HARRISON HOT SPRINGS Naturally Refreshed	**VILLAGE OF HARRISON HOT SPRINGS** **NOTICE OF MEETING** **AND MEETING AGENDA**

COMMITTEE OF THE WHOLE

DATE: **Tuesday, March 27, 2012**
TIME: **10:00 a.m.**
LOCATION: **Council Chambers, Harrison Hot Springs**

1. CALL TO ORDER	
	Meeting called to order by Mayor Facio.

2. ITEMS FOR DISCUSSION	
	Traffic Calming

3. REPORTS FROM MAYOR	
4. DELEGATIONS	
5. STAFF REPORTS	
6. PUBLIC QUESTIONS	
7. ADJOURNMENT	

TRANSPORTATION PLANNERS AND ENGINEERS

bunt &associates

Harrison Hot Springs Traffic Calming Plan
Harrison Hot Springs, BC

Final Report

Prepared for

Village of Harrison Hot Springs

Date

October 6th, 2011

Prepared by

Bunt & Associates

Project No.

4801.01

TABLE OF CONTENTS

EXHIBITS

TABLES

EXECUTIVE SUMMARY

i. This report aims to develop a traffic calming plan for the Village of Harrison Hot Springs.

ii. The Village has been installing traffic calming devices for a number of years in response to residents concerns over speeding vehicles. The Village now wishes to look at this issue in a more holistic way.

Existing Conditions

iii. Existing conditions in terms of speed and volume of vehicles was collected, as well as a resident questionnaire survey to determine people's opinions of existing and potential future traffic calming.

iv. Speeding is a major issue for residents. Although they feel speeding on McCombs has been reduced as a result of the currently installed measures, speeding on Hot Springs Road continues to be a significant concern. This is reinforced by the speed data collected by Bunt & Associates on this road showing 85th percentile speeds well in excess of the posted speed limit.

v. The lack of sidewalks in the Village was also noted as a concern in regards pedestrian safety.

Traffic Calming Policy

vi. The aim of the traffic calming policy is to help the Village effectively address future requests for traffic calming measures. As such it is intended to provide the village with a range of options when it comes to implementing a new traffic calming measure and give them confidence in their applicability in different situations.

vii. Many different organisations and guides were used in putting together this section including material from the Transportation Association of Canada (TAC), the Institute of Transportation Engineers and the US Department of Transportation.

viii. Traffic calming is '*The combination of mainly physical measures that reduce the negative effects of motor vehicle use, alter driver behaviour and improve conditions for non-motorized street users.*'

ix. Although much literature exists on traffic calming, there has been less research carried out on appropriate traffic calming measures in more rural areas.

x. If the Village were to establish warrants for the installation of traffic calming measures then the excessive speeds on Hot Springs Road would likely qualify that street for some type of traffic management measures to reduce speeds. However, due to its role and function, physical and horizontal traffic calming measures are not appropriate for this arterial road.

xi. Some of the traffic calming measures that would potentially be appropriate in the Village have already been installed, at least, one location. These measures are: traffic circles; raised intersections; speed humps (not currently present); textured crosswalks (not currently installed).

xii. Other measure more suited to Hot Springs Road include: traverse markings; speed feedback signs; having the speed limit painted on the road; narrow lane markings.

xiii. One point to make is that three-way stops are not technically traffic calming devices. They should technically only be installed to assist minor street traffic exiting onto the main road. However, they are effective in calming speeds in the Village and many are used together with raised intersections. Compliance appears to be fairly good, based on our surveys.

xiv. Some measures help to give pedestrians and cyclists more comfort, which do not have an effect on vehicles. These measures include bicycle lanes, sidewalks and multi-use pathways.

Traffic Calming Plan

xv. Three options were initially developed, based on different road hierarchy approaches.

xvi. **The arterial approach** attempted to focus all through traffic on Hot Springs Road, with all other roads, including McCombs Drive, designated as local roads. As such, vertical and horizontal measures are acceptable on any of the 'local' roads. This includes speed humps, traffic circles, raised intersections, textured crosswalks, centre medians etc. This approach used the most traffic calming devices. Traffic management measures on Hot Springs Road were also included in all the options.

xvii. **The cross cut approach** saw Eagle Street/ McCombs Drive as a collector road as far south as Alder Avenue. Alder Avenue would also be a Collector Road. These collector roads would have less traffic calming on (no vertical measures) and as a result higher volumes (and possibly speeds) would be expected as the idea would be to focus traffic onto these roads, in part by designating a preferred east-west connection.

xviii. **The balanced approach** is similar to the cross cut approach but McCombs Drive would continue as a collector all the way south, and include McPherson Road. Alder Avenue would not be a collector Road. Thus equal preference is given to the two north - south roads and through traffic could choose either route. McCombs would have less traffic calming on it and no vertical measures.

xix. These three options were presented to the public as part of an Open House. Based on feedback from the Open House, as well as reference to the traffic calming policy research, a 'preferred option' was developed.

xx. The measures included have been put into three phases based on priority. Highlights of the preferred option are:

- Rebuild the raised intersections and traffic circle to Transportation Association of Canada (TAC) standards, which will retain their effectiveness while making them more comfortable to navigate;
- Replace the existing speed bumps with more comfortable sinusoidal speed humps.
- Install a speed hump and textured crosswalks on Walnut Avenue, outside the school;
- Add additional speed humps on other east – west streets if required;
- Construct a new multi-use pathway along the east side of McCombs Drive to provide a safe, off-street, north – south route for pedestrians and cyclists.

xxi. Some options require consultation and discussion with the Ministry of Transportation and Infrastructure (MoTI). Highlights of these measures include:

- Painted speed limit signs;
- Mobile speed feedback signs;
- Shared use asphalt path on east side of road;
- Painted bike lane on west side;
- Traverse pavement markings;
- Enhanced gateway feature.

xxii. These measures, in total, are expected to cost in the range of $1,900,000 to $2,265,000 (including additional 20% for contingency). However, the asphalt shared path on Hot Springs Road costs about $1,500,000. Without this element, the cost is in the region of $500,000.

1. INTRODUCTION

1.1 Aim of Report

The aim of this report is to develop a traffic calming plan and policy for the Village of Harrison Hot Springs that considers the issues of traffic safety and traffic calming in a holistic way and delivers a plan which contributes towards the enhancement of the Village in terms of connectivity, social and economic vitality, attractiveness and safety.

1.2 Components of the Report

The report is divided into three main components:

- **Existing Conditions.** This section consists of: a review of existing traffic conditions within the Village in terms of speed and volume on different streets; a review of the effectiveness and appropriateness of existing traffic calming measures; and, questionnaire survey results outlining the views and priorities of Village residents when in comes to traffic calming and safety in the Village.

- **Traffic Calming Policy.** This section aims to provide relevant research and advice as to appropriate traffic calming measures that could be applied in the Village. It outlines the costs and benefits of various traffic calming devices, what they should be used for and what they should not be used for. This section provides useful context for both analyzing the existing conditions, as well as choosing appropriate measures moving forward.

- **Traffic Calming Plan Development.** This section of the report outlines both the process and outcome in developing a preferred traffic calming plan for the Village. It outlines the process of developing three possible options and then consulting on these options through a public open house. Feedback from the Open House led to the development of the Preferred Option, which has then been costed and a phasing strategy suggested.

- **Conclusions.** This section of the report summarises the work undertaken, focusing on the main conclusions of the report and actions to be taken to implement the preferred plan.

1.3 Background

The Village of Harrison Hot Springs (the Village) has been installing various traffic calming devices in recent years to alleviate neighbourhood concerns regarding speed and volume of vehicles. The existing traffic calming devices were installed to respond to residents' requests and as the result of a tragic accident. The decision by the Village to install these devices did not necessarily go through a thorough evaluation process. More recently, additional traffic calming devices have been requested and the Village has decided the time is right to review existing and future traffic calming in a more holistic way.

Harrison Hot Springs is located at the eastern end of the Fraser Valley, north of the Fraser River and north of Agassiz. The Village is relatively small and relatively isolated in that there is only one principal road in and out. Its lakeside setting and the presence of the Hot Springs means that it is also a tourist destination for much of year. **Exhibit 1.1** indicates the location of the Village within the context of the eastern end of the Fraser Valley.

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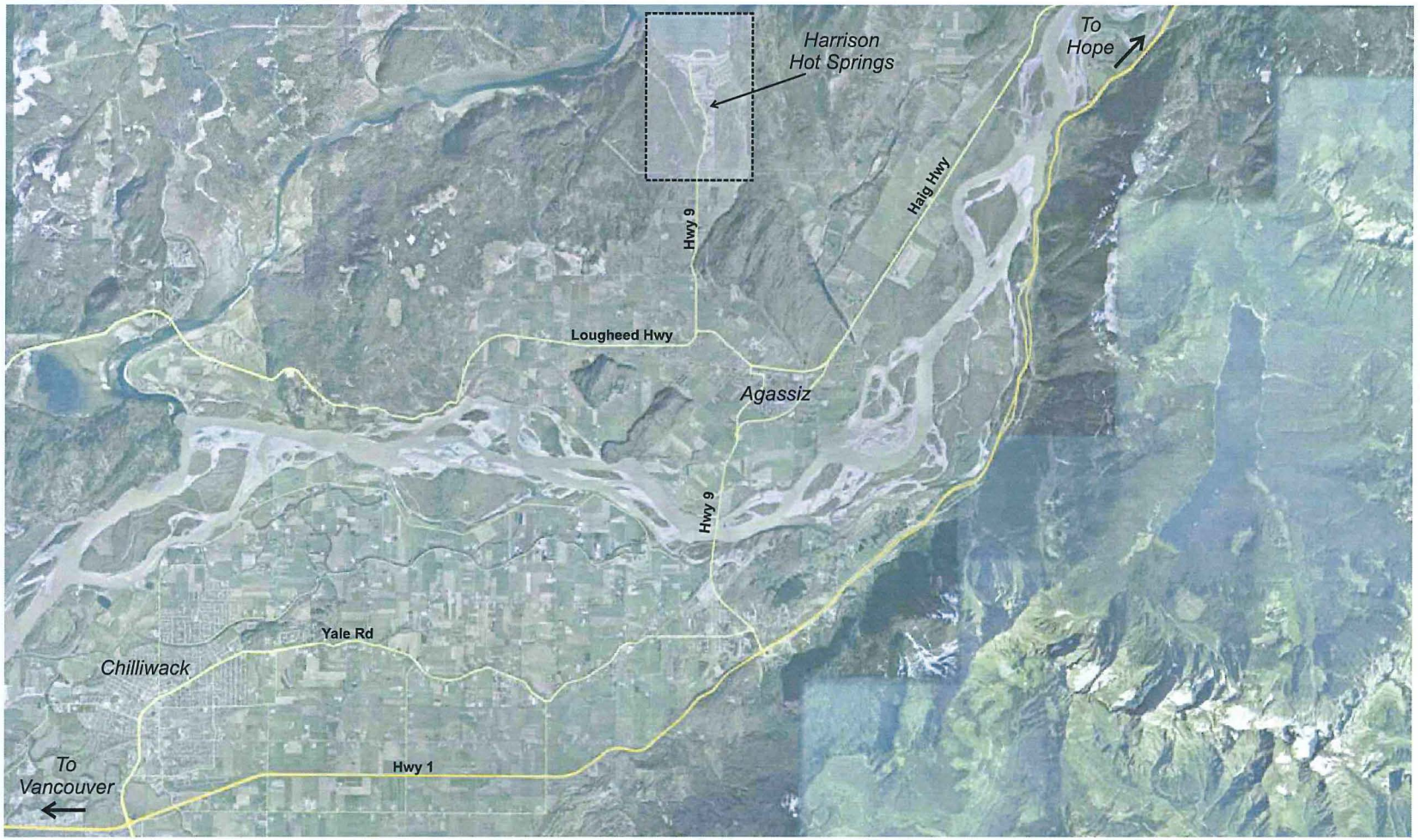

Exhibit 1.1
Site Context

Harrison Hot Springs Traffic Calming Plan
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2. EXISTING CONDITIONS

2.1 Introduction

In order to effectively review the existing traffic calming devices and develop a new traffic calming plan, it is necessary to understand existing operations within the Village, and assess the effectiveness of the existing measures.

Bunt & Associates (Bunt) conducted a series of traffic surveys including traffic volume (intersection counts), spot-speed, and multi-way stop-compliance surveys at several key locations throughout the village to develop an understanding of the existing traffic conditions and operational issues within the study area. Additionally, pneumatic road tube counters were installed along Balsam Avenue and Pine Avenue (streets with temporary speed humps) in April, and May/June, 2011 for one-week periods to capture traffic volumes and vehicle speeds both with and without speed humps on the roadway.

Bunt developed an online questionnaire launched via the Village's website to facilitate resident feedback regarding existing traffic calming features, local driving routes/patterns, walking and cycling habits within the study area, and general overall opinions of these topics. The following sections summarize the existing road network and traffic calming features in the study area as well as the results of the traffic surveys and online questionnaire.

2.2 Existing Road Network & Traffic Calming Features

The Village of Harrison Hot Springs is accessed via Highway 9 which provides a connection to Lougheed Highway at Agassiz and further south to Highway 1 at Rosedale. There are two main north-south routes within the Village, Hot Springs Road (Hwy 9) on the west side which carries the bulk of the traffic to and from the Village, and McCombs Drive on the east side which acts as a local service road primarily used by residents.

Esplanade Avenue and Lillooet Avenue are the two main east-west routes in town (both on the north side of town near Harrison Lake). They are located outside of the main geographical focus of this study. Due to the elongated form of the Village there are several east-west connections which provide local access to residential areas. **Exhibit 2.1** highlights the study area considered for the Traffic Calming Plan. Below are descriptions of key roads considered for this study.

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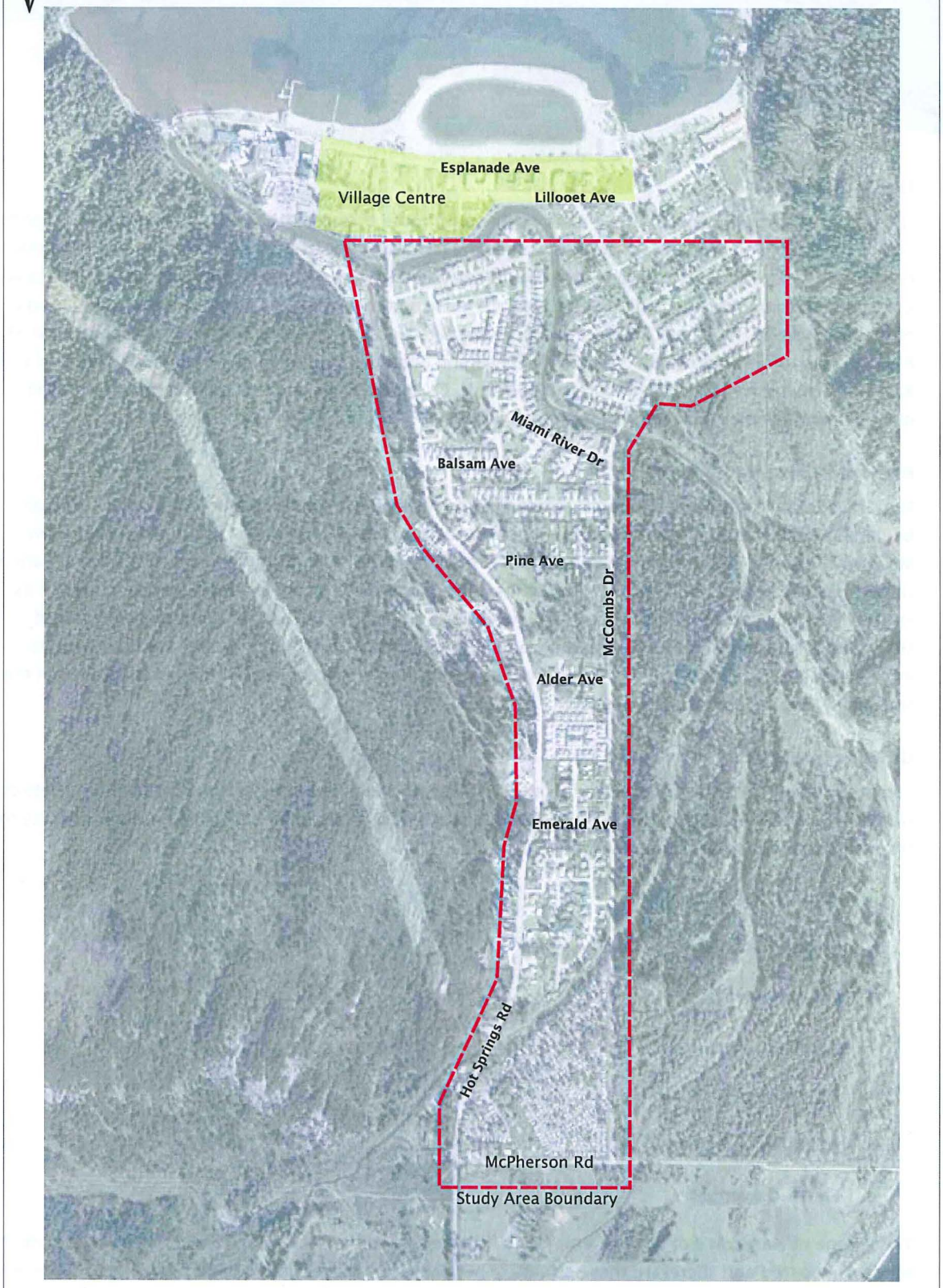

Exhibit 2.1
Study Area

Harrison Hot Springs Traffic Calming Plan
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Hot Springs Road

Hot Springs Road (Highway 9) is the main north-south route through the Village of Harrison Hot Springs and to the south it provides connections west and east via Lougheed Highway (route 7) and Highway 1. It is operated by the Ministry of Transportation. It has a two-lane cross-section throughout the Village with a gravel shoulder on the west side and a paved shoulder on the east side, as well as a sidewalk along most of the east side of the street. South of McPherson Road, Hot Springs Road has a posted speed limit of 80km/h as a rural highway, while north of McPherson Road the posted speed limit is 60km/h, and north of Balsam Avenue it has a 50km/h posted speed limit. Currently, there are no traffic calming or traffic management features located on Hot Springs Road.

McCombs Drive/Eagle Street

McCombs Drive/Eagle Street is a local street running north-south for the entire length of the Village, beginning at McPherson Drive to the south and continuing north to Lillooet Avenue (changing from McCombs Drive to Eagle Street north of Miami Creek). It provides local connections to residential areas throughout the Village for residents. McCombs Drive/Eagle Street has a two-lane cross-section for its entirety with narrow single-lane sections at two bridge crossings. In addition there are very limited sidewalks or shoulders. It has a posted speed limit of 50km/h, and traffic calming features such as raised intersections and a traffic circle have recently been installed. Speed humps which were installed at the south end have recently been removed.

Other Local Streets

There are several other local streets within the study area which provide east-west connections between Hot Springs Road and McCombs Drive and access to residential areas for residents. Some of the key local streets considered in this study include:

- Miami River Drive;
- Walnut Avenue;
- Balsam Avenue;
- Chestnut Avenue;
- Pine Avenue;
- Alder Avenue; and
- Emerald Avenue.

The Village of Harrison Hot Springs employs a 'blanket speed limit' of 50km/h within the village unless otherwise posted and therefore these streets generally have a speed limit of 50km/h. One exception is adjacent to the Village elementary school where Walnut Avenue is 30km/h. They all have two-lane cross-

sections with, generally, room for on-street parking. Sidewalks are very limited on these local streets. Temporary speed bumps were installed on both Balsam Avenue and Pine Avenue, which are removed during the winter for snow-removal purposes.

Existing Traffic Calming Features

The Village of Harrison Hot Springs has installed a number of traffic calming features throughout the Village in response to residents' complaints about speeding and "rat-running" (i.e. cutting-through of residential neighbourhoods) within the Village. Existing traffic calming and related traffic features are shown at **Exhibit 2.2**.

Existing traffic calming features that have been installed include speed bumps, and raised intersections (vertical deflections), as well as a traffic circle (horizontal deflection). As shown in Exhibit 2.2, most of these devices were installed along McCombs Drive which had received a number of complaints regarding speeding and where a tragic accident had taken place. More specifically, there are raised intersections at McCombs Drive / Chestnut Avenue, and McCombs Drive / Emerald Avenue, and a traffic circle at McCombs Drive / Alder Avenue.

As a result of the installation of these traffic calming devices it is reported that residents began to "cut-through" on residential streets between McCombs Drive and Hot Springs Road in order to avoid the traffic calming efforts. Consequently, this increased traffic volumes and speeds on some local streets, particularly, Balsam Avenue and Pine Avenue, to which residents of these streets complained to the City and asked for the installation of speed bumps to remedy the situation. Therefore, temporary (screw-down) speed bumps were installed on Balsam Avenue and Pine Avenue.

A review of these existing traffic calming features is considered later in the report, as well as resident feedback on the devices and field observations which helped to develop the Traffic Calming Plan.

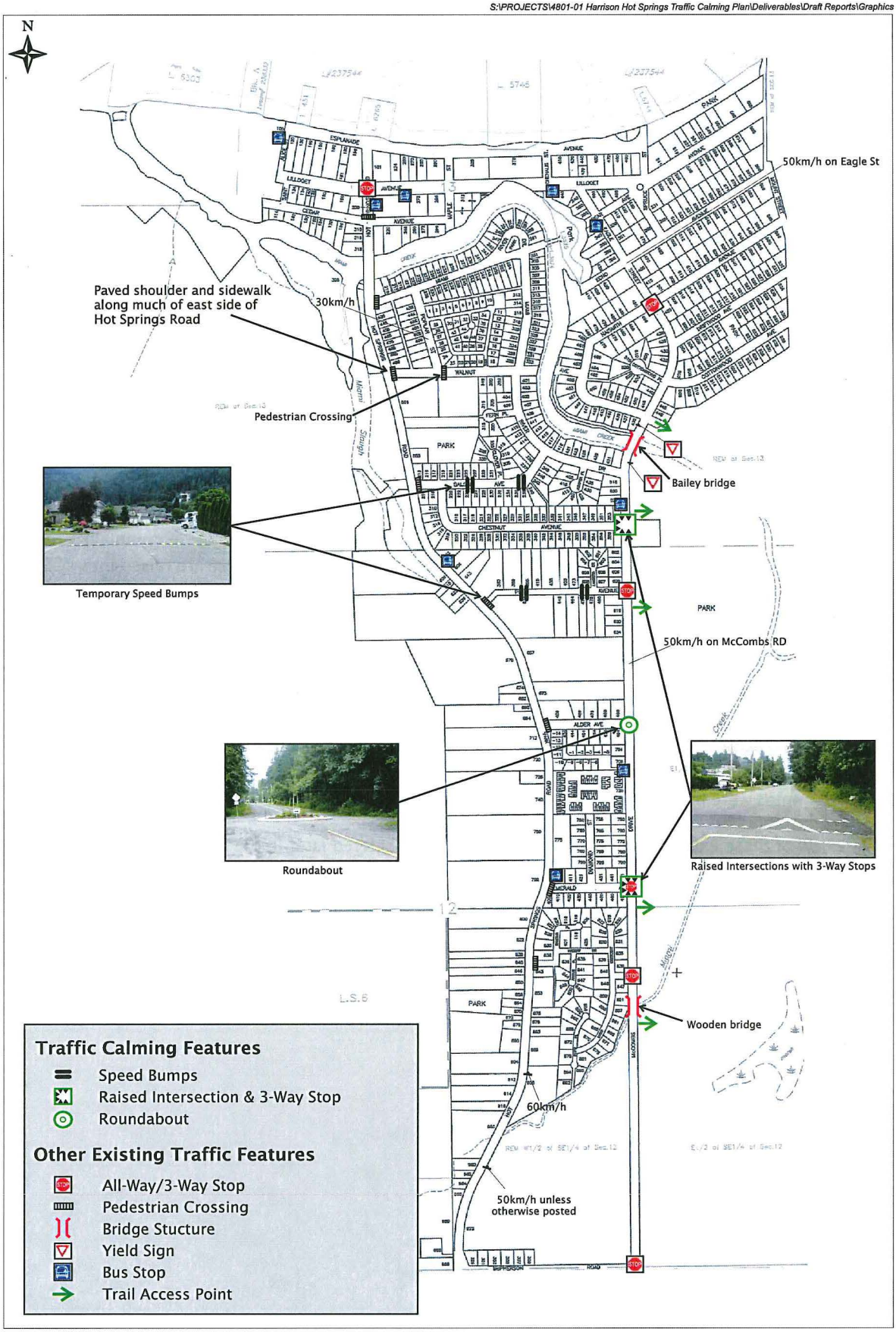

Exhibit 2.2
Existing Traffic Calming Features

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2.3 Traffic Survey Results

Traffic surveys including intersection counts, spot speed surveys, and stop-compliance surveys were conducted on Saturday May 28th, 2011 and Thursday June 2nd, 2011 at several key locations within the study area. Intersection counts occurred during the mid-day peak on Saturday (11:00am - 3:00pm) and during the AM (6:30am – 9:00am) and PM (3:00pm – 6:00pm) peak periods on Thursday, while spot-speed and stop-compliance surveys took place prior to and between the intersection counts.

As mentioned previously, pneumatic road tube counters were installed on Balsam Avenue and Pine Avenue for two one-week periods (24-hours a day) between April 14 - 20, 2011 (i.e. without temporary speed bumps), and May 29 – June 4, 2011 (i.e. with temporary speed bumps). This was done in order to capture weekly traffic volume profiles as well as vehicle speed data both with and without speed bumps for comparison purposes. Study survey locations are shown at **Exhibit 2.3**.

