
TOWN OF TORBAY

2015 PEDESTRIAN SAFETY REVIEW

PREPARED FOR:
TOWN OF TORBAY
1288 TORBAY ROAD
P.O. BOX 1160
TORBAY, NL A1K 1K4

PREPARED BY:
Harbourside Transportation Consultants

CONTACT:
Robin King, P. Eng.
Email: rking@harboursideengineering.ca
Tel: (709) 579.6435

Michael MacDonald, P. Eng.
Email: mmacdonald@harboursideengineering.ca
Tel: (902) 405.4696

March 18, 2015


Status: Final Report

HTC File #15312



Project Name: Town of Torbay Pedestrian Safety Review
Project Number: 15312



	PROVINCE OF NEWFOUNDLAND
	PERMIT HOLDER
	CLASS "A"
	This Permit Allows
Harbourside Transportation Consultants	
To practice Professional Engineering in Newfoundland and Labrador.	
Permit No. as issued by PEGNL N0763 which is valid for the year 2016.	




				
March-18-2016	Final	C. McCarthy	M. MacDonald	R. King
DATE	STATUS	PREPARED BY	APPROVED BY	APPROVED BY
The Town of Torbay				CLIENT

Table of Contents

EXECUTIVE SUMMARY	1
1 INTRODUCTION	5
1.1 Background.....	5
1.2 Town Walk-about/Drive about	6
1.3 Study Area	11
2 BACKGROUND TRAFFIC VOLUME/ SPEED INFORMATION	12
2.1 ADT Data Collection and Pedestrian Crosswalk Assessments.....	12
2.1.1 ADT Counts.....	12
2.1.2 ADT and Speed Count Results	13
2.1.3 Pedestrian Crosswalk Assessments	13
2.1.4 Pedestrian Crossing Controls.....	14
2.1.5 Pedestrian Crosswalk Assessments	15
3 PUBLIC CONSULTATION/ WORKSHOP AND OBSERVATIONS.....	18
3.1 When / Where / Turnout and Pictures	18
3.2 Summary of Comments	18
3.3 Word Cloud.....	19
3.4 HTC's Observations of School	19
4 CAPITAL WORKS PLANS/ANTICIPATED GROWTH	23
5 FINDINGS.....	24
6 PRIORITY PLAN	25
6.1 Priority Plan #1	25
6.2 Priority Plan #2	28
6.3 Priority Plan #3	28
6.4 Priority Plan #4	29
6.5 Typical Cross Sections	30
7 COSTING	31
7.1 Priority Plan #1	31
7.2 Priority Plan #2	31
7.3 Priority Plan #3	31
8 OTHER CONSIDERATIONS	32
8.1 Speed Zoning Policy.....	32
8.2 School Zone Signage	33
8.3 Crosswalk Signage.....	34
8.4 Street Classification	35
8.5 Pavement Markings.....	36
8.6 Access Control	36
8.7 Traffic Calming.....	36
8.8 Trail Network – Review/Plan.....	37
8.9 Street Lighting.....	38
8.10 Snow Clearing.....	38

List of Figures

Figure 1: Study Area	11
Figure 2: Word Cloud	19
Figure 3: School Bus and vehicles at Marine Drive/Lynch's Lane.....	19
Figure 4: Parents and children walking to Holy Trinity Elementary on Doyle's and Quigley's Lane	20
Figure 5: Parents and Children walking to Holy Trinity Elementary near the intersection of Torbay Road/Doyle's and Quigley's Lane.	20
Figure 6: Children walking on shoulder of Torbay Road towards Irving Gas Station	21
Figure 7: Children waiting to cross and walking on the shoulder of Torbay Road near the Town Hall	21
Figure 8: Children walking on shoulder of Torbay Road near Mahon's Lane	22
Figure 9: Significant queuing of students and parents at lunchtime at the intersection of Torbay Road/Mahon's Lane	22
Figure 10: Proposed cross sections for Torbay Road	26
Figure 11: Conceptual roundabout alignment at the intersection of Torbay Road and Marine Drive	27
Figure 12: Typical cross sections for design of new roadways throughout the Town of Torbay ...	30
Figure 13: Feedback signage in school zones with 50 km/hr and 30 km/hr speed limit	33
Figure 14: RA-4R Figure 15: WC-2R.....	34
Figure 16: WC-16L Figure 17: RA-3R	34

List of Tables

Table 1: ADT and Speed Count Data Results	13
---	----

Appendices

Appendix A – Traffic Counts
Appendix B – Pedestrian Counts
Appendix C – Public Consultation Comments
Appendix D – Priority Plan 1 Drawings
Appendix E – Cost Estimates

Executive Summary

General

The Town of Torbay retained Harbourside Transportation Consultants (HTC) on March 31st, 2015 through Progressive Engineering & Consulting Inc., to conduct a pedestrian safety review in the Town of Torbay. The study area included all of the Town of Torbay, including the roadways within the Town boundary falling under the Provincial Governments jurisdiction.

HTC started gathering traffic data for this project in May 2015 when weather conditions were favourable and the data collection process continued into mid-July, 2015. HTC collected 24-hour average daily traffic (ADT) counts and speed data at 19 different locations throughout the Town of Torbay. HTC also collected 24 hour ADT volume information at an additional three locations. HTC also gathered crosswalk count data at three locations in September 2015 after schools were back in session to facilitate a review of the existing pedestrian crossings and controls that are presently in place to accommodate them.

HTC and the Town of Torbay hosted a public consultation session on August 18th, 2015 at the Kinsmen Centre in Torbay. The purpose of this session was solicit comments and feedback from the residents of Torbay on pedestrian safety within the community. HTC had all traffic count and speed data that was collected in the months previous available to aid in facilitating discussion on the issues raised by the residents of Torbay.

In total, there were approximately 50 residents that attended and/or participated in this public consultation process. Many residents expressed concerns about speeding on many of the streets throughout the Town. Some of these streets were in residential areas, but many were in relation to the main collector and arterial routes throughout the Town. Many residents expressed concerns about walking on the streets throughout the Town; narrow shoulders and speed problems being the main issues. For many residents living within the 1.6 km busing radius that the English School District has in place is deemed problematic. Parents indicated that they don't feel it's safe to allow their children to walk to school.

Many of the residents that attended this public information session, felt that additional crosswalks should be installed at several locations along Torbay Road. They also felt that sidewalks should be installed on at least one side Torbay Road along the Town Centre section which runs from the Irving Service Station to Indian Meal Line/Lower Street.

HTC also observed traffic operations in the area of both schools, Holy Trinity High School and Holy Trinity Elementary School, on the first day of school September 9th, 2015. Both school areas were congested with parents dropping kids off to both schools. Many parents destined for Holy Trinity Elementary School had to park at the church parking lot on the west side of Torbay Road and walk their kids across Torbay Road and as best they could along the narrow shoulders and/or the traveled lanes of Marine Drive to get to the school. Our observations from a pedestrian safety perspective were very disconcerting to say the least.

HTC also observed pedestrian patterns at lunch time, as many of the high school students make their way to popular lunch destinations along Torbay including the Irving, Atlas Pizza and Mary Brown's. Children are observed walking four and five persons abreast and, in some cases, within the conflicting travel lane on Torbay Road. Other students are observed looking to cross Torbay Road in front of City Hall with no crosswalk in place to accommodate them.

Pedestrian safety is a concern for many of the residents throughout the Town of Torbay. HTC agrees with the concerns of these residents. Most of the community's streets and roadways are rural in nature, characterized by narrow asphalt widths, gravel shoulders and ditches to accommodate drainage. Many of these streets are not well suited to accommodate the urban growth patterns that are currently being experienced within the Town. Accordingly, HTC is recommending a number of priority plans that will address this problem over a timeframe that can be accommodated by the Town in conjunction with its other priorities.

Priority Plan #1 – Upgrading the Town Centre Segment of Torbay Road

The Town of Torbay should fully upgrade Torbay Road from the Irving on Torbay Road to the intersection of the Bauline Line/Torbay Road and provide a sidewalk on one side of Torbay Road north of the Bauline Line to the new middle school that is presently under construction. Concept drawings of the suggested widening and the proposed road cross sections are contained in Appendix D. This project would also include constructing a roundabout at intersection of Marine Drive Lane and Torbay Road to deal with the traffic congestion from the school and to handle the associated pedestrian movements in a safe manner. The conceptual alignment of the proposed roundabout is also shown in Appendix D, drawing 15312 _Sk6.

The estimated cost of proceeding with the improvements noted in Priority Plan 1, with the Roundabout added at the intersection of Marine Drive and Torbay Road is estimated at 4.9 million dollars. The estimated cost of proceeding with the improvements noted in Priority Plan 1 without the Roundabout option being added is estimated at 4.5 million dollars.

Priority Plan #2 – Upgrading to provide sidewalks on at least one side of the main collector and arterial roadways within the 1.6 km busing radius of the schools within the Town

The Town of Torbay should construct sidewalks on at least one side of the roadway on all arterial and collector roadways falling within the 1.6 km busing radius of Holy Trinity Elementary School and Holy Trinity High School and of the middle school presently under construction on Torbay Road, north of the Bauline Line.

The estimated cost of installing sidewalks on the appropriate segments of Torbay Road both north and south of the areas defined in Priority Plan 1, along Marine Drive, Indian Meal Line and the Bauline Line is estimated at 11.3 million dollars.

Priority Plan #3 – Upgrading to provide sidewalks on at least one side of the remaining segments of main collector and arterial roadways within the Town that have not had sidewalk installed under Priority Plans 1 and 2

The Town of Torbay should construct sidewalks of at least one side of the remaining segments Torbay Road, Marine Drive, Indian Meal Line, and Bauline Line not addressed previously under Priority Plans 1 and 2.

The estimated cost of installing sidewalk on at least one side of the remaining segments of the arterial and collector status roadways within the Town after Priority Plans 1 and 2 have been addressed is 11.4 million dollars.

Priority Plan #4 – Sidewalks in Residential Areas.

As residential roads are built or upgraded, it is recommended that sidewalks should be installed as part of the project. Each street should be evaluated for the appropriate pedestrian treatment, but, at a minimum, sidewalk should be included on one side of the street. Rather than constructing the sidewalk network in its entirety, it is reasonable to include sidewalk on street upgrade projects where the Town will replace some (or all) of the municipal services in the street, or will plan to resurface the existing street.

