.0		185.9	
Turn Bay Length (m)	60.0			30.0		50.0
Base Capacity (vph)	346	1519	1519	1294	553	634
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.16	0.38	0.58	0.01	0.09	0.32

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 55.7
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.69
Intersection Signal Delay: 7.9 Intersection LOS: A
Intersection Capacity Utilization 61.0% ICU Level of Service B
Analysis Period (min) 15

Splits and Phases: 2: Starrs Road & Highway 101

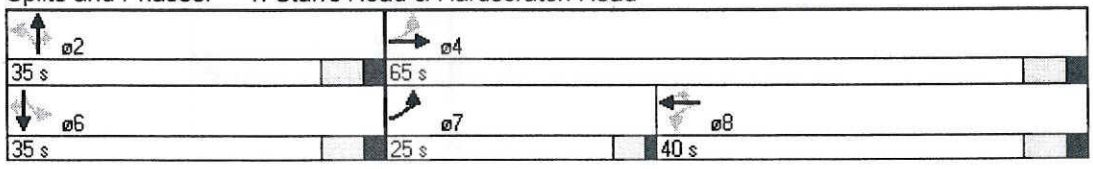


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Satd. Flow (prot)	1789	1859	0	1789	1883	1601	1789	1883	1601	1789	1883	1601
Flt Permitted	0.369			0.445			0.553			0.389		
Satd. Flow (perm)	695	1859	0	838	1883	1601	1042	1883	1601	733	1883	1601
Satd. Flow (RTOR)		8				113			212			283
Volume (vph)	455	490	45	160	295	120	75	280	230	85	175	260
Lane Group Flow (vph)	495	582	0	174	321	130	82	304	250	92	190	283
Turn Type	pm+pt			Perm		Perm	Perm		Perm	Perm		Perm
Protected Phases	7	4			8			2			6	
Permitted Phases	4			8		8	2		2	6		6
Total Split (s)	25.0	65.0	0.0	40.0	40.0	40.0	35.0	35.0	35.0	35.0	35.0	35.0
Act Effct Green (s)	45.4	45.4		22.2	22.2	22.2	19.5	19.5	19.5	19.5	19.5	19.5
Actuated g/C Ratio	0.62	0.62		0.30	0.30	0.30	0.26	0.26	0.26	0.26	0.26	0.26
v/c Ratio	0.70	0.51		0.69	0.57	0.23	0.30	0.61	0.43	0.47	0.38	0.45
Control Delay	14.5	10.3		40.0	27.0	7.1	27.7	31.5	8.6	35.0	26.9	5.8
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	14.5	10.3		40.0	27.0	7.1	27.7	31.5	8.6	35.0	26.9	5.8
LOS	B	B		D	C	A	C	C	A	D	C	A
Approach Delay		12.2			26.5			22.0			17.7	
Approach LOS		B			C			C			B	
Queue Length 50th (m)	32.2	39.3		22.0	38.7	1.7	9.5	38.9	4.2	11.3	22.6	0.0
Queue Length 95th (m)	70.2	84.2		49.8	71.9	13.9	24.0	73.7	22.9	29.0	46.2	17.4
Internal Link Dist (m)		582.0			233.7			218.4			259.4	
Turn Bay Length (m)	35.0			60.0		30.0	50.0		30.0	50.0		30.0
Base Capacity (vph)	726	1284		355	798	744	392	709	735	276	709	779
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.68	0.45		0.49	0.40	0.17	0.21	0.43	0.34	0.33	0.27	0.36

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 73.7
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.70
Intersection Signal Delay: 18.5 Intersection LOS: B
Intersection Capacity Utilization 73.5% ICU Level of Service D
Analysis Period (min) 15

Splits and Phases: 1: Starrs Road & Hardscratch Road

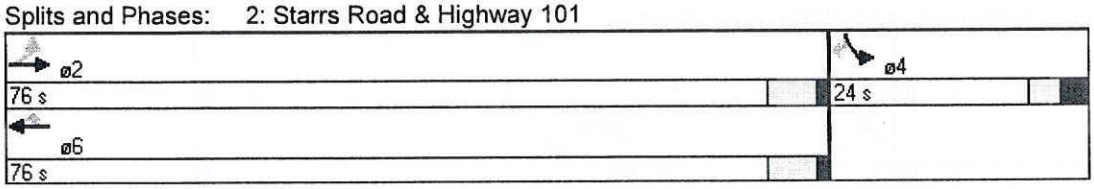


Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Satd. Flow (prot)	1789	1883	1883	1601	1789	1601
Flt Permitted	0.225				0.950	
Satd. Flow (perm)	424	1883	1883	1601	1789	1601
Satd. Flow (RTOR)				35		92
Volume (vph)	155	920	820	45	30	85
Lane Group Flow (vph)	168	1000	891	49	33	92
Turn Type	Perm			Perm		Perm
Protected Phases		2	6		4	
Permitted Phases	2			6		4
Total Split (s)	76.0	76.0	76.0	76.0	24.0	24.0
Act Effct Green (s)	63.1	63.1	63.1	63.1	9.6	9.6
Actuated g/C Ratio	0.80	0.80	0.80	0.80	0.12	0.12
v/c Ratio	0.50	0.66	0.59	0.04	0.16	0.34
Control Delay	9.5	6.9	5.7	1.2	27.3	10.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	9.5	6.9	5.7	1.2	27.3	10.8
LOS	A	A	A	A	C	B
Approach Delay		7.2	5.4		15.2	
Approach LOS		A	A		B	
Queue Length 50th (m)	6.1	46.6	37.0	0.3	3.2	0.0
Queue Length 95th (m)	22.7	95.8	74.0	2.3	12.6	12.4
Internal Link Dist (m)		358.1	582.0		185.9	
Turn Bay Length (m)	60.0			30.0		50.0
Base Capacity (vph)	359	1594	1594	1361	413	440
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.47	0.63	0.56	0.04	0.08	0.21