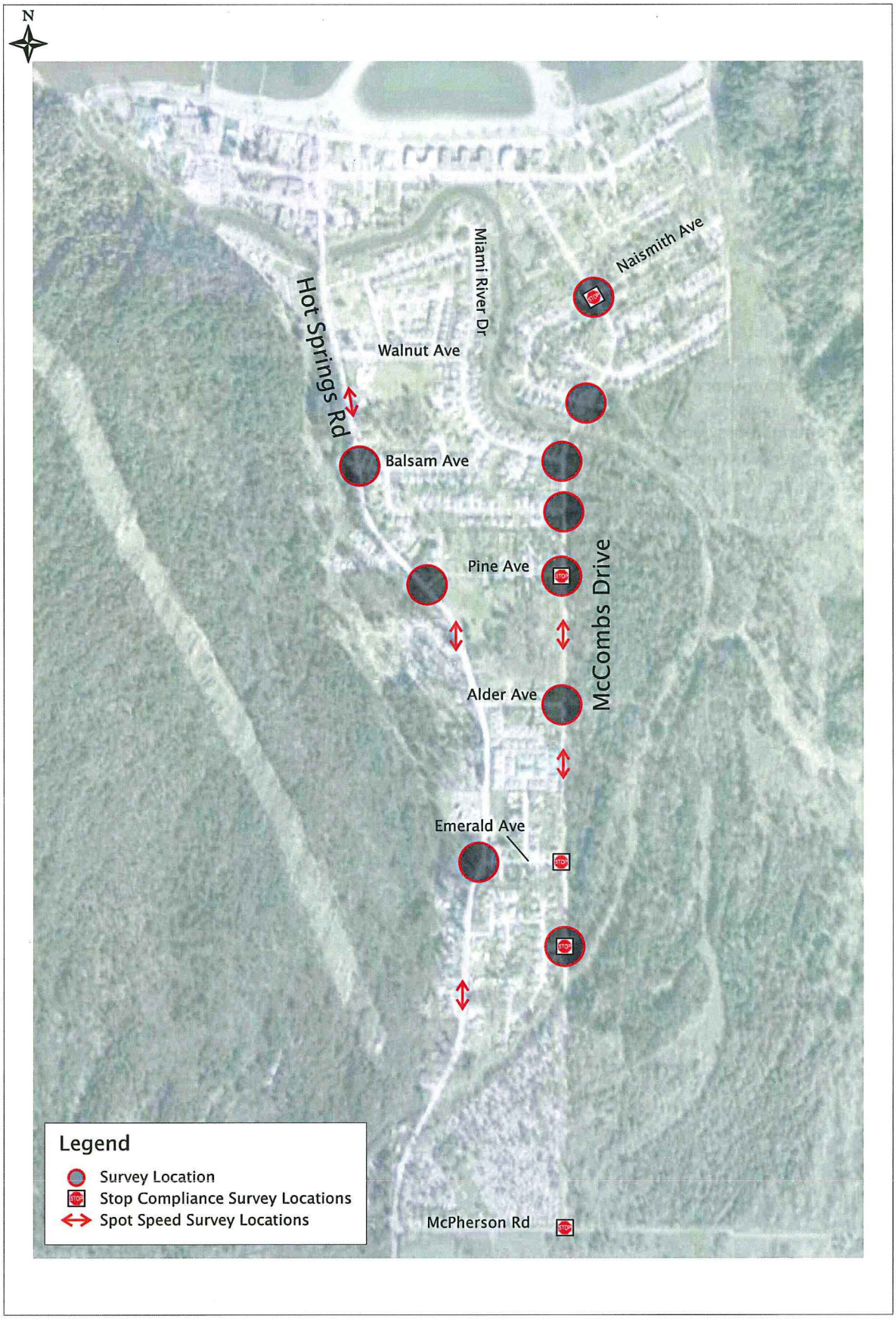

Exhibit 2.3
Study Survey Locations

Harrison Hot Springs Traffic Calming Plan
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2.3.1 Existing Traffic Volumes

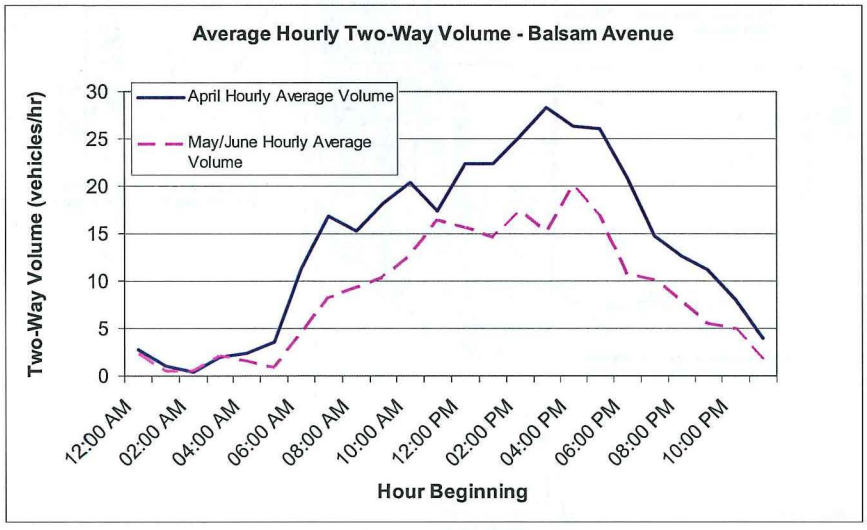
Existing weekday AM and PM and Saturday Mid-day peak hour volumes along with spot-speed data are summarized at **Exhibits 2.4** and **2.5**.

Two-way vehicle volumes on Hot Springs Road were around 225 and 350 vehicles during the weekday AM and PM peak hours respectively, and were approximately 450 vehicles during the Saturday peak hour. This equates to approximately four and six vehicles per minute (two-way) during the weekday AM and PM peak hours and seven vehicles per minute (two-way) during the Saturday peak hour which is low for an arterial road. Turning movements onto and off of Hot Springs Road via local streets averaged around 25 and 30 vehicles per hour per intersection during the weekday AM and PM peak hours and 25 vehicles during the Saturday peak hour which is negligible.

Two-way vehicle volumes on McCombs Drive were around 35 and 40 vehicles during the weekday AM and PM peak hours respectively, and were approximately 50 vehicles during the Saturday peak hour. This equates to less than one vehicle per minute in all three peak hours. Turning movements onto and off of McCombs Drive via local streets were very low averaging around 15 and 12 vehicles per hour during the weekday AM and PM peak hours and 15 vehicles during the Saturday peak.

Average two-way hourly vehicle volume profiles on Balsam Avenue from April, 2011 and May/June, 2011 obtained from pneumatic road tube counts are summarized in **Figure 2.1** and similarly in **Figure 2.2** for Pine Avenue. No temporary speed bumps were present during the April counts, while they were present during the May/June counts.

Figure 2.1: Average Hourly Two-Way Volume Profile – Balsam Avenue



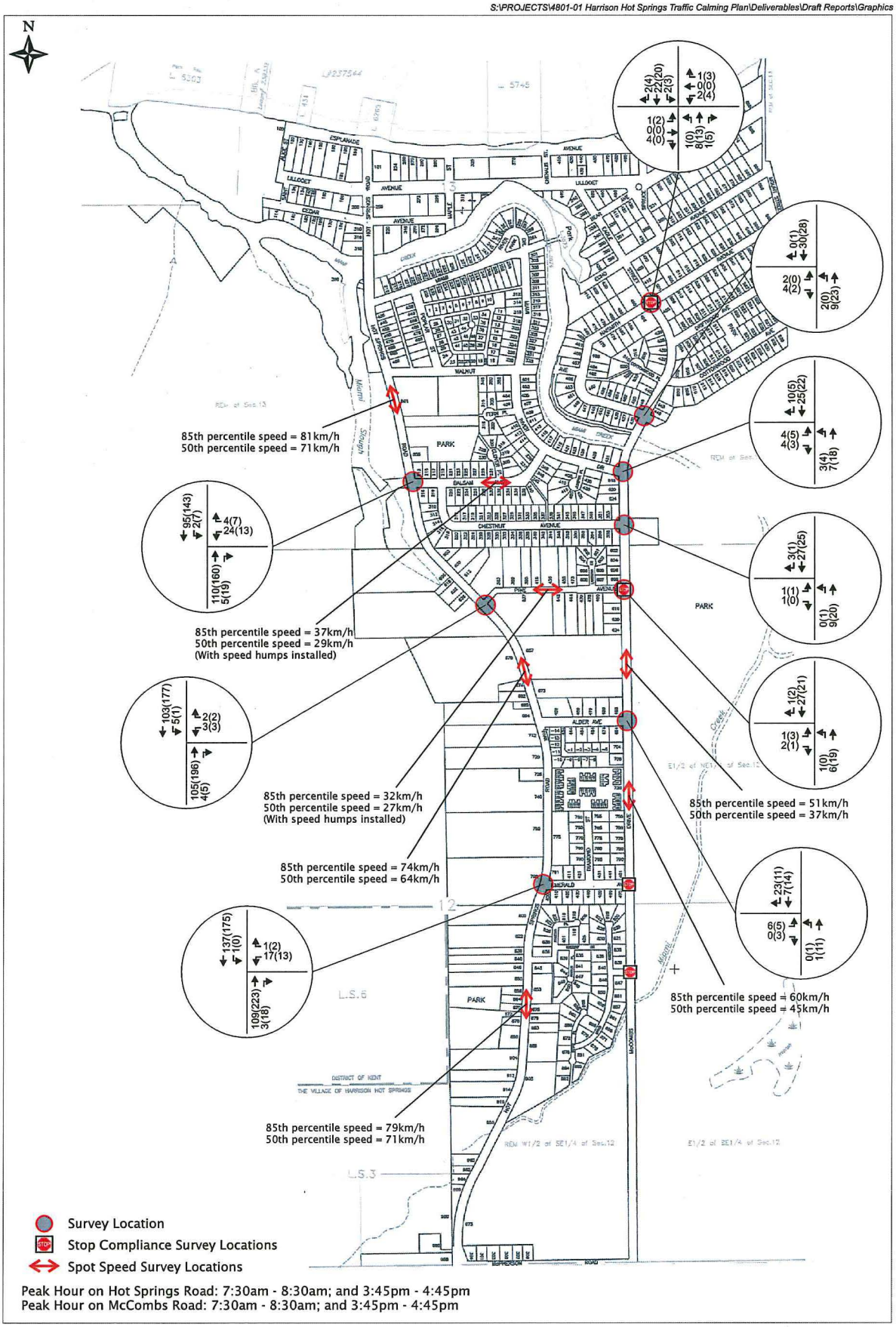


Exhibit 2.4

Existing Weekday Traffic Conditions (Thursday June 2, 2011)

Harrison Hot Springs Traffic Calming Plan
4801.01 October, 2011 Scale NTS

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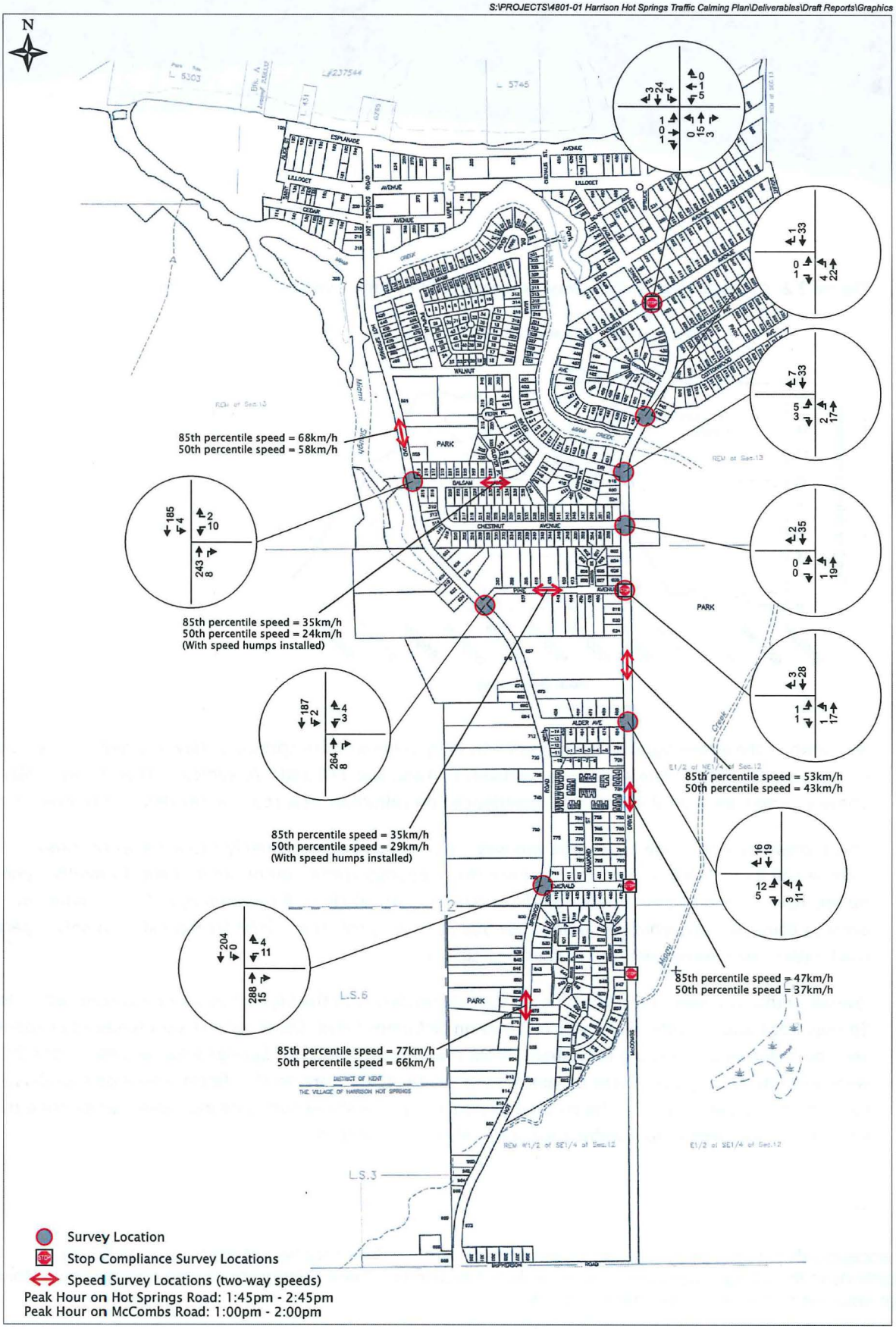

Exhibit 2.5

Existing Traffic Conditions (Saturday May 28, 2011)

Harrison Hot Springs Traffic Calming Plan
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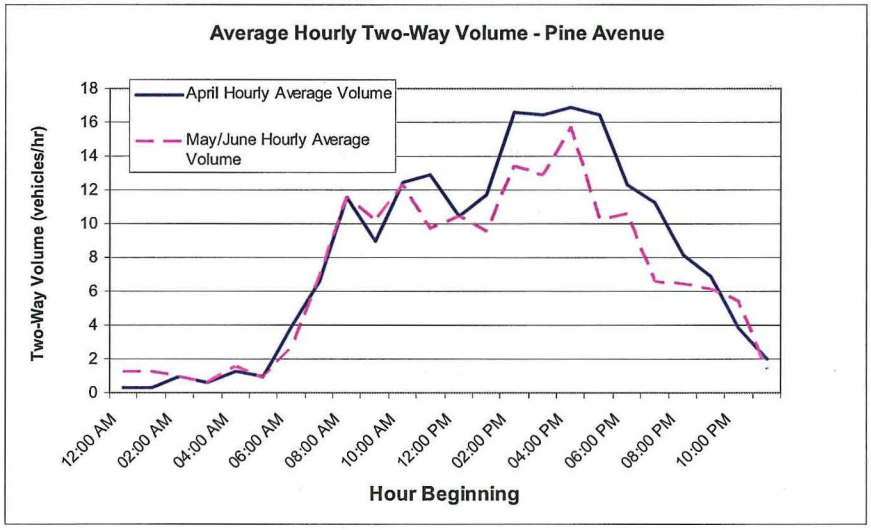
Figure 2.2: Average Hourly Two-Way Volume Profile - Pine Avenue



As shown in the above figures average two-way daily volumes were approximately 335 and 195 vehicles on Balsam Avenue and Pine Avenue respectively in April, and 210 and 170 vehicles respectively in May. These volumes are typical of volumes experienced on suburban local roads in residential neighbourhoods.

This represents a decrease in average two-way daily traffic of approximately 125 vehicles on Balsam Avenue and 25 vehicles on Pine Avenue once the temporary speed bumps are in place. Evidently, speed bumps have in effect calmed traffic on these streets, particularly on Pine Avenue, with a reduction in average daily two-way vehicle volumes observed. It is likely that these vehicles have shifted onto a parallel road, rather than overall vehicle volumes decreasing.

Overall, traffic volumes in the Village are relatively modest with the highest volumes experienced on Hot Springs Road and considerably lower volumes on McCombs Drive. Other local streets tended to experience very low volumes and turning movements from these streets onto Hot Springs Road and McCombs Drive were also low. During the course of Bunt's observations there were no significant operational or delay-based traffic issues to note at the studied intersections. The above summary indicates that existing traffic volumes are well within acceptable capacity levels for all scenarios.[1]

[1] It is accepted that during peak summer tourist season, some delays may be experienced at particular intersections in the Village. However, this report is not focused on these temporary volume changes but rather regular volumes on the mainly residential streets.

2.3.2 Vehicle Speeds

The Village of Harrison Hot Springs has a "blanket speed" of 50km/h within the Village unless otherwise posted. McCombs Drive / Eagle Street has a posted speed of 50km/h along its entirety, while Hot Springs Road has a posted speed of 80km/h south of McPherson Road, and 60km/h from McPherson Road to just north of Balsam Avenue where it becomes 50km/h. Speed limits on the majority of local roads are therefore 50km/h.

Speeding had been raised by many residents as a main traffic concern in the Village, particularly on Hot Springs Road and McCombs Drive, as well as on streets which connect between Hot Springs Road and McCombs Drive. This caused the Village to implement a series of traffic calming measures on McCombs Drive which consequently caused drivers to divert away from McCombs Drive to Hot Springs Road via a number of east-west connecting streets such as Balsam Avenue and Pine Avenue.

As a result, speeding and volume on these side streets became a major concern of residents who then lobbied to have temporary speed bumps installed on Balsam Avenue and Pine Avenue in an effort to reduce vehicle speeds on their streets and to lower the number of "cut-through's". In order to measure the effectiveness and necessity of these speed bumps, Bunt & Associates conducted speed studies (using pneumatic road tube counters) both while speed bumps were temporarily removed for snow removal purposes and again once they had been reinstalled. Further, spot speed studies were carried out at various locations along Hot Springs Road and McCombs Drive to determine the degree of speeding taking place to aid in the decision-making process for the traffic calming plan. Our findings are summarised below:

- Speed studies conducted by Bunt & Associates in April, 2011 (that is, when speed bumps had been removed for snow removal purposes) showed actual operating 85th percentile speeds on Balsam Avenue and Pine Avenue were in the order of 48km/h, and 45km/h respectively, which is slightly below the 50km/h speed limit.
- Speed studies in May, 2011 (that is, when speed bumps had been reinstalled) showed actual operating 85th percentile speeds on Balsam Avenue and Pine Avenue had dropped significantly to 35km/h on both streets.
- This is a decrease in speeds of approximately 10-15km/h.

Therefore, vehicle speeds on Balsam and Pine were greatly affected by the presence of speed bumps. This suggests that although vehicles were not technically speeding in general without speed bumps, they may have been perceived to be speeding due to the nature of the street as a quiet, local street. Nevertheless, it is evident that vehicle speeds have been reduced to more reasonable levels for these local streets with the installation of speed bumps indicating they are an effective means of reducing vehicle speeds.

Spot speed studies were conducted on the same dates as the intersection counts (Saturday, May 28, and Thursday June 2, 2011) at several points along Hot Springs Road and McCombs Drive. Spot speed studies on Hot Springs Road revealed that actual operating 85th percentile speeds ranged between 74km/h and

81km/h on the Thursday and 68km/h and 77km/h on the Saturday. Exhibit's 2.4 and 2.5 shows the location of the spot counts, which were located south of Ramona Place and north of Alder Avenue. This is significantly above the posted speed limit, particularly on the weekday at up to 21km/h over the posted speed limit. This reaffirms that speeding on Hot Springs Road is indeed an issue and should be addressed by some form of traffic calming or traffic management measures.

Spot speed studies on McCombs Drive (one north of Alder Avenue and one south of Alder Avenue) revealed that actual operating 85th percentile speeds ranged between 51km/h and 60km/h on the Thursday, and between 37km/h and 45km/h on the Saturday. Vehicle speeds were higher than the posted speed limit on the Thursday and lower than the posted speed limit on the Saturday, which indicates that vehicle speeds overall on McCombs Drive tend to average near the posted speed limit. Therefore, in the case of McCombs Drive, it would appear that traffic calming measures have reduced the prevalence of speeding, although some drivers still exceed the 50km/h limit.

2.3.3 Traffic Control & Compliance

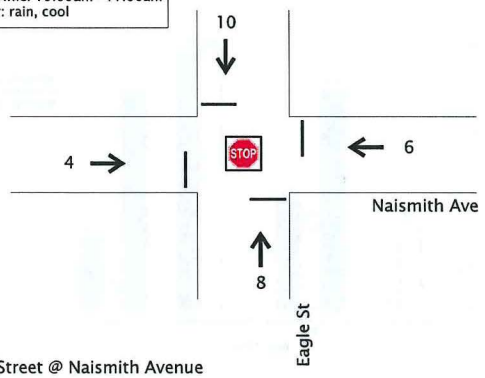
There are three three-way stops on McCombs Drive located at Hadway Drive, Emerald Avenue and Pine Avenue, and a four-way stop at Eagle Street (north extension of McCombs Drive) and Naismith Avenue. In order to understand the potential traffic safety issues on McCombs Drive and to help develop the traffic calming plan, Bunt & Associates conducted stop-compliance observations at the above intersections. Again, surveys were carried out on Saturday May 28th, 2011 and Thursday June 2nd, 2011. Observations of drivers' response to the stop signs were recorded. The results are summarized at **Exhibits 2.6** and **2.7**.

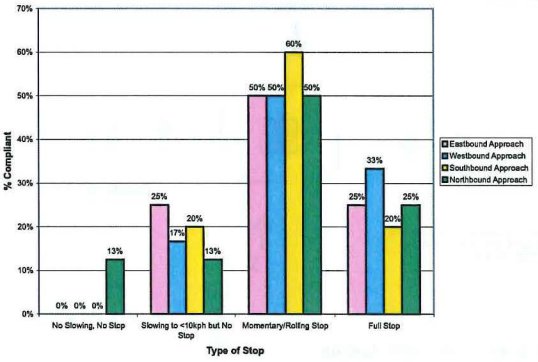
Stop compliance surveys were conducted for a one-hour period at each intersection, and due to the low volumes, sample sizes tended to be quite small. In general, the majority of drivers (72%) at all intersections combined were observed to be either coming to a full stop, or conducting momentary/rolling stops on both Saturday and Thursday, while the remaining 28% of drivers were observed as either slowing to less than 10km/h with no stop (approximately 25%), or no slowing, no stopping (approximately 3.5%). There does not appear to be any differences in compliance based on direction of travel with roughly equal compliance levels on all approaches at each intersection.

While momentary/rolling stops are not strictly compliant to legislation which requires a full stop, in general they are considered acceptable in terms of safety and certainly the vast majority of drivers at other stop-controlled intersections in the Lower Mainland would fall under the "rolling" or "full" stop categories. It is the "non-stop" categories which are, in our view, generally of primary concern in terms of safety.

Overall, the majority of drivers at the three three-way stops on McCombs Drive and at the four-way stop at Eagle Street and Naismith Avenue in our opinion were observed to be mostly compliant with the stop signs (either coming to a full stop or performing a momentary/rolling stop) and there were no major safety issues to report. Further, with such low vehicle and pedestrian volumes this creates fewer opportunities for safety conflicts.

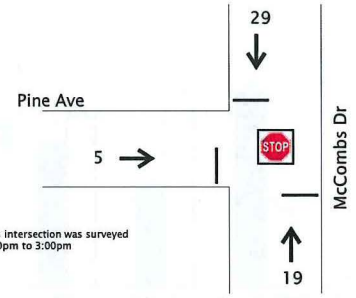
Survey Time: 10:00am - 11:00am
Weather: rain, cool



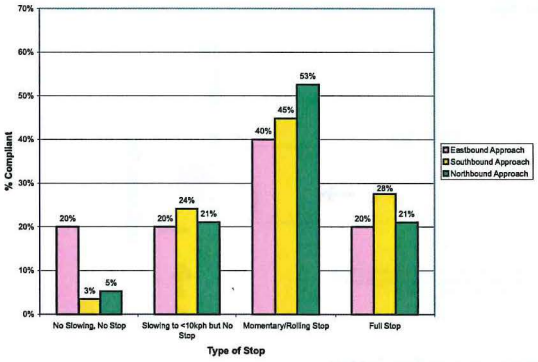


Eagle Street @ Naismith Avenue

Survey Time: 2:00pm - 3:00pm
Weather: rain, cool

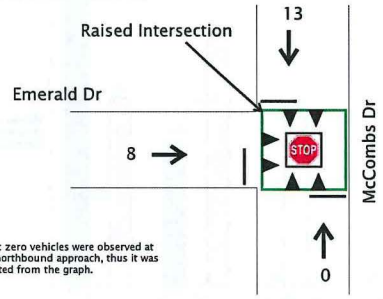


Note: this intersection was surveyed from 2:00pm to 3:00pm

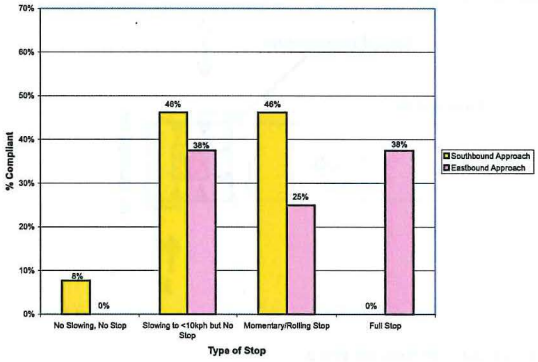


McCombs Drive @ Pine Avenue

Survey Time: 10:00am - 11:00am
Weather: rain, cool

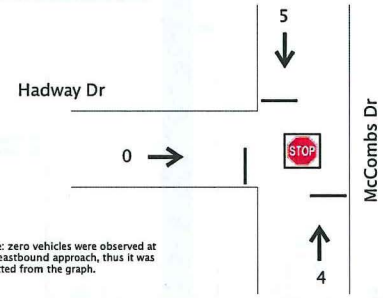


Note: zero vehicles were observed at the northbound approach, thus it was omitted from the graph.

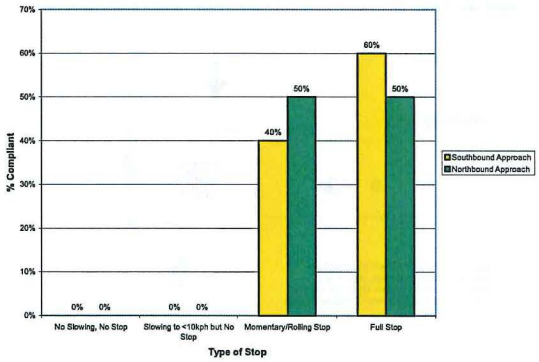


McCombs Drive @ Emerald Drive

Survey Time: 10:00am - 11:00am
Weather: rain, cool



Note: zero vehicles were observed at the eastbound approach, thus it was omitted from the graph.