Time Frames for Implementation

Years 1 - 5 – It is recommended that the Town proceed and Implement Priority Plans 1 and 2. The average yearly Capital expenditure would be approximately 3.2 million dollars over the five year timeframe - a total expenditure of 16.2 million dollars. The Town should seek cost sharing with the Provincial Government.

Years 6 - 10 – It is recommended that the Town proceed and implement Priority Plan 3. The average yearly Capital expenditure would be approximately 2.3 million dollars - a total expenditure of 11.4 million dollars during years 6-10. Again, the Town should seek cost sharing with the Provincial Government.

On-going – The implementation of Priority Plan 4 has limited financial liabilities for the Town of Torbay. Sidewalks installed in new residential areas should be done at the expense of the subdivision developer. The cost of sidewalks installed in existing residential areas should be done at the expense of the individual home owners and recovered by the Town under an appropriate assessment policy.

Other Considerations

The implementation of priority plans 1-4 will go a long way in addressing the pedestrian safety concerns of the community. But implementation of these plans alone will not solve all the problems that have been raised by residents. Accordingly, HTC is recommending the Town look at a number of other issues as part of this process which will enhance pedestrian safety throughout the community. These include:

Speed Zoning Policy – The Town should develop and apply a speed zone policy which is consistent and without political or public pressure; based on sound engineering principles and analysis.

School Zone Signage – It is critical from a pedestrian safety perspective that the Town of Torbay use the latest signage techniques in school zones including feedback signage.

Crosswalk Signage – It is important from a pedestrian safety perspective that all crosswalks throughout the community are installed properly and in accordance with the TAC signage requirements.

Streets Classification System – It is recommended that the Town of Torbay street classification system be altered to conform to the Transportation Association of Canada (TAC) streets classification system. A well classified streets classification system will help the Town in establishing snow clearing priorities, in dealing with Traffic Calming concerns and with a host of other matters that enhance traffic operations throughout the Town.

Pavement Markings– The Town of Torbay should ensure that all roadways requiring pavement markings are marked in accordance with TAC standards.

Access Control– The Town of Torbay should develop an access management policy. The goal to maintain roadway safety and mobility by controlling the location, design and spacing of access locations.

Traffic Calming Policy– It is recommended that the Town of Torbay develop and implement a traffic calming policy that will allow staff to deal with traffic complaints received from the residents throughout the Town in consistent and responsible manner. The policy should provide mechanisms that allow staff to determine whether a complaint merits further investigation, and if so, in what priority in relation the other complaints staff may have evaluated it should be dealt with. Such an approach allows serious complaints to be dealt with immediately as funding allows.

Trail Network Development– The Town of Torbay should review the existing trail network and develop a trail network plan for the entire Town.

Street Lighting– It is recommended that the Town of Torbay undertake a street lighting service review within the Town. Providing residents with streets that are well lit and lit in accordance with a consistent standard will enhance pedestrian safety.

Snow Clearing– Until such time as priority plans 1-4 are implemented and the Town has a snow clearing policy in place for sidewalks throughout the Town, care should be taken to ensure shoulders are cleared and available for pedestrians to use during winter months.

1 Introduction

1.1 Background

The Town of Torbay is one of the fastest growing communities in the Province of Newfoundland and Labrador. Since 1991, the population has steadily increased from 4,700 residents in 1991 to 7,400 residents in 2011. The community is a mere 22 minutes away from the downtown core of the City of St. John's and as such, residents have traditionally been able to enjoy the rural lifestyle with all the conveniences of being minutes away from the Capital City and all its urban amenities.

Most of the streets and roadways within the community are also rural in nature, characterized by narrow asphalt widths, gravel shoulders and ditches to accommodate drainage. Many of these streets are not well suited to accommodate the urban growth patterns that are currently being experienced within the Town. This has led to many complaints from Town residents in relation to pedestrian safety. In response to these concerns the Town of Torbay decided to undertake a pedestrian safety review.

Harbourside Transportation Consultants (HTC) were retained by Progressive Engineering and Consulting Inc., on behalf of the Town of Torbay, on March 31st, 2015 to complete a pedestrian safety review for the Town. This review will be a key element for the Town of Torbay in the provision of a sustainable and safe transportation system for its residents. With the rapid growth that has occurred in previous years and the potential for similar growth patterns in the future, it is important to have suitable infrastructure such as sidewalks, trail systems and integrated pedestrian crossings throughout the Town.

The scope of work for this pedestrian safety review includes the following tasks:

Task 1: Project Initiation Meeting – An initial meeting was held with Town staff to obtain required background information including the:

- Available mapping
- Capital works plans for the Town
- Development areas and anticipated areas of growth for the Town
- Available traffic count information, related reports etc.
- Available collision data
- Pavement markings
- Locations of existing crosswalks
- Locations of key pedestrian generators (schools, recreational facilities, playgrounds, retail areas, churches etc.)
- Warrant systems and standards used (if any)
- Complaints/comments from residents, or location(s) with known problem areas
- Streets classification system with the Town

Task 2: Town Walkabout/Drive about – HTC was on site for a full day with the Town Manager. HTC visited the various problem areas of the Town to talk about the traffic and pedestrian safety related concerns and issues.

Task 3: Road Network Data Collection – HTC gathered traffic volumes and speed data at various key locations throughout the Town's road network. HTC also gathered traffic volumes at key pedestrian crossing locations along Torbay Road.

Task 4: Public Consultation – HTC hosted an Open House type workshop to obtain comments from area residents on pedestrian safety, crosswalks, existing problems etc. HTC prepared a PowerPoint presentation summarizing the traffic count and speed data results.

Task 5: Crosswalk Review – HTC examined existing pedestrian crossings and control throughout the Town. Recommendations were made with respect to the need for the crossings and adequacy of the control devices presently in place. Recommendations were in keeping with the standards and recommended practices of the Transportation Association of Canada's (TAC's) Pedestrian Crossing Control Manual.

Task 6: Pedestrian Planning – HTC examined existing and anticipated pedestrian patterns throughout the Town and prepared recommendations on any new infrastructure that may be required such as sidewalks and new crossings and controls. HTC will provide priority plans and estimated costs as required.

HTC also provided the Town with recommendations for follow up work that will be necessary to provide the Town with direction and a policy framework to work towards making its streets and indeed entire neighborhoods more livable for residents.

Task 7: HTC met with the Town's project manager to discuss the draft findings.

Task 8: HTC prepared a final report summarizing the findings of our analysis.

1.2 Town Walk-about/Drive about

Harbourside Transportation Consultants (HTC) conducted a Town walk-about with Mr. Bernard P. Manning, Director of Public Works & Technical Services, on Tuesday, May 5, 2015. The purpose of which was to allow the Town of Torbay an opportunity to highlight issues that are of concern. A number of issues were brought forward at this meeting, including roadways with high traffic speeds, intersections with high collision rates, and areas that were high pedestrian generators but that do not have the proper pedestrian facilities present to accommodate the same. A summary of the main discussion points included:

Provincial Roadways

There are a number of roadways throughout the Town of Torbay that fall under Provincial jurisdiction. These roadways include:

- **Torbay Road (Route 20)** – One of the main roadways running through the Town of Torbay. It originates in the City of St. John's and is a prominent major arterial roadway that extends through the municipal boundary with the City of St. John's in the south and flows in a northerly direction through the Town's center and onto the intersection with Route 20 just south of the community of Flatrock. This roadway has a number of different cross-sections including a 5 lane cross-section on the segment of roadway south of the Torbay Bypass Road. A two lane cross-section extends through the Town Centre. The majority of the roadway is posted at 50 km/hr however there is a segment posted at 30 km/hr near the Holy Trinity school zone.
- **Bauline Line (Route 21)** – Is a main roadway that extends from Torbay Road and runs in a northwesterly direction towards the community of Bauline. It has a posted speed limit of 50 km/hr.

- **Marine Drive (Route 30)** – Is a main roadway that extends from Torbay Road just north of Holy Trinity School in westerly direction to the community of Logy Bay – Middle Cove – Outer Cove. It has a posted speed limit of 50km/hr.
- **Indian Meal Line** - Is a main roadway that extends from Torbay Road and runs in a westerly direction towards the community of Portugal Cove – St. Philips. It has a posted speed limit of 50 km/hr.
- **Torbay Road By-Pass** – The Torbay Road By-Pass provides a by-pass route for motorists starting in the area of Torbay Road near the Jack Byrne Arena and extends in a northerly direction into the community of Flat Road. The posted speed limit is 70km/hr
- **Pine Line** – The Pine Line connects to Torbay Road approximately 700 meters in advance of the junction of Torbay Road and the Torbay Road Bypass. The roadway runs in a northeasterly direction towards the Town of Logy Bay – Middle Cove – Outer Cove. Only a small section of this roadway is contained within the municipal boundary of the Town of Torbay, approximately 650 meters. The speed limit is presently 50 km/hr.

All other roadways throughout the Town of Torbay are owned and maintained by the Town itself. The vast majority of these streets are residential in nature and are characterized by narrow asphalt widths of between 5.5m and 7m wide.

Signalized Intersections

There are four signalized intersections located within the Town of Torbay. All are located on Provincial roadways. The locations include:

- Torbay Road @ Karon Drive/Kennedy's Brook Drive
- Torbay Road @ Torbay By-Pass Road
- Torbay By-Pass Road @ Indian Meal Line
- Torbay By-Pass Road @ Bauline Line

It was noted that the traffic signals located at Torbay Road/Kennedy's Brook Drive (Jack Byrne Arena) are causing large queues of vehicles in both directions on Torbay Road in the morning and in the afternoon peak hours. It is believed that the side streets have detector loops and vehicles are activating the traffic signal when cars are turning left onto the side streets. All the other traffic signals seem to be operating well.

Roadways with High Speeds

There are a number of roadways throughout the Town that experience high traffic speeds. This has led to many complaints and concerns being brought forward by residents in local neighborhood areas.