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 79
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.66
Intersection Signal Delay: 6.9 Intersection LOS: A
Intersection Capacity Utilization 65.1% ICU Level of Service C
Analysis Period (min) 15

Splits and Phases: 2: Starrs Road & Highway 101

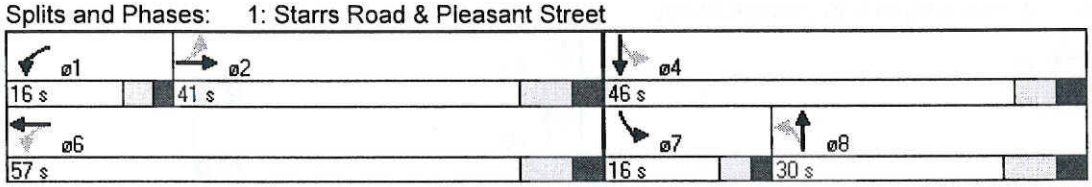


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Satd. Flow (prot)	1770	1846	0	1770	1768	0	1770	1708	0	1770	1825	0
Flt Permitted	0.423			0.417			0.654			0.361		
Satd. Flow (perm)	788	1846	0	777	1768	0	1218	1708	0	672	1825	0
Satd. Flow (RTOR)		3			37			58			9	
Volume (vph)	15	240	15	170	340	175	35	100	125	165	130	20
Lane Group Flow (vph)	16	277	0	185	560	0	38	245	0	179	163	0
Turn Type	Perm			pm+pt			Perm			pm+pt		
Protected Phases		2		1	6			8		7	4	
Permitted Phases	2			6			8			4		
Total Split (s)	41.0	41.0	0.0	16.0	57.0	0.0	30.0	30.0	0.0	16.0	46.0	0.0
Act Effct Green (s)	37.0	37.0		53.0	53.0		26.0	26.0		42.0	42.0	
Actuated g/C Ratio	0.36	0.36		0.51	0.51		0.25	0.25		0.41	0.41	
v/c Ratio	0.06	0.42		0.36	0.60		0.12	0.52		0.45	0.22	
Control Delay	22.5	27.0		15.7	19.7		31.1	29.4		24.0	19.6	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	22.5	27.0		15.7	19.7		31.1	29.4		24.0	19.6	
LOS	C	C		B	B		C	C		C	B	
Approach Delay		26.7			18.7			29.6			21.9	
Approach LOS		C			B			C			C	
Queue Length 50th (m)	2.2	42.9		20.2	74.2		6.2	33.6		24.3	20.6	
Queue Length 95th (m)	7.1	66.5		33.2	109.4		15.0	58.7		40.3	35.3	
Internal Link Dist (m)		371.6			282.6			210.7			194.2	
Turn Bay Length (m)	30.0			35.0			50.0			50.0		
Base Capacity (vph)	283	665		516	928		307	475		402	750	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.06	0.42		0.36	0.60		0.12	0.52		0.45	0.22	

Intersection Summary

Cycle Length: 103
Actuated Cycle Length: 103
Offset: 32 (31%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Control Type: Pretimed
Maximum v/c Ratio: 0.60
Intersection Signal Delay: 22.6 Intersection LOS: C
Intersection Capacity Utilization 67.3% ICU Level of Service C
Analysis Period (min) 15