McCombs Drive @ Hadway Drive

Exhibit 2.6
Stop Compliance Results (Thursday June 2, 2011)

Harrison Hot Springs Traffic Calming Plan
4801.01 October, 2011 Scale NTS

bunt & associates

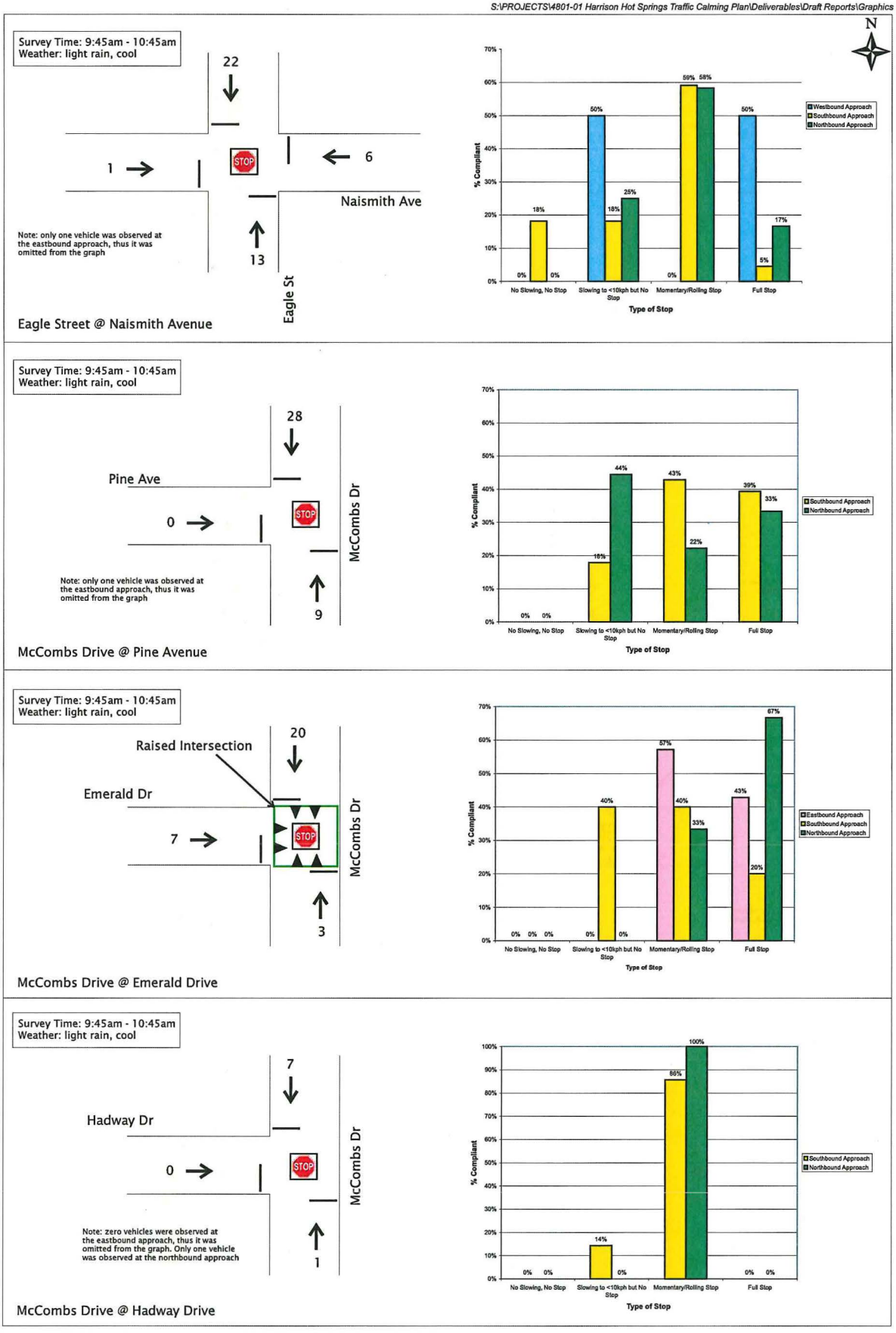


Exhibit 2.7

Stop Compliance Results (Saturday May 28, 2011)

Harrison Hot Springs Traffic Calming Plan
4801.01 October, 2011 Scale NTS

bunt &associates

Interestingly, compliance observations were conducted on a weekday and a Saturday and both compliance and non-compliance levels were the same on each day. Additional discussion on the non-compliance issues and warrants for stop sign installation is provided in the following section.

2.3.4 Multi-Way Stop Review

When traffic calming measures were installed along McCombs Drive the Village chose to also install 3-Way Stops at three locations in the middle of the study area, at Hadway Drive, Emerald Avenue (in conjunction with a raised intersection), and Pine Avenue, and a four-way stop at Eagle Street and Naismith Avenue in hopes that this would contribute towards calming traffic. With observations of traffic on McCombs Drive showing considerably modest vehicle volumes, analysis into whether stop signs are warranted or even necessary has been carried out.

Stop signs are not strictly traffic calming measures, although they can have speed reduction benefits. Stop signs are traffic control measures, intended to legally allocate right of way. The Transportation Association of Canada (TAC) Manual of Uniform Traffic Control Devices for Canada states:

> *Stop sign control results in delay to drivers and may increase fuel consumption, vehicle emissions and frequency of collisions. Therefore, Stop signs should not be used indiscriminately. Stop signs are not intended as speed control devices and there usage should therefore be limited to the control of right-of-way conflicts...Stop signs should only be used where traffic engineering studies indicate that the usage of Stop signs is warranted. These studies should consider such aspects as traffic speeds, traffic volumes, sight lines and collision experience.*

Multi-way stops signs may be warranted under one of more of the following conditions:

a) *where the traffic volumes on the intersecting roads are approximately equal and the combined pedestrian and vehicle volumes on the minor road average 200 per hour for an eight hour period;*

b) *where the average delay to the minor road vehicular traffic entering the intersection exceeds 30 seconds per vehicle during the peak hour;*

c) *where traffic signals are not warranted, and a collision problem exists, as indicated by five or more reported collisions per year of a type which may be prevented by a Multi-way Stop sign installation. Such collisions include right and left turn collisions as well as right angle collisions;*

d) *as an interim measure prior to the installation of traffic signals; or*

e) *as an interim measure, for a period of approximately one month prior to switching the stop control from one road to an intersecting road and the subsequent removal of existing Stop signs on the first road.*

Based on the TAC warrant described above and the traffic volumes recorded on McCombs Drive (shown previously in Exhibits 2.4 and 2.5), it is unlikely that the multi-way Stop signs located at McCombs Drive

intersecting with Pine Avenue, Emerald Avenue and Hadway Drive, and at Eagle Street and Naismith Avenue would be warranted for traffic control purposes. (Please note that volumes were not recorded at McCombs/Emerald or at McCombs/Hadway as volumes were negligible at these locations)

It is concluded that the low side street volumes at these locations would not warrant Multi-way stop controls. Further, due to the fact that driver stop compliance was observed to be acceptable at these intersections, and speeds along McCombs Drive are also acceptable, Multi-way stop controls are also not necessary along McCombs. However, although they are not traffic calming devices, they can be effective at reducing vehicle speeds when used in conjunction with other traffic calming measures. Therefore, it is possible that their presence has helped contribute to neutralizing speeds on McCombs Drive.

Based on the above, as well as our observations, it is suggested that, while not strictly compliant with TAC, the multi-way stops appear to be effective in helping contribute to controlling speeds, and no safety issues associated with their use has been observed.

The next sections will briefly highlight accident data obtained from ICBC for the Village of Harrison Hot Springs before focusing on assessing opinions of local residents on traffic calming, driving habits, and cycling and walking habits within the study area.

2.4 ICBC Crash Data

To assist with the assessment of existing traffic conditions in the Village, Bunt conducted a brief review of accident report data from ICBC for the Village. Bunt obtained crash data for a five-year period (2006-2010) from ICBC to determine the highest frequency crash locations in the Village. **Table 2.1** highlights the top five crash locations from 2006-2010.

Table 2.1: Top Five Crash Locations in Harrison Hot Springs (2006-2010)

Location	Crashes Involving Casualty*	Crashes with Property Damage Only	Total Crashes
Hot Springs Rd & Lillooet Avenue	4	8	12
100 Block Esplanade Avenue	0	12	12
670 Hot Springs Road	0	7	7
Hot Springs Road & McPherson Road	1	5	6
160 Esplanade Avenue	0	5	5

* Casualty indicates a crash incident resulting in an injury or fatality

As shown in the above table, approximately 42 crashes occurred at the top-five crash locations in a five-year period. Not surprisingly, the majority of these crashes (29) occurred within the Village Centre near areas with high pedestrian and vehicle volumes.

Interestingly, 670 Hot Springs Road (the intersection of Hot Springs Road and Pine Avenue) had 7 crashes from 2006-2010. This is notable due to the fact that it is located just north of a blind curve in Hot Springs Road, and because the sightlines for vehicles exiting Pine Avenue are obscured by hedges on both sides of the street. This suggests that speeds on Hot Springs Road are too high at this location (60 km/h posted speed limit) and that sightlines from Pine Avenue need to be improved reducing or removing hedges at this location.

Lastly, Hot Springs Road and McPherson Road also experienced 6 crashes over that time period. This again is likely attributable to high speeds, as the speed limit changes from 80 to 60 just north of McPherson and sightlines are not great for exiting vehicles. The next section details the findings from the online resident traffic calming questionnaire.

2.5 Resident Traffic Calming Questionnaire

Bunt developed an online questionnaire launched via the Village's website to facilitate resident feedback regarding existing traffic calming features, local driving routes/patterns, walking and cycling habits within the study area, and general overall opinions of these topics. The online questionnaire ran for approximately one month during May/June in order to collect a large enough sample of responses. Assessments of the traffic survey and online questionnaire have aided in the development of the Traffic Calming Plan options.

2.5.1 Methodology & Purpose

The traffic calming questionnaire was accessible via the Village of Harrison Hot Spring's website and was open to all residents of the Village, but would have been of particular interest to those residents who have been affected by current traffic calming measures in the Village or who had an interest in the traffic calming plans.

It was intended to develop an understanding of how residents felt about existing traffic measures, whether they felt they were working or if they were even necessary, as well as to try and identify which traffic calming measures were most preferable to residents and why. Further, it aimed to identify which streets residents typically used for driving, and whether they also walked, or cycled on the local streets (and if so, which ones). Also, respondents were asked to give their general impressions of traffic safety and operations in the Village. A copy of the questionnaire and the results is included at **Appendix A.**

There were a total of 56 respondents to the online survey which was considered reasonable given the population of Harrison Hot Springs and the typically low response rate that such initiatives usually produce.

2.5.2 Results/Findings

Some of the key results/findings are presented below providing a picture of residents' feelings towards traffic calming.

Driving Routes

The online questionnaire revealed that:

- More than 50% of residents surveyed primarily use Hot Springs Road when travelling between home and the Village Centre (i.e. Esplanade Avenue);
- Only 10% primarily use McCombs Drive;
- Approximately 34% use both equally.

This is reflective of the traffic survey data which also showed significantly higher vehicle volumes on Hot Springs Road. This could also be due to the introduction of traffic calming features onto McCombs Drive which may have caused some residents to switch their routes.

Other roads used most regularly by residents when travelling by car within the study area include Miami River Drive (46%), Balsam Avenue (44%), Walnut Avenue (24%), and Pine Avenue (24%).

Walking

The main results were:

- The vast majority of respondents (91%) stated that they regularly walk along the local streets in the Village;
- Miami River Drive (71%), McCombs Drive/Eagle Street (55%), and Walnut Avenue (41%) were among the most popular within the study area;
- Approximately 61% of respondents felt that the roads were either safe or very safe for walking on while an additional 24% felt that they were at least somewhat safe for walking.

Cycling

The main results were:

- Approximately 60% of respondents said that they regularly cycle along the local streets;
- Miami River Drive (77%), McCombs Drive/Eagle Street (68%), Walnut Avenue (55%), and Balsam Avenue (52%) were the most regularly used by respondents;
- When asked how safe the roads were perceived to be, just over half (51%) felt they were safe or very safe, while an additional 30% said they were somewhat safe for cycling.

Trail Access

The main results were:

- At least 80% of respondents said that they at least occasionally (ranging from occasionally to daily) use the hiking/walking trails east of McCombs Drive/Eagle Street;
- Cottonwood Avenue, Miami River Drive, Chestnut Avenue, Naismith Avenue and McPherson Road were cited as the common crossing points across McCombs Drive/Eagle Street;
- Access points most commonly cited by respondents include Cottonwood Avenue, Chestnut Avenue, and Naismith Avenue.

Existing Traffic Calming Measures

Respondents were asked rate the effectiveness of existing traffic calming measures within the study area with regards to reducing vehicle speeds:

- The raised intersections appeared to be the most favourable measure with 71% of respondents indicating that the raised intersection at McCombs Drive / Chestnut Avenue was effective or very effective, although a significant minority of 20% thought that it was ineffective or very ineffective;
- 68% said that the raised intersection (combined with 3-way stop) at McCombs Drive / Emerald Avenue was effective or very effective and 23% indicated that it was ineffective or very ineffective.
- The traffic circle at McCombs Drive / Alder Avenue split opinions with 58% of respondents indicating that it was effective or very effective, while 33% thought it was ineffective or very ineffective.
- The temporary speed bumps were viewed least favourably by respondents with just over half of respondents (52%) indicating the speed bumps on Balsam Avenue were effective or very effective, and 28% saying they were ineffective or very ineffective;
- Only 44% of respondents thought that the speed bumps on Pine Avenue were effective or very effective, although interestingly, only 18% thought that they were ineffective or very ineffective and 24% said they don't know which indicates that perhaps many of the respondents were either unaware of them or do not drive on Pine Avenue.

Overall, the majority of respondents have indicated that all of the traffic calming measures that have been implemented are effective or very effective at reducing vehicle speeds with raised intersections being perceived the most favourable, and speed bumps being the least favourable. The single most mentioned traffic issue by respondents within the Village has been speeding on various streets. These traffic calming measures have helped mitigate speeding in the areas they are located but speeding is still identified as an issue on other routes, notably Hot Springs Road.

Other Traffic Concerns

In general, many residents noted that speeding was and still is a major traffic issue in the Village, particularly on Hot Springs Road and a number of the side streets. Speeding was also a major concern

noted on McCombs Drive. However, as mentioned; the traffic calming measures installed appear to have helped considerably. Many residents have also noted that a lack of sidewalks and bike lanes (or lack of maintenance of the bike lanes on Hot Springs Road) throughout the Village have been major safety concerns.

Respondents were asked what they would do if they could make only one change in the Village concerning traffic calming. In response to this, respondents mentioned enforcing speed limits and using signage (i.e. lowering speed limits) to reduce vehicle speeds, and more and wider sidewalks to improve pedestrian safety. Many expressed that the combination of excessive vehicle speeds and the lack of sidewalks on many streets throughout the Village were the cause for the main traffic safety issues. These were the common themes expressed by residents in order to improve traffic safety in the Village.

2.5.3 Summary

In summary, the questionnaire was a useful tool in assessing residents' thoughts and concerns with regards to traffic calming in the Village. It yielded important information regarding driving routes, walking and cycling levels, trail access and key pedestrian crossing locations, as well as feelings regarding the effectiveness of existing traffic calming measures in reducing vehicle speeds. It also helped to pinpoint remaining key traffic concerns in the Village as well as residents' opinions on how to mitigate these issues.

Generally, residents appear to think favourably of all existing traffic calming measures to varying levels of effectiveness. However, as noted, raised intersections were viewed as the most effective and there were few comments that people did not like them, while the traffic circle and speed bumps were generally seen as effective there were various comments about them not being liked which in most cases was due to their design (i.e. speed bumps being too abrupt, and the radius of the traffic circle being too tight). Some respondents on the contrary felt that there were no traffic issues at all and that traffic calming measures were not necessary. This feedback is important and will be taken into consideration in the traffic calming policy review and plan options.

2.6 Overall Observations

Based on the factual information collected from the various traffic surveys conducted by Bunt and from questionnaire responses gathered from the online traffic calming survey, some central themes have been revealed regarding remaining traffic issues in the Village of Harrison Hot Springs. This allows the study to focus its goals and objectives for creating an effective traffic calming plan. Traffic surveys provide statistical representation of traffic issues in the Village and provide evidence of what these issues are and where they are occurring which confirms in some cases the opinions of residents.

Speeding has been identified as the central traffic issue within the Village. It was the main reason for implementing traffic calming measures on McCombs Drive and was a contributing factor for installing speed bumps on Balsam Avenue and Pine Avenue. Speed surveys revealed that vehicle speeds on McCombs Drive are now close to the posted limit (i.e. near the posted speed limit) compared to before

traffic calming measures were installed. Speeds were observed to have decreased on both Balsam Avenue and Pine Avenue with the installation of temporary speed bumps. Vehicle speeds on Hot Springs Road, however, were observed to be considerably higher than the posted speed limit creating traffic safety issues, a sentiment which was also noted by several respondents in the online survey and evidenced to some degree in the ICBC crash data.

Additionally, the lack of sidewalks on most streets within the Village was revealed to be a major traffic safety concern of residents, and when combined with vehicle speeds even within the 50km/h range leads to further traffic safety issues for pedestrians (and cyclists). It may be the case that through addressing vehicle speeds in the Village pedestrian safety will therefore improve and then perhaps sidewalks aren't needed. Similarly, if sidewalks are added and speeds remain the same, pedestrian safety would still be improved. However, in order to remedy both issues effectively and thoroughly, it is likely that a combination of speeding enforcement/traffic calming along with sidewalk improvements would be required.

Overall, traffic safety seems to have improved in some parts of the Village with the implementation of traffic calming measures to a point there is a net benefit for the village. However, traffic safety issues remain which need to be addressed as noted above. Further, upon review of traffic survey data and questionnaire responses and taking into consideration recommended traffic calming practices it is possible to optimize existing and potential future traffic calming measures in order to create a more equitable balance of traffic safety and traffic distribution throughout the Village. Section 3 presents a review of current traffic calming best practice, and reviews the applicability of measures to this project. This review feeds into the traffic calming plan, outlined in Section 4.

3. TRAFFIC CALMING POLICY

3.1 Introduction

The Village of Harrison Hot Springs, as part of this traffic calming review, have requested that a traffic calming policy be established for the Village in order to effectively address future requests for traffic calming measures by residents. This policy will inform the Village of the appropriateness of various traffic calming measures to address different traffic issues taking into account context within the Village. It is not the aim of this policy to provide prescribed measures for each and every situation. However, it is intended to provide the village with a range of options when it comes to implementing a new traffic calming measure and give them confidence in their applicability in different situations based on best practice research and guidelines in traffic calming.

The following sections provide an introduction regarding the necessity of this traffic calming policy for the Village and then present context and research behind various recommended traffic calming measures and practices. It then describes some the main traffic calming measures considered and their appropriateness for the Village while also reviewing the applicability of different traffic calming measures within the Village context.

3.2 Background

The Village of Harrison Hot Springs requires a traffic calming policy in order to properly guide future traffic calming requests from residents. This Traffic Calming Policy will help the village and its residents to comprehend the role of traffic calming on the local road network and the potential applicability of different types of traffic calming measures. The policy is based on research conducted by Bunt on best practice traffic calming guidelines in Canada and the United States tailored to the needs and requirements of the Harrison Hot Springs rural village setting, while also taking into account Bunt's previous studies on traffic calming for similar Towns and Municipalities in the Lower Mainland.

This type of policy guide is important to the Village both as a framework for understanding the purposes of traffic calming more generally as well as a resource document to help make informed decisions when addressing traffic issues in the Village. Harrison Hot Springs occupies a unique setting and has developed with a unique layout of its streets. As such, not all types of traffic calming measures will be appropriate. The following therefore provides details on measures which are appropriate for the Village now and in the future.

3.3 Context & Research

Contextual research for this traffic calming policy section is based on best practice documentation including:

- Canadian Guide to Neighbourhood Traffic Calming (Transportation Association of Canada - 1998);
- Traffic Calming State of the Practice (Institute of Transportation Engineers - 1999);
- Community Traffic Calming Program - City of North Vancouver (Urban Systems - 2001);
- Guidelines for the Design and Application of Speed Humps (Institute of Transportation Engineers - 2007); and
- Traffic Calming on Main Roads Through Rural Communities - Technical Brief (U.S. Department of Transportation, Federal Highway Administration - 2009).

These resources have been combined with previous studies conducted by Bunt & Associates to inform and shape this Traffic Calming Policy and the Traffic Calming Plan options in Section 4. Section 3 continues by defining traffic calming and by providing an explanation of general considerations when applying traffic calming.

3.3.1 What is Traffic Calming?

The main purpose of traffic calming is to have drivers behave appropriately to the functional classification of the road and its surrounding land uses. The Institute of Transportation Engineers (ITE) defines traffic calming as:

> *The combination of mainly physical measures that reduce the negative effects of motor vehicle use, alter driver behaviour and improve conditions for non-motorized street users.*

The *Canadian Guide to Neighbourhood Traffic Calming* published by the Transportation Association of Canada (TAC) acknowledges the above ITE definition of traffic calming. In addition, it recommends that traffic calming be applied only to local and collector residential streets. Many of the physical traffic calming measures applied to local and collector streets are inappropriate for the objectives of arterials and higher order roads in safely and efficiently moving traffic. It is also noted that traffic calming should not be a substitute for good engineering design and can not be used solely to resolve traffic and safety problems on all streets. This however, should be taken within the context of the local area which traffic calming is planned for.

3.3.2 Application of Traffic Calming

Currently, standardized practice related to the development and design of traffic calming measures has focused on urban rather than rural conditions, where the demand by residents is the greatest and curbs,

sidewalks and roadway lighting are present. The Canadian Guide to Neighbourhood Traffic Calming does not even address potential traffic calming measures on Arterial roads or in rural areas.

The Village of Harrison Hot Springs does not have established warrants for the installation of traffic calming measures on a roadway or network of roadways. Most communities have warrants for installation of traffic calming measures; such warrants are usually based on one or more of the following:

- Average or 85th percentile operating speeds at some prescribed level over the posted or desired speed;
- Total daily or peak hour volumes in excess of suitable volumes for the road's function; and
- Total or percentage of "cut through" traffic.

If the Village of Harrison Hot Springs were to establish a warrant for installation of traffic calming measures, Hot Springs Road may meet the excessive speed warrant with an 85th percentile speed which is more than 20 km/h over the posted speed but it likely would not meet the latter two criteria as it carries fairly low volumes for its overall network function and available capacity, and carries some "cut through" traffic from McCombs Drive (i.e. due to installation of traffic calming measures on McCombs) but probably not enough to affect its functionality.

Given the above, there is an argument that traffic calming measures are not appropriate for Hot Springs Road (or McCombs Drive for that matter) given its Arterial function, rural nature, designation as a provincial highway route and regional Major Road Network element and its lack of volume warrants.

Another important consideration is that Hot Springs Road is a key emergency response route, while McCombs Drive is the designated alternate diversion route to Hot Springs Road, and some types of traffic calming measures negatively influence response times. Extensive research using over 36 emergency vehicle drivers by the City of Portland[2] has indicated the following delays caused by selected traffic calming measures:

Vertical Measures:

- 14 ft. long parabolic, 3" tall speed humps = delay from 1.0 to 9.4 sec./hump
- 22 ft. long flat topped, 3" tall speed humps = delay from 0 to 9.2 sec./hump

Horizontal Measures:

- Traffic circles = 1.3 to 10.7 seconds per circle

[2] The Influence of Traffic Calming on Emergency Response Times, Atkins & Coleman, ITE Journal, August 1997, page 42

The low end of the range of delay was for smaller Rescue Vehicles about 21' (6.4m) long and the high end of delay was for the largest of City of Portland ladder trucks, about 57' (17m) long with a GVW of 53,960 lbs (24,475kg). In addition, the low range of delay was for "desired speeds" of 25 mph (35 km/h) and the high end of delay was for "desired speeds" of 40 mph (65 km/h).

The size of the largest SAFD vehicle is not known for the Village of Harrison Hot Springs, but it is expected to be less than the City of Portland's largest vehicle; delays in the order of 0 to 7 or 8 seconds are probable for SAFD vehicles. However, we note the highest end of delay is for "desired speeds" of 65 km/h, which may not be the "desired speed" of the SAFD on Hot Springs Road or McCombs Drive. If the "desired speed" of emergency response vehicles is matched to the posted speed of 50-60 km/h on Hot Springs Road and 50km/h on McCombs Drive, then average delays for measures that require a horizontal or vertical deflection are more likely in the range of 0 to 4 or 5 seconds, according to the Portland research.

However, in our view, there are some mitigating circumstances in the case of Hot Springs Road and McCombs Drive (as well as some local residential streets) supporting the application of traffic calming measures. For Instance, there are a significant number of fronting residences that are impacted by speeding vehicles (particularly on McCombs Drive and on local residential streets), both Hot Springs Road and McCombs Drive are popular cycling routes and cyclists are clearly intimidated by prevailing speeds, volumes are much lower than typical Arterial roads and they (Hot Springs Road and McCombs Drive) lead to a small community where lower densities and growth rates will ensure it will likely not carry very high volumes typical of most Arterial roads.

3.4 Applicability of Different Traffic Calming Measures

The following is a summary of key traffic calming measures deemed to be applicable to the Village of Harrison Hot Springs currently and in the future. Design specifications for these measures are included at **Appendix B**.

3.4.1 Key Traffic Calming Measures

Traffic Circles

A traffic circle is a raised island located in the centre of an intersection, which requires vehicles to travel through the intersection in a counter-clockwise direction around the island. They have the following characteristics:

- Motorists yield to vehicles already in the intersection;
- Motorists need only consider traffic approaching in one direction, rather than two or more directions as at conventional intersections; and
- Landscaping placed in the centre of a traffic circle reduces visibility beyond the circle and thus encourages motorists to slow as they approach the circle.

Traffic circles are most appropriate for local or collector roads and can be applied to both urban and rural cross-sections with a maximum of two traffic lanes (both directions). Their effectiveness can be enhanced when used in conjunction with textured crosswalks, and they are most effective in reducing speeds when used in a series of two or more consecutive intersections. Locations to avoid include: transit routes, emergency access routes (unless acceptable to emergency services), intersections with high pedestrian volumes, intersections with high left turn volumes, and intersections with significantly higher volumes on the main street. Hot Springs Road does not generally meet these criteria, being an arterial road with many arterial characteristics.

McCombs Drive would potentially seem a more appropriate location for traffic circles and one is resent at McCombs Drive/ Alder Avenue. This is illustrated in **Figure 3.1**.

Figure 3.1: Example of a Traffic Circle

Traffic calming benefits of traffic circles include: reductions in vehicle speeds of around 10-15km/h, reduction in vehicle volumes, reduced vehicle conflicts and collisions, improved aesthetic appearance of roadway, and reduced noise pollution resulting from vehicles having consistent acceleration through traffic circles. Some of the disbenefits of traffic circles include:

- Potential vehicle encroachment on pedestrian crossings;
- Potential removal of on-street parking in some areas;
- May divert traffic to parallel streets without traffic calming;
- Can restrict access and cause minor delays for some larger vehicles; and
- Potential increase in bicycle/vehicle conflicts.

Speed Humps

A speed hump is defined as a roadway geometric design feature whose primary purpose is to reduce the speed of vehicles travelling along that roadway. There might be certain secondary purposes of speed hump installations, such as traffic diversion, but that is not their primary intended purpose. Speed humps are a measure of vertical deflection which causes both the wheels and frame of a traversing vehicle to deflect upwards. With speed humps:

- The vertical deflection of vehicles produces an uncomfortable sensation for vehicle occupants travelling at speeds higher than the design speed;
- The design speed is determined by the dimensions of the speed hump, and the spacing between speed humps;
- The speed hump extends across the roadway, with gaps for drainage at the curbs; bicycles do not require special provisions; and
- Installation of a speed hump sign is considered mandatory.

Typical dimensions are:

- Local street speed humps – 4.0m in length and 80mm high, with a sinusoidal cross-section.
- Collector street speed humps – 7.0m in length and 80 mm high, with a flat centre section

Speed humps are used mainly on local and collector residential streets, are ideal with posted speed limits less than or equal to 50km/h, and are applicable to all traffic volume levels. They are best suited to a more urban cross-section with curb and gutter and for 2 traffic lanes. They are typically not effective on rural cross sections unless obstructions (such as posts or bollards) placed on roadside at speed hump location and may also not be effective on streets with rolled curbs. Speed humps are preferable in a series, close to street lighting to increase visibility, and on roads with reasonable grades away from catch basins.