The following eight (8) roadways were identified as having high speed concerns, however these roadways are within residential areas and are not pass through roadways:

- Karon Drive
- Forest River Road
- Flora Drive
- Evening's Path

- Country Drive
- Patrick's Path
- Convent Lane
- North Pond Road

The following three (3) roadways are collectors and arterials throughout the Town and have high speeds where the roadway is quite flat and straight:

- Bauline Line
- Marine Drive
- Torbay Road (near Town Hall)

Mahon's Lane was identified as another street having high speeds. This street is a local residential street with a posted speed limit of 30 km/hr. This roadway connects to Lynch's Lane which is the main access into Holy Trinity High School. Students who have access to a vehicle use the roadway to go to Irving, Atlas Pizza and PJ's Convenience on their breaks throughout the school day. Residents have raised concerns about speeding and careless driving along Lynch's Lane and Mahon's Lane.

The Town of Torbay will be placing sidewalk on the North side of Mahon's Lane to accommodate the students that are walking along the side of the street to the convenience stores.

Intersections with Multiple Collisions

There were a number of intersections that were identified by Town staff as problem intersections. It was noted that it is difficult for motorists at some of these intersections to turn left onto the main streets. Others have geometric alignment issues and/or sight distance restrictions. It was also suggested that these issues may contribute to the collision experiences at these intersections. The intersections that were noted by the Town staff are listed below:

Along Torbay Road:

- Middle Cove Road (Left-turn issues)
- Quarry Road (Left-turn issues)
- Convent Lane/Marine Drive (Left-turn Issues, alignment issues and sight distance restrictions)
- Indian Meal Line/Lower Street (Left-turn issues and alignment issues)
- Bauline Line (Sight distance restrictions)
- Manning's Hill and Area (Alignment issues and viewing restrictions)
- Fleming's Hill (Left-turn issues and viewing restrictions)

Other Intersections:

- Convent Lane/North Pond Road (Alignment issues)
- Patrick's Path/Bauline Line (Alignment issues)

Pedestrian Generators

The Town Centre ("downtown") of Torbay extends from the Irving Gas Station along Torbay Road to Indian Meal Line. There are a variety of pedestrian generators within the vicinity that appeal to all age groups. The following are some of the main attractions in the area:

- Municipal Centre (Town Hall, Library, Fire Department, Museum)
- Gas Station and Convenience Stores (Irving and PJ's Convenience)
- Restaurants (Atlas Pizza, Mary Brown's and Coady's Eatery)
- Bars (Liddy's Bar)
- Town Shopping Centre (Torbay Medical Clinic and Shoppers Drug Mart)
- Banks (RBC)

There are currently no sidewalks throughout the Town of Torbay, with the exception of Doyle's and Quigley's Lane near the Elementary School. Accordingly, pedestrians and cyclists must have no choice but use the gravel shoulders that are present. In some instances the roadways and shoulders can be quite narrow, leading to experiences which may not be as safe as perhaps they could be if the appropriate facilities were in place.

Existing Pedestrian Crosswalks

The Town of Torbay has requested that the Province place crosswalks at various locations along Torbay Road, but; the Province has refused to do so. Therefore, each spring the Town of Torbay paints three crosswalks along Torbay Road, one in front of the Town Hall, one at Convent Lane/Marine Drive/Torbay Road intersection, and one by Holy Trinity Elementary School.

These are the only crosswalks presently in place throughout the Town.

Local Parks

There are six (6) recreation facilities throughout the Town, which includes four (4) playgrounds and two (2) recreation areas and they are listed below:

Playgrounds

- Western Island Pond (2 temporary speed humps)
- Motion Drive
- Pine Ridge (1 temporary speed hump)
- Kinsmen Place

Recreation Areas

- Upper Three Corner Pond Park
- Northeast Avalon Regional Arena (Jack Byrne Arena)

Near two of the playgrounds noted above, there are speed humps placed during the spring, summer and fall seasons. The Town of Torbay has noted that the speed humps have slowed down traffic and make the motorists more aware of the playground's presence.

Upper Three Corner Pond Park has a Master Plan to improve the existing park to become the main recreation area/facility for the Town of Torbay. It is to include a new dog park and improvements to all fields and amenities that are currently in place.

School Paths

There are two existing schools in the Town of Torbay: Holy Trinity Elementary and Holy Trinity High School, with a third, New Holy Trinity Middle School (Gr 5-7), presently under construction. Both existing schools currently have issues with children walking or driving to convenience stores, the Irving gas station and pizzerias on their recess and lunch breaks. Because there are no sidewalks, the children are forced to walk along the shoulder of the roads or on the roads themselves in some cases, to get to their destinations.

Holy Trinity Elementary School (Grades K-6)

Holy Trinity Elementary School is located on Doyle's and Quigley's Lane off of Marine Drive. There is currently a crosswalk, painted by the Town, to allow for the children to cross and walk on the sidewalk. It was noted that the existing sidewalk on Doyle's and Quigley's Lane is on the "wrong" side of the roadway and should have been placed on the school side.

Another issue that was noted, is that the buses cannot navigate the turning radius and proceed to Marine Drive at the other intersection (toward the north). Therefore, all of the buses must proceed out of the south entrance/exit and this creates traffic congestion during school hours. The Town noted that Cullen's Lane and Doyle's and Quigley's Lane may be connected in the future to allow for alternatives bus routes out of the Elementary School.

During recess and lunch breaks, the children that are old enough, walk to convenience/pizza stores and the Irving Gas Station. The children walk along the shoulder of the roadway on Torbay Road to get to their destinations. There are no sidewalks or designated crosswalks for the children to use and the shoulder of the road is very narrow.

Holy Trinity High School (Grades 7-12)

Holy Trinity High School is located on Lynch's Lane off of Marine Drive. There are no crosswalks located near the school, however the Town of Torbay is adding sidewalk to the north side of the roadway along Mahon's Lane to accommodate the children walking to convenience stores and the Irving Gas Station. The children walk across the field from the school to Mahon's Lane and then on the shoulder of the roadway to Torbay Road.

The children that are eligible to drive use two different paths to and from school. One is Mahon's Lane and the other is Seaview Avenue, both having a posted speed limit of 30 km/hr. Multiple residents have made complaints and raised concerns about the speeding along both of the roadways.

There is currently a radar sign/feedback sign on Mahon's Lane and is visible for the majority of the roadway. It was noted that there may be data that HTC can use to determine the 85th percentile and the average daily traffic using the roadway, however the radar recorder may record the same vehicle 3 or 4 times during one passing.

Roundabout Concept

It was brought to HTC's attention that the Town of Torbay would like to see a conceptual drawing of a single-lane roundabout at the intersection of Convent Lane/ Marine Drive along Torbay Road. There are congestion problems at this intersection now that could be resolved with such an installation.

1.3 Study Area

The study area for the 2015 Pedestrian Safety Review for the Town of Torbay includes all roadways within the boundaries of the municipality including roadways that fall under the jurisdiction of the Provincial Department of Transportation and Works (NLDTW) which are listed below and highlighted on the map of the study area shown in Figure 1.

- Torbay By-Pass Road (Red)
- Torbay Road (Purple)
- Indian Meal Line (Blue)
- Pine Line (Orange)
- Bauline Line (Yellow)
- Marine Drive (Green)

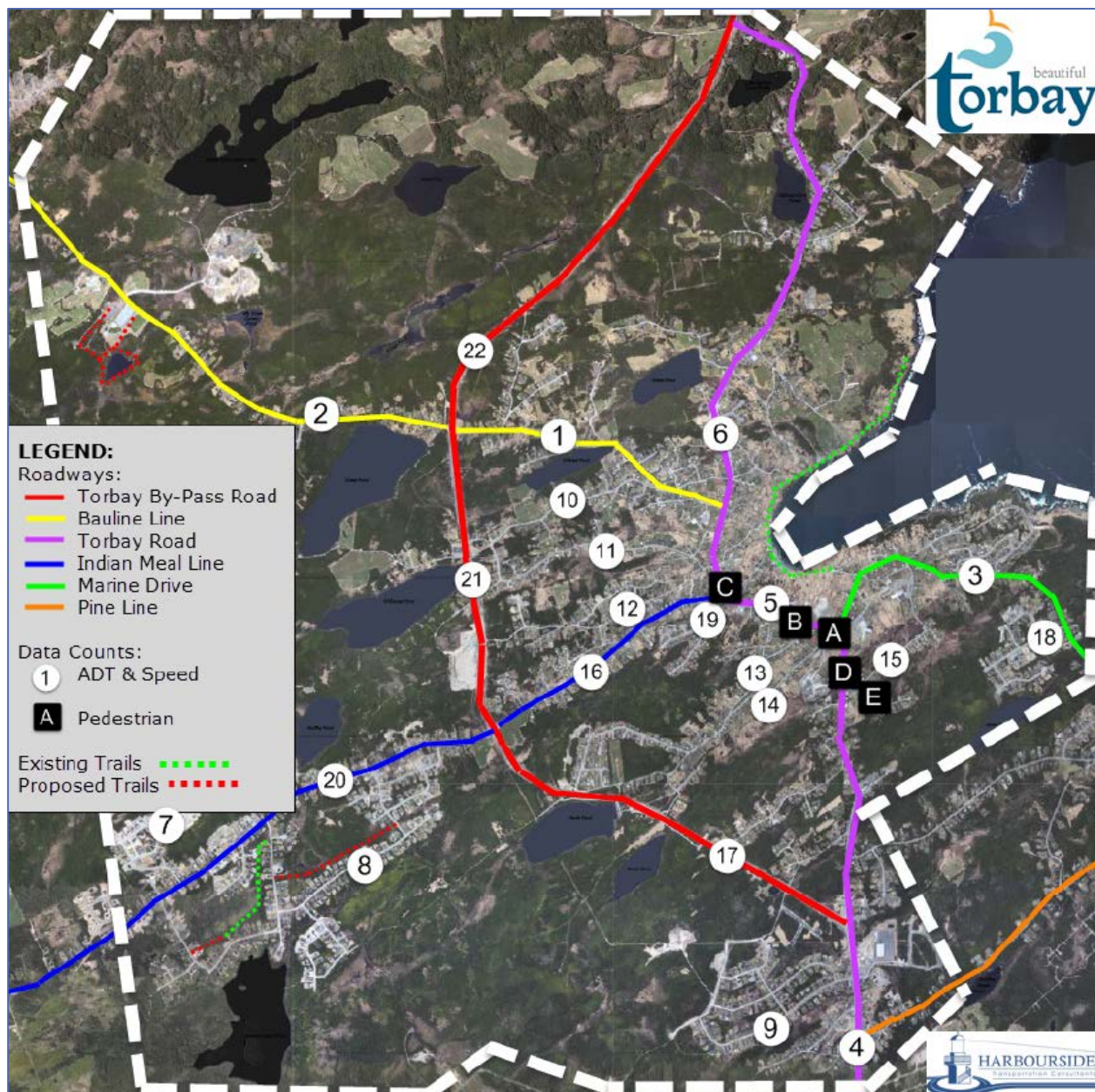


Figure 1: Study Area

2 Background Traffic Volume/ Speed Information

2.1 ADT Data Collection and Pedestrian Crosswalk Assessments

Harbourside Transportation Consultants completed 22 Average Daily Traffic (ADT) counts and 3 pedestrian crosswalk assessments throughout the Town of Torbay to determine the traffic and pedestrian patterns. A listing of the locations where ADT data was collected and where assessments were conducted on the pedestrian crossings along Torbay Road is noted below.