Splits and Phases: 1: Starrs Road & Pleasant Street

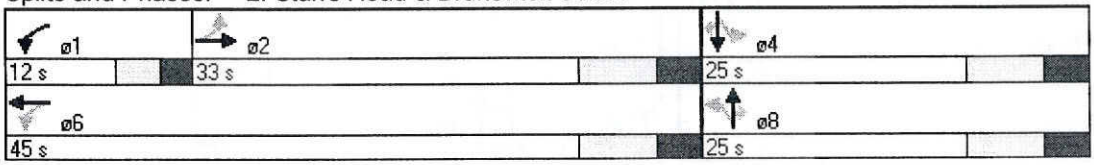


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Satd. Flow (prot)	1770	1852	0	1770	1853	0	0	1853	1583	0	1852	1583
Flt Permitted	0.563			0.477				0.969			0.962	
Satd. Flow (perm)	1049	1852	0	889	1853	0	0	1805	1583	0	1792	1583
Satd. Flow (RTOR)		4			4				38			16
Volume (vph)	5	225	10	40	290	10	10	85	35	10	70	15
Lane Group Flow (vph)	5	256	0	43	326	0	0	103	38	0	87	16
Turn Type	Perm			pm+pt			Perm		Perm	Perm		Perm
Protected Phases		2		1	6			8			4	
Permitted Phases	2			6			8		8	4		4
Total Split (s)	33.0	33.0	0.0	12.0	45.0	0.0	25.0	25.0	25.0	25.0	25.0	25.0
Act Effct Green (s)	29.0	29.0		41.0	41.0			21.0	21.0		21.0	21.0
Actuated g/C Ratio	0.41	0.41		0.59	0.59			0.30	0.30		0.30	0.30
v/c Ratio	0.01	0.33		0.07	0.30			0.19	0.08		0.16	0.03
Control Delay	12.2	15.2		6.5	8.1			19.4	7.1		19.1	9.1
Queue Delay	0.0	0.0		0.0	0.0			0.0	0.0		0.0	0.0
Total Delay	12.2	15.2		6.5	8.1			19.4	7.1		19.1	9.1
LOS	B	B		A	A			B	A		B	A
Approach Delay		15.2			7.9			16.1			17.6	
Approach LOS		B			A			B			B	
Queue Length 50th (m)	0.4	22.7		2.3	19.9			10.4	0.0		8.8	0.0
Queue Length 95th (m)	2.2	39.4		5.9	33.2			21.7	6.2		18.8	4.0
Internal Link Dist (m)		245.8			371.6			187.2			150.0	
Turn Bay Length (m)	15.0			20.0					20.0			20.0
Base Capacity (vph)	435	770		621	1087			542	502		538	486
Starvation Cap Reductn	0	0		0	0			0	0		0	0
Spillback Cap Reductn	0	0		0	0			0	0		0	0
Storage Cap Reductn	0	0		0	0			0	0		0	0
Reduced v/c Ratio .	0.01	0.33		0.07	0.30			0.19	0.08		0.16	0.03

Intersection Summary

Cycle Length: 70
Actuated Cycle Length: 70
Offset: 34 (49%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Control Type: Pretimed
Maximum v/c Ratio: 0.33
Intersection Signal Delay: 12.5 Intersection LOS: B
Intersection Capacity Utilization 40.9% ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 2: Starrs Road & Brunswick Street

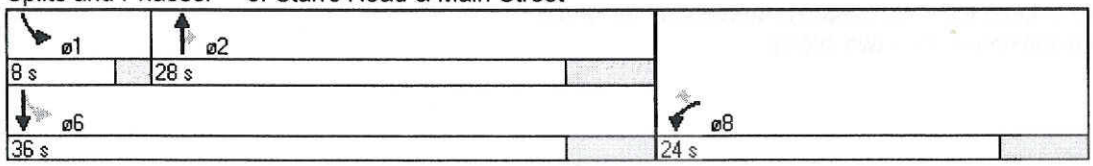


Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Satd. Flow (prot)	1770	1583	1863	1583	1770	1863
Flt Permitted	0.950				0.457	
Satd. Flow (perm)	1770	1583	1863	1583	851	1863
Satd. Flow (RTOR)		158		114		
Volume (vph)	220	145	250	105	145	255
Lane Group Flow (vph)	239	158	272	114	158	277
Turn Type		Perm		Perm	pm+pt	
Protected Phases	8		2		1	6
Permitted Phases		8		2	6	
Total Split (s)	24.0	24.0	28.0	28.0	8.0	36.0
Act Effct Green (s)	20.0	20.0	24.0	24.0	32.0	32.0
Actuated g/C Ratio	0.33	0.33	0.40	0.40	0.53	0.53
v/c Ratio	0.41	0.25	0.37	0.16	0.31	0.28
Control Delay	18.0	4.1	14.4	3.5	9.0	8.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	18.0	4.1	14.4	3.5	9.0	8.6
LOS	B	A	B	A	A	A
Approach Delay	12.5		11.2			8.8
Approach LOS	B		B			A
Queue Length 50th (m)	20.9	0.0	21.2	0.0	8.5	15.9
Queue Length 95th (m)	38.0	10.5	37.8	8.0	16.7	28.2
Internal Link Dist (m)	245.8		178.7			96.8
Turn Bay Length (m)		50.0		50.0	30.0	
Base Capacity (vph)	590	633	745	702	515	994
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.41	0.25	0.37	0.16	0.31	0.28

Intersection Summary

Cycle Length: 60
Actuated Cycle Length: 60
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
Control Type: Pretimed
Maximum v/c Ratio: 0.41
Intersection Signal Delay: 10.8 Intersection LOS: B
Intersection Capacity Utilization 43.4% ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 3: Starrs Road & Main Street