Locations to avoid include: designated emergency access routes on local streets (unless acceptable to emergency vehicles), locations with limited sight distance, intersections, driveways, bus stops, grades greater than 8%, traffic signals, and at accesses to underground utilities. Effectiveness of speed humps can be increased when used in combination with pedestrian crossings or curb extensions. **Figure 4.2** is an example of a speed hump on a local residential street (Surrey, BC).

Figure 3.2: Example of a Speed Hump

Major benefits include vehicle speed reduction, particularly when used in succession (i.e. 50km/h = spaced every 125m), reducing vehicle volumes (by diversion to other parallel streets), reduction of conflicts and collisions, and in reducing traffic noise due to lower speeds. Some of the main disbenefits include possible diversion of traffic to parallel streets which do not have traffic calming measures, as well as minor delays to ambulances and fire trucks, reduction in maximum bus speeds, and increased time for snow removal.

Costs vary depending on width of roadway and labour and material costs. Maintenance costs are around $100/year/speed hump for markings and asphalt repair.

Raised Intersections

A raised intersection is an intersection – including crosswalks – which is constructed at a higher elevation than the adjacent roadways and which has vertical deflectors to help vehicle traverse them. The main purposes of raised intersections are to: reduce vehicle speeds; better define crosswalk areas; and reduce pedestrian-vehicle conflicts. Similar to a speed hump, a raised intersection creates a vertical deflection of vehicles wheels producing an uncomfortable sensation for vehicle occupants travelling at higher speeds. Also, the raised roadway surface emphasizes pedestrian priority at intersections, with the raised centre section including crosswalks. Ramps are designed in consideration of vehicle types and desired speeds.

Raised intersections are appropriate for local and collector residential streets with a posted speed limit of less than or equal to 50km/h for all traffic volume levels. They are typically suited to an urban cross-section with curb and gutter but can be extended beyond the roadway edge in rural cross-sections (i.e. see **Figure 3.3**). They are to be used with a maximum of two traffic lanes and should be avoided on designated emergency access routes unless deemed acceptable by emergency services. Their effectiveness can be enhanced when used in conjunction with textured crosswalks or curb extensions.

Figure 3.3 is an example of a raised intersection in a semi-rural setting (McCombs Drive and Chestnut Avenue in Harrison Hot Springs).

Figure 3.3: Example of a Raised Intersection

The main traffic calming benefits of raised intersections are vehicle speed reductions and in providing better definition of pedestrian areas as vehicles are forced to slow through the intersection. Some disbenefits include:

- High construction costs;
- May divert traffic to parallel residential streets without traffic calming measures;
- Slows speeds of emergency vehicle to approximately 25km/h, and
- They may increase snow removal time.

Textured Crosswalks

A textured crosswalk is a crosswalk incorporating a textured and/or patterned surface which contrasts with the adjacent roadway. Their main purpose is to better define the crossing location for pedestrians, as well as to reduce pedestrian-vehicle conflicts. The enhanced visual and tactile identification of the crosswalk area emphasizes pedestrian priority, and texturing may extend beyond the crosswalk to provide greater visual identification of the area. Types of material typically used include interlocking paving stones, coloured reinforced stamped concrete, and asphalt. Also, the texturing may incorporate two or more colours or textures.

Textured crosswalks are intended for local and collector residential streets and for all levels of traffic volume. They are best suited to urban and suburban cross-sections, and are made more effective when used in conjunction with raised crosswalks, raised intersections, curb-extensions and curb radius reductions. Suitable locations include marked, unsignalized crosswalks; signalized crosswalks; intersection and mid-block crosswalks.

Figure 3.4 is an example of a textured crosswalk in a suburban setting (Kelowna, BC).

Figure 3.4: Example of a Textured Crosswalk

Textured crosswalks do not have an effect on vehicle speeds or volumes unless combined with other measures (traffic circles, raised intersections). The main benefits of textured crosswalks are improved visibility of the crosswalk which reduces vehicle-pedestrian conflicts, and they enhance appearance of the street particularly with other streetscaping and landscaping.

Some disbenefits may include maintenance issues due to uneven surface, and textured surface may create traction or stability issues for some users (seniors, the disabled, wheelchairs, bicycles and motorcycles). They have no effect on resident access, on-street parking, or snow removal.

3.4.2 Other Traffic Calming Measures

Some traffic calming measures have been developed more recently which are not included in the previously mentioned traffic calming policy guidebooks (i.e. Canadian Guide to Neighbourhood Traffic Calming - TAC), or which have been developed for more rural settings, such as Harrison Hot Springs and thus are not included in most policy guidebooks. Due to the unique semi-rural/suburban setting of Harrison Hot Springs, some of these other traffic calming measures may be considered appropriate given the different requirements and specifications of its road network. A few of these measures are briefly described and shown below.

Transverse Markings & Speed Feedback Signage

Transverse markings consist of a series of small parallel painted bars on the inside edges of the travel lane. They are typically used on rural arterial roads or highways to reduce vehicle speeds by giving the optical perception that the vehicle's speed is increasing which triggers driver awareness of the need to slow down. Markings are often spaced closer together when approaching a community or more densely populated areas which enhance this effect helping to lower speeds even further. **Figure 3.5** illustrates transverse markings on a rural arterial (Source: U.S. DOT, Federal Highway Administration - 2009).

Figure 3.5: Example of Transverse Markings

In some cases, transverse markings alone are not enough to reduce vehicle speeds and so they are used in conjunction with speed feedback signs in order to increase vehicle speed awareness of drivers causing them to be more cautious and reduce their speeds. These signs consist of a static message "your speed" sign combined with an electronic display of the speed of approaching vehicles which is measured by radar integrated with the sign. They can either be placed within a section of transverse markings (perhaps where they spaced more closely at the entrance to a community) or they can be placed immediately after a section of transverse markings to help remind drivers of their speeds. Also, they could be used independently of transverse markings; however the effect of both measures combined is greater in reducing vehicle speeds. **Figure 3.6** shows an example of a speed feedback sign (Source: U.S. DOT, Federal Highway Administration - 2009).

Figure 3.6: Example of Speed Feedback Signage

Narrow Lane Markings

Median and shoulder pavement markings can be used to reduce lane widths for a section of roadway with high observed speeds in order to reduce vehicle speeds. Similar to transverse markings, narrow lane markings can reduce vehicle speeds by creating the perception of drivers that the roadway is narrower than it actually is. This creates a feeling of being constrained which causes them to slow down as they are channelized into the narrowed lane. Narrow lane markings and painted medians can also be used with speed feedback signage. **Figure 3.7** shows an example of narrow lane markings with the speed limit painted on the roadway (Source: U.S. DOT, Federal Highway Administration - 2009).

Figure 3.7: Example of Narrow Lane Markings

As shown in the above figure, another option to remind drivers of the speed limit is to stamp it on the roadway. This would typically be used on an arterial or collector road.

Other measures are often used in conjunction with traffic calming measures which are not necessarily considered traffic calming measures themselves. These are called supportive measures, and can either intentionally be used to augment traffic calming or do so by their natural placement, a few of which are presented below.

Possible Supportive Measures

Supporting measures are elements that do not specifically calm traffic or slow vehicle speeds, but that add to the pedestrian and bicycle realm, making an area more welcome for those on foot, bicycle or travelling by transit. These measures would include elements such as sidewalks and covered bus shelters.

Three-way/Multi-way Stops – As noted in Section 2, three-way or multi-way stop intersections are not a proper measure of traffic calming, but rather are intended for traffic control or operational purposes. They can however, have the effect of reducing vehicle speeds when they are used in conjunction with other traffic calming measures, such as speed humps, textured crosswalks or narrow lane markings. Therefore, it is common for municipalities, particularly in semi-rural/suburban settings, to use them as a supportive

measure to other traffic calming measures. They should not however, be used on their own as a traffic calming measure or when traffic conditions do not warrant their presence.

Sidewalks/Multi-use Paths – Sidewalks are generally used in urban and suburban landscapes to separate vehicle traffic from pedestrian traffic in order to enhance overall safety on a roadway. Multi-use paths can be used in urban, suburban, or semi-rural/rural settings to create a path for cyclists and pedestrians which is separated from vehicles and also serve to increase overall safety on a street for all users. These are not traffic calming measures, however, when used in conjunction with traffic calming measures they help enhance the safety of non-motorized users. Safety can particularly be increased when a sidewalk or a multi-use path is added to a street which did not previously have one. However, it is possible that vehicle speeds may be higher on streets with sidewalks and multi-use paths as drivers may feel they do not need to be as cautious with their speeds, unless there are other traffic calming measures to keep vehicle speeds in check.

On-street Bicycle Lanes – Bicycle lanes can have a similar effect to narrow lane markings in reducing vehicle speeds by making travel lanes appear narrower than they actually are which makes the driver feel constrained. This is not a traffic calming measure as it is intended to increase travel mode options and increase safety for cyclists on the streets.

The next section summarizes the appropriateness of traffic calming measures that could potentially be used by the Village of Harrison Hot Springs by reviewing applicable measures and what their implications are.

3.4.3 Appropriateness of Traffic Calming Measures for Harrison Hot Springs

There are several varieties of traffic calming measures ranging from vertical deflections (physically force vehicles to slow down and drive over them), to horizontal deflections (physically force vehicles to slow down by narrowing the roadway or causing them to drive around), to obstructions (divert or block vehicles, and signing (encourage driver awareness). **Tables 3.1** and **3.2** illustrate the applicability of different traffic calming measures and their implications for Harrison Hot Springs. Measures crossed out are not considered appropriate for Harrison Hot Springs.

Table 3.1: Applicability of Traffic Calming Measures in Harrison Hot Springs

Measure		Potential Benefits			
		Speed Reduction	Volume Reduction	Conflict Reduction	Environment
Vertical Deflection	~~Raised Crosswalk~~	◙	⊖	⊛	⊛
	Raised Intersection	⊙	○	⊙	⊙
	~~Rumble Strip~~	⊖	⊖	⊖	⊖
	~~Sidewalk Extension~~	⊛	⊖	⊛	⊖
	Speed hump	◙	⊙	◙	⊙
	Textured Crosswalk	○	○	⊙	⊙
Horizontal Deflection	~~Chicane – one-lane~~	◙	◙	⊛	⊛
	~~Chicane – Two-lane~~	⊛	⊖	⊛	⊛
	~~Curb extension~~	⊛	⊖	⊖	◙
	~~Curb radius reduction~~	⊛	⊖	⊖	⊛
	~~On-Street Parking~~	⊛	⊖	⊖	⊛
	~~Raised median Island~~	⊛	⊖	⊛	⊖
	Traffic circle	◙	⊙	◙	◙
Obstruction	~~Directional Closure~~	⊖	◙	⊛	⊛
	~~Diverter~~	⊖	◙	⊛	⊛
	~~Full Closure~~	⊖	◙	◙	⊛
	~~Intersection Channelization~~	⊖	⊛	⊛	⊛
	~~Raised median through intersection~~	⊖	◙	⊛	⊛
	~~Right-in/right-out island~~	⊖	◙	⊛	⊛
Signing	Maximum Speed	⊙	○	○	○
	~~Right (Left) Turn Prohibited~~	⊖	⊛	⊛	⊛
	~~One-Way~~	⊖	◙	⊛	⊛
	~~Through Traffic Prohibited~~	⊖	⊛	⊛	⊛
	Traffic-Calmed Neighbourhood	○	○	○	⊙

◙ = Substantial benefits ⊙ = Minor benefits ○ = No benefit

Source: Transportation Association of Canada – Canadian Guide to Neighbourhood Traffic Calming

Table 3.2: Implications of Traffic Calming Measures

Measure		Potential Disbenefits					
		Local Access	Emergency Response	Other Travel Modes	Enforce-ment	Maint-enance	Cost
Vertical Deflection	~~Raised Crosswalk~~	~~⊖~~	~~⊛~~	~~⊛~~	~~⊖~~	~~⊛~~	~~$ To $$~~
	Raised Intersection	○	◉	◉	○	◉	$$$
	~~Rumble Strip~~	~~⊖~~	~~⊖~~	~~⊛~~	~~⊖~~	~~■~~	~~$ to $$~~
	~~Sidewalk Extension~~	~~⊖~~	~~⊖~~	~~⊖~~	~~⊖~~	~~⊛~~	~~$$~~
	Speed hump	○	◉	◉	○	◉	$ to $$
	Textured Crosswalk	○	○	◉	○	◉	$ to $$
Horizontal Deflection	~~Chicane - one-lane~~	~~⊖~~	~~⊛~~	~~⊛~~	~~⊖~~	~~⊛~~	~~$$ to $$$~~
	~~Chicane - Two-lane~~	~~⊖~~	~~⊖~~	~~⊖~~	~~⊖~~	~~⊛~~	~~$$~~
	~~Curb extension~~	~~⊖~~	~~⊖~~	~~⊛~~	~~⊖~~	~~⊛~~	~~$ to $$~~
	~~Curb radius reduction~~	~~⊖~~	~~⊖~~	~~⊖~~	~~⊖~~	~~⊛~~	~~$ to $$~~
	~~On-Street Parking~~	~~⊖~~	~~⊛~~	~~⊛~~	~~⊖~~	~~⊛~~	~~$ to $$~~
	~~Raised median Island~~	~~⊛~~	~~⊖~~	~~⊖~~	~~⊖~~	~~⊛~~	~~$ to $$~~
	Traffic circle	○	◉	◉	○	◉	$$ to $$$
Obstruction	~~Directional Closure~~	~~⊛~~	~~⊖~~	~~⊛~~	~~⊛~~	~~⊛~~	~~$$~~
	~~Diverter~~	~~⊛~~	~~⊛~~	~~⊛~~	~~⊖~~	~~⊛~~	~~$$ to $$$~~
	~~Full Closure~~	~~■~~	~~■~~	~~⊛~~	~~⊖~~	~~⊛~~	~~$$ to $$$~~
	~~Intersection Channelization~~	~~⊛~~	~~⊛~~	~~⊖~~	~~⊖~~	~~⊛~~	~~$$ to $$$~~
	~~Raised median through intersection~~	~~⊛~~	~~⊛~~	~~⊛~~	~~⊖~~	~~⊛~~	~~$ to $$~~
	~~Right-in/right-out island~~	~~⊛~~	~~⊛~~	~~⊛~~	~~⊛~~	~~⊛~~	~~$$~~
Signing	Maximum Speed	○	○	○	■	○	$
	~~Right (Left) Turn Prohibited~~	~~⊛~~	~~⊖~~	~~⊖~~	~~■~~	~~⊖~~	~~$~~
	~~One-Way~~	~~⊛~~	~~⊛~~	~~⊛~~	~~⊖~~	~~⊖~~	~~$~~
	~~Through Traffic Prohibited~~	~~⊛~~	~~⊖~~	~~⊖~~	~~■~~	~~⊖~~	~~$~~
	Traffic-Calmed Neighbourhood	○	○	○	○	○	$

■ = Substantial dis-benefits ◉ = Moderate dis-benefits ○ = No dis-benefits

$ = Low cost $$ = Moderate cost $$$ = High Cost

Source: Transportation Association of Canada – Canadian Guide to Neighbourhood Traffic Calming

Tables 3.1 and 3.2 indicate that for vertical deflection measures, raised intersections, speed humps and possibly textured crosswalks are appropriate for the Village. Other measures are more urban in nature and require existing sidewalks. Table 3.1 shows that raised intersections have minor benefits in terms of speed reduction, conflict reduction and environmental benefits where as speed humps have major speed reduction and confliction reduction benefits. Emergency response and maintenance are the main disbenefits that Table 3.2 highlights for these measures.

The only horizontal measure considered appropriate for the Village is a traffic circle which offers significant speed reduction, conflict reduction and environmental benefits. Other horizontal measures are not considered appropriate within the Village's setting, as they are too urban in nature, with some requiring curbing and sidewalk to be in place. Its disbenefits are similar to the horizontal measures.

Obstruction measures such as diverters, right in/right out islands etc are not considered appropriate in this instance. Some signage measures are appropriate but these are mainly supporting measures to reinforce other elements of the plan.

4. TRAFFIC CALMING PLAN

A series of three Traffic Calming Plan options were developed for the Village for a public open house held on August 10th, 2011 which were based on a review of best practice standards and traffic calming guidelines, public feedback from online questionnaires, and consultation with the Village. These options were presented to the public at the open house and feedback was given regarding the various strengths and limitations of each option.

Upon review of feedback forms completed by the public, as well as taking into consideration conversations with the public and Village staff members at the open house a preferred option was developed. The following sections describe the original three Traffic Calming Plan options, before going on to detail the preferred option and its key features, as well as the proposed recommended phasing and cost estimates for the plan.

4.1 Traffic Calming Plan Options

As part of the Traffic Calming Plan Review three possible plan options were produced, each one reflecting a different road hierarchy ideology. These were developed based on our analysis and review of the traffic survey data, including the online questionnaire, as well as a review of relevant literature and previous traffic calming studies. The road hierarchy ideology approach stemmed from the need to address various traffic calming and traffic management issues in the Village in different ways. **Exhibit 4.1** highlights the road hierarchy traffic calming approaches.

These three conceptual approaches address the traffic calming objectives of the Village based on issues identified by both the Village and its residents as well as issues identified by Bunt in the field. The options stem from a road network/hierarchy solutions approach whereby the traffic calming measures are applied to varying degrees, and on different road segments, depending on what type of road it is. Therefore, the solutions are based on a traffic management framework (i.e. traffic distribution) of getting residents to/from the north and northeast sections of town to enter/exit the Village effectively which consequently also addresses speeding and "cut-through" issues experienced in the Village. The three approaches are described in detail below.

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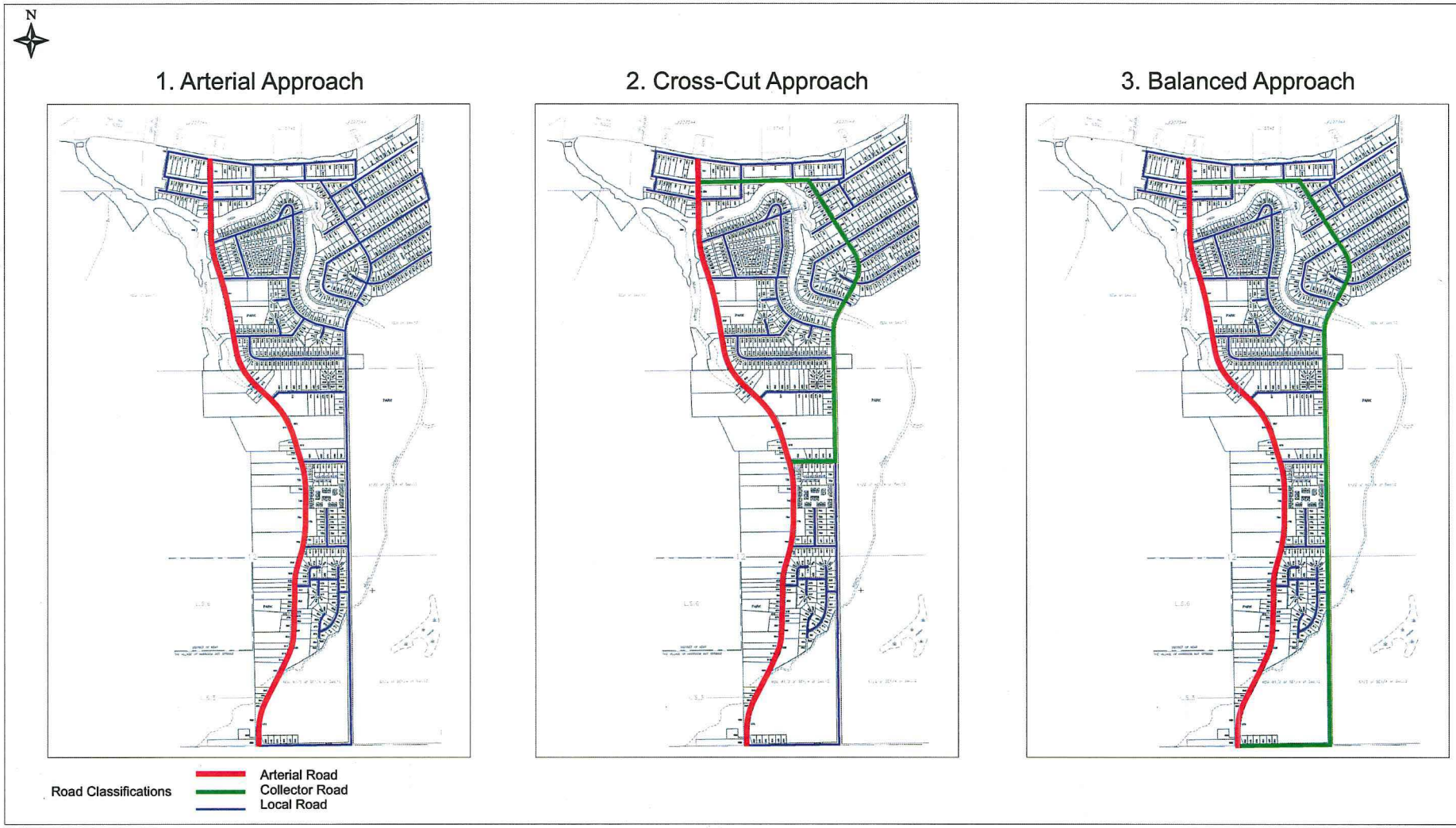

Exhibit 4.1
Traffic Calming Plan Approaches

Harrison Hot Springs Traffic Calming Plan
4801.01 October, 2011 Scale NTS

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4.1.1 Traffic Calming Plan Option 1 - Arterial Approach

The Arterial Approach assumes that Hot Springs Road will remain as the primary arterial route for vehicles to/from the Village. All other roads in the Village including McCombs Drive and McPherson Road would become designated as local roads. This approach focuses on keeping the bulk of traffic flowing to Hot Springs Road from all residential areas of town. **Exhibit 4.2** illustrates the Arterial Approach in detail.

In order to contain vehicle speeds, reduce cut-through traffic and improve general safety, traffic calming measures (both vertical and horizontal deflections, as well as signage) would need to be placed strategically throughout the Village on several local roads so that drivers would not try to evade these measures by traveling on other local roads (i.e. what has previously happened on Balsam Avenue and Pine Avenue).

Further, vehicle speeds are a key concern on Hot Springs Road and therefore traffic calming measures would likely be required here too. As Hot Springs Road is a Provincial Highway these measures would need to be supported by the BC Ministry of Transportation.

Traffic calming measures for the Arterial Approach could include:

- Speed humps;
- Traffic circles;
- Transverse pavement markings;
- Narrow lane markings and bike lanes,
- Centre medians (painted or concrete); and
- Speed feedback signage.

This approach requires the most traffic measures to be implemented and therefore would likely be the most costly as well. It puts some pressure onto Hot Springs Road to carry higher vehicle volumes; however, there is currently significant spare capacity to accommodate this. This approach is most similar to the existing operations of the road network.

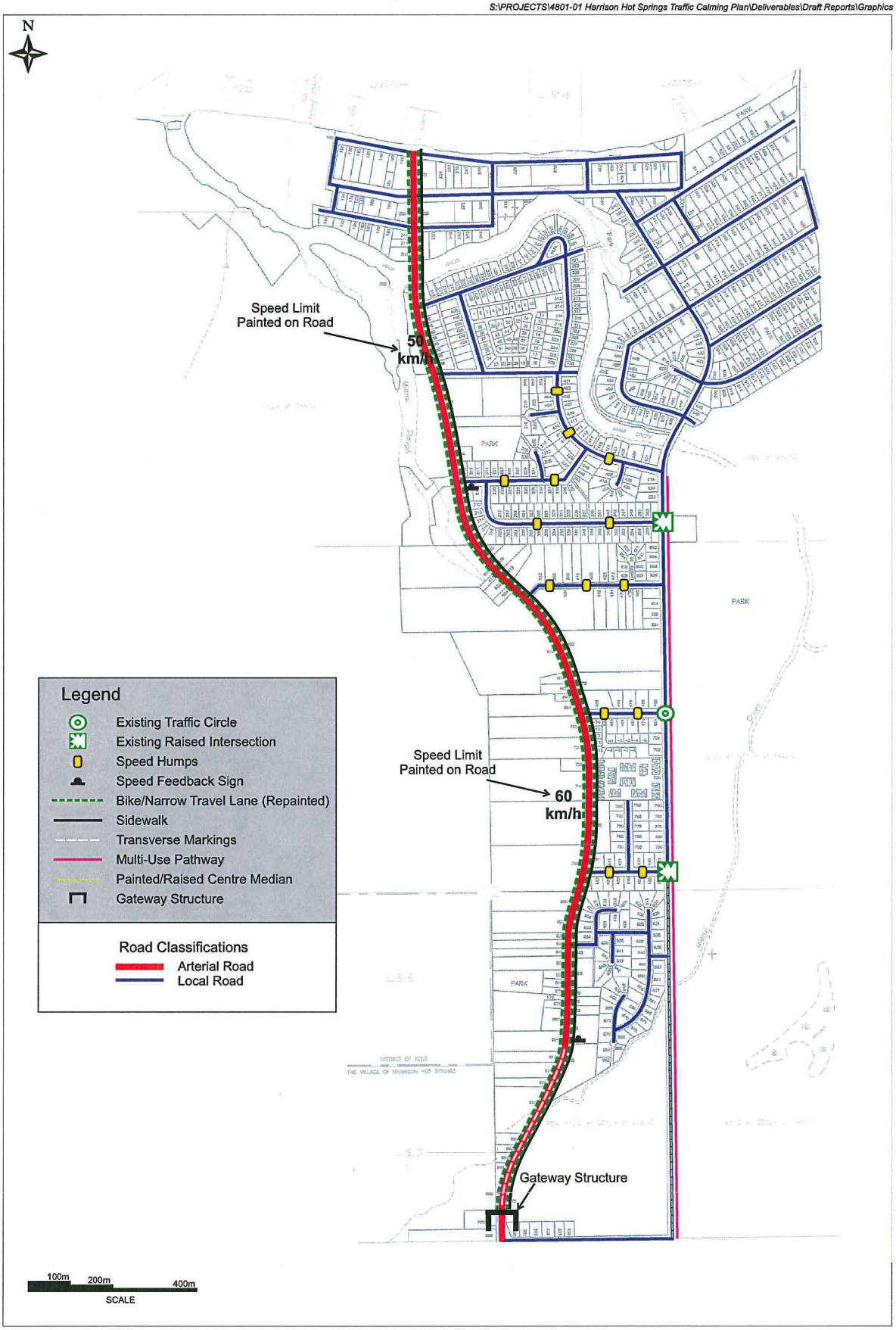

Exhibit 4.2
Traffic Calming Plan - Arterial Approach

Harrison Hot Springs Traffic Calming Plan
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4.1.2 Traffic Calming Plan Option 2 – Cross-Cut Approach

The Cross-Cut Approach also assumes that Hot Springs Road would remain as the primary arterial route through the Village. However, the main difference with this option is that it is supported by a collector route on the east side of the Village. Eagle Street/McCombs Drive would become a collector road from Lillooet Avenue south to Alder Avenue, and would continue as a local road south of Alder.