2.1.1 ADT Counts

The Average Daily Traffic (ADT) counts for this project were gathered by Harbourside Transportation Consultants using a 'BlackCat' Radar Recorder which produced an ADT and 85th percentile speed reports for that roadway. The ADT is the total volume of vehicle traffic over a 24 hour period and the 85th percentile speed is the speed value that 85 percent of the vehicles do not exceed. The radar recorder was mounted to a utility pole along the roadways mentioned below, for a 24-hour period. Each location is listed below and shown in *Figure 1*:

1. Bauline Line / Near Buckley's Hill – Tuesday, May 12, 2015
2. Bauline Line / Pond Side Lane – Wednesday, May 13, 2015
3. Marine Drive / Easterbrook Drive – Thursday, May 14, 2015
4. Torbay Road / Near Quarry Road – Tuesday, May 19, 2015
5. Torbay Road / Across from RBC – Wednesday, May 20, 2015
6. Torbay Road / Near Post Office – Friday, June 19, 2015
7. Flora Drive / Near Civic Address #19 – Monday, June 8, 2015
8. Forest River Road / Near Civic Address #25 – Tuesday, June 9, 2015
9. Karon Drive / Near Civic Address #36 – Wednesday, June 10, 2015
10. Patrick's Path / Near Civic Address #84 – Thursday, June 11, 2015
11. Country Drive / Near Civic Address #58 – Friday, June 12, 2015
12. Evening's Path / Near Civic Address #93 – Monday, June 22, 2015
13. North Pond Road / Near Civic Address #89 – Tuesday, June 23, 2015
14. Convent Lane / Near Civic Address #53 – Thursday, June 18, 2015
15. Mahon's Lane / Near Civic Address #25 – Wednesday, June 17, 2015
16. Indian Meal Line / Near Civic Address #99 – Wednesday, June 24, 2015
17. Torbay By-Pass Road / Near Pump House Road – Thursday, June 25, 2015
18. Torquay Place / Near Entrance – Tuesday, July 15, 2015
19. Bridge Road / Near Civic Address #22 – Wednesday, July 16, 2015

Harbourside Transportation Consultants also used two (2) MioVision 'Scout' Video Collection Units to record the ADT at three locations. The Scout video collection units were mounted to utility poles along the roadways mentioned below for a 24-hour period to record only the ADT. The three locations are:

20. Indian Meal Line / Near Civic Address #371 – Wednesday, June 24, 2015
21. Torbay By-Pass Road / Near Birchy Nap Hill Road – Thursday, June 25, 2015
22. Torbay By-Pass Road / North of Bauline Line Intersection – Thursday, June 25, 2015

The ADT count and speed data reports have been included in Appendix A for both the BlackCat and MioVision Units.

2.1.2 ADT and Speed Count Results

Table 1 shows the data results for each location listed in Section 2.1.1 and includes the Average Daily Traffic (ADT), the 85th percentile speed and the posted speed limit.

Table 1: ADT and Speed Count Data Results

Date	Location	24-Hour Period	ADT	85th Percentile Speed	Posted Speed Limit
May-12-15	Bauline Line / Near Buckley's Hill	8:00-8:00	1176	68 KPH	50 KPH
May-13-15	Bauline Line / Pond Side Lane	8:45-8:45	2188	68 KPH	50 KPH
May-14-15	Marine Drive / Easterbrook Drive	9:15-9:15	1695	50 KPH	50 KPH
May-19-15	Torbay Road / Near Quarry Road	8:30-8:30	15225	68 KPH	50 KPH
May-20-15	Torbay Road / Across from RBC	9:00-9:00	15667	56 KPH	50 KPH
June-08-15	Flora Drive / Near Civic Address #15	8:30-8:30	204	56 KPH	30 KPH
June-09-15	Forest River Road / Near Civic Address #25	8:45-8:45	550	55 KPH	30 KPH
June-10-15	Karon Drive / Near Civic Address #26	8:45-8:45	744	57 KPH	30 KPH
June-11-15	Patrick's Path / Near Civic Address #84	9:00-9:00	615	57 KPH	30 KPH
June-12-15	Country Drive / Near Civic Address #116	9:00-9:00	839	56 KPH	30 KPH
June-17-15	Mahon's Lane / Near Civic Address #25	18:30-18:30	944	55 KPH	30 KPH
June-18-15	Convent Lane / Near Civic Address #53	18:45-18:45	1,177	36 KPH	30 KPH
June-19-15	Torbay Road / Near Post Office	19:30-19:30	9,152	63 KPH	50 KPH
June-22-15	Evening's Path / Near Civic Address #57	8:30-8:30	311	34 KPH	30 KPH
June-23-15	North Pond Road / Near Civic Address #89	9:00-9:00	1085	57 KPH	30 KPH
June-24-15	Indian Meal Line / Near Civic Address #99	13:00-13:00	2171	64 KPH	50 KPH
June-24-15	Indian Meal Line / Near Civic Address #371	13:00-13:00	4006	-	50 KPH
June-25-15	Torbay By-Pass Road / Near Pump House Road	13:00-13:00	9912	85 KPH	70 KPH
June-25-15	Torbay By-Pass Road / Near Birchy Nap Hill Road	14:00-14:00	6657	-	70 KPH
June-25-15	Torbay By-Pass Road / North of Bauline Line Intersection	14:00-14:00	4928	-	70 KPH
July-15-15	Torquay Place/ Near Entrance	8:30-8:30	395	47 KPH	30 KPH
July-16-15	Bridge Road/ Near Civic Address #22	8:45-8:45	640	33 KPH	30 KPH

As seen above there are multiple roadways with the 85th percentile speed significantly higher than the posted speed limit, especially on the local roadways.

2.1.3 Pedestrian Crosswalk Assessments

There are very few marked pedestrian crossings within the Town of Torbay. The locations of the pedestrian crossings along Torbay Road were identified by the Town, which included near Holy Trinity Elementary School, the Town Hall and Torbay Beach. HTC gathered pedestrian counts using three MioVision Scout Video Collection units at the three pedestrian crossings along Torbay Road, to determine the adequacy of the pedestrian crossing control at each location. These Scout video collection units were mounted along the roadway near the pedestrian crossings to record the pedestrians from 7:00am to 6:00pm. Pedestrian count data for this project was recorded at the locations and times noted below.

- A. Torbay Road / Convent Lane and Marine Drive – Wednesday, September 9, 2015
- B. Torbay Road / Front of Town Hall – Thursday, September 10, 2015
- C. Torbay Road / Indian Meal Line and Lower Street – Wednesday, September 9, 2015

The pedestrian count data for locations A and B have been included in Appendix B. No crossings were observed at location C, therefore the data was not processed. Location C is a popular crossing location in the summer months.

2.1.4 Pedestrian Crossing Controls

The three pedestrian crossings mentioned in the previous section were analyzed using the Transportation Association of Canada's (TAC) – Pedestrian Crossing Control Guide. The minimum threshold parameters to proceed with a crosswalk assessment include:

- Greater than 15 EAUs (Equivalent Adult Units) per hour,
- A minimum of 100 pedestrians over a 7-hour continuous counting period, and
- A minimum roadway volume of 1,500 vehicles per day.

If the above requirements were met, a crosswalk assessment was completed which included, the average daily traffic volume (ADT), the posted speed limit and the number of lanes on the roadway. Based on the crosswalk assessments, two different pedestrian crossing controls were selected for the three pedestrian crossings located on Torbay Road; the descriptions are noted below:

- Ground Mounted System – There are two options with this type of system. One includes having a crosswalk with side-mounted signs and the second option is to have a crosswalk with overhead-mounted signs. Neither option has a flashing beacon or a push-button application.
- Overhead Flashing Beacon System – This system is considered to be a special crosswalk due to the overhead mounted system with flashing beacons and push-button application.

2.1.4.1 Discussion of the Results

After completing a pedestrian count and assessment at the three pedestrian crossings, three things were common at each pedestrian crossing:

- a. All pedestrian crossings' zebra crosswalk markings were either completely worn away or barely visible to both the pedestrians and motorists. These should be replaced/repainted at each pedestrian crossing.
- b. WC-2 and WC-16 (School Zone) signs should be placed on each approach in advance to the pedestrian crossings to warn/advise the motorists of a pedestrian crossing ahead.
- c. At the locations where there exist yellow flashing beacons, they should be considered for removal as they are not part of any standard.

The two pedestrian crossings along Torbay Road, located at Indian Meal Line/Lower Street and Town Hall, are warranted to have a Ground Mounted System with side mounted signs.

The pedestrian crossing located at the intersection of Torbay Road and Convent Lane/ Marine Drive warrants an Overhead Flashing Beacon System.

2.1.5 Pedestrian Crosswalk Assessments

A crosswalk assessment was completed for the three crosswalks along Torbay Road which included the examination of the following parameters:

- Pavement Markings
- Wheelchair Accessibility
- Signage
- Stopping Sight Distance
- Street Lighting
- Parking

Torbay Road and Convent Lane/ Marine Drive

Pavement Markings:

- The pavement markings for both the vehicular traffic and pedestrians were not visible, they should be replaced with zebra crosswalk markings.

Wheelchair Accessibility:

- There is no curb at this pedestrian crossing location and the asphalt is in good condition.