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Satd. Flow (prot)	1770	1857	0	1770	1786	0	1770	1647	0	1770	1792	0
Flt Permitted	0.293			0.098			0.634			0.133		
Satd. Flow (perm)	546	1857	0	183	1786	0	1181	1647	0	248	1792	0
Satd. Flow (RTOR)		1			27			161			20	
Volume (vph)	15	535	10	155	455	170	35	90	310	270	135	45
Lane Group Flow (vph)	16	593	0	168	680	0	38	435	0	293	196	0
Turn Type	Perm			pm+pt			Perm			pm+pt		
Protected Phases		2		1	6			8		7	4	
Permitted Phases	2			6			8			4		
Total Split (s)	41.0	41.0	0.0	16.0	57.0	0.0	30.0	30.0	0.0	16.0	46.0	0.0
Act Effct Green (s)	37.0	37.0		53.0	53.0		26.0	26.0		42.0	42.0	
Actuated g/C Ratio	0.36	0.36		0.51	0.51		0.25	0.25		0.41	0.41	
v/c Ratio	0.08	0.89		0.60	0.73		0.13	0.81		1.05	0.26	
Control Delay	23.3	48.3		27.0	24.3		31.2	35.9		96.1	19.2	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	23.3	48.3		27.0	24.3		31.2	35.9		96.1	19.2	
LOS	C	D		C	C		C	D		F	B	
Approach Delay		47.6			24.8			35.6			65.3	
Approach LOS		D			C			D			E	
Queue Length 50th (m)	2.2	116.0		18.2	102.7		6.2	55.9		~51.3	23.9	
Queue Length 95th (m)	7.4	#182.4		39.3	149.8		15.0	#107.5		#105.2	40.6	
Internal Link Dist (m)		371.6			282.6			210.7			194.2	
Turn Bay Length (m)	30.0			35.0			50.0			50.0		
Base Capacity (vph)	196	668		279	932		298	536		278	743	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.08	0.89		0.60	0.73		0.13	0.81		1.05	0.26	

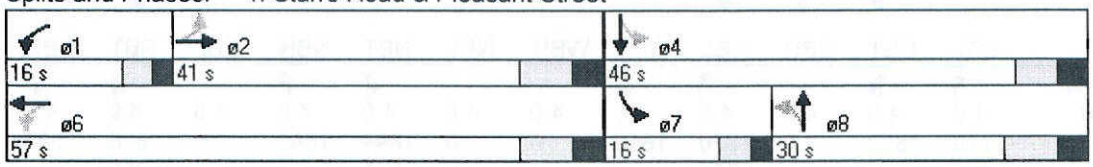
Intersection Summary

Cycle Length: 103
Actuated Cycle Length: 103
Offset: 32 (31%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Control Type: Pretimed
Maximum v/c Ratio: 1.05
Intersection Signal Delay: 40.8 Intersection LOS: D
Intersection Capacity Utilization 89.7% ICU Level of Service E
Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: Starrs Road & Pleasant Street

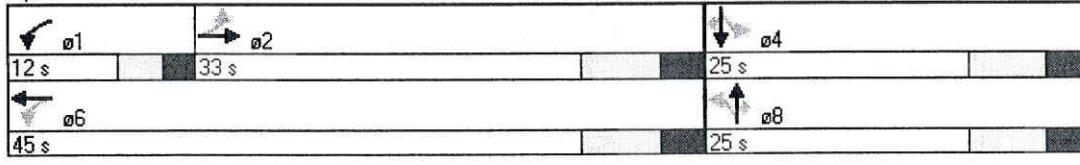


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Satd. Flow (prot)	1770	1853	0	1770	1850	0	0	1844	1583	0	1846	1583
Flt Permitted	0.492			0.284				0.941			0.950	
Satd. Flow (perm)	916	1853	0	529	1850	0	0	1753	1583	0	1770	1583
Satd. Flow (RTOR)		3			6				71			5
Volume (vph)	5	410	15	75	415	20	15	55	65	10	45	5
Lane Group Flow (vph)	5	462	0	82	473	0	0	76	71	0	60	5
Turn Type	Perm			pm+pt			Perm		Perm	Perm		Perm
Protected Phases		2		1	6			8			4	
Permitted Phases	2			6			8		8	4		4
Total Split (s)	33.0	33.0	0.0	12.0	45.0	0.0	25.0	25.0	25.0	25.0	25.0	25.0
Act Effct Green (s)	29.0	29.0		41.0	41.0			21.0	21.0		21.0	21.0
Actuated g/C Ratio	0.41	0.41		0.59	0.59			0.30	0.30		0.30	0.30
v/c Ratio	0.01	0.60		0.18	0.44			0.14	0.14		0.11	0.01
Control Delay	12.4	19.9		7.3	9.5			18.9	5.9		18.5	11.4
Queue Delay	0.0	0.0		0.0	0.0			0.0	0.0		0.0	0.0
Total Delay	12.4	19.9		7.3	9.5			18.9	5.9		18.5	11.4
LOS	B	B		A	A			B	A		B	B
Approach Delay		19.8			9.2			12.6			18.0	
Approach LOS		B			A			B			B	
Queue Length 50th (m)	0.4	47.5		4.4	32.0			7.6	0.0		6.0	0.0
Queue Length 95th (m)	2.2	76.4		9.6	51.5			16.9	8.3		14.1	2.2
Internal Link Dist (m)		245.8			371.6			187.2			150.0	
Turn Bay Length (m)	15.0			20.0					20.0			20.0
Base Capacity (vph)	379	769		452	1086			526	525		531	478
Starvation Cap Reductn	0	0		0	0			0	0		0	0
Spillback Cap Reductn	0	0		0	0			0	0		0	0
Storage Cap Reductn	0	0		0	0			0	0		0	0
Reduced v/c Ratio	0.01	0.60		0.18	0.44			0.14	0.14		0.11	0.01