Alder Avenue would also become a collector route providing a designated alternative connection to Hot Springs Road (at the narrowest point in a central location) to serve the residents in the northeast area of the Village. Traffic calming measures would still be applied on local east-west streets north of Alder Avenue (i.e. that connect to Hot Springs Road) discouraging cross-cutting traffic from using them, thus shifting these vehicles to Alder Avenue as an alternative route to Hot Springs Road. **Exhibit 4.3** illustrates the Cross-Cut Approach in detail.

Traffic Calming measures on Eagle Street/McCombs Drive would likely be restricted to horizontal measures such as lane narrowing and speed feedback signs as well as centre medians (painted or concrete) which could reduce vehicle speeds without being a nuisance to drivers. Measures would also be required south of Alder on McCombs Drive to attract drivers to use Alder Avenue and not McCombs Drive beyond this point when exiting the Village.

Further, Lillooet Avenue would become a collector road which would attract some traffic in the north and northeast parts of the Village to go to Hot Springs Road via this route. Similar traffic calming measures would be applied to Hot Springs Road as per the Arterial Approach. This approach would likely require the least traffic calming measures and therefore would be the least expensive to implement.

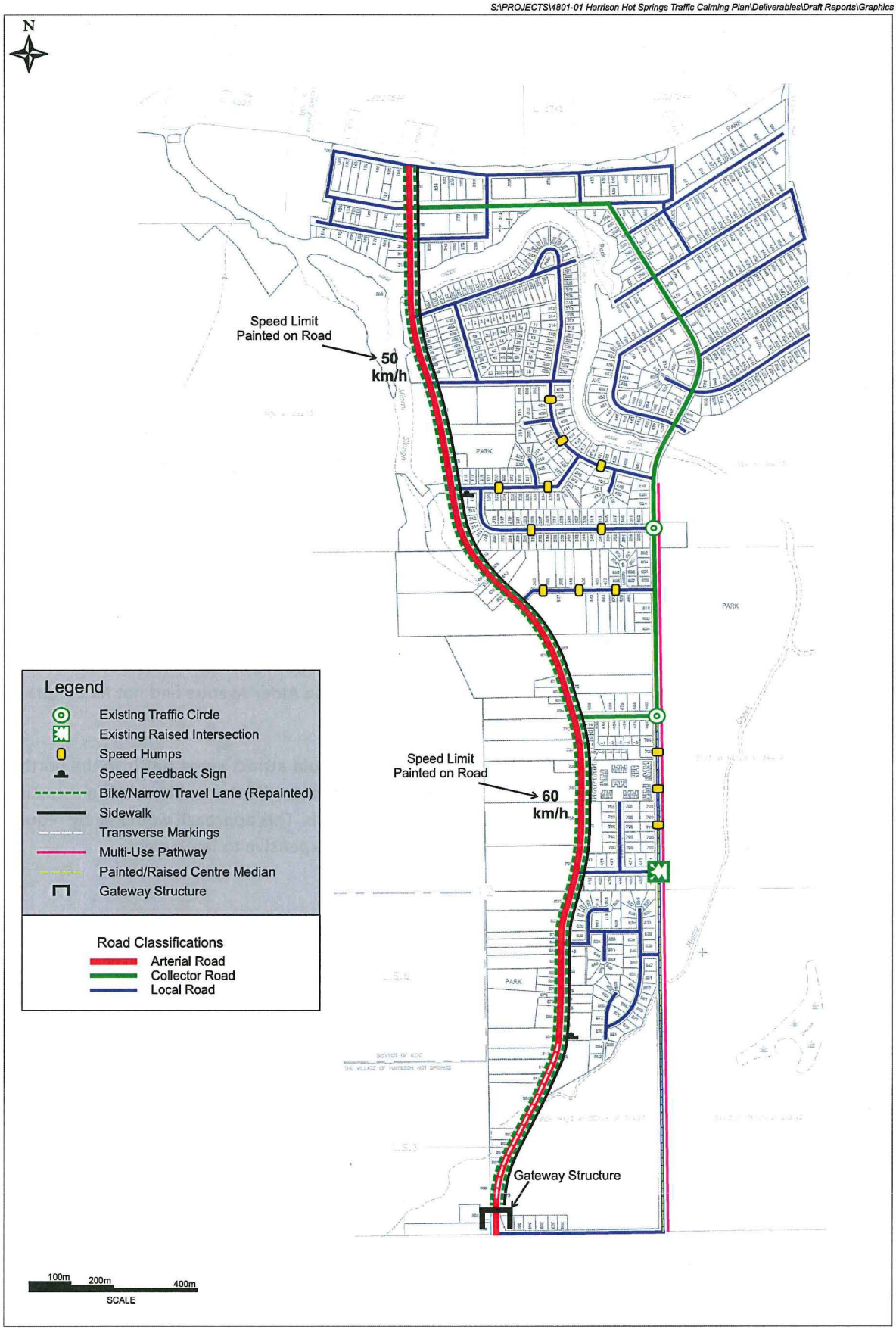

Exhibit 4.3

Traffic Calming Plan - Cross-Cut Approach

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4.1.3 Traffic Calming Plan Option 3 - Balanced Approach

As with the previous two Traffic Calming Plan Options, the Balanced Approach again assumes Hot Springs Road remains as the main arterial route through the Village. Similar to Option 2, Lillooet Avenue would again become a collector route to encourage some traffic in the north and northeast to use Hot Springs Road to enter/exit the Village.

The key difference with this approach is that Eagle Street/McCombs Drive would become a collector road for its entirety and McPherson Road would also become a collector road to connect with Hot Springs Road. There would be no central collector roads connecting Eagle Street/McCombs Drive, only Lillooet Avenue (to the north) and McPherson Road (to the south). **Exhibit 4.4** illustrates the Balanced Approach in detail.

This approach attempts to encourage traffic to use both Hot Springs Road and Eagle Street/McCombs Drive making the local connecting streets less attractive to cross-cutting vehicles by placing traffic calming measures such as speed humps on them. Additional traffic calming measures such as transverse road markings, narrow lane markings and bike lanes, speed feedback signs and centre medians (painted or concrete) could be applied to both Hot Springs Road and Eagle Street/McCombs Drive to reduce vehicle speeds. Traffic becomes more balanced throughout the road network with this approach but still requires some substantial traffic calming on local roads to deter cut-through traffic.

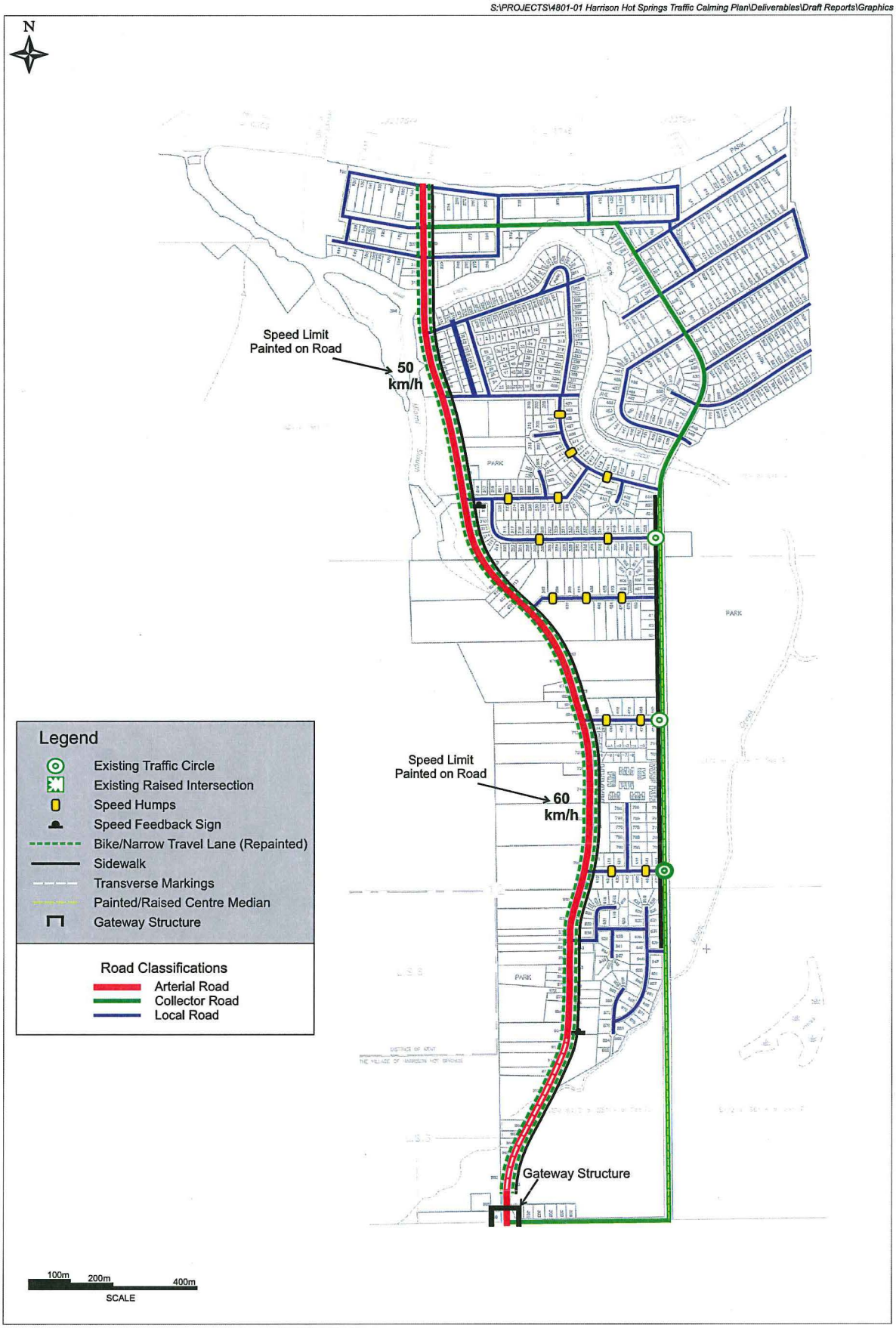

Exhibit 4.4
Traffic Calming Plan - Balanced Approach

Harrison Hot Springs Traffic Calming Plan
4801.01 October, 2011 Scale NTS

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4.2 Traffic Calming Plan - Preferred Option

A preferred option for the Traffic Calming Plan was developed based on consultation with the public at the open house in August, as well as from feedback forms provided by the public, and further deliberation regarding information presented in Sections 2 and 3. The following paragraphs illustrate how this option was arrived at and presents recommended phasing for this Traffic Calming Plan.

4.2.1 Preferred Option (Modified Arterial Approach)

The preferred option for the Harrison Hot Springs Traffic Calming Plan is primarily based on the Arterial Approach originally presented at the public open house and described in detail in section 4.1. This approach was determined to be the most favourable by the public based on our conversations with the public at the open house as well as from feedback forms completed by the public. **Exhibit 4.5** illustrates the preferred Traffic Calming Plan option in detail.

Generally, the feeling was that the public wanted to see the majority of vehicle traffic (particularly non-local) using Hot Springs Road while the rest of the residential streets should be considered local roads for local traffic and thus be suited to lower vehicle speeds (i.e. 30km/h). Therefore, the implementation of traffic calming measures (mainly speed humps) on these local "connecting" roads would: a) slow traffic down on these streets; and b) deter non-local traffic from using them.

Further, the public seemed that they were generally quite satisfied with the existing traffic calming measures on McCombs Drive with the exception of the fact that the raised intersections were perhaps a little too aggressive, and the traffic circle was not easily navigable with larger vehicles. Existing 3-way stops on McCombs Drive were also acceptable to most people except for the one at McPherson and McCombs, which some felt was unnecessary due to the low volumes experienced here and the lack of opposing volume from the east approach of the intersection.

Speed along Hot Springs Road continued to be an issue with the public which was consistent with our findings and so speed management measures are still proposed here on the Preferred Option although they have been slightly modified from the Arterial Approach. Safety for pedestrians and cyclists on Hot Springs Road and McCombs Drive also remained key concerns of the public and so this has been considered in the Preferred Option with shared-use/multi-use paths.

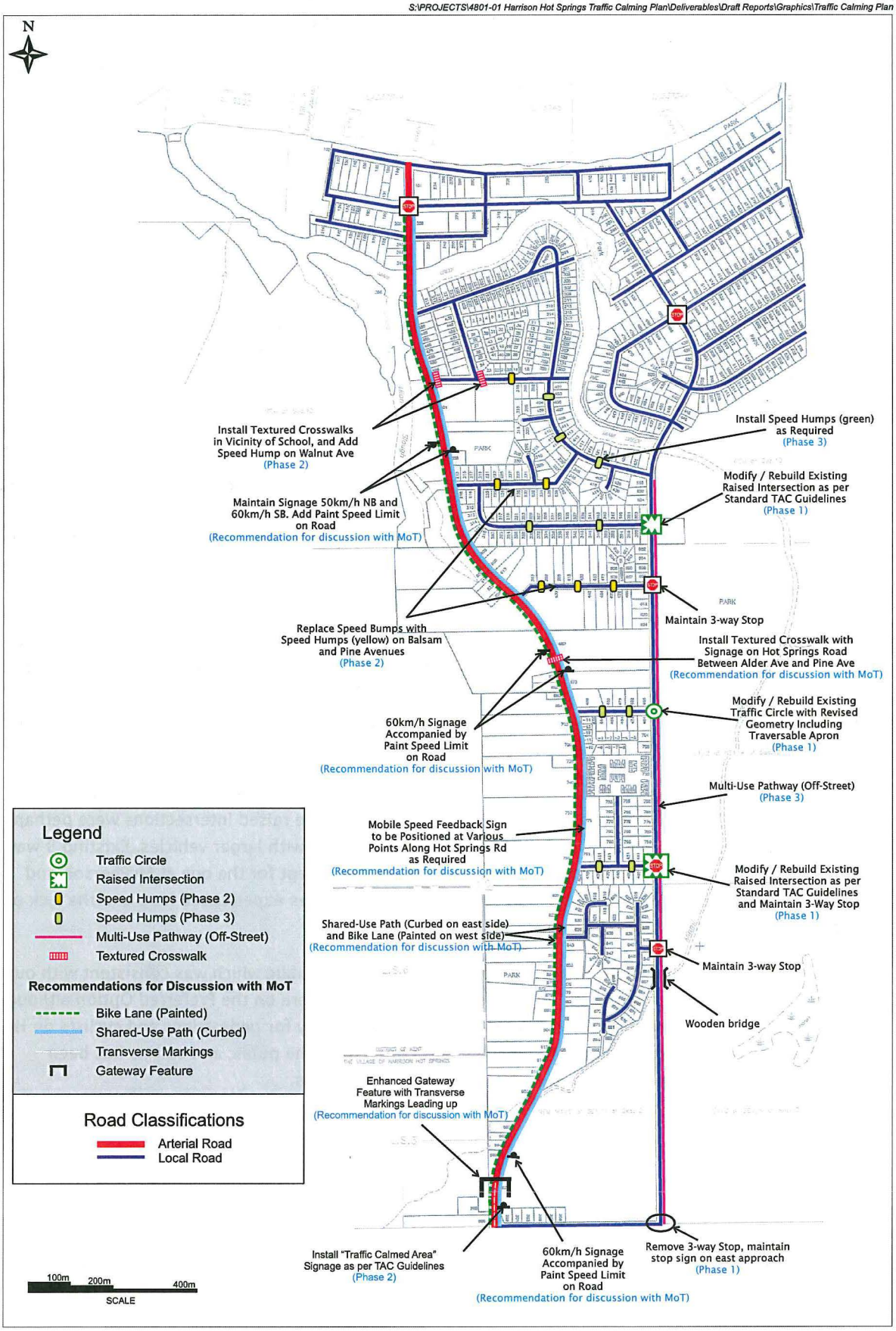

Exhibit 4.5
Traffic Calming Plan - Preferred Option (Modified Arterial Approach)

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Key Modifications

Some of the key modifications made to the Arterial Approach Traffic Calming Plan to develop the Preferred Option include:

- Addition of traffic calming measures on Walnut Avenue in front of the school including a speed hump and textured crosswalks;
- Additional speed limit signage and painted speed limits on Hot Springs Road as per existing speed limits;
- Usage of a mobile speed feedback sign that can be placed at variable locations as required (which helps to avoid desensitization to signs for drivers who become too familiar with them);
- Limit transverse markings to the south of the gateway feature instead of extending northward into the Village (i.e. to create driver awareness prior to entering the Village to slow down vehicle speeds);
- Modify/rebuild existing raised intersections on McCombs Drive as per TAC standard detail to make them more comfortable to traverse;
- Modify/Rebuild existing traffic circle at McCombs Drive / Alder Avenue with revised geometry to make it traversable; and
- Remove bike lane and sidewalk from east side of Hot Springs Rd and combine as a shared-use path (curbed), and repaint and maintain bike lane on the west side.

4.3 Proposed Phasing

Recommended phasing for implementation of the Traffic Calming Plan Preferred Option is presented below. Phasing is based on a priority/as needed basis, as well as budget constraints and includes recommendations to discuss with the Ministry of Transportation for measures recommended on Hot Springs Rd.

Phase 1 (Retro-fit Existing Measures on McCombs Drive):

- Modify/rebuild existing raised intersections on McCombs Drive at Chestnut Avenue and Emerald Avenue according to the Transportation Association of Canada's design standards to make them more comfortable;
- Modify/rebuild existing traffic circle on McCombs Drive at Alder Avenue with revised geometry and traversable apron to allow larger vehicles to navigate more easily; and

- Remove 3-way stop at McPherson Rd and McCombs Drive, and maintain stop sign on east approach.

Phase 2 (Additional High Priority Traffic Calming Measures):

- Replace speed bumps with speed humps on Balsam Avenue and Pine Avenue;
- Install textured crosswalks on Walnut Avenue at Hot Springs Road and at Poplar Street in the vicinity of the school to create safe crossings to school and create awareness for drivers to slow down;
- Install speed hump on Walnut Avenue east of Poplar Street to slow vehicle speeds near school; and
- Install "Traffic Calmed Area" signage at entrance to Village.

Phase 3 (Additional Low Priority Traffic Calming Measures):

- Install additional speed humps as required on local east-west streets; and
- Install multi-use path (off-street) on east side of McCombs Drive.

Recommendations to Discuss with MoTI:

- Paint speed limits on Hot Springs Rd in vicinity of the 50km/h sign (north of Balsam Avenue) in both directions, and install new 60km/h speed limit signs with paint speed limits on Hot Springs Rd (as noted on Exhibit 4.5);
- Mobile speed feedback sign to be positioned at various locations along Hot Springs Rd for speed management as required;
- Install shared-use path (curbed on east side), and bike lane (painted on west side) on Hot Springs Road; and
- Install enhanced gateway feature at "entrance" to Village and paint transverse markings leading up to it.

4.4 Cost Estimates

Bunt has prepared some preliminary cost estimates for the Traffic Calming Plan Preferred Option, and included both a cost estimate plus a 20% contingency. The source of these unit costs is a mix of transportation engineering resource websites, manufacturer's websites, municipal government websites and actual documented projects that were conducted in the United States or Canada. For Village budgeting purposes, the cost estimates have further been divided by phase (as noted above) and by measure. The summary of these estimates is provided in **Table 4.1**. These costs do not include detailed design considerations.

Table 4.1: Preferred Option Cost Estimate by Phase

Phase	Type of Measure	Quantity/ Area	Estimated Cost Per Item	Total Cost
1	Modify/Rebuild existing raised intersections as per TAC guidelines	2	$30,000	$60,000
	Modify/Rebuild existing traffic circle with revised geometry and traversable apron	1	$50,000	$50,000
	Remove 3-way stop signs and stop bars (McPherson/McCombs) but maintain east approach stop sign	2	$200	$400
			Phase 1 Total	$110,400
			Plus 20% Contingency	$132,480
2	Install textured crosswalks on Walnut Ave at school (Poplar St, and Hot Springs Rd)	2	$6,000	$12,000
	Install speed hump on Walnut	1	$7,500	$7,500
	Replace speed bumps with speed humps on Balsam and Pine	5	$10,000	$50,000
	Install "Traffic Calmed Area" signage at entrance to Village	1	$200	$200
			Phase 2 Total	$69,700
			Plus 20% Contingency	$83,640
3	Install additional speed humps as required on other local streets	9	$12,000	$108,000
	Multi-use pathway (compacted gravel off-street)	1.76km (1,760m) x 4m wide	$40	$70,400
			Phase 3 Total	$178,400
			Plus 20% Contingency	$214,080
MoTI	Paint speed limits on Hot Springs Road	5 (3 NB, and 2 SB)	$130	$650
	Acquire mobile speed feedback sign	1	$7,500	$7,500
	Shared-use path (asphalt) curbed on east side of Hot Springs Road	2.5km (2,500m) x 4m wide	$600	$1,500,000
	Painted bike lane on west side of Hot Springs Road	2.5km (2,500m) x 2m wide	$5	$12,500
	Install textured crosswalk with signage on Hot Springs Road between Alder and Pine	1	$6,000	$6,000
	Transverse pavement markings on Hot Springs Road	100 m	$10	$1,000

Enhanced gateway feature (depending on design)	1	(not included)	(not included)
		MoTI Total	$1,527,650
		Plus 20% Contingency	$1,833,180
		Grand Total	$1,886,150
		Grand Total Plus 20% Contingency	$2,263,380

As shown, the preferred Traffic Calming Plan option (Modified Arterial Approach) is expected to cost in the range of $1,900,000 to $2,265,000 (including additional 20% for contingency). However, this is affected by the high cost of building an asphalt shared path on Hot Springs Road which itself costs about $1,500,000. Without this element, the cost is in the region of $500,000. These costs do not include detailed design considerations.

5. CONCLUSIONS

The Village of Harrison Hot Springs has experienced growing calls for traffic calming over the last few years and has installed many devices. In general, these devices have had a positive effect. However, this report meets the Village's wish to look at the issue of traffic calming in a holistic way by covering the following areas:

- **Reviewing the existing situation.** This found low volumes and relatively low speeds on many routes, although speeds were higher on Hot Springs Road, often in excess of the posted speed limit. Residents were largely happy with many of the traffic calming devices in place, although there was room for improvement. Speeding on Hot Springs Road continues to be an issue.

- **Traffic Calming Policy.** Using Industry standard literature, a review of appropriate traffic calming measures for Harrison Hot Springs was undertaken. This helped inform the eventual traffic calming plan.

- **Traffic Calming Plan.** Three options were developed based on different approaches to a road hierarchy, and presented to the public in an Open House format. Many comments were received, and based on this, a preferred option was developed.

The preferred option consists of the recommendations of the report and is detailed in the previous section, including the phasing. In summary, the highlights of the preferred option are:

- Rebuild the raised intersections and traffic circle to TAC standards, which will retain their effectiveness while making them more comfortable to navigate;

- Replace the existing speed bumps with more comfortable sinusoidal speed humps.

- Install a speed hump and textured crosswalks on Walnut Avenue, outside the school;

- Add additional speed humps on other east - west streets if required;

- Construct a new multi-use pathway along the east side of McCombs Drive to provide a safe, off-street, north - south route for pedestrians and cyclists.

Some options require consultation and discussion with MOT. Highlights of these measures include:

- Painted speed limit signs;

- Mobile speed feedback signs;

- Shared use asphalt path on east side of road;

- Painted bike lane on west side;
- Traverse pavement markings;
- Enhanced gateway feature.

These measures, in total, are expected to cost in the range of $1,900,000 to $2,265,000 (including additional 20% for contingency). However, the asphalt shared path on Hot Springs Road costs about $1,500,000. Without this element, the cost is in the region of $500,000.

By implementing a phased approach the Village can spread the cost of these measures over several years. In addition, several funding sources may be available to assist with costs.

APPENDIX A

Resident Traffic Calming Questionnaire

HARRISON HOT SPRINGS - TRAFFIC CALMING DRAFT SURVEY QUESTIONS

The following provides an outline of information to be collected and questions to be asked via the online survey which will be posted on the Village's website. Methods of publicizing the survey to be determined through consultation with the Village.

The Village of Harrison Hot Springs, with the help of transportation consultants Bunt & Associates, are undertaking a review of traffic calming in the Village. The traffic calming devices currently installed will be reviewed in terms of effectiveness and appropriateness. In addition, new traffic calming measures in terms of both type and location will be considered. In order to help us carry out this assessment, we would appreciate a few minutes of your time to fill in the following questionnaire. At the end of the questionnaire there will be an opportunity to register your email address in order to be kept informed of progress on the study.

We thank you for your time and your willingness to be involved in the study.

Driving/Walking/Cycling Routines

1. Which route do you use most often when coming into/out of the Village?

   (Choose between Mainly Hot Springs Road; Mainly McComb's Drive; Both; n/a).

2. What other roads do you regularly use when travelling by car? (Please circle all that are applicable)

   - *Esplanade Avenue*
   - *Lillooet Avenue*
   - *Eagle Street*
   - *Cedar Avenue*
   - *Miami River Drive*
   - *Walnut Avenue*
   - *Balsam Avenue*
   - *Chestnut Avenue*
   - *Pine Avenue*
   - *Alder Avenue*
   - *Emerald Avenue*

   - *Other – please state*

Bunt & Associates Engineering (BC) Ltd.
Suite 1812 – 1177 West Hastings Street, Vancouver, BC V6E 2K3 **Tel** 604 685 6427 **Fax** 604 685 6579
Vancouver Victoria Calgary Edmonton **www.bunteng.com**

3. a) Do you regularly walk along the local streets?

   Yes/No

   b) If so, which roads do you use? (Please circle all that are applicable)

   - *Esplanade Avenue*
   - *Lillooet Avenue*
   - *Eagle Street*
   - *Cedar Avenue*
   - *Miami River Drive*
   - *Walnut Avenue*
   - *Balsam Avenue*
   - *Chestnut Avenue*
   - *Pine Avenue*
   - *Alder Avenue*
   - *Emerald Avenue*

   - *Other – please state*

   c) How safe do you perceive the roads to be for walking?

   (Provide range of options to select. i.e. very safe; safe; somewhat safe; not very safe; dangerous; don't know)

4. a) Do you regularly cycle along the local streets?

   Yes/No

   b) If so, which roads do you use? (Please circle all that are applicable)

   - *Esplanade Avenue*
   - *Lillooet Avenue*
   - *Eagle Street*
   - *Cedar Avenue*
   - *Miami River Drive*
   - *Walnut Avenue*
   - *Balsam Avenue*
   - *Chestnut Avenue*
   - *Pine Avenue*
   - *Alder Avenue*
   - *Emerald Avenue*

   - *Other – please state*

   c) How safe do you perceive the roads to be for cycling?

   (Provide range of options to select. i.e. very safe; safe; somewhat safe; not very safe; dangerous; don't know)

5. How often do you use the trails on the east side of McComb's Drive (East Sector Lands/Park)?

   (Provide range of options to select. i.e. never; occasionally; more than once a month; once a week; daily)

6. a) If you use the trails on the east side of McComb's Drive how/where do you access them?

   (Text box to be included)

   b) This would require you to cross McComb's Drive. Where do you cross?

   (Text box to be included)

Traffic Concerns

7. Prior to the installation of traffic calming measures on McComb's Drive, Pine Avenue, and Balsam Avenue, what, if any traffic related issues did you observe?