Signage:

- There is currently an RA-3R on the southbound approach to the crosswalk.
- There should be an RA-3L and RA-3R placed on the northbound approach and an RA-3L placed on the southbound approach. These signs are to be back to back.
- There should be a WC-16R placed on both approaches to the crosswalk, notifying the motorists of a crosswalk ahead.
- The yellow flashing beacons should be considered for removal, as they are not part of any standard.

Stopping Sight Distance:

- The location of this crosswalk is not ideal, due to the grade change on both approaches and the curvature of the road. This crosswalk should be considered during the detailed design of this intersection.

Street Lighting:

- There is no street lighting at this crosswalk. Consideration should be given to installing street lighting which will improve the visibility of pedestrians at night.

Parking:

- There is no parking along Torbay Road.

Torbay Road & Town Hall

Pavement Markings:

- The pavement markings for both the vehicular traffic and pedestrians were not visible, they should be replaced with zebra crosswalk markings.

Wheelchair Accessibility:

- There is no curb at this pedestrian crossing location and the asphalt is in good condition.

Signage:

- There is currently no signage on either approach to the crosswalk.
- There should be a WC-2R placed on both approaches to the crosswalk, notifying the motorists of a crosswalk ahead.
- There should be an RA-4L & RA-4R, back to back, placed on both the northbound and southbound approach.

Stopping Sight Distance:

- The location of this crosswalk is on a tangent section of roadway with bends in the road on each approach and there is also a grade change on both approaches. This crosswalk should be considered during the detailed design of the road cross section.

Street Lighting:

- There is no street lighting at this crosswalk. Consideration should be given to installing street lighting which will improve the visibility of pedestrians at night.

Parking:

- There is no parking along Torbay Road.

Torbay Road & Indian Meal Line/ Lower Street*Pavement Markings:*

- The pavement markings for both the vehicular traffic and pedestrians were not visible, they should be replaced with zebra crosswalk markings.

Wheelchair Accessibility:

- There is a low back curb at this pedestrian crossing location and the asphalt is in good condition.

Signage:

- There is currently no signage on either approach to the crosswalk.
- There should be a WC-2R placed on both approaches to the crosswalk, notifying the motorists of a crosswalk ahead.
- There should be an RA-4L & RA-4R, back to back, placed on both the northbound and southbound approach.

Stopping Sight Distance:

- The location of this crosswalk is not ideal, due to the grade change on both approaches and the curvature of the road. This crosswalk should be considered during the detailed design of the roadway.

Street Lighting:

- There is no street lighting at this crosswalk. Consideration should be given to installing street lighting which will improve the visibility of pedestrians at night.

Parking:

- There is no parking along Torbay Road.

2.1.5.1 Summary of Assessments

HTC recommends that all three pedestrian crossings have the following:

- Warning signs on each approach to the crosswalk.
- Pedestrian crossing signs on both sides of the road and on each approach, back to back.
- Zebra pavement markings placed at each crossing.
- Any yellow flashing beacons removed.

At two locations along Torbay Road, Indian Meal Line/Lower Street and in front of the Town Hall, HTC recommends placing a Ground Mounted System with the appropriate signage.

HTC recommends placing an Overhead Flashing Beacon System at the location along Torbay Road at Convent Lane/Marine Drive with the appropriate signage.

3 Public Consultation/ Workshop and Observations

3.1 When / Where / Turnout and Pictures

A Public Consultation/ Workshop was held at the Kinsmen Centre in Torbay, NL on August 18, 2015 from 6:00pm to 8:00pm. There were representatives from the Town of Torbay, HTC and Progressive Engineering in attendance to solicit comments and feedback from the residents of Torbay on pedestrian safety issues in the community. Approximately, 50 people attended the public workshop with 28 people leaving their name and email information. A fact sheet and a comment sheet were provided to all residents that attended the public workshop. All residents in attendance were given the option to submit their feedback at the workshop or submit their comments via email by September 4, 2015.

3.2 Summary of Comments

HTC received 7 comment sheets, which were filled out at the public information session, and 15 follow-up emails from residents with concerns and comments about pedestrian safety in the Town. HTC has summarized the comments into the following groups:

Speeding

- Suggested to have more enforcement (RNC) on the main roads to reduce speeding.
- Place speed monitoring signs/ feedback signs.
- ATVs and dirt bikes speeding on the main road and then going through subdivisions.
- These streets were noted by a number residents as having problems with respect to speeding and aggressive driving:
 - Bridge Road/Riverdale Drive
 - Forest River Road
 - Indian Meal Line

Walking

- Shoulders of local roadways are too narrow to walk on, suggest to have a wider shoulder or sidewalk on at least one side of the roadway.
- Walking trails that provide easy access for young families.
- Many families that live within the 1.6km distance for school busing, feel it not safe for the children to walk to school.

Crosswalks

- Suggested to have high visibility crosswalks along Torbay Road at Lower Street, Town Hall, Convent Lane/Marine Drive and Irving Gas Station.

Priority Areas

- Town Centre, which is along Torbay Road from Irving Gas Station to Lower Street, was suggested to have a sidewalk on one side of the road, preferably the east side of Torbay Road.

New Developments

- Suggested that all new developments throughout the Town have sidewalks.

All of the comments and suggestions can be found in Appendix C.

A summary of key words and phrases were collected during the public workshop and compiled together to create a visual word cloud as seen below in Figure 2. The reoccurring themes in the residents correspondence seems to be predominantly related to speeding and pedestrian safety for children.



On the first day of school, September 9th, 2015, HTC observed the traffic and pedestrian patterns near Holy Trinity High School and near Holy Trinity Elementary School. The traffic volumes and pedestrian volumes were high due to this being the first day of school.

Harbourside Transportation Consultants - #15312

At Holy Trinity Elementary School, the parking lot of the school became overfilled with vehicles and buses very early in the morning. The vehicles then began parking on Doyle's and Quigley's Lane on both sides of the road, which in turn blocked the crosswalk and limited the capacity on the roadway itself. As seen in Figure 4, parents and children are forced to walk in between vehicles, in areas where there is no sidewalk and, in some cases, with the traffic in the actual travel lane.



Figure 4: Parents and children walking to Holy Trinity Elementary on Doyle's and Quigley's Lane

Once Doyle's and Quigley's lane was full, parents were instructed to park in the church parking lot on Convent Lane and cross at the crosswalk on Torbay Road at the intersection with Marine Drive. The amount of vehicles turning onto Torbay Road from Doyle's and Quigley's Lane and Convent Lane and then yielding to the crosswalk, was significant and very concerning from a safety perspective. Below shows the congestion at the intersection on Torbay Road. Significant queueing was observed on Marine Drive and along Torbay Road extending from the intersection of Marine Drive and Torbay Road to the intersection of Torbay Road and Bauline Line.



Figure 5: Parents and Children walking to Holy Trinity Elementary near the intersection of Torbay Road/Doyle's and Quigley's Lane.

HTC placed traffic counters at five different locations, mentioned previously in Section 2.1.3, along Torbay Road to monitor the pedestrian traffic and the crossing locations. The four figures shown below were taken from video recorded at lunchtime on Thursday, September 10, 2015. Figures 6, 7 and 8 show the children walking on the shoulder of the road on Torbay Road in groups, some groups with 4 or 5 children walking abreast, towards Atlas Pizza, Irving or Mary Brown's. Figure 9 shows the students leaving the High School in vehicles heading towards Stavanger Drive for lunch.



Figure 6: Children walking on shoulder of Torbay Road towards Irving Gas Station



Figure 7: Children waiting to cross and walking on the shoulder of Torbay Road near the Town Hall



Figure 8: Children walking on shoulder of Torbay Road near Mahon's Lane



Figure 9: Significant queuing of students and parents at lunchtime at the intersection of Torbay Road/Mahon's Lane

4 Capital Works Plans/Anticipated Growth

The Town of Torbay continues to experience significant development, particularly in the residential sector. The CBCL Town Centre report (2014) says that Torbay is the second fastest growing municipality in the Province. With the Town's location, in close proximity to the east end of St. John's, Torbay provides a unique style of living which provides its residents with the best of both Torbay and St. John's without a long commute.

The Town's development listing (dated February 3, 2015) illustrates the various subdivisions that are planned, in progress or completed. Of note, the subdivisions with a significant (more than 25) number of potential lots to be developed include:

- Bay View Estates, Phase II (216+ lots)
- Forest Landing, Phase VII (60+ lots)
- Forest Landing, Phase VIII (31 lots)
- Indian Meal Line North, Phase II (80+ lots)
- Pine Ridge Creek, Phase IV (120+ lots)
- River Valley Estates, Phase III (35+ lots)
- Whitty's Ridge Area (180+ lots)
- Look Limited (Reddy Drive) (25+ lots)
- Duffy Development (160+ lots)

The other significant planned development is associated with the concept of a new Town Centre in the middle of Torbay. The CBCL report (2014) provides various concepts which includes a Wellness Centre and a significant amount of mixed-use development. These concepts will have an impact on traffic and pedestrian patterns in the Town Hall area of Torbay.

5 Findings

As noted in Section 3.2 above, HTC attended the Public Consultation that was held to gather comments and feedback from the residents regarding pedestrian safety throughout the Town of Torbay. During the public consultation, residents provided roadways and residential areas with high traffic volumes and high speeds as well as areas where residents do not feel comfortable walking on the shoulder of the road and crossing Torbay Road. The locations of the major roadways and residential areas and the concerns that were brought forward are mentioned below:

Speeding

Major Roadways:

- Indian Meal Line
- Marine Drive
- Torbay Road

Residential Area:

- Tourquay Place (Jones Pond Area)
- Bridge Road
- Forest River Road (Forest Landing)
- Reddy Drive
- Karon Drive
- Pineridge Crescent

High Traffic Volumes

Major Roadways:

- Indian Meal Line
- Bauline Line
- Torbay Road
- Marine Drive

Residential Area:

- Riverdale Road
- Forest River Road
- Mahon's Lane
- Lynch's Lane

No Sidewalks and Narrow Shoulders

Major Roadways:

- Indian Meal Line
- Marine Drive
- Torbay Road, Irving to Indian Meal Line

Residential Area:

- Bridge Road
- South Pond Road
- Forest River Road (Forest Landing)
- Piperstock Place
- Lynch's Lane
- Mahon's Lane
- Doyle's and Quigley's Lane

Crosswalk Locations

Major Roadways:

- Torbay Road/Lower Street
- Torbay Road/Town Hall
- Torbay Road/Manning's Hill
- Torbay Road/Marine Drive
- Torbay Road/Irving Gas Station
- Torbay Bypass/Indian Meal Line
- Torbay Bypass/Bauline Line

Other Issues

- Construction vehicles using side streets and speeding.
- Speeding on the sharp turn on Bridge Road near mailboxes and shortcutting across.
- Dirt bikes and ATVs using the main road and side streets and speeding.
- Suggestion to include GPS in Town of Torbay vehicles to encourage driving in the speed limit.
- Snow clearing in the winter to allow for pedestrians to walk on the shoulder of the roadway.
- Walking trails to get residents off of the high speed roadways.