Intersection Summary

Cycle Length: 70
Actuated Cycle Length: 70
Offset: 34 (49%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Control Type: Pretimed
Maximum v/c Ratio: 0.60
Intersection Signal Delay: 14.1 Intersection LOS: B
Intersection Capacity Utilization 47.0% ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 2: Starrs Road & Brunswick Street

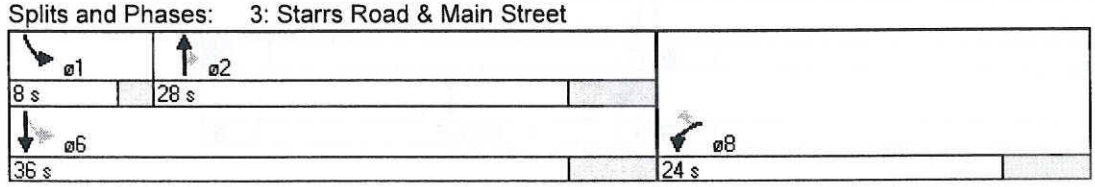


Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Satd. Flow (prot)	1770	1583	1863	1583	1770	1863
Flt Permitted	0.950				0.372	
Satd. Flow (perm)	1770	1583	1863	1583	693	1863
Satd. Flow (RTOR)		141		277		
Volume (vph)	295	130	330	255	190	305
Lane Group Flow (vph)	321	141	359	277	207	332
Turn Type		Perm		Perm	pm+pt	
Protected Phases	8		2		1	6
Permitted Phases		8		2	6	
Total Split (s)	24.0	24.0	28.0	28.0	8.0	36.0
Act Effct Green (s)	20.0	20.0	24.0	24.0	32.0	32.0
Actuated g/C Ratio	0.33	0.33	0.40	0.40	0.53	0.53
v/c Ratio	0.54	0.23	0.48	0.35	0.47	0.33
Control Delay	20.5	4.2	16.1	3.2	11.5	9.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	20.5	4.2	16.1	3.2	11.5	9.1
LOS	C	A	B	A	B	A
Approach Delay	15.5		10.5			10.1
Approach LOS	B		B			B
Queue Length 50th (m)	29.7	0.0	29.7	0.0	11.5	19.8
Queue Length 95th (m)	51.8	10.0	50.7	12.1	21.4	34.1
Internal Link Dist (m)	245.8		178.7			96.8
Turn Bay Length (m)		50.0		50.0	30.0	
Base Capacity (vph)	590	622	745	799	441	994
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.54	0.23	0.48	0.35	0.47	0.33

Intersection Summary

Cycle Length: 60
Actuated Cycle Length: 60
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
Control Type: Pretimed
Maximum v/c Ratio: 0.54
Intersection Signal Delay: 11.8 Intersection LOS: B
Intersection Capacity Utilization 54.2% ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 3: Starrs Road & Main Street

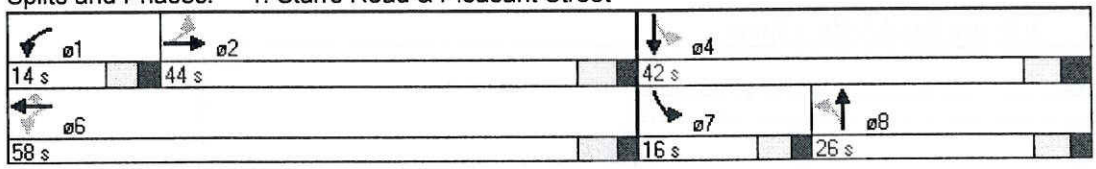


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Satd. Flow (prot)	1770	1846	0	1770	1863	1583	1770	1708	0	1770	1825	0
Flt Permitted	0.541			0.443			0.654			0.320		
Satd. Flow (perm)	1008	1846	0	825	1863	1583	1218	1708	0	596	1825	0
Satd. Flow (RTOR)		4				190		58			9	
Volume (vph)	15	240	15	170	340	175	35	100	125	165	130	20
Lane Group Flow (vph)	16	277	0	185	370	190	38	245	0	179	163	0
Turn Type	Perm			pm+pt		Perm	Perm			pm+pt		
Protected Phases		2		1	6			8		7	4	
Permitted Phases	2			6		6	8			4		
Total Split (s)	44.0	44.0	0.0	14.0	58.0	58.0	26.0	26.0	0.0	16.0	42.0	0.0
Act Effct Green (s)	26.2	26.2		32.8	36.1	36.1	14.0	14.0		25.5	25.9	
Actuated g/C Ratio	0.41	0.41		0.49	0.56	0.56	0.21	0.21		0.38	0.39	
v/c Ratio	0.04	0.37		0.34	0.36	0.20	0.15	0.60		0.43	0.23	
Control Delay	21.7	24.3		14.5	14.5	2.9	25.1	26.2		16.5	13.2	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	21.7	24.3		14.5	14.5	2.9	25.1	26.2		16.5	13.2	
LOS	C	C		B	B	A	C	C		B	B	
Approach Delay		24.1			11.5			26.0			14.9	
Approach LOS		C			B			C			B	
Queue Length 50th (m)	1.7	33.1		14.9	33.4	0.0	4.3	22.8		14.5	12.3	
Queue Length 95th (m)	6.7	62.6		31.7	63.8	10.8	13.0	50.1		31.9	28.0	
Internal Link Dist (m)		371.6			282.6			210.7			194.2	
Turn Bay Length (m)	30.0			35.0		35.0	50.0			50.0		
Base Capacity (vph)	547	1003		542	1231	1110	367	555		452	898	
Starvation Cap Reductn	0	0		0	0	0	0	0		0	0	
Spillback Cap Reductn	0	0		0	0	0	0	0		0	0	
Storage Cap Reductn	0	0		0	0	0	0	0		0	0	
Reduced v/c Ratio	0.03	0.28		0.34	0.30	0.17	0.10	0.44		0.40	0.18	