   (Text box to be included)

8. How effective, in your opinion has each of the following traffic calming interventions been in slowing/reducing traffic volumes?

   a) Raised intersection/3-way stop at McComb's Drive / Emerald Avenue

   (Provide range of options to select. i.e. very effective; effective; neither effective nor ineffective; ineffective; very ineffective; don't know)

   b) Traffic circle at the intersection of McComb's Drive/Alder Avenue

   (Provide range of options to select. i.e. very effective; effective; neither effective nor ineffective; ineffective; very ineffective; don't know)

   c) Speed humps on Pine Avenue

   (Provide range of options to select. i.e. very effective; effective; neither effective nor ineffective; ineffective; very ineffective; don't know)

   d) Raised intersection at McComb's Drive/Chestnut Avenue

   (Provide range of options to select. i.e. very effective; effective; neither effective nor ineffective; ineffective; very ineffective; don't know)

   e) Speed humps on Balsam Avenue

(Provide range of options to select. i.e. very effective; effective; neither effective nor ineffective; ineffective; very ineffective; don't know)

9. Are there, or have there been any traffic-related issues on your road? If so, what are they?

   (Text box to be included)

10. Do you have any other traffic concerns in the Village?

    (Text box to be included)

11. If you could change one thing to improve traffic safety in the Village what would it be?

    (Text box to be included)

12. Any other comments?

    (Text box to be included)

Background Information

You do not have to fill out all or any of this information below. However, it is helpful in analyzing the responses. Please include an email address or phone number if you'd like to be informed of future developments concerning this study.

13. Name: *text box*

14. Address (if not willing to provide address, then postal code and or street/block number where they reside): *text box*

15. Contact email/phone if you would like to stay informed: *text box*

16. Age (please indicate): *0-18 19-35 35-50 51-65 >65 would rather not say*

17. Gender (please indicate): *Male/ female/ would rather not say*

Once again, thank you for your time,

The Village of Harrison Hot Springs and Bunt & Associates.

HHS Traffic Calming

SurveyMonkey

1. Which route do you use most often when coming into/out of the Village?

	Response Percent	Response Count
Mainly Hot Springs Road	**53.6%**	**30**
Mainly McComb's Drive	10.7%	6
Both	33.9%	19
n/a	1.8%	1
	answered question	**56**
	skipped question	**0**

2. What other roads do you regularly use when traveling by car? (Please select all that are applicable)

	Response Percent	Response Count
Esplanade Avenue	29.6%	16
Lillooet Avenue	44.4%	24
Eagle Street	38.9%	21
Cedar Avenue	9.3%	5
Miami River Drive	**46.3%**	**25**
Walnut Avenue	24.1%	13
Balsam Avenue	44.4%	24
Chestnut Avenue	1.9%	1
Pine Avenue	24.1%	13
Alder Avenue	14.8%	8
Emerald Avenue	11.1%	6
	Other (please specify)	7
	answered question	**54**
	skipped question	**2**

3. Other general comments for this section? (Please state in text box below)

	Response Count
	22
answered question	**22**
skipped question	**34**

4. Do you regularly walk along the local streets?

	Response Percent	Response Count
Yes	90.7%	49
No	9.3%	5
n/a	0.0%	0
answered question		54
skipped question		2

5. If you answered yes to the previous question, which roads do you use? (Please select all that are applicable)

	Response Percent	Response Count
Esplanade Avenue	**83.7%**	**41**
Lillooet Avenue	79.6%	39
Eagle Street	55.1%	27
Cedar Avenue	20.4%	10
Miami River Drive	71.4%	35
Walnut Avenue	40.8%	20
Balsam Avenue	30.6%	15
Chestnut Avenue	26.5%	13
Pine Avenue	20.4%	10
Alder Avenue	10.2%	5
Emerald Avenue	14.3%	7
Other (please specify)	53.1%	26
	answered question	**49**
	skipped question	**7**

6. How safe do you perceive the roads to be for walking? (Please select one)

	Very Safe	Safe	Somewhat safe	Not very safe	Dangerous	Don't know	Response Count
Safety of roads for walking	25.9% (14)	**35.2% (19)**	24.1% (13)	13.0% (7)	1.9% (1)	0.0% (0)	54
						answered question	**54**
						skipped question	**2**

7. Do you regularly cycle along the local streets?

	Response Percent	Response Count
Yes	60.4%	32
No	37.7%	20
n/a	1.9%	1
answered question		53
skipped question		3

8. If you answered yes to the previous question, which roads do you use? (Please select all that are applicable)

	Response Percent	Response Count
Esplanade Avenue	77.4%	24
Lillooet Avenue	**80.6%**	**25**
Eagle Street	67.7%	21
Cedar Avenue	25.8%	8
Miami River Drive	77.4%	24
Walnut Avenue	54.8%	17
Balsam Avenue	51.6%	16
Chestnut Avenue	35.5%	11
Pine Avenue	38.7%	12
Alder Avenue	22.6%	7
Emerald Avenue	29.0%	9
Other (please specify)		12
answered question		**31**
skipped question		**25**

9. How safe do you perceive the roads to be for cycling? (Please select one)

	Very safe	Safe	Somewhat safe	Not very safe	Dangerous	Don't know	Response Count
Safety of roads for cycling	14.0% (6)	**37.2% (16)**	30.2% (13)	7.0% (3)	7.0% (3)	4.7% (2)	43
answered question							**43**
skipped question							**13**

10. Other general comments for this section? (Please state in text box below)

	Response Count
	17
answered question	**17**
skipped question	**39**

11. How often do you use the trails on the east side of McComb's Drive (East Sector Lands/Park)?

	Response Percent	Response Count
Never	18.5%	10
Occasionally	**40.7%**	**22**
More than once a month	18.5%	10
Once a week	18.5%	10
Daily	3.7%	2
answered question		**54**
skipped question		**2**

12. If you use the trails on the east side of McComb's Drive (East Sector Lands/Park) how/where do you access them? (Please indicate in text box below)

	Response Count
	40
answered question	**40**
skipped question	**16**

13. This would require you to cross McComb's Drive. Where do you cross? (Please indicate in text box below)

	Response Count
	38
answered question	38
skipped question	18

14. Other general comments for this section? (Please state in text box below)

	Response Count
	13
answered question	13
skipped question	43

15. Prior to the installation of traffic calming measures on McComb's Drive, Pine Avenue, and Balsam Avenue, what, if any traffic related issues did you observe? (Please indicate in text box below)

	Response Count
	41
answered question	41
skipped question	15

16. How effective, in your opinion has each of the following traffic calming interventions been in slowing/reducing traffic volumes?

	Very effective	Effective	Neither effective nor ineffective	Ineffective	Very ineffective	Don't know	Response Count
Raised intersection at McComb's Drive / Emerald Avenue	28.3% (15)	**39.6% (21)**	7.5% (4)	7.5% (4)	15.1% (8)	1.9% (1)	53
Traffic circle at McComb's Drive/Alder Avenue	23.1% (12)	**34.6% (18)**	5.8% (3)	9.6% (5)	23.1% (12)	3.8% (2)	52
Speed humps on Pine Avenue	22.0% (11)	22.0% (11)	14.0% (7)	4.0% (2)	14.0% (7)	**24.0% (12)**	50
Raised intersection at McComb's Drive/Chestnut Avenue	31.4% (16)	**39.2% (20)**	7.8% (4)	5.9% (3)	13.7% (7)	2.0% (1)	51
Speed humps on Balsam Avenue	24.0% (12)	**28.0% (14)**	12.0% (6)	8.0% (4)	20.0% (10)	8.0% (4)	50
					answered question		**53**
					skipped question		**3**

17. Are there, or have there been any traffic-related issues on your road? If so, what are they? (Please indicate in text box below)

	Response Count
	36
answered question	**36**
skipped question	**20**

18. Do you have any other traffic concerns in the Village? Please indicate in text box below)

	Response Count
	41
answered question	41
skipped question	15

19. If you could change one thing to improve traffic safety in the Village what would it be? (Please indicate in text box below)

	Response Count
	43
answered question	43
skipped question	13

20. Any other comments?

	Response Count
	25
answered question	25
skipped question	31

21. Name

	Response Count
	43
answered question	43
skipped question	13

22. Address (if not willing to provide address, then postal code and or street/block number where you reside):

	Response Count
	41
answered question	**41**
skipped question	**15**

23. Contact email/phone if you would like to stay informed:

	Response Count
	42
answered question	**42**
skipped question	**14**

24. Age (please indicate):

	Response Percent	Response Count
0-18	0.0%	0
19-35	3.7%	2
35-50	18.5%	10
51-65	35.2%	19
>65	**42.6%**	**23**
would rather not say	0.0%	0
answered question		**54**
skipped question		**2**

25. Gender (please indicate):

	Response Percent	Response Count
Male	**54.7%**	**29**
Female	45.3%	24
Would rather not say	0.0%	0
	answered question	**53**
	skipped question	**3**

Page 2, Q2. What other roads do you regularly use when traveling by car? (Please select all that are applicable)

1	McCombs Drive	Jun 5, 2011 9:22 PM
2	McComb's	May 30, 2011 12:39 PM
3	McComb	May 29, 2011 7:47 AM
4	Cottonwood Ave.	May 19, 2011 7:09 PM
5	Rockwell Drive	May 16, 2011 5:35 PM
6	Ramona Place	May 16, 2011 12:55 PM
7	McCombs Drive	May 12, 2011 10:38 AM

Page 2, Q3. Other general comments for this section?

(Please state in text box below)

1	The traffic calming in place at present is dangerous, some installed on 50kph road with no prior warning, poor lighting, out of specification, used to deter traffic only, warning marking on calming not reflective, placed in the wrong location, too far apart, increase is exhaust emission, diverting traffic pass a school and no enforcement of other measures.	May 31, 2011 10:35 AM
2	I would like to see the speed bumps stay in place as people like to speed on that back road because it's not patrolled as much as Hot Springs RD and one life has been lost.Do we want more?No,no,no.	May 30, 2011 12:39 PM
3	Remove speed bums and evevated intercections	May 30, 2011 12:07 PM
4	Dislike the abundance of stop signs	May 29, 2011 7:47 AM
5	round about on Mc Combs is not safe to drive around ,not enough room and poor lighting.	May 26, 2011 12:58 PM
6	With the traffic bumps back on Balsam I now use Walnut instead. Traffic bumps are very annoying!	May 24, 2011 11:03 PM
7	In order to solve the excessive on-going speeding issues on Balsam, I'd like to suggest to the town of Harrison Hot Springs the addition of a round-about at the intersection of Clover Pl road and Balsam. This would result in a safer alternative year round.	May 22, 2011 12:06 PM
8	The stop signs are rather ineffective. The speed humps at intersections or T intersections are excellent . Place one at Miami River Drive and McCombs after the bridge is completed. The speed bumps should be eliminated .	May 20, 2011 12:26 PM
9	I travel Hot Springs Road instead of McCombs because the McCombs is too awful to use.	May 19, 2011 8:47 PM
10	Of course, the route will vary depending where I need to travel so some streets are less travelled.	May 19, 2011 7:09 PM
11	Remove the oversized speed bumps. Round abouts and extra stop sides are good. Those bumps should go away far. Dumb idea!! Knee action soluation!	May 19, 2011 1:49 PM
12	The trafic circle on mc Combs dus not have wide enough road surface and develop`s a pothole The square intersection trafic calmers force you to slow down completly.The sharp bumps,likethe one what were on Pineview were verry annoying,thank goodnes tey are gone.	May 19, 2011 10:29 AM
13	Miami River Dr., Eagle & Lillooet are all death traps for both kids & seniors alike. Cross walks required at key points such as park & boat launch. All the other streets checked above require serious trafic calming measures. This is a tourist town, not Indy. Also lower speed limit to 35 on all subdivision roads	May 16, 2011 10:54 PM
14	Why did you miss Rockwell Drive from the list? Why not ask what roads I used before this "traffic calming" nonsense drove me nuts?	May 16, 2011 5:35 PM

Page 2, Q3. Other general comments for this section?

(Please state in text box below)

15	The village does NOT end at Pine-Walnut etc!!There are taxpayers further south!There WILL be an accident on Ramona-caused by constant non observance of stop sign at Hadway--or speeders on Hot Springs road-it seems speed is only monitored north of Balsam!	May 16, 2011 12:55 PM
16	We are strongly apposed to speed bumps on Balsam Avenue. as my wife is handicapped and uses a scooter to get around the Village, it is awful for her going over them and bothers her back also when in our car I have to almost stop as the bumps are too severe for her.	May 15, 2011 7:01 PM
17	miami river, balsam are used to get to hot springs rd while avoiding traffic calming additions	May 15, 2011 5:27 PM
18	My bicycling route is mainly McCoombs/Eagle/Chestnut/ but only in the summer	May 14, 2011 11:15 AM
19	Above our the routes that I regularly use by car, but my children and I bike, rollerblade, and walk all around Harrison on a daily basis.	May 14, 2011 10:46 AM
20	The excess of traffic calming on McComb's Drive has caused traffic from the east part of town to almost stop using McComb's and access Hot Springs Rd. via Miami and then Balsam Avenue.	May 13, 2011 9:32 AM
21	THE WAY IT IS NOW IS GREAT	May 12, 2011 1:16 PM
22	Shortest routes to my destination	May 12, 2011 10:38 AM

Page 3, Q2. If you answered yes to the previous question, which roads do you use? (Please select all that are applicable)

1	Hot Springs road	Jun 4, 2011 10:29 AM
2	McCombs	May 31, 2011 10:37 AM
3	Echo	May 30, 2011 12:41 PM
4	McComb & MacPherson	May 29, 2011 7:51 AM
5	Cottonwood, Driftwood, Naismith, Chehalis	May 27, 2011 8:34 PM
6	trails	May 24, 2011 11:04 PM
7	maple	May 24, 2011 11:37 AM
8	driftwood-cottonwood-Mccomb	May 23, 2011 10:59 PM
9	McCombe	May 23, 2011 9:40 AM
10	McCombs Drive	May 20, 2011 11:01 AM
11	McCombs Drive	May 20, 2011 6:57 AM
12	Hot Springs	May 19, 2011 7:10 PM
13	McCombs	May 19, 2011 1:51 PM
14	harrison hot springs road	May 19, 2011 12:30 PM
15	Rockwell Drive, Hot Springs Road.	May 16, 2011 5:39 PM
16	Miami River Dr.	May 16, 2011 3:21 PM
17	MCoombs	May 16, 2011 12:36 PM
18	mccoombs, hot springs	May 16, 2011 12:31 PM
19	McCoumb	May 16, 2011 10:38 AM
20	lack of sideways on some streets add to unsafe feeling	May 15, 2011 7:28 AM
21	McCombs, McPherson	May 14, 2011 5:36 PM
22	Hot Springs Rd	May 14, 2011 3:38 PM
23	Cottonwood, Driftwood	May 14, 2011 10:52 AM
24	Mccoombs	May 14, 2011 9:09 AM
25	Naismeth	May 12, 2011 7:14 PM
26	McCombs Drive	May 12, 2011 10:38 AM

Page 3, Q5. If you answered yes to the previous question, which roads do you use? (Please select all that are applicable)

1	Hot Springs road	Jun 4, 2011 10:29 AM
2	Hot Springs Road, McCombs	Jun 4, 2011 8:59 AM
3	McCombs	May 31, 2011 10:37 AM
4	cottowood- Mc comb-Mc pearcen-harris rd-	May 23, 2011 10:59 PM
5	McCombe	May 23, 2011 9:40 AM
6	Hot Springs Road , Rockwell Drive	May 16, 2011 5:39 PM
7	Hot Springs Road and McCoombs	May 16, 2011 12:36 PM
8	McCombs, Hot Springs Road	May 14, 2011 5:36 PM
9	Hot Springs Road	May 14, 2011 3:38 PM
10	McCoombs, Cottonwood, Driftwood, Hot Springs Road	May 14, 2011 11:18 AM
11	McPherson, Hot Springs Rd.	May 14, 2011 10:52 AM
12	McComb Drive	May 12, 2011 10:38 AM

Page 3, Q7. Other general comments for this section?

(Please state in text box below)

1	Harrison roads are pretty safe for biking, hot springs road bike lane needs to be repaved and cleaned.	Jun 4, 2011 10:29 AM
2	Greatly desire a bike lane on Hot Springs Rd. heading to Agassiz!!!	May 29, 2011 7:51 AM
3	It has been observed by many neighbors that OFTEN motorists speed excessively on Balsam Ave therefore a permanent solution is needed. Reducing the speed limit from 50 to 30 would not control the issue at hand. An alternative solution as mentioned previously about a roundabout would be in the best interest to ALL neighbours. Thank you	May 22, 2011 12:12 PM
4	The biggest problem with the roads in Harrison is the lack of sidewalks on most.	May 19, 2011 8:49 PM
5	There is a bend on balsm and too many cars whip around this corner it is not safe	May 19, 2011 12:30 PM
6	safe because there is litle trafic most of the time	May 19, 2011 10:41 AM
7	Why exclude Hot Springs Rd and Rockwell Drive from these lists.	May 16, 2011 5:39 PM
8	Hadway stop sign at Ramona rarely observed-ditto speed limits south of Pine--exiting Ramona hazardous due to speeders on Hot Springs Rd	May 16, 2011 12:58 PM
9	No sidewalks means that while walking or cycling, we must be constantly cognizant of approaching traffic. Should be 30 kmh on residential streets	May 16, 2011 5:39 AM
10	many close calls with cars over the years, to be expected, I guess because cars are mixed in with bikes. Bike lanes would be great!!	May 15, 2011 7:28 AM
11	Hot Springs Road is very unsafe. Still no properly designated bicycle lane.	May 14, 2011 5:36 PM
12	Usually only cycle only in the summer months	May 14, 2011 11:18 AM
13	With only one route out of town with excess calming on McComb's traffic is now using Miami then Balsam to reach Hot Springs Rd. A speed limit of 50 km/hr and the absence of enforcement makes foot travel less than safe at times.	May 13, 2011 9:40 AM
14	Traffic travelling way past posted speed limits. Narrow shoulder a concern.	May 12, 2011 10:43 PM
15	Actually as long as we don't cycle on the main roads.	May 12, 2011 7:14 PM
16	WE LIKE IT THE WAY IT IS NOW DO NOT CHANGE ANYTHING.	May 12, 2011 1:18 PM
17	We need side walks and wider streets on all areas off of Lillooet	May 12, 2011 10:38 AM

Page 4, Q2. If you use the trails on the east side of McComb's Drive (East Sector Lands/Park) how/where do you access them?

(Please indicate in text box below)

1	Emerald Ave	Jun 5, 2011 9:25 PM
2	use trails and roads through Harrison to get there	Jun 4, 2011 10:30 AM
3	Rockwell Drive & Lillooet	Jun 4, 2011 9:02 AM
4	From McCombs and Eagle	May 31, 2011 10:38 AM
5	mcCombs	May 30, 2011 12:09 PM
6	McCombs Drive	May 30, 2011 12:05 PM
7	McComb's Drive	May 30, 2011 11:32 AM
8	- several of the trail entrances off of McCombs drive, best one is toward the end of McCombs,near Mac Phearson.	May 29, 2011 8:15 AM
9	2 trails near the south bridge over Miami and from MacPherson	May 29, 2011 7:53 AM
10	Usually from Lillooet Rd. Also from Cottonwood or Driftwood, or higher up near Myng Cres for Faces Trail	May 27, 2011 8:38 PM
11	At Nasmith	May 26, 2011 1:03 PM
12	Cottonwood or Eagle or Ramona for masks trail	May 24, 2011 11:06 PM
13	Pine	May 23, 2011 9:41 AM
14	Corner of Miami Dr and McComb's Drive	May 22, 2011 12:13 PM
15	Myng Crescent area	May 21, 2011 2:38 PM
16	Off of Naismith / McCombs	May 20, 2011 12:28 PM
17	Chestnut Avenue	May 20, 2011 11:02 AM
18	At the end of Cottonwood Ave.	May 20, 2011 8:49 AM
19	Chestnut Avenue	May 20, 2011 6:59 AM
20	At the bridge and at the end of Echo	May 19, 2011 8:51 PM
21	Cottonwood Ave., Chestnut, South McCombs (Mask Park)	May 19, 2011 7:32 PM
22	by eagle st	May 19, 2011 12:31 PM
23	echo av	May 19, 2011 10:48 AM
24	Rockwell Drive , Driftwood & Cottonwood , McPherson. Eagle St.	May 16, 2011 5:44 PM
25	from McCoombs	May 16, 2011 3:22 PM
26	just over the one way bridge past Miami River drive	May 16, 2011 12:38 PM

Page 4, Q2. If you use the trails on the east side of McComb's Drive (East Sector Lands/Park) how/where do you access them?

(Please indicate in text box below)

27	mccombs	May 16, 2011 12:32 PM
28	Various points along McCombs and Eagle	May 16, 2011 5:42 AM
29	Access from Cottonwood Ave	May 15, 2011 8:40 PM
30	near emerald, and other spots	May 15, 2011 5:30 PM
31	Cottonwood/Driftwood	May 15, 2011 7:29 AM
32	Naismith, Cottonwood and Lillooet	May 14, 2011 5:39 PM
33	Off of McCoombs/Eagle at Chestnut or Cottonwood or Driftwood	May 14, 2011 11:20 AM
34	At the end of Chestnut, the end of Naismith, or the end of Rockwell De.	May 14, 2011 11:00 AM
35	Foot of Naismith	May 13, 2011 4:34 PM
36	Via Eagle just north of the Miami R. bridge.	May 13, 2011 9:52 AM
37	On the main trail near the bridge.	May 12, 2011 7:15 PM
38	McComb & Naismith	May 12, 2011 1:50 PM
39	MCCOMBS	May 12, 2011 1:19 PM
40	Off Eagle and Naismith	May 12, 2011 10:38 AM

Page 4, Q3. This would require you to cross McComb's Drive. Where do you cross?

(Please indicate in text box below)

1	Emerald Ave	Jun 5, 2011 9:25 PM
2	trail behind miami drive usually	Jun 4, 2011 10:30 AM
3	Does not require crossing McComb's Drive.	Jun 4, 2011 9:02 AM
4	any where	May 31, 2011 10:38 AM
5	pine	May 30, 2011 12:09 PM
6	Pine	May 30, 2011 12:05 PM
7	Emerald Street or Ming	May 30, 2011 11:32 AM
8	- I am usually already on the side of the park as i walk against traffic though I also i cross at the safety circles as well.	May 29, 2011 8:15 AM
9	anywhere	May 29, 2011 7:53 AM
10	Anywhere convenient.	May 27, 2011 8:38 PM
11	AT Nasmith	May 26, 2011 1:03 PM
12	Just over the bailey bridge or at Miami River Drive	May 24, 2011 11:06 PM
13	Naismith and Pine	May 23, 2011 9:41 AM
14	Miami Drive	May 22, 2011 12:13 PM
15	middle of road when no cars	May 21, 2011 3:20 PM
16	Miami River	May 21, 2011 2:38 PM
17	Naismith	May 20, 2011 12:28 PM
18	Chestnut Avenue	May 20, 2011 11:02 AM
19	Chestnut Avenue	May 20, 2011 6:59 AM
20	Where ever I feel like.	May 19, 2011 8:51 PM
21	anywhere that is near to "park" entrance	May 19, 2011 7:32 PM
22	miami drive	May 19, 2011 12:31 PM
23	I live on Echo,however if we cross to follow the trail allong miami river we cross at the bridge on Mc Combes	May 19, 2011 10:48 AM
24	Anywhere I like. Is there a problem with that. It`s a very low-volume roadway. Crossing is no problem. We don`t need any help with that , thank you.	May 16, 2011 5:44 PM
25	from Miami River Dr	May 16, 2011 3:22 PM
26	Haismith & Eagle	May 16, 2011 12:38 PM

Page 4, Q3. This would require you to cross McComb's Drive. Where do you cross? (Please indicate in text box below)

27	pine	May 16, 2011 12:32 PM
28	Usually at Miami River Drive and McCombs and sometimes Naismith at Eagle	May 16, 2011 5:42 AM
29	Driftwood	May 15, 2011 7:29 AM
30	Naismith near the bridge	May 14, 2011 5:39 PM
31	Miami River Drive or Chestnut	May 14, 2011 11:20 AM
32	The East end of Miami River Drive or the end of Naismith	May 14, 2011 11:00 AM
33	Naismith	May 13, 2011 4:34 PM
34	Just north of where McComb's starts.	May 13, 2011 9:52 AM
35	The corner of Naismeth and Eagle	May 12, 2011 7:15 PM
36	End of Naismith	May 12, 2011 1:50 PM
37	MIAMI RIVER DRIVE	May 12, 2011 1:19 PM
38	Eagle and Naismith	May 12, 2011 10:38 AM

Page 4, Q4. Other general comments for this section?

(Please state in text box below)

1	Trails on the East side can be accessed at numerous places. Lillooet, Echo, Naismith, Driftwood, Eagle, McCombs, McPherson	Jun 4, 2011 9:02 AM
2	no problem	May 29, 2011 7:53 AM
3	Oviously one checks for traffic when crossing McCombs Rd. This does not seem a problem.	May 27, 2011 8:38 PM
4	There is a lot of wet areas on the trails that need attention.	May 24, 2011 11:06 PM
5	I did not find the roads unsafe before the calming measures were put into effect	May 19, 2011 8:51 PM
6	Remove speed bumps!!!!!	May 19, 2011 1:51 PM
7	Love the trails.They need some clearing and gravol on soft spots.	May 19, 2011 10:48 AM
8	please don`t even think about any more traffic calming nonsense such as cross walks on McComb Drive. We`re not idiots here. we don`t need some busybody from Surrey or Vancouver telling us we are incapable of driving, walking and biking safely without multiple nannny-state rules.	May 16, 2011 5:44 PM
9	The trail access and improvements are great and regularly used.	May 14, 2011 5:39 PM
10	It's more difficult crossing at the end of Naismith because I know the visibility of oncoming cars is inhibited by the one lane bridge and the curve in Eagle St. between Driftwood and Cottonwood	May 14, 2011 11:00 AM
11	don't use them because of the possiblilty of wildlife.	May 13, 2011 11:25 AM
12	The speed limit on residental streets should be lowered to 40Km/hr and 50Km/hr. on access streets as McComb's and Hot Springs Rd. However, witihout enforcement many drivers will ignore these changes as are many stop signs.	May 13, 2011 9:52 AM
13	Trails require more signage for more usage	May 12, 2011 10:38 AM

Page 5, Q1. Prior to the installation of traffic calming measures on McComb's Drive, Pine Avenue, and Balsam Avenue, what, if any traffic related issues did you observe?