6 Priority Plan

With the absence of pedestrian facilities within the Town, it is clearly the desire of the Town and its residents to begin the process of building those facilities. This process, however, will likely take time, due to the expense of such a program. With that being accepted, a logical, prioritized plan is recommended and outlined below. This plan will allow the Town to budget appropriately and also to coordinate other necessary work (municipal services upgrades, pavement rehabilitation) with this pedestrian facilities upgrade work.

6.1 Priority Plan #1

HTC conducted several site visits in the Town in early September 2015. It was certainly evident at those times, that there is a large gap in the pedestrian facilities available to accommodate the activities noted specifically in the school areas of the Town. At drop-off times, lunchtime and at pick-up times we observed parents, children and teenagers walking along the shoulders of the road and in some cases within the travelled lanes to reach their destinations.

With the combination of pedestrian volumes, vehicular volumes and a lack of separation between the two, there is certainly a significant safety concern that exists on the Torbay Road. This is the reason that the Town's highest priority should be to construct a sidewalk(s) on both sides of Torbay Road from Mahon's Lane to the Bauline Line, with an exception on sections of the road where construction would be difficult and cost prohibitive. Sidewalk should be provided on one side of Torbay Road from the Bauline Line to the new school site, across from Anstey's Cove Lane.

The construction of this sidewalk would result in a new cross section for Torbay Road, including two 1.5m wide sidewalks, a 1.0m landscaped median, concrete curb and gutter and 11.0m driving surface, from curb to curb. The travel lanes would be divided into two 5.25m lanes, which could be further subdivided into a 1.75m on-street bicycle lane and a 3.5m travel lane, if so decided by the Town. The landscaped median is important for a few reasons, including snow storage and providing a buffer from pedestrian traffic and street traffic. This buffer provides an increased feeling of safety for pedestrians by increasing the horizontal distance between the two traffic streams. Figure 10 shows the proposed cross sections along Torbay Road.

There are some sections of Torbay Road, however, that this median may have to be eliminated in favour of constructing the sidewalk immediately behind the curb and gutter. This is due to the fact that there are areas where existing buildings are close to the road, and other areas where the existing edge of road is in close proximity to a significant change in topography. In these sections, it is deemed that providing this desirable cross section would be quite expensive and funds may be better allocated to other sidewalk projects in other sections of the Town.

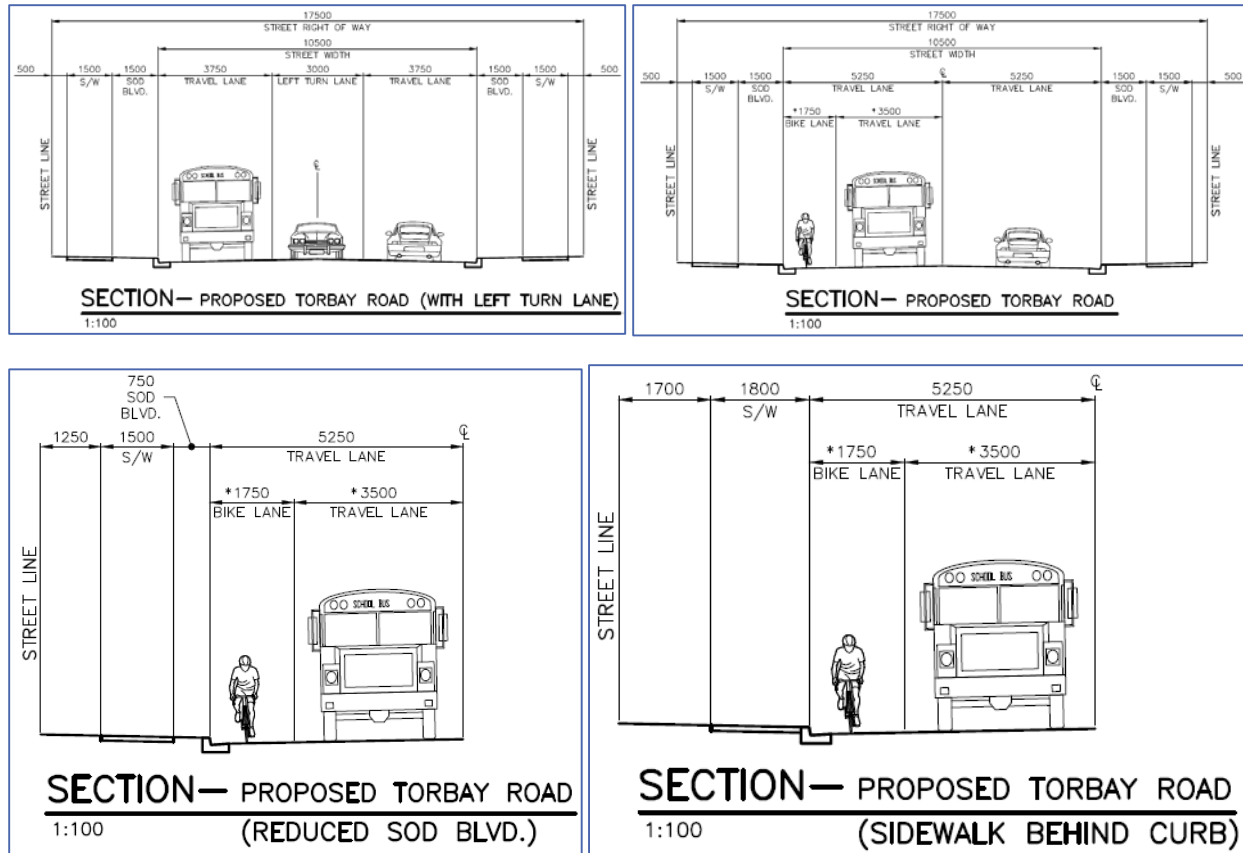


Figure 10: Proposed cross sections for Torbay Road

One of the most significant traffic operations issues encountered in the Town was the activity observed during the school hours at the intersection of Torbay Road and Marine Drive/Convent Lane. Both pedestrian volumes and traffic volumes are significant at school drop-off and pick-up times. This leads to traffic congestion and unsafe pedestrian conditions at this intersection. Considering the options for improving this intersection, one treatment stands out above all others – a roundabout.

A roundabout is a circular intersection which requires approaching vehicles to yield to vehicles already inside the roundabout. When designed properly, the geometry of the approach roads requires vehicles to slow down to yield to pedestrians and to yield to other vehicles. The result is a safe intersection which provides efficient traffic operations. Research focussed on roundabouts has shown that roundabouts not only reduce the number of accidents at intersections, but they reduce the severity of accidents that do occur at the intersection. Due to the slow speeds of vehicles, roundabouts are safe for pedestrians, allowing pedestrians to cross one lane at a time, with a refuge island between each crossing.

With a roundabout, there also exists the opportunity to create landscaped areas and improved aesthetics over similar, stop-controlled intersections. The central island and splitter islands provide areas where the Town can install plantings or other features to create a real gateway landmark to the Town. This gateway will also serve to provide drivers with the visual queues to remind them that they are entering a different area from the more rural sections of Torbay Road, and that they should reduce their speeds.

To create a roundabout at this particular intersection, it is recommended that a number of modifications be made to the immediate area:

- The roundabout would occupy a section of the existing sports field – with the presence of the cemeteries, options are limited for providing the footprint adequate for the roundabout.
- Convent Lane would be relocated away from the roundabout, through the church parking lot. Ideally, Convent Lane would connect to the roundabout, but due to its proposed location, this is not feasible without disturbing the existing cemetery.
- Minor realignment of Torbay Road (north) and Marine Drive to provide proper alignment into the roundabout in order to reduce speeds.

The roundabout would be designed to accommodate large trucks, school busses and emergency vehicles. It is assumed, due to the constrained area, that the roundabout would have a concrete truck apron in the central island to accommodate turning movements for larger vehicles. The design must also consider provision of proper signage, markings, lighting and storm drainage.



Figure 11: Conceptual roundabout alignment at the intersection of Torbay Road and Marine Drive

HTC has developed a conceptual alignment for the road work proposed under priority plan # 1. The drawings associated with this alignment are enclosed in Appendix D. We have also included an option to construct a roundabout at the intersection of Torbay Road and Marine Drive as part of this roadway alignment. The roundabout option is also shown previously in Figure 11.

6.2 Priority Plan #2

After sidewalks and the new road cross section have been constructed on Torbay Road, the next priority for the Town should be to construct sidewalks within a 1.6km radius of all schools. This 1.6km radius corresponds to the distance which children walk to school, based on the policy of the Eastern School District. This priority would result in all children who are required to walk to school being provided with a safe facility to be able to walk. This would, hopefully, also provide an increase in the number of children walking to school, which would promote an active lifestyle and reduce the number of vehicles traveling to the school sites from parents driving their children to and from school.

In association with this will be the careful examination of all pedestrian crossings to ensure that they are properly located, adequately designed and clearly visible in order to maximize safety for all pedestrians. A careful route planning exercise must be undertaken to ensure that all routes to school provide an adequate pathway and crossings for the entire length. Crossing locations must consider the appropriateness of RA-5 crossings (flashing beacons) or pedestrian half signals to properly accommodate pedestrian volumes.

6.3 Priority Plan #3

After Priorities 1 and 2 have been achieved, the Town's focus must turn to providing pedestrian facilities on its major collector roads. While there does not appear to be a significant amount of pedestrian traffic on these roadways, it is clear that this is a priority for residents, and is the next logical step in the process of building a pedestrian network in Torbay. Careful design must be undertaken to best manage the available space within the Town's right-of-way and to customize the design to ensure that the design provides best value to the Town without requiring expensive retaining walls or excavations.