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 64.6
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 0.60
Intersection Signal Delay: 16.9 Intersection LOS: B
Intersection Capacity Utilization 58.4% ICU Level of Service B
Analysis Period (min) 15

Splits and Phases: 1: Starrs Road & Pleasant Street

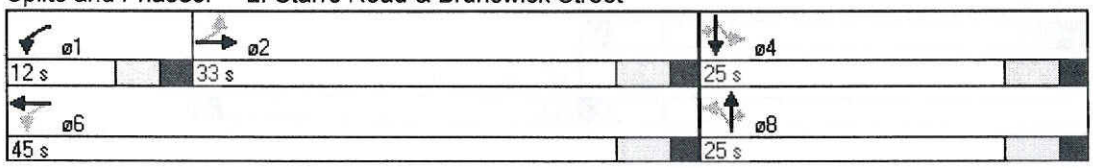


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Satd. Flow (prot)	1770	1852	0	1770	1853	0	0	1853	1583	0	1852	1583
Flt Permitted	0.563			0.477				0.973			0.967	
Satd. Flow (perm)	1049	1852	0	889	1853	0	0	1812	1583	0	1801	1583
Satd. Flow (RTOR)		4			4				38			16
Volume (vph)	5	225	10	40	290	10	10	85	35	10	70	15
Lane Group Flow (vph)	5	256	0	43	326	0	0	103	38	0	87	16
Turn Type	Perm			pm+pt			Perm		Perm	Perm		Perm
Protected Phases		2		1	6			8			4	
Permitted Phases	2			6			8		8	4		4
Total Split (s)	33.0	33.0	0.0	12.0	45.0	0.0	25.0	25.0	25.0	25.0	25.0	25.0
Act Effct Green (s)	29.0	29.0		41.0	41.0			21.0	21.0		21.0	21.0
Actuated g/C Ratio	0.41	0.41		0.59	0.59			0.30	0.30		0.30	0.30
v/c Ratio	0.01	0.33		0.07	0.30			0.19	0.08		0.16	0.03
Control Delay	6.6	10.1		6.5	8.1			19.4	7.1		19.1	9.1
Queue Delay	0.0	0.0		0.0	0.0			0.0	0.0		0.0	0.0
Total Delay	6.6	10.1		6.5	8.1			19.4	7.1		19.1	9.1
LOS	A	B		A	A			B	A		B	A
Approach Delay		10.0			7.9			16.1			17.5	
Approach LOS		B			A			B			B	
Queue Length 50th (m)	0.4	22.6		2.3	19.9			10.4	0.0		8.7	0.0
Queue Length 95th (m)	m1.3	30.6		5.9	33.2			21.7	6.2		18.8	4.0
Internal Link Dist (m)		245.8			371.6			187.2			150.0	
Turn Bay Length (m)	15.0			20.0					20.0			20.0
Base Capacity (vph)	435	770		621	1087			544	502		540	486
Starvation Cap Reductn	0	0		0	0			0	0		0	0
Spillback Cap Reductn	0	0		0	0			0	0		0	0
Storage Cap Reductn	0	0		0	0			0	0		0	0
Reduced v/c Ratio	0.01	0.33		0.07	0.30			0.19	0.08		0.16	0.03

Intersection Summary

Cycle Length: 70
Actuated Cycle Length: 70
Offset: 15 (21%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Control Type: Pretimed
Maximum v/c Ratio: 0.33
Intersection Signal Delay: 11.0 Intersection LOS: B
Intersection Capacity Utilization 40.9% ICU Level of Service A
Analysis Period (min) 15
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Starrs Road & Brunswick Street