(Please indicate in text box below)

1	There were very few traffic issues even before the traffic calming measures. The worst problem is probably the speeding traffic and logging trucks on lillooet	Jun 4, 2011 10:36 AM
2	People use McCombs Drive as a short cut and speed to prove to themselves it takes less time than using Hot Springs Road.	Jun 4, 2011 9:09 AM
3	Speeding.	May 30, 2011 12:43 PM
4	Remove single lane overpass	May 30, 2011 12:12 PM
5	Speeding down these streets.	May 30, 2011 12:11 PM
6	One way overpass	May 30, 2011 12:07 PM
7	Drivers going way too fast.	May 29, 2011 8:40 AM
8	Cars speeding down McComb	May 29, 2011 7:56 AM
9	I feel McCOmbs drive was a natural secondary access road to the village.....and a needed alternative road for emergency use. Drivers go too fast , but the calming measures are detrimental to village traffic.They would be a real problem in any emergency requiring immediate evacuation of residents.	May 27, 2011 8:51 PM
10	They are a joke people will just find other ways to get out of the subdevision,I dot know of anyone speeding on such a short distance.	May 26, 2011 1:09 PM
11	Speeding on McCombs prior to the death of the young cyclist otherwise none.	May 24, 2011 11:16 PM
12	speeding, including myself!	May 24, 2011 11:38 AM
13	Traffic was generally very good. No real speeding or reckless driving.	May 23, 2011 9:54 AM
14	- Excessive Speeding - Flow of traffic increased dramatically when calming measures were removed. - Noise pollution increase - It dissapoints me that no option for a traffic circle on Balsam and Clover is not added in questions 2	May 22, 2011 12:27 PM
15	Vehicles were speeding When McComb's speed bumps went in, there was a high increase of traffic on Balsam Ave	May 21, 2011 2:54 PM
16	Speeding	May 20, 2011 12:33 PM
17	What part of Stop Signs do drivers not understand. Perhaps more law enforcement is required.	May 20, 2011 11:10 AM
18	none	May 20, 2011 9:02 AM
19	McCombs Drive was used as a drag strip	May 20, 2011 7:04 AM
20	none	May 19, 2011 8:59 PM
21	I do not live on these streets so it would not be fair to say. But can tell you that the speed bumps were very hard on the vehicle.	May 19, 2011 7:32 PM

Page 5, Q1. Prior to the installation of traffic calming measures on McComb's Drive, Pine Avenue, and Balsam Avenue, what, if any traffic related issues did you observe?

(Please indicate in text box below)

22	No stop signs	May 19, 2011 1:53 PM
23	cars do not stop at signs or yield at bridge and they speed in the summer monthes espl	May 19, 2011 12:34 PM
24	One way bridge over Miami River does not even slow down some of the idiots	May 16, 2011 11:08 PM
25	There was one problem. The Village of Harrison failed to maintain safe sightlines where Myng Crescent joins McComb. The roadside brush grew up and was not removed as required by bylaw. The intersection was unsafe because traffic on the arterial Rd, McComb, couldn`t see emerging traffic from Myng. It was a hidden intersection. A small boy on a bicycle was killed there, having emerged onto McComb into the path of a speeding, drunk or drugged driver. The kid might have lived if the driver had seen him and taken evasive action or if the kid had seen the car. Next morning, the Village cleared the brush. Too late. the damage was done. Ever since, the Village has been trying furiously to cover up their own negligence by pretending that speed on McComb is a problem. We also made the mistake of electing a senior citizen who thinks McComb is his own private walking path and who is trying to drive all cars off it by putting in assorted impediments to traffic. You demonstrate your bias by posing your next question as if slowing or reducing volumes on McComb (a designated arterial street) is a good thing. It`s not. You`ve simply driven through (arterial) traffic onto residential streets where it does not belong, thus creating conflicts which did not exist before. Npot only is McComb designated as an arterila Rd in Harrison`s OCP. It is also the official MoTH alternateédiversion route to Hot Springs Rd (Hwy 9) which is often blocked by accidents , fires, roadworks etc.	May 16, 2011 6:10 PM
26	(1) non observance of stop sign on Hadway at Ramona (2)speed limit on Hot Springs Rd south of Pine ignored-esp after bars close-and during early morning commute (5 a.m.-9.am)	May 16, 2011 1:07 PM
27	speeding cars on McCooms	May 16, 2011 12:54 PM
28	speeding	May 16, 2011 12:40 PM
29	There was actually traffic on McComb.	May 16, 2011 10:50 AM
30	Cars speeding, near misses of pedestrians and children emerging from Clover Place onto Balsam	May 16, 2011 5:58 AM
31	None	May 15, 2011 5:37 PM
32	Speeders down McCombs	May 15, 2011 7:33 AM
33	Excessive speeding	May 14, 2011 5:47 PM
34	speeding, drag racing	May 14, 2011 3:41 PM
35	Lots of speeding cars on McCoombs, it was like a straight speedway for drivers who don't care about other people either walking or bicycling along the route. Prior to the traffic calming my husband was almost hit by a speeding driver on several occasions..	May 14, 2011 11:31 AM

Page 5, Q1. Prior to the installation of traffic calming measures on McComb's Drive, Pine Avenue, and Balsam Avenue, what, if any traffic related issues did you observe?

(Please indicate in text box below)

36	Excessive speeding down McCombs and Eagle St. and near accidents and "road rage" at both ends of the one lane bridge on Eagle.	May 14, 2011 11:15 AM
37	traffic speeding on McCombs	May 14, 2011 9:16 AM
38	No problem. (Not as much traffic on Balsam Ave)	May 13, 2011 5:02 PM
39	As mentioned previously traffic calming on McComb's resulted in greatly increased traffic on Balsam and then with calming on Pine an even greater increase on Balsam.	May 13, 2011 10:13 AM
40	Speeding. Outright violation of the Traffic Act 1975, Fail to yield, Fail to stop. Fail to yield to pedestrians and cyclists. Speeding above posted speed limits.	May 12, 2011 10:50 PM
41	The speed bumps are too high and possible damage to vehicle and roundabout is far too small/tight	May 12, 2011 10:39 AM

Page 5, Q3. Are there, or have there been any traffic-related issues on your road? If so, what are they?

(Please indicate in text box below)

1	Lillooet avenue has many speeding cars at night, also road needs resurfacing so big trucks don't shake the entire neighbourhood	Jun 4, 2011 10:36 AM
2	I live on Lillooet and there is lots of traffic. For the most part there are no issues with the exception of the occasional speeder.	Jun 4, 2011 9:09 AM
3	Yes reckless drivers, both speeding and driving dangerously.The loss of my son's life as a result of these.McComb's Drive is a straight road way used by pedestrians and cyclist. These calming devices have slowed traffic down; making McComb's Drive safer for everyone.	May 30, 2011 12:11 PM
4	Yes, speeding motorcycles that come roaring into town on Sat. and Sunday with no mufflers. The sound is deafening and reverberates off the mountains that surround us.	May 29, 2011 8:40 AM
5	heavy trucks still use the south bridge; some cars ignore stop signs	May 29, 2011 7:56 AM
6	However people just avoid these routes and take others. For example there is much more traffic down Walnut beside the school. This is a very dangerous situation. Last week a dog was struck and killed there and the culprit did not even bother to stop! For trades people the traffic calming measures make it almost impossible to move around town with equipment.	May 24, 2011 11:16 PM
7	The temperary bridge on Mccombs is a pain in the ass. Also the gravel on the bike path on harrison rd.	May 23, 2011 11:08 PM
8	Traffic in general for the entire Village is good. There is the odd problem however that is were traffic law enforcement should come in, not impede the general traffic for the sake of a few problems.	May 23, 2011 9:54 AM
9	Improperly installed speed bumps. Vehicles travelling towards Hot Springs Ave can align their vehicles tires in order to not hit the speed bumps. How is this effective?	May 22, 2011 12:27 PM
10	poor side walks no proper bike lanes	May 21, 2011 3:24 PM
11	Near miss of a school child being hit by a car, increased traffic flow from people accessing Hot Springs Road as well as high speed of cars.	May 21, 2011 2:54 PM
12	Speeding is the main issue - locals driving unlicensed mini bikes , etc	May 20, 2011 12:33 PM
13	Excessive speed - Excessive noise - Failure to obey Stop Signs.	May 20, 2011 11:10 AM
14	none	May 20, 2011 9:02 AM
15	We live near the corner of McCombs Drive and Pine and on a continual basis I observe vehicles not observing the stop signs. I have witnessed kids trying to cross the road and vehicles not stopping for them.	May 20, 2011 7:04 AM
16	A few people tend to go rather fast considering there are young children on this street (Cottonwood Ave.)	May 19, 2011 7:32 PM
17	as stated above about balsm street	May 19, 2011 12:34 PM

Page 5, Q3. Are there, or have there been any traffic-related issues on your road? If so, what are they?

(Please indicate in text box below)

18	Speeding	May 16, 2011 11:08 PM
19	This survey is just a lot of BS designed to justify the stupid decisions made by this council of idiots.	May 16, 2011 6:10 PM
20	traffic diverted from McCoombs to Balsam and since the raised areas have been removed from Balsam traffic has been increased	May 16, 2011 3:28 PM
21	(1)stop sign on Hadway at Ramona frequently ignored COMPLETELY--have almost been T-boned many times	May 16, 2011 1:07 PM
22	heavy traffic, speeding cars, no sidewalks	May 16, 2011 12:54 PM
23	cars dodge speed bumps and tear up boulevard grass around them. stop signs do not stop traffic at all, they just run through them.	May 16, 2011 12:40 PM
24	Please refer to an E-mail sent to Bunt on May 14th which contained a letter outlining the traffic concerns on Balsam	May 16, 2011 5:58 AM
25	Pertaining to the traffic circle at Alder & McComb. We find this circle not to be effective in controlling speed of the most trafffic (ie cars and light trucks etc.) but is an unessesary obstacle to larger traffic such as RV.s wishing to make the left turn onto or off from either Alder or McColmb. The circle is much to tight for most truck and trailer combinations. To compound this problem most truck and trailer combinations are required to use this intersection by the load limits imposed on the bridge at Miami Creek.	May 15, 2011 1:12 PM
26	Speeders on Miami River Drive	May 15, 2011 7:33 AM
27	Naismith Avenue is pretty good as it is not a through road.	May 14, 2011 5:47 PM
28	We live on Miami River Drive and for the most part people drive within the speed limit but I have witnessed at various times, young drivers who are speeding, driving irratically and squeeling their tires.	May 14, 2011 11:31 AM
29	We live right beside the one lane bridge and therefore have witnessed a lot of traffic-related issues because of it. When it was a two lane bridge, there were many cars who went over it at excessive speeds and I'm concerned about the speeds increasing again when the bridge is replaced.	May 14, 2011 11:15 AM
30	Too much speeding traffic on Balsam Avenue.	May 13, 2011 5:02 PM
31	I reside on Balsam Ave and am concerned with the increased traffic from the calming on McComb's. A 50 km/hr speed limit is too fast with the school children who cross just west of the curve on Balsam which impedes vision around the corner.	May 13, 2011 10:13 AM
32	Speed bumps are way to sharp. Very hard on suspension. Need to be made bigger and wider and well marked with yellow caution paint.	May 12, 2011 10:50 PM
33	We live in a cul de sac	May 12, 2011 7:20 PM
34	no!	May 12, 2011 1:53 PM

Page 5, Q3. Are there, or have there been any traffic-related issues on your road? If so, what are they?

(Please indicate in text box below)

35	BALSAM BUMPS WAY TO HIGH . HURT MOMS BACK NO MATTER HOW SLOW I WENT SAME FOR HUSBAND WITH BACK OPERATION . GLAD THEY ARE DOWN NOW ALSO HARD ON CAR TO.	May 12, 2011 1:22 PM
36	occasional failure to stop at Eagle and Naismith	May 12, 2011 10:39 AM

Page 5, Q4. Do you have any other traffic concerns in the Village?

Please indicate in text box below)

1	Build Sidewalks	Jun 5, 2011 9:27 PM
2	no	Jun 4, 2011 10:36 AM
3	Full public consultation before any more schemes are introduced and specification on road types (how many use that road + the 85% speed + pedestrian usage = type of claming)	May 31, 2011 10:58 AM
4	remove all speed bumps	May 30, 2011 12:12 PM
5	Often speeding drivers pass dangerously on the highway leading into town. Anything that slows people down in and near the village is good.	May 29, 2011 8:40 AM
6	question 2 stop signs at MacPherson and McComb	May 29, 2011 7:56 AM
7	I think the traffic calming measures are overdone , as a result of some unfortunate accidents and bad driving habits.	May 27, 2011 8:51 PM
8	People who have the audacity to stick no parking signs in front of there homes. There is no problem with visitors on busy weekends parking on residential streets. There is not a home in HHS that does not have ample parking within the confines of their lot to be so selfish.	May 24, 2011 11:16 PM
9	I do not see police traffic law enforcement in the Village. Does police ever come to Harrison to enforce traffic laws?	May 23, 2011 9:54 AM
10	If the Village is to have speed bumps installed, perhaps they can install them correctly and give vehicles the ability to drive between them.	May 22, 2011 12:27 PM
11	congestion no parking because of employees taking all parking 24 hrs a day	May 21, 2011 3:24 PM
12	Children and adults driving motorized pocket bikes, driveable lawn mowers going up the streets and Atv's on the roads as well.	May 21, 2011 2:54 PM
13	Implement pay parking on Esplanade and ease parking opportunities for those visitors wishing a short stay.	May 20, 2011 12:33 PM
14	Excessive noise with motorcyles. Lack of safety considerations for pedestrians. Failure to obey speed limits.	May 20, 2011 11:10 AM
15	the one way bridge on McCombs at the Miami River. The state of the Bridges on McCombs	May 20, 2011 9:02 AM
16	My main concern is McCombs drive and Pine intersection. Vehicles still drag race from Chestnut to Emerald without stopping for the stop signs on McCombs Drive and Pine	May 20, 2011 7:04 AM
17	I am sure the calming measures have been very effective. I do not want to drive on any of those roads any more. This seems to defeat the purpose of having a road there, if it does not get used.This means that Hot Springs Road carries much more traffic and as a result is less safe. I find crossing Hot Springs Road to be very difficult, especially with children. I did not find McCombs unsafe before the calming measures and I feel it was an over-reaction to the situation.	May 19, 2011 8:59 PM

Page 5, Q4. Do you have any other traffic concerns in the Village?

Please indicate in text box below)

18	Round About on McComb is not effective as people do not go around but cut back the wrong way before getting into the correct lane. Also, this circle will not accommodate pull trailers and even pickup trucks have difficulty as the circle it is too narrow. Could pose a hazard in the event of an emergency as there is limited exit possiblities for the village.	May 19, 2011 7:32 PM
19	Better signage for bus stops,with pickup time posted on them.	May 19, 2011 11:01 AM
20	Speed Limits, To high on Lillooet and in subdivision	May 16, 2011 11:08 PM
21	Yes. I`m concerned that this council refuses to acknowledge that Harrison has a traffic plan which was established many years ago and which has , until now, ensured rational, safe traffic patterns.	May 16, 2011 6:10 PM
22	my only concern is the speed of vehicles on Hot Springs Road NOTHING is done to control it..I have no concerns other than this	May 16, 2011 3:28 PM
23	Speed limit on Hot Springs road south of Pine not enforced-speeds of 80-100 kph not uncommon-especially after 1 am-when pubs close-and after 5 am when commuters arrive/depart--traffic hazard and annoyance-frequently woken up by hi speed traffic noise	May 16, 2011 1:07 PM
24	1. crosswalks required along Lilloet especially one from Spring Park at Chehalis (I think it is....too small to read easily), on the corner where the church is (Spruce Street), one at Maple Street too 2. major traffic back up onto Hot Springs Road caused by the 4 way stop at Lilloet and Hot Springs Road 3. speed bumps along the 100-300 Miami River Drive	May 16, 2011 12:54 PM
25	kids play on pine ave and the cul de sac on pine ave and with pine ave being the shortest and only street without proper traffic calming measures, and soon to be the easiest route to hot springs road for the new kingma development, pine ave will see a fatality. i can't even have my dog off leash on my front lawn with the speeding traffic going down pine ave.	May 16, 2011 12:40 PM
26	Since all the traffic calming measures have been taken on McComb the traffic has been forced into more populated areas such as Balsam. Which makes it absolutely more dangerous.	May 16, 2011 10:50 AM
27	1. The speeding on Hot Springs Rd. is so excessive at times. More enforcement required. 2. 30 kmh within Village residential core is essential. We have no sidewalks and pride ourselves on being pedestrian friendly.	May 16, 2011 5:58 AM
28	Would like to see more sidewalks to make walking safer	May 15, 2011 8:43 PM
29	Yes! That I streets will have "traffic calming" on them. If you don't want the streets connecting McCombs and Hot Springs road used, why not just block them all at Hot Springs road and reroute traffic on the streets of choice.	May 15, 2011 5:37 PM
30	Exit off Alder Ave. to the driveway into 434 Alder when travelling east was changed during some Village roadwork from a curved entrance to a right angle turn again making it necessary for larger vehicles to navigate the above mentioned traffic circle or run over the curb at the entrance to 434 Alder.	May 15, 2011 1:12 PM
31	Speeders on Hot Springs Road	May 15, 2011 7:33 AM

Page 5, Q4. Do you have any other traffic concerns in the Village?

Please indicate in text box below)

32	The short, sharp speed bumps on Balsam and Pine are dangerous. They work but are much too agressive. The stop sign at McCombs and Pine is not observed as one can see clearly whether there is traffic BUT there could be a speed bump at that point on McCombs	May 14, 2011 5:47 PM
33	Speeding on Hot Springs Road, especially through the school zone between Balsam and Walnut Avenue. We walk on the new bridge daily and witness many drivers exceeding the speed limit.	May 14, 2011 11:31 AM
34	No crosswalk for people walking to the beach from Eagle Street. The speed with which people come around the curve in the road on Eagle between Cottonwood and Driftwood.	May 14, 2011 11:15 AM
35	Speed limit definitely not being enforced on Hot Springs Road.	May 13, 2011 5:02 PM
36	Why has the only other route in or out of the village besides Hot Springs Rd., McComb's Drive been calmed to a point where few drivers use it?? The number of residences on McComb's is very low compared to Balsam, Pine, Emerald and etc.	May 13, 2011 10:13 AM
37	Esplanade speed bumps during the summer really sucks. Again suspension issues. Prefer rumble strips.	May 12, 2011 10:50 PM
38	no, Harrison is extremely safe compared to other towns.	May 12, 2011 7:20 PM
39	Lack of Law enforcement!	May 12, 2011 1:53 PM
40	NO	May 12, 2011 1:22 PM
41	Pedestrian safety of concern	May 12, 2011 10:39 AM

Page 5, Q5. If you could change one thing to improve traffic safety in the Village what would it be?

(Please indicate in text box below)

1	Enforce speed limits	Jun 5, 2011 9:27 PM
2	crosswalk on Lillooet at maple and eagle with some flashing pedestrain lights to make drivers more aware of pedestrians and their speed	Jun 4, 2011 10:36 AM
3	Drivers need to be more responsible, and slow down when driving in the Village.	Jun 4, 2011 9:09 AM
4	Better enforcement and signage	May 31, 2011 10:58 AM
5	Maybe traffic light at the four way stop	May 30, 2011 12:43 PM
6	take out one way streets	May 30, 2011 12:12 PM
7	Yes speed bumps needed between Emerald Street and Ming and McPherson Street.	May 30, 2011 12:11 PM
8	- Have bylaw officers giving tickets to speeding motorcycle drivers that have no regard for the noise they create when they visit Harrison.	May 29, 2011 8:40 AM
9	More police presence on our local roads, to charge anyone speeding.	May 27, 2011 8:51 PM
10	Take out all these silly idea,s that it will stop people from speeding .	May 26, 2011 1:09 PM
11	Change the speed limits: in residential areas to 40 km and the Hot Springs Road limit to 50.	May 24, 2011 11:16 PM
12	find a way to decrease speed on the highway	May 24, 2011 11:38 AM
13	More sings indicating the speed.	May 23, 2011 11:08 PM
14	Remove the speed bumps and raised intersections and have police randomly enforce traffic laws on on main streets.	May 23, 2011 9:54 AM
15	Create roundabouts where needed to control flow of traffic.. A roundabout at Clover Pl and Balsam needs to be created in order to solve this on-going issues with vehicles disobeying speed limits.	May 22, 2011 12:27 PM
16	wider side walks on all roads including highway from Agassiz	May 21, 2011 3:24 PM
17	Adjust the speed bumps on McCombs to longer flatter ones so motor homes and trailers are more likely to travel the route.	May 21, 2011 2:54 PM
18	Put more traffic humps on McCombs and less stop signs.	May 20, 2011 12:33 PM
19	More radar speed traps. Presence of police officers.	May 20, 2011 11:10 AM
20	More sidewalks,painting the parking spaces on Lillooet	May 20, 2011 9:02 AM
21	More Sidewalks.	May 19, 2011 8:59 PM

Page 5, Q5. If you could change one thing to improve traffic safety in the Village what would it be?

(Please indicate in text box below)

22	Generally, the traffic safety is satisfactory. The unfortunate death of a child has created some change but some of these changes have been quite significant (bumps on Pine and Balsam, traffic circle). The lines on the roads need to be upgraded so they could be seen (4 way stop on Eagle/Naismith). The sign indicating a bump in right at the table top calmers giving no warning that a bump is coming up. The paint on the table toppers is not that visible at night.	May 19, 2011 7:32 PM
23	Get rid of those petal bikes they rent of police them. People just ride out on to the street with no concern for cars.	May 19, 2011 1:53 PM
24	Enforce the speed limit more.not enough radar checks	May 19, 2011 12:34 PM
25	Lower Speed Limitws	May 16, 2011 11:08 PM
26	Get rid of this council of idiots. Stop wasting money of consultants who know nothing about Harrison. Get rid of all the crap on McComb Drive and establish it as a proper arterial route which it has been since I paved it. Get rid of the unnecessary stop signs, particularly at McPherson and McComb.	May 16, 2011 6:10 PM
27	speed on Hot Springs Rd particularly in the summer and also noise from the motorcycles	May 16, 2011 3:28 PM
28	crosswalks on Lilloet	May 16, 2011 12:54 PM
29	install table top at pine/mccombs, larger/permanent speed bumps along pine ave.	May 16, 2011 12:40 PM
30	Iwould remove all the traffic calming measures taken on McColm.	May 16, 2011 10:50 AM
31	Lower speed limit. Install landscaped traffic circles and where not feasible, table top speed calmers	May 16, 2011 5:58 AM
32	Remove the round about. too many people by pass it and instead of going around they go down the wrong side	May 15, 2011 8:43 PM
33	make the village safer by having a two way system, namely come in up hot springs road and leave on McCombs making a circular route.	May 15, 2011 7:13 PM
34	There are no concerns. Council reacted to an unfortuneate accident to show they had done something. There is very little speeding and traffic calming will not bring the child back. Move On!!!	May 15, 2011 5:37 PM
35	Speed enforcement on Hot Springs Road	May 15, 2011 7:33 AM
36	Speeding on Hot Springs road is a major and uncontrolled problem.Install a permanent electronic feedback display showing the drivers speed. Also need more enforcement.	May 14, 2011 5:47 PM
37	More tickets handed out to speeding drivers	May 14, 2011 11:31 AM
38	Crosswalk over Lillooet Ave. at the end of Eagle and a raised intersection at Eagle/South Naismith Ave..	May 14, 2011 11:15 AM

Page 5, Q5. If you could change one thing to improve traffic safety in the Village what would it be?

(Please indicate in text box below)

39	Remove speed bumps & stop signs at ALL intersections on McCombs Drive & replace with Traffice Circles. (Miami River Dr, Chestnut, Pine, Emerald, & Myng). Also install a Traffic Circle at intersection of Balsam Ave & Clover Place.	May 13, 2011 5:02 PM
40	Allow traffic to once again flow on McComb's by removing the so called calming devices.	May 13, 2011 10:13 AM
41	More aggressive moving infraction ticketing by RCMP/GRC. Yield, Stopping, Speeding, Handheld devices.	May 12, 2011 10:50 PM
42	HAVE A COP STANDING AT THE BRIDGE 24 7	May 12, 2011 1:22 PM
43	More police presence with speed control (RADAR) more often. This would control locals but we would have to contend with visitors.	May 12, 2011 10:39 AM

Page 5, Q6. Any other comments?

1	The perceptions of a vocal minority seem to drive the issue. The reality is that even with the high volume of seasonal traffic, there are relatively few problems.	Jun 4, 2011 9:09 AM
2	I have over 34 years experience of designing and installing Traffic calming, parking schemes, street lighting and highway maintenance for a large London Municipal in London (UK) and know to introduce a scheme that work well and improves the streetscape of the roads you must have all the funds available to complete the schemes or it will have an adverse effect on the surrounding area causing more problems that it solves	May 31, 2011 10:58 AM
3	Anything that slows people down is a good thing. Thank you for looking after the residents of Harrison by creating these calming circles.	May 29, 2011 8:40 AM
4	If people want to speed they will do so in orher area,s of the village.	May 26, 2011 1:09 PM
5	Keep all downtown parking free. The idea of meters is absurd if you want tourists to visit!	May 24, 2011 11:16 PM
6	I think that the numerous speed bumps and raised intersections was overkill to a relatively small problem. These measures should not be implemented as a result of a very few incidents. As we have seen speed bumps cause traffic to flow through residential streets which causes more speed bumps to be installed. It is never ending,	May 23, 2011 9:54 AM
7	pay parking yes	May 21, 2011 3:24 PM
8	The roundabout on McCombs is in an inappropriate place. The area is too small and accidents have almost occured from cars turning left trying to avoid going around it in the correct direction.	May 20, 2011 9:02 AM
9	I find the roundabout not a deterent for calming traffic on McCombs	May 20, 2011 7:04 AM
10	McCombs road used to be a road that allowed residents to bypass the main road and the tourists clogging them. Now everyone ends up on the same road.	May 19, 2011 8:59 PM
11	Right Lane Road surface leading up to stop sign by Lillooat dr needs repair and better road markings	May 19, 2011 11:01 AM
12	I`m pretty sure you have your orders to write a glowing report praising the crap on McComb and making this council look good in an election year . I don`t think that anything I or others might say will change this one bit. I resent paying for this BS as a taxpayer. I`d like to know how much it is costing me. Please provide me with a copy of this survey response for my records. Box 201, V0M 1K0	May 16, 2011 6:10 PM
13	ENFORCE SPEED LIMITS on Hot Springs Rd south of Pine St	May 16, 2011 1:07 PM
14	a police presence or other authority to direct traffic at the end of major tourist events especially at the 4 way stop in town AND at the 4 way stop at the Esso corner	May 16, 2011 12:54 PM
15	have some rcmp enforcement on the side streets in regards to these calming measures	May 16, 2011 12:40 PM
16	If we had an unlimited budget, we could put sidewalks in but as that is not possible, we must work within the parameters that exist	May 16, 2011 5:58 AM

Page 5, Q6. Any other comments?