It is deemed appropriate to provide sidewalks on one side of the road for these collectors, which will ultimately be connected to Torbay Road, which will be the major pedestrian pathway through Town. These collectors include:

1. Indian Meal Line
2. Bauline Line from Torbay Road to Torbay Bypass Road
3. Marine Drive to Town's Boundary
4. Torbay Road from Irving to the Torbay Bypass and then to City Limits

These routes, in some sections, experience higher than desirable vehicle speeds. It is often the experience that the installation of pedestrian facilities and then the presence of pedestrians, can provide some level of speed reduction on these types of roadways. In addition, the design must provide a facility which is inviting, safe and well maintained.

6.4 Priority Plan #4

As residential roads are built or upgraded, sidewalks should be installed. This is important in providing a connected pedestrian network throughout the Town. Each street should be evaluated for the appropriate pedestrian treatment, but, at a minimum, sidewalk should be included on one side of the street. Rather than constructing the sidewalk network in its entirety, it is reasonable to include sidewalk on street upgrade projects where the Town will replace some (or all) of the municipal services in the street, or will plan to resurface the existing street. This will serve to minimize the cost of the sidewalk, due to the fact that it would be part of a larger civil project. The details of the sidewalk would need to be evaluated on a case-by-case basis, but it would be desirable to construct a minimum 1.5m wide sidewalk with a 1m median between the sidewalk and the curb. Curb must be installed in addition to the sidewalk to provide adequate protection for pedestrians from vehicular traffic.

For new developments, minimum street standards must be developed to include cross-sectional elements such as curb and sidewalk. Typical minimum street cross sections should be developed for local residential streets to ensure that important infrastructure is included on any subdivision design. As part of this process, it is also recommended that the Town require that all developments be subject to the development agreement process, which would require that all proposed development submit details on their design, traffic and servicing requirements.

6.5 Typical Cross Sections

As per the Engineering Design Guidelines for Subdivisions that was prepared for the Town of Torbay in February 2014 by Newfoundland Design Associates Limited, streets should be designed and upgraded in accordance with the minimum requirements as shown below:

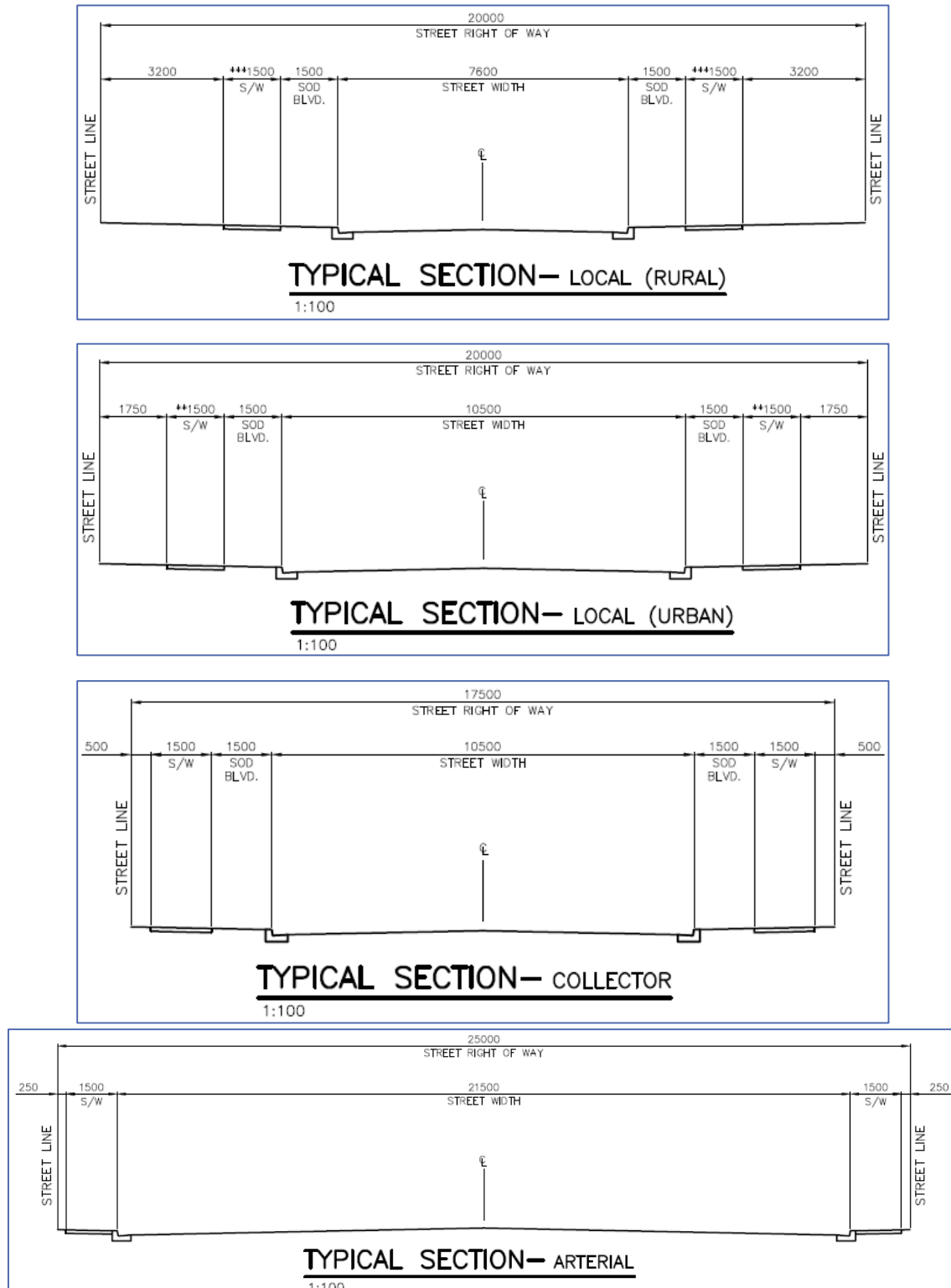


Figure 12: Typical cross sections for design of new roadways throughout the Town of Torbay

7 Costing

HTC has completed a Class 'D' cost estimate for the Priority Plan 1 through 3 mentioned above in Section 6 and they are summarized below with a 25% contingency.

7.1 Priority Plan #1

For Priority Plan 1, HTC has recommended that sidewalk be installed along Torbay Road from the Irving Service Station to Bauline Line and then extended to the new middle school. The below shows the breakdown of the Torbay Road Improvements, and the option of including a roundabout at the intersection of Torbay Road/Convent Lane/Marine Drive. The costs include road regrading and resurfacing with curb and gutter, sidewalks and storm sewer.

- Torbay Road Improvements = \$ 4,000,000
- Roundabout = \$ 425,000
- Roundabout Roadway Improvements = \$ 415,000
- Roadwork with no Roundabout = \$ 430,000

The estimated cost of proceeding with the improvements noted above, with the Roundabout added at the intersection of Marine Drive and Torbay Road is estimated at 4.9 million dollars. The estimated cost of proceeding with the improvements noted above without the Roundabout option being added is estimated at 4.5 million dollars.

7.2 Priority Plan #2

For Priority Plan 2, HTC has recommended that sidewalk be installed within the 1.6km radius of all schools. The below shows the breakdown of the sidewalk improvements within the 1.6km radius of the schools which includes the main collectors and arterials throughout the Town. The costs include road regrading and resurfacing with curb and gutter, sidewalks and storm sewer.

- Torbay Road South = \$ 1,315,000
- Torbay Road South (Urban Section) = \$ 16,500
- Marine Drive = \$ 2,525,000
- Indian Meal Line = \$ 965,000
- Bauline Line = \$ 2,255,000
- Torbay Road North = \$ 1,940,000

The estimated cost of proceeding with the improvements noted above is estimated at 11.3 million dollars.

7.3 Priority Plan #3

For Priority Plan 3, HTC has recommended that sidewalk be installed on the remaining collector roads throughout the Town on one side of the roadway. The below shows the breakdown of the sidewalk improvements. The costs include road regrading and resurfacing with curb and gutter, sidewalks and storm sewer.

- Torbay Road South = \$ 200,000
- Indian Meal Line = \$ 4,255,000
- Bauline Line = \$ 4,200,000
- Torbay Road North = \$ 415,000

The estimated cost of proceeding with the improvements noted above is estimated at 11.4 million dollars.

8 Other Considerations

8.1 Speed Zoning Policy

Setting appropriate speed limits in a municipality is often a challenging and controversial task. At the root of it all is the desire to create a driving environment that is safe for all users. There are five main principles to be accepted when considering the development of a speed zone policy:

1. The key element in determining the most appropriate posted speed for a roadway is the physical environment. The elements in the physical environment include:
 - a. Lane width
 - b. Horizontal geometry
 - c. Presence of parking
 - d. Presence of pedestrian facilities
 - e. Surrounding land use
2. Posting an inappropriate speed limit will have little effect on driver behaviour and may in fact, decrease overall safety.
3. The authority must apply a speed zone policy which is consistent and without political or public pressure. The policy must be based on sound engineering principles and analysis.
4. Enforcement and education are critical components to a successful speed zone program.
5. The Transportation Association of Canada (TAC) has created a standardized approach to setting speed limits – “Canadian Guidelines for Establishing Posted Speed Limits” (2009). This document states that minimum speed limits should generally be set at 50km/hr, but allows speed limits as low as 40km/hr if the roadway meets a specific set of criteria.

The Town should develop a speed zone policy which outlines the methods to established speed zones within the Town. Once developed, it is recognized that the Town cannot implement this policy across the entire Town all at once. It is recommended that the Town of Torbay follow the below steps to implement the policy:

1. Prepare a detailed road classification map, which would classify the roads within the Town (both municipally and provincially controlled) into different categories, based on a number of characteristics, including functionality, traffic volumes and geometric properties.
2. Carry out a public consultation open house to communicate the Town’s intent and the procedure in which it will carry out the process. This program must first involve meetings with NLDTW, the City of St. John’s and the RNC.
3. On the road classification map, add modified speed zones. A coordinated plan to change signage will be developed in order for the Town to make modifications to the existing posted speed limit signage in the Town. The speed zone map must also consider specific areas where geometric or other conditions require localized speed advisory signage to warn drivers of a variance in road conditions which require their attention.
4. Develop a Traffic Calming Policy to efficiently handle requests for traffic calming within the Town.