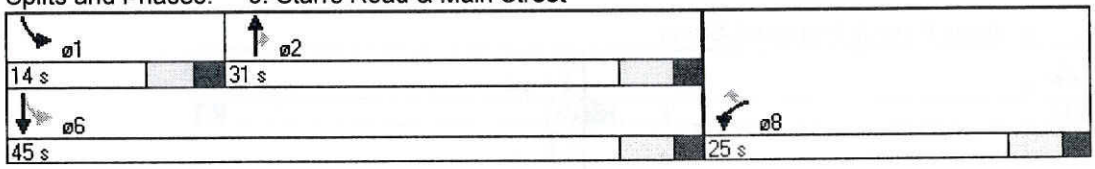


Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Satd. Flow (prot)	1770	1583	1863	1583	1770	1863
Flt Permitted	0.950				0.446	
Satd. Flow (perm)	1770	1583	1863	1583	831	1863
Satd. Flow (RTOR)		158		114		
Volume (vph)	220	145	250	105	145	255
Lane Group Flow (vph)	239	158	272	114	158	277
Turn Type		Perm		Perm	pm+pt	
Protected Phases	8		2		1	6
Permitted Phases		8		2	6	
Total Split (s)	25.0	25.0	31.0	31.0	14.0	45.0
Act Effct Green (s)	21.0	21.0	27.0	27.0	41.0	41.0
Actuated g/C Ratio	0.30	0.30	0.39	0.39	0.59	0.59
v/c Ratio	0.45	0.27	0.38	0.17	0.25	0.25
Control Delay	17.8	3.7	17.4	3.9	7.8	7.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	17.8	3.7	17.4	3.9	7.8	7.8
LOS	B	A	B	A	A	A
Approach Delay	12.2		13.4			7.8
Approach LOS	B		B			A
Queue Length 50th (m)	26.8	0.3	26.2	0.0	8.9	16.7
Queue Length 95th (m)	46.7	7.5	44.7	9.0	16.7	28.2
Internal Link Dist (m)	245.8		178.7			96.8
Turn Bay Length (m)		50.0		50.0	30.0	
Base Capacity (vph)	531	586	719	681	621	1091
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.45	0.27	0.38	0.17	0.25	0.25

Intersection Summary

Cycle Length: 70
Actuated Cycle Length: 70
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
Control Type: Pretimed
Maximum v/c Ratio: 0.45
Intersection Signal Delay: 11.0 Intersection LOS: B
Intersection Capacity Utilization 43.4% ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 3: Starrs Road & Main Street



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Satd. Flow (prot)	1770	1857	0	1770	1863	1583	1770	1647	0	1770	1792	0
Flt Permitted	0.482			0.145			0.634			0.154		
Satd. Flow (perm)	898	1857	0	270	1863	1583	1181	1647	0	287	1792	0
Satd. Flow (RTOR)		1				157		159			19	
Volume (vph)	15	535	10	155	455	170	35	90	310	270	135	45
Lane Group Flow (vph)	16	593	0	168	495	185	38	435	0	293	196	0
Turn Type	Perm			pm+pt		Perm	Perm			pm+pt		
Protected Phases		2		1	6			8		7	4	
Permitted Phases	2			6		6	8			4		
Total Split (s)	44.0	44.0	0.0	14.0	58.0	58.0	26.0	26.0	0.0	16.0	42.0	0.0
Act Effct Green (s)	33.9	33.9		47.4	47.4	47.4	20.2	20.2		36.5	36.5	
Actuated g/C Ratio	0.37	0.37		0.51	0.51	0.51	0.22	0.22		0.40	0.40	
v/c Ratio	0.05	0.87		0.57	0.52	0.21	0.15	0.90		0.94	0.27	
Control Delay	19.1	41.7		19.9	16.9	3.5	32.8	45.8		64.7	19.6	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	19.1	41.7		19.9	16.9	3.5	32.8	45.8		64.7	19.6	
LOS	B	D		B	B	A	C	D		E	B	
Approach Delay		41.1			14.6			44.8			46.6	
Approach LOS		D			B			D			D	
Queue Length 50th (m)	2.0	104.5		16.5	60.0	2.5	6.2	56.1		~43.7	23.9	
Queue Length 95th (m)	6.4	#153.4		27.9	87.7	12.6	15.4	#115.8		#100.9	41.9	
Internal Link Dist (m)		371.6			282.6			210.7			194.2	
Turn Bay Length (m)	30.0			35.0		35.0	50.0			50.0		
Base Capacity (vph)	368	761		303	1024	941	280	511		311	744	
Starvation Cap Reductn	0	0		0	0	0	0	0		0	0	
Spillback Cap Reductn	0	0		0	0	0	0	0		0	0	
Storage Cap Reductn	0	0		0	0	0	0	0		0	0	
Reduced v/c Ratio	0.04	0.78		0.55	0.48	0.20	0.14	0.85		0.94	0.26	

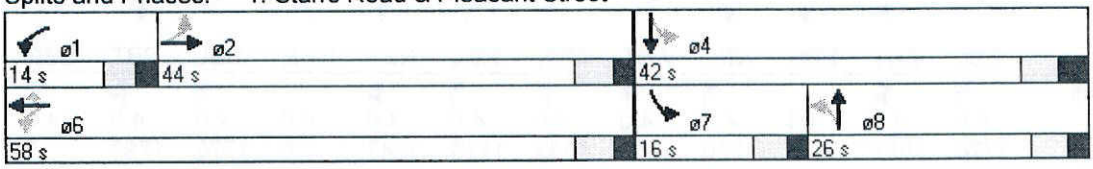
Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 92.1
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.94
Intersection Signal Delay: 33.6 Intersection LOS: C
Intersection Capacity Utilization 89.5% ICU Level of Service E
Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: Starrs Road & Pleasant Street