8.2 School Zone Signage

The Town of Torbay has two existing schools: Holy Trinity Elementary which is a K-6 school, and Holy Trinity High School, which is a grade 7-12 facility. A new middle school is presently under construction on Torbay Road, north of Bauline Line.

In conjunction with establishing a consistent speed zoning policy, the Town of Torbay should also consider looking at posting a reduced speed limit on school days only on all approaches to the school zones within Town of Torbay. HTC is suggesting that the reduced speed be 40 km/hr. The Town should consider installing feedback signage similar to those shown in Figure 8 and Figure 9 below.



Figure 13: Feedback signage in school zones with 50 km/hr and 30 km/hr speed limit

There is an exponential relationship between pedestrian fatality risk and the impact speed of the collision. It is therefore important to lower speed limits in school zones during school hours to limit the risk of a fatality should an unfortunate event occur. Many municipalities throughout Canada have selected 40 km/hr as that reduced speed limit.

8.3 Crosswalk Signage

The Transportation Association of Canada (TAC) provides the Manual for Uniform Traffic Control Devices as the standard that should be followed when signing crosswalks.

For a standard crossing, not within a school zone, municipalities should sign with the RA-4R and the RA-4L. Signage should be mounted back to back on both sides of the street. Signage should also be manufactured by an approved 3M sign shop to ensure an appropriate level of retro-reflectivity.

Where there is limited visibility of the crosswalk area, the Pedestrian Crosswalk Ahead sign, WC-2R and WC-2L should be used.



Figure 14: RA-4R



Figure 15: WC-2R

For a crossing located within a school zone, municipalities should sign with the RA-3R and RA-3L. Signage should be mounted back to back on both sides of the street. The School Crosswalk Ahead sign, WC-16R and WC-16L, may be used in advance of a school crossing.



Figure 16: WC-16L



Figure 17: RA-3R

8.4 Street Classification

The road network in the Town of Torbay consists of a number of different types of roadways, each providing particular services including providing access to property and facilitating travel between points of trip origin and points of trip destination. A good road classification system establishes a sort of hierarchy of roads that provides a gradation in service functionality leaning towards unrestricted access and limited movement functionality for public lanes and local roadways to varying degrees of access control and larger proportions of through traffic and increasing speeds for both minor and major arterial roadways.

It is recommended that the Town of Torbay street classification system be altered to conform to the Transportation Association of Canada's (TAC's) streets classification system. Accordingly, we are suggesting the following classification categories be introduced into a new road classification system for the Town of Torbay.

Local Roads

- Residential
- Industrial/ Commercial

Collector Roads

- Residential
- Industrial/ Commercial

Arterial Roads

- Minor
- Major

Freeways

A properly classified roadway system can be helpful in a number of different ways. For example, some municipalities establish their snow clearing and ice control policies based on the streets classification. Streets that move more traffic and that have higher speeds and that may be on transit routes receiving higher priorities than streets that carry lower volumes of traffic and that perhaps have not been incorporated as transit routes.

Similarly, many municipalities also used their streets classification system to prioritize their pavement markings programs. Higher volume streets receiving priority for re-striping over lower volume roadways.

Municipalities that have traffic calming policies often use the street classification system to filter the requests they receive. Traffic calming measures are not normally used on roadways classified as either minor or major arterial roadways, or that have a higher classification.

It is recommended that all roadways within the Town of Torbay be re-evaluated with collected data and re-classified into the new categories noted above, using the characteristics of each noted by TAC in Table 1.3.4.2 in the Geometric Design Guide for Canadian Roads.

8.5 Pavement Markings

The Provincial Department of Transportation and Works is responsible for the pavement marking efforts on Torbay Road, the Torbay By-Pass Road, Bauline Line, Indian Meal Line, Marine Drive, and Pine Line. All of these roadways should be marked in accordance with the Transportation Association of Canada's Manual for Uniform Traffic Control Devices. All of these roadways should have the standard yellow centre lines, left turn bays as required, and white edge lines to establish where the pavement ends and the shoulder starts.

Midblock crosswalks should be marked with zebra style markings, with plastic thermal marking treatments being preferable.

8.6 Access Control

Access Management generally refers to the regulation of intersections and driveway openings on a roadway segment. The objective behind any access management plan or policy is to maintain roadway safety and mobility by controlling the location, design and spacing of access locations.

This is not a huge problem for the Town at the present time, but there are areas that could benefit from this practice when roads are upgraded in the future. The areas along the frontages of both sides of Torbay Road in the area of the Town Hall, for example, could benefit from limiting access to specific points on Torbay Road.

Access management practices should be followed in all roadway upgrading projects and in areas where the benefits

8.7 Traffic Calming

Residential streets are meant to be shared by pedestrians, cyclists and motorists alike. On local and collector residential streets, users should be able to co-exist in harmony and do so in a relatively safe manner. In neighbourhoods that have this dynamic, the streets feel safe and are a pleasure to walk, cycle and drive on. These are the streets and neighbourhoods that we want to create for all the residents of Torbay to enjoy.

Unfortunately, and for a myriad of reasons, many of the local residential streets in different locations throughout the Town of Torbay are experiencing problems, both real and in some cases perceived, that may be related to traffic volumes, speeds, geometry and general operations. These issues result in local streets that are not perceived as being pleasant or safe for children, pedestrians, cyclists or motorists alike to use.

Where such situations exist, residents, and often others in the community, demand actions from the governing authority which most often is the community's Council and/or Staff, to have the traffic and/or safety issues resolved.

Some residents of the Town used the public information session that was held at the Kinsmen Centre in Torbay, NL on August 18, 2015 from 6:00pm to 8:00pm as the forum to voice their concerns with respect to speeding and pedestrian safety in their neighbourhood. HTC gathered speed data in advance of this meeting on many of the streets that were highlighted as being problematic. Some of the 85th percentile speeds measured on these streets were concerning. Appendix B contains full detailed results on the speed studies undertaken by HTC throughout the Town.

Municipalities often recognize the benefits in addressing traffic and pedestrian safety issues in a consistent manner. Many communities, for example, will have warrant systems that they employ for traffic signals and for the installation of pedestrian crossings to ensure these controls are only put in place when needed and in a safe consistent manner. Dealing with speeding and traffic issues in neighbourhoods is no different. Many organizations throughout Canada and indeed North America are putting “Traffic Calming” policies in place to deal with neighbourhood traffic and speeding concerns in a consistent/appropriate manner.

What is Traffic Calming?

Traffic calming is most often defined as a combination of physical and/or policy measures that, when implemented, reduce the negative effects of the use of motor vehicles on residential streets, alter motorists’ behaviour and improve conditions for both pedestrians and cyclists alike.

Having a good traffic calming policy in place provides a mechanism for the Town to deal with complaints raised by residents in a consistent and responsible manner.

It is recommended that the Town of Torbay develop and implement a traffic calming policy that will allow staff to deal with traffic complaints received from the residents throughout the Town in consistent and responsible manner. The policy should provide mechanisms that allow staff to determine whether a complaint merits further investigation, and if so, in what priority in relation the other complaints staff may have evaluated it should be dealt with. Such an approach allows serious complaints to be dealt with immediately as funding allows.

8.8 Trail Network – Review/Plan

It is clear that the Town and its residents share a strong desire to develop a well-planned, safe and usable trail network within the Town for use by walkers, cyclists and skiers. Trails have been built along the coast in the form of the Father Troy Trail. Also, there are short sections of trail built to the south of Indian Meal Line, adjacent to the residential neighbourhood. The key to a successful trail network plan is to create the infrastructure that creates connectivity to the places that people want to go. It must be accessible, visible and safe. To create this, the Town must begin the exercise of trail network planning. The steps for the process should include:

1. Identifying the key destinations in the Town (recreational facilities, municipal facilities, open spaces, commercial areas, etc.)
2. Identifying development areas to be connected to the network
3. Route planning between origins and destinations, including negotiations with landowners to provide trail access and links across private lands
4. Discussion and decisions on required elements for trails (asphalt, signage and wayfinding, lighting, benches, trash receptacles, etc.)
5. Design treatment of necessary road crossings
6. Provision for connections to future transit routes within the Town
7. Policy development to include trail network extensions within new developments
8. Develop a strategic plan to construct the network

These steps should be carried out with public involvement. Public consultation may be best organized in the form of workshop sessions in order to solicit creative, meaningful input from the Town’s residents – the people who will live with and use the trail network.

8.9 Street Lighting

If a municipality chooses to provide street lighting on any street within their jurisdiction then they must do to a prescribed standard. Failure to do so exposes the municipality to the possibility of litigation in the event of an unfortunate accident where street light levels can be shown as a contributing factor. The standard to which a municipality provides street lighting can vary somewhat depending on a number of factors but usually is a function of advice provided by NL Power.

For arterial roadways, typical street lighting levels range from 12-17 lux with a uniformity ratio of 3:1. For collector status roadways the lighting levels range from 8-12 lux with a uniformity ratio of 4:1. For local streets between 6- 9 lux with a uniformity ratio of 6:1.

Some municipalities also use a light on every 3rd of 4th pole as a common standard. This standard is often altered over time with upgrading done at spot locations as a result of complaints or requests from area residents, leading to inconsistent lighting levels.

It is recommended that a complete review of the street lighting within the Town be initiated by the Town of Torbay in conjunction with NL Power. The result will be more consistent lighting levels throughout the Town of Torbay which is safer for both pedestrians and motorists alike.

8.10 Snow Clearing

The Provincial Department of Transportation and Works is responsible for the snow clearing efforts on Torbay Road, the Torbay By-Pass Road, Bauline Line, Indian Meal Line, Marine Drive, and Pine Line. Until such time as the Town of Torbay is able to effectively address the sidewalk issues throughout the Town, all shoulders on these routes should be snow cleared to safely accommodate pedestrians.

Forcing pedestrians to walk in the travelled lanes because of snow build ups on the shoulder is not an acceptable practice.

APPENDIX A

Traffic Counts

APPENDIX B

Pedestrian Counts

APPENDIX C

Public Consultation Comments

APPENDIX D

Priority Plan 1 Drawings

APPENDIX E

Cost Estimates