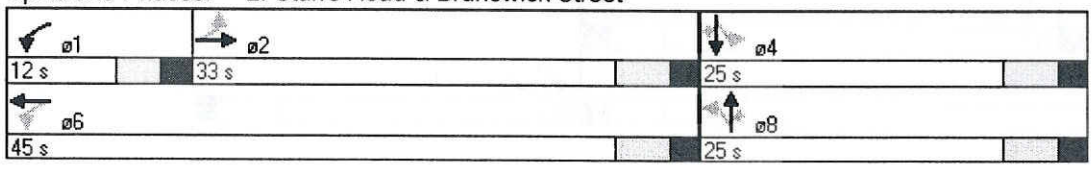


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Satd. Flow (prot)	1770	1853	0	1770	1850	0	0	1844	1583	0	1846	1583
Flt Permitted	0.492			0.284				0.949			0.957	
Satd. Flow (perm)	916	1853	0	529	1850	0	0	1768	1583	0	1783	1583
Satd. Flow (RTOR)		3			6				71			5
Volume (vph)	5	410	15	75	415	20	15	55	65	10	45	5
Lane Group Flow (vph)	5	462	0	82	473	0	0	76	71	0	60	5
Turn Type	Perm			pm+pt			Perm		Perm	Perm		Perm
Protected Phases		2		1	6			8			4	
Permitted Phases	2			6			8		8	4		4
Total Split (s)	33.0	33.0	0.0	12.0	45.0	0.0	25.0	25.0	25.0	25.0	25.0	25.0
Act Effct Green (s)	29.0	29.0		41.0	41.0			21.0	21.0		21.0	21.0
Actuated g/C Ratio	0.41	0.41		0.59	0.59			0.30	0.30		0.30	0.30
v/c Ratio	0.01	0.60		0.18	0.44			0.14	0.14		0.11	0.01
Control Delay	7.6	15.6		7.3	9.5			18.9	5.9		18.5	11.4
Queue Delay	0.0	0.0		0.0	0.0			0.0	0.0		0.0	0.0
Total Delay	7.6	15.6		7.3	9.5			18.9	5.9		18.5	11.4
LOS	A	B		A	A			B	A		B	B
Approach Delay		15.5			9.2			12.6			18.0	
Approach LOS		B			A			B			B	
Queue Length 50th (m)	0.4	47.5		4.4	32.0			7.6	0.0		6.0	0.0
Queue Length 95th (m)	m0.7	76.2		9.6	51.5			16.9	8.3		14.1	2.2
Internal Link Dist (m)		245.8			371.6			187.2			150.0	
Turn Bay Length (m)	15.0			20.0					20.0			20.0
Base Capacity (vph)	379	769		452	1086			530	525		535	478
Starvation Cap Reductn	0	0		0	0			0	0		0	0
Spillback Cap Reductn	0	0		0	0			0	0		0	0
Storage Cap Reductn	0	0		0	0			0	0		0	0
Reduced v/c Ratio	0.01	0.60		0.18	0.44			0.14	0.14		0.11	0.01

Intersection Summary

Cycle Length: 70
Actuated Cycle Length: 70
Offset: 15 (21%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Control Type: Pretimed
Maximum v/c Ratio: 0.60
Intersection Signal Delay: 12.4 Intersection LOS: B
Intersection Capacity Utilization 47.0% ICU Level of Service A
Analysis Period (min) 15
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Starrs Road & Brunswick Street



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Satd. Flow (prot)	1770	1583	1863	1583	1770	1863
Flt Permitted	0.950				0.358	
Satd. Flow (perm)	1770	1583	1863	1583	667	1863
Satd. Flow (RTOR)		141		277		
Volume (vph)	295	130	330	255	190	305
Lane Group Flow (vph)	321	141	359	277	207	332
Turn Type		Perm		Perm	pm+pt	
Protected Phases	8		2		1	6
Permitted Phases		8		2	6	
Total Split (s)	25.0	25.0	31.0	31.0	14.0	45.0
Act Effct Green (s)	21.0	21.0	27.0	27.0	41.0	41.0
Actuated g/C Ratio	0.30	0.30	0.39	0.39	0.59	0.59
v/c Ratio	0.60	0.25	0.50	0.35	0.38	0.30
Control Delay	18.9	3.0	19.4	3.5	9.0	8.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	18.9	3.0	19.4	3.5	9.0	8.2
LOS	B	A	B	A	A	A
Approach Delay	14.1		12.5			8.5
Approach LOS	B		B			A
Queue Length 50th (m)	37.9	3.1	36.6	0.0	12.0	20.6
Queue Length 95th (m)	63.4	4.6	60.1	13.5	21.4	34.3
Internal Link Dist (m)	245.8		178.7			96.8
Turn Bay Length (m)		50.0		50.0	30.0	
Base Capacity (vph)	531	574	719	781	548	1091
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.60	0.25	0.50	0.35	0.38	0.30

Intersection Summary

Cycle Length: 70
Actuated Cycle Length: 70
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
Control Type: Pretimed
Maximum v/c Ratio: 0.60
Intersection Signal Delay: 11.6 Intersection LOS: B
Intersection Capacity Utilization 54.2% ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 3: Starrs Road & Main Street