17	If speed bumps go back in on Balsam, please leave room for bikes to pass safely	May 15, 2011 7:33 AM
18	The efforts so far have improved safety greatly for everyone in Harrison Hot Springs but there is more to be done. Thank you.	May 14, 2011 5:47 PM
19	We spend most summer at Harrison Holiday Park and our lot backs onto McComb - we have seen, and heard, a big difference since the speed humps, etc. Much less speeding traffic.	May 14, 2011 3:41 PM
20	I think the traffic calming measures are effective. The traffic on McCombs has been reduced to more local traffic, it feels safe to walk or bike on that road now.	May 14, 2011 9:16 AM
21	Residential streets are nice & wide but there is no sidewalk to separate Vehicle & Pedestrian traffic. Also there are no speed limit signs on residential streets.	May 13, 2011 5:02 PM
22	Speed limit reduction would make for a safer more people friendly community but will have little effect without enforcement.	May 13, 2011 10:13 AM
23	I think that the speed bumps are a nuisance, however the raise speed bumps are very effective. The speeding on McComb was horrendous before the bumps were put in.	May 12, 2011 7:20 PM
24	YES STOP WITH THE BUMPS	May 12, 2011 1:22 PM
25	Lets promote Harrison not discourage tourism.	May 12, 2011 10:39 AM

Page 6, Q1. Name		
1	Robert Reyerse	Jun 4, 2011 10:36 AM
2	K. Becotte	Jun 4, 2011 9:11 AM
3	Ray Hooper	May 31, 2011 11:00 AM
4	Beverly Sargent	May 30, 2011 12:44 PM
5	Jacki Meisner	May 30, 2011 12:14 PM
6	Ketti Goudey	May 29, 2011 7:57 AM
7	Jack Knight	May 26, 2011 1:11 PM
8	Gerry & Anke Smit	May 23, 2011 11:11 PM
9	Ron Hurt	May 23, 2011 9:56 AM
10	s. nOWAK	May 22, 2011 6:42 PM
11	Teresa Macpherson & Shawn Emond	May 22, 2011 12:28 PM
12	Andrea Schmid	May 21, 2011 2:56 PM
13	Terry Mitchell	May 20, 2011 12:34 PM
14	Diana Wheeler	May 20, 2011 11:11 AM
15	Jane M. Smith	May 20, 2011 9:04 AM
16	Uwe and Karen Skibbe	May 20, 2011 7:04 AM
17	Marg Doman	May 19, 2011 7:32 PM
18	Tom Bancroft	May 19, 2011 1:54 PM
19	Barbara Gunson	May 19, 2011 12:35 PM
20	bernhard van velze	May 19, 2011 11:01 AM
21	Capt. Peter & Linda Bugden	May 16, 2011 11:12 PM
22	John Allen	May 16, 2011 6:11 PM
23	Pat Derksen	May 16, 2011 3:29 PM
24	Lawrence Tilander	May 16, 2011 1:08 PM
25	Jayne Fleming	May 16, 2011 12:55 PM
26	Brian Hollaus	May 16, 2011 12:41 PM
27	Geoff Thomson	May 16, 2011 10:52 AM
28	Ray Bennie	May 16, 2011 6:01 AM
29	Gail Guimont	May 15, 2011 8:44 PM

Page 6, Q1. Name

30	Paul Fairley	May 15, 2011 7:13 PM
31	Don Smith	May 15, 2011 5:38 PM
32	Gale and Jean Lynn	May 15, 2011 1:15 PM
33	Merv Rose	May 15, 2011 7:34 AM
34	Brian Moore	May 14, 2011 5:48 PM
35	Barbara Grant	May 14, 2011 3:42 PM
36	Joanne Rose	May 14, 2011 11:32 AM
37	Michele Bugden	May 14, 2011 11:16 AM
38	Elaine Smith	May 14, 2011 9:17 AM
39	Ken Chrystall	May 13, 2011 5:05 PM
40	Keith Kivett	May 13, 2011 10:16 AM
41	Carolyn Janousek	May 12, 2011 7:21 PM
42	IRENE VENTRESS	May 12, 2011 1:23 PM
43	Gerald Hadway	May 12, 2011 10:40 AM

Page 6, Q2. Address (if not willing to provide address, then postal code and or street/block number where you reside):

1	312 Lillooet Avenue	Jun 4, 2011 10:36 AM
2	565 Lillooet, Harrison Hot Springs, V0M 1K0	Jun 4, 2011 9:11 AM
3	Box 467 404 Miami River Drive Harrison Hot Springs V0M 1K0	May 31, 2011 11:00 AM
4	Emerald Street and McCombs Drive. v0m 1k0	May 30, 2011 12:14 PM
5	857 Myng	May 29, 2011 7:57 AM
6	505 Cottonwood place	May 26, 2011 1:11 PM
7	522 cottonwood ave po box 192	May 23, 2011 11:11 PM
8	466 Naismith	May 23, 2011 9:56 AM
9	480 NAISMITH	May 22, 2011 6:42 PM
10	246 Balsam Avenue	May 22, 2011 12:28 PM
11	239 Balsam Ave	May 21, 2011 2:56 PM
12	433 Miami River Drive	May 20, 2011 12:34 PM
13	170 Cedar Avenue	May 20, 2011 11:11 AM
14	Cottonwood Ave.	May 20, 2011 9:04 AM
15	606 McCombs Drive	May 20, 2011 7:04 AM
16	Walnut Ave,	May 19, 2011 1:54 PM
17	315 Clover Place	May 19, 2011 12:35 PM
18	407 Miami River Drive	May 16, 2011 11:12 PM
19	PO Box 201 , HHS V0M 1K0	May 16, 2011 6:11 PM
20	215 Balsam	May 16, 2011 3:29 PM
21	830 Ramona Pl--Box 283	May 16, 2011 1:08 PM
22	244 Miami River Drive	May 16, 2011 12:55 PM
23	480 Pine Ave	May 16, 2011 12:41 PM
24	#29-349 Walnut Ave.	May 16, 2011 10:52 AM
25	300 Clover Place	May 16, 2011 6:01 AM
26	505 Cottonwood Ave, Box 877 Harrison Hot Springs V0M 1K0	May 15, 2011 8:44 PM
27	310 Chestnut Avenue.	May 15, 2011 7:13 PM
28	503 Driftwood ave.	May 15, 2011 5:38 PM

Page 6, Q2. Address (if not willing to provide address, then postal code and or street/block number where you reside):

29	#9 434 Alder Ave.	May 15, 2011 1:15 PM
30	403 Miami River Drive	May 15, 2011 7:34 AM
31	443 Naismith Avenue	May 14, 2011 5:48 PM
32	Harrison Holiday Park, Hot Springs Road	May 14, 2011 3:42 PM
33	403 Miami River Drive	May 14, 2011 11:32 AM
34	435 Naismith Ave. PO Box 655 V0M1K0	May 14, 2011 11:16 AM
35	822 Myng Crescent	May 14, 2011 9:17 AM
36	221 Balsam Avenue Box 445	May 13, 2011 5:05 PM
37	Box 427, 238 Balsam Ave. HHS V0M 1K0	May 13, 2011 10:16 AM
38	VOM 1K0	May 12, 2011 10:50 PM
39	440 Juniper Place	May 12, 2011 7:21 PM
40	429 MIAMI RIVER DRIVE	May 12, 2011 1:23 PM
41	405 Eagle St	May 12, 2011 10:40 AM

Page 6, Q3. Contact email/phone if you would like to stay informed:		
1	604 796 9552	Jun 4, 2011 10:36 AM
2	hoopers404@shaw.ca 604-796-8846	May 31, 2011 11:00 AM
3	butterflygal1943@yahoo.ca	May 30, 2011 12:44 PM
4	jakiz@live.ca	May 30, 2011 12:14 PM
5	kgnut@shaw.ca	May 29, 2011 7:57 AM
6	lis2480@shaw.ca	May 27, 2011 8:52 PM
7	jack.knight@shaw.ca	May 26, 2011 1:11 PM
8	gerrysmit@shaw.ca 604 796 8670	May 23, 2011 11:11 PM
9	hurt.major@shaw.ca	May 23, 2011 9:56 AM
10	snowak@shaw.ca	May 22, 2011 6:42 PM
11	sonadordreamer@gmail.com	May 22, 2011 12:28 PM
12	aaschmid@shaw.ca	May 21, 2011 2:56 PM
13	mitchelltj@shaw.ca	May 20, 2011 12:34 PM
14	dianawheeler@shaw.ca 604-796-9331	May 20, 2011 11:11 AM
15	janeandhenk@shaw.ca	May 20, 2011 9:04 AM
16	ukskibbe@shaw.ca	May 20, 2011 7:04 AM
17	ted.margd@shaw.ca	May 19, 2011 7:32 PM
18	tdban@shaw.ca	May 19, 2011 1:54 PM
19	bgunson@shaw.ca	May 19, 2011 12:35 PM
20	captpete@shaw.ca 604-796-0767	May 16, 2011 11:12 PM
21	johnjallen at shaw.ca	May 16, 2011 6:11 PM
22	pat_derksen @hotmail.com	May 16, 2011 3:29 PM
23	tilanderl@shaw.ca	May 16, 2011 1:08 PM
24	jaynefleming@shaw.ca	May 16, 2011 12:55 PM
25	bskier@shaw.ca 604-220-5049	May 16, 2011 12:41 PM
26	kippert@shaw.ca	May 16, 2011 10:52 AM
27	rbennie@shaw.ca	May 16, 2011 6:01 AM
28	gguimont@shaw.ca	May 15, 2011 8:44 PM
29	pbfairley@shaw.ca	May 15, 2011 7:13 PM

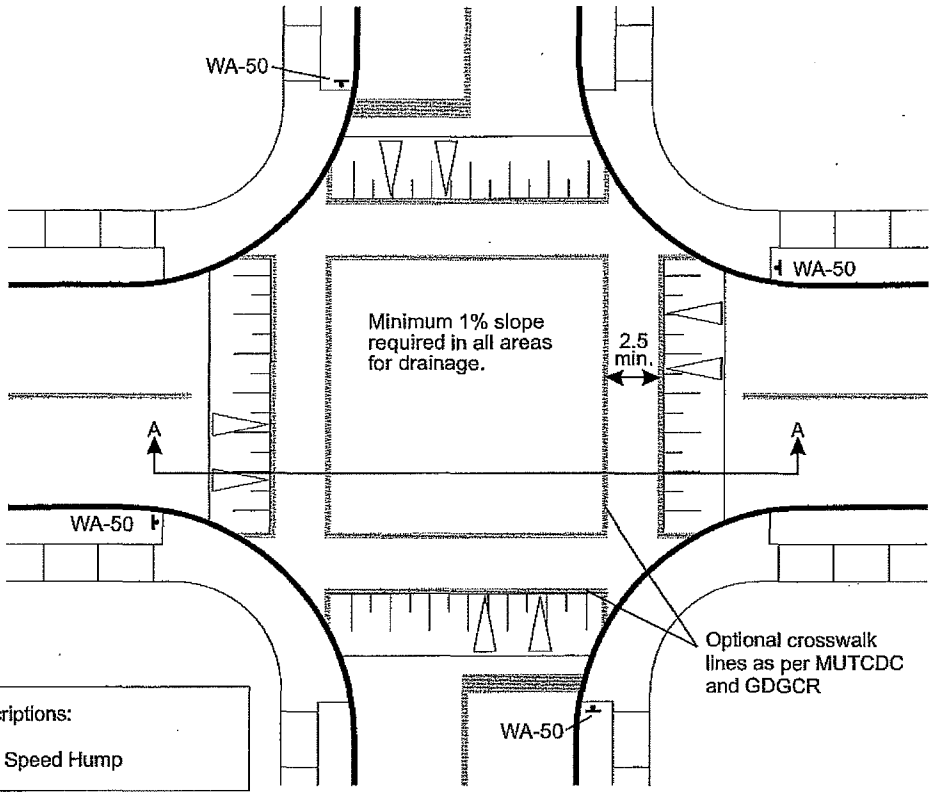
Page 6, Q3. Contact email/phone if you would like to stay informed:

30	donandtraci@hotmail.com	May 15, 2011 5:38 PM
31	Email lynngj@shaw.ca	May 15, 2011 1:15 PM
32	mervrose@shaw.ca	May 15, 2011 7:34 AM
33	796-1201	May 14, 2011 5:48 PM
34	dbgrant1@shaw.ca	May 14, 2011 3:42 PM
35	joannerose@shaw.ca	May 14, 2011 11:32 AM
36	mdbugden@shaw.ca	May 14, 2011 11:16 AM
37	me_smith@shaw.ca	May 14, 2011 9:17 AM
38	chr5520@shaw.ca	May 13, 2011 5:05 PM
39	604-796-9273 Kivett@shaw.ca	May 13, 2011 10:16 AM
40	fjanousek@shaw.ca	May 12, 2011 7:21 PM
41	irenethebean@shaw.ca	May 12, 2011 1:23 PM
42	hugnhadi@shaw.ca/604-796-9975	May 12, 2011 10:40 AM

APPENDIX B

Sample Traffic Calming Measure Design Specifications

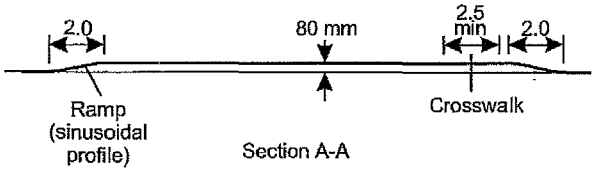
FIGURE 4.2 RAISED INTERSECTION

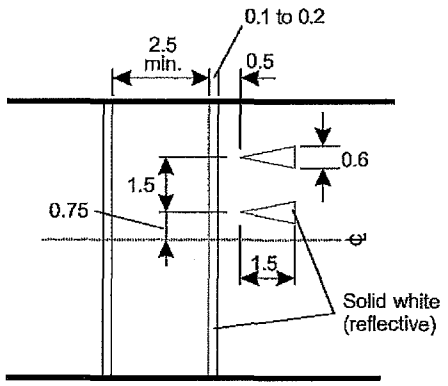


Sign Descriptions:

WA-50 Speed Hump

- If intersection is Stop sign controlled, WA-50 signs are not required on the Stop sign approaches.
- A 15 mm curb face should be retained at all crosswalk locations.





Pavement Markings

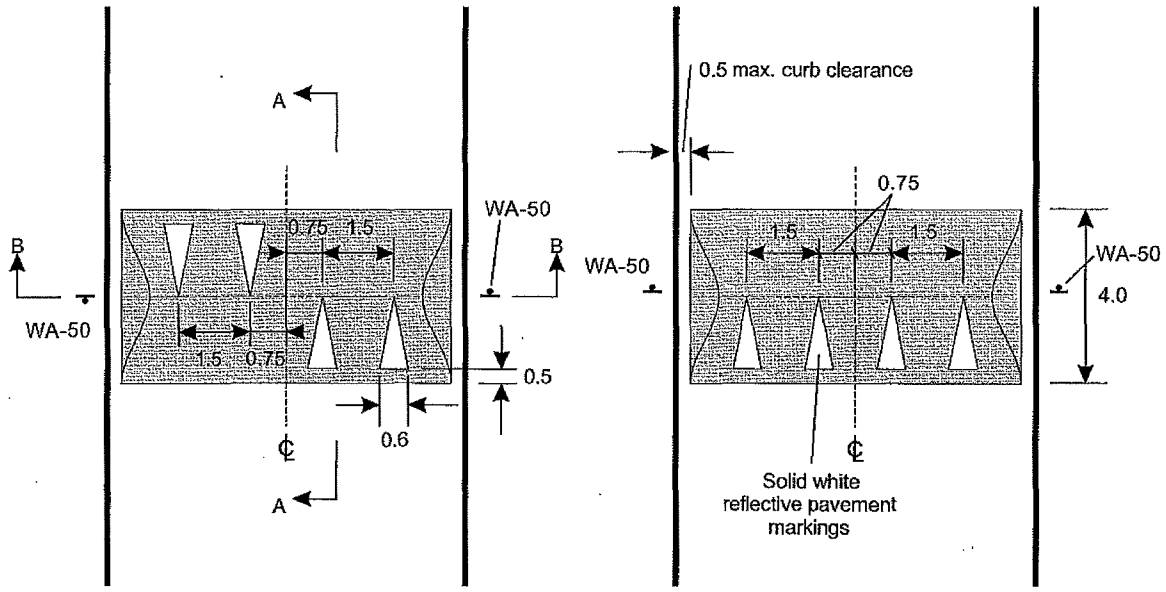
Ramp Height Development

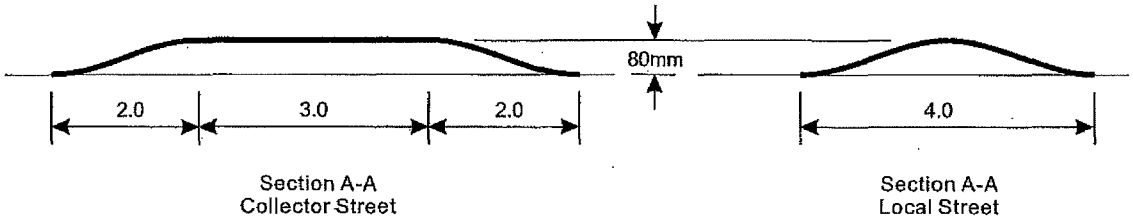
Crosswalk profile parallel to roadway surface.

Distance (m)	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875	1.000	1.125	1.250	1.375	1.500	1.625	1.750	1.875	2.000
Finished Height (mm)	0	1	3	7	12	18	25	32	40	48	55	62	68	73	77	79	80

All dimensions are in metres unless otherwise noted. **NOT TO SCALE**

FIGURE 4.4 SPEED HUMP



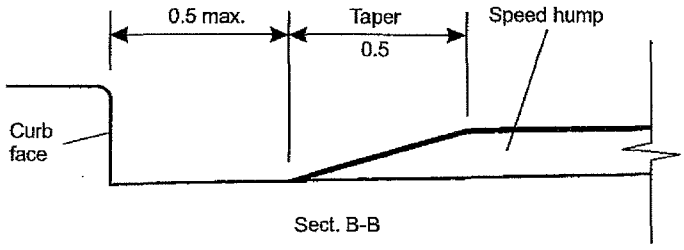


Sinusoidal Speed Hump Development

Distance (m)	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875	1.000	1.125	1.250	1.375	1.500	1.625	1.750	1.875	2.000
Finished Height (mm)	0	1	3	7	12	18	25	32	40	48	55	62	68	73	77	79	80

Sign Descriptions:

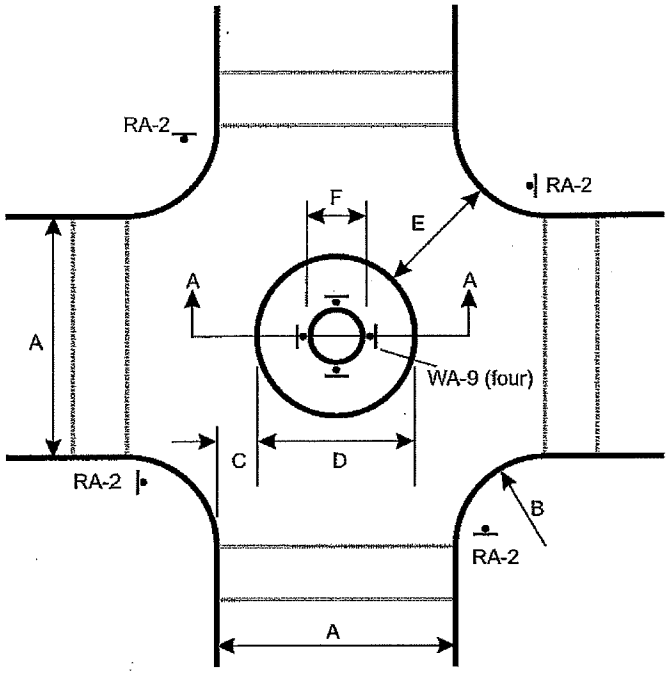
WA-50 Speed Hump



All dimensions are in metres unless otherwise noted.

NOT TO SCALE

FIGURE 4.10 TRAFFIC CIRCLE

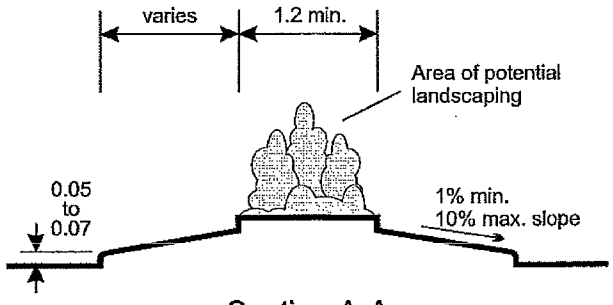


Dimension Chart for Varying Roadway Widths				
A Roadway Width	B Curb Return Radius	C Off-Set Distance	D Circle Diameter	E Minimum Opening Width
6.0	4.7	1.7	2.6	4.9
	5.3	1.6	2.8	5.0
	6.9	1.4	3.2	5.5
	8.1	1.2	3.6	5.8
7.0	4.2	1.7	3.6	4.9
	4.8	1.6	3.8	5.0
	6.4	1.4	4.2	5.5
	7.8	1.2	4.6	5.9
8.0	3.7	1.7	4.6	4.9
	4.3	1.6	4.8	5.0
	5.9	1.4	5.2	5.5
	7.3	1.2	5.6	5.9
9.0	3.2	1.7	5.6	4.9
	3.8	1.6	5.8	5.0
	5.4	1.4	6.2	5.5
	6.6	1.2	6.6	5.8
	7.6	1.0	7.0	6.0
10.0	3.0	1.7	6.6	5.0
	3.3	1.6	6.8	5.0
	4.9	1.4	7.2	5.5
	6.1	1.2	7.6	5.8
	6.9	1.0	8.0	5.9
11.0	3.4	1.5	8.0	5.2
	3.6	1.4	8.2	5.2
	5.6	1.2	8.6	5.8
	6.8	1.0	9.0	6.1
12.0	3.0	1.5	9.0	5.2
	3.9	1.4	9.2	5.5
	5.1	1.2	9.6	5.8
	6.3	1.0	10.0	6.1

Legend:
- A Roadway Width
- B Curb Return Radius (3.0 m min)
- C Off-Set Distance (1.7 m max.)
- D Circle Diameter
- E Opening Width (See table above)
- F Raised Island Diameter (1.2 m min.)

Sign Descriptions:

RA-2	Yield
WA-9	Chevron Alignment



Section A-A

- Minimum opening width to be provided to all crosswalks.
- A deflection triangle painted on the pavement on each approach to the traffic circle may be appropriate.

All dimensions are in metres unless otherwise noted.

NOT TO SCALE

APPENDIX C

Sample Traffic Calming Guidelines – District of Squamish

Guidelines to Traffic Calming
for the
District of Squamish

These guidelines are part of District Policy # 027-03 – Traffic Calming.

The objectives of Traffic Calming include, but are not limited to:

- Enhance Safety for All Users
- Reduce Vehicular Speeds
- Discourage Through Traffic on Local Streets
- Minimize Conflicts between Street Users
- Improve the Neighbourhood Environment

Prior to considering an engineered solution to traffic problems, education and enforcement options should be pursued. Education can be achieved, for example, through the use of the Speed Watch equipment from the RCMP. The District can assist volunteers from the affected area with borrowing the Speed Watch equipment, getting training in its use and coordinating with the RCMP. If the problem persists, as shown by the results from the Speed Watch equipment, the District will request that the RCMP target the area for speed enforcement.

If these strategies fail to resolve the problem, then residents may apply for an engineering solution, in the form of traffic calming.

Steps in the Traffic Calming process:

1. Identification

The need for a traffic calming study is identified. This may be by requests from residents, business owners or by District initiative. If the request comes from the public, they should provide the following:

- results of the Speed Watch program, showing that the Speed Watch equipment was used at least once a week over a three week period, with at least two hours of records each week. Alternatively, an engineering report detailing 85th percentile speeds and traffic volumes may be submitted.
- confirmation from the RCMP that enforcement was used after the three week period of education (use of the Speed Watch equipment).
- a list of at least 10 households or businesses that agree that the problem exists in the area. These households or businesses must be in the affected area.

Applications for engineered traffic calming measures must be received prior to June 1 to ensure that they will be considered in the following year's budget deliberations.

2. Preliminary Evaluation

The results from the Speed Watch program will be analyzed to estimate the 85th percentile speed in the affected area. Traffic volume will also be estimated at the affected area. The affected area will be rated on its quantity of pedestrian and cyclist activity. Areas that attract pedestrian and cyclist traffic (such as schools, community centers or other recreational facilities) will receive higher ratings. Scoring will be as shown in Table 1.

Table 1 – Preliminary Scoring

Criteria	Points	Basis for Point Assignment
Speed	10 to 50	85th percentile traffic speed more than 5 km/h above the posted limit (2 points for every km/h over the posted limit)
Volume	0 to 20	Average daily traffic volumes (1 point for every 100 vehicles)
Education	10	Motorist education program used to no avail (Speed Watch records or similar data to be provided – 10 points)
Enforcement	10	Enforcement program used to no avail (confirmation from RCMP – 10 points
Pedestrian / Cyclist	5 to 10	Facilities that generate pedestrian / cyclist traffic (5 points each for schools, recreation centers, parks, trails, etc)
Maximum	100	Total points possible

All requests will be placed on a list of preliminary projects. Requests with scores below 35 points will not be considered further but will be included on the list of preliminary projects as "not recommended". The Director of Community Development will review the list and make a recommendation to Council prior to the budget deliberations for the coming year suggesting funding levels for the coming year. The Director of Community Development will recommend that requests with scores of 60 points or greater be further evaluated and may recommend that requests with scores from 36 to 59 points be further evaluated. The Director of Community Development will give an indication of the costs to study the recommended projects.

3. First Council Review & Allocation of Funds

Council will review the report from the Director of Community Development and the associated recommendation(s) and may allocate funds in the budget deliberations for 1) studies and/or 2) implementation of approved projects.

4. Data Collection

Studies will proceed based on the funding allocated by Council. Detailed data will be collected and public input will be taken, either in the form of a resident survey or an open house. The data to be collected may include, but not be limited to the following:

- Traffic Speeds
- Traffic Volumes
- Through Traffic Percentage
- History of Vehicle Collisions
- Proximity of Schools
- Usage Patterns of Local Facilities (Parks, Community Centers, Trails)
- Age Distribution in Neighbourhood
- Public Perceptions of Traffic Related Impacts
- Road Dimensions, Accesses and Pedestrian / Cyclist Facilities
- Previous Measures Implemented

5. Quantification / Confirmation of Problem

Based on the data collected above, the problem is quantified and/or confirmed. A detailed score will be assigned to the problem according to Table 2.

Table 2 – Detailed Scoring

Criteria	Points	Basis for Point Assignment
Speed	1 to 5	85th percentile traffic speed (1 point for every 2 km/h more than 5 km/h over the posted limit i.e. 1 point - up to 7 km/h over the limit, 5 points - more than 13 km/h over the limit)
Volume	1 to 5	Average daily traffic volumes (1 point for every 500 vehicles, 5 points – more than 2500 vehicles)
Through Traffic	1 to 5	Percent of traffic volume that is through traffic (1 point for every 20%, 1 point = 1 to 20%, 5 points = 81 to 100%)
Collision History	1 to 5	1 point – low collision history, 3 points – average collision history, 5 points – high collision history
Pedestrian / Cyclist	1 to 3	Facilities that generate pedestrian / cyclist traffic (1 point each for schools, recreation centers, parks, trails, etc)
Maximum	23	Total points possible

Projects will be prioritized according to their detailed score.

6. Review Traffic Calming Options

First, adjacent arterial and collector roads will be reviewed to ensure the problem is not caused by deficiencies in the arterial network. Deficiencies in adjacent arterial and collector roads will be rectified first. If the problem persists six months after such rectification, or if no deficiencies are identified in adjacent roads, various Traffic Calming measures will then be reviewed and options will be formalized. Acceptable Traffic Calming Measures will be taken from Table 3, depending on the road classification and other considerations as specified. Soft measures such as landscaping will also be considered for all classifications of road.

Table 3 – Acceptable Traffic Calming Measures

	Road Classification				Other		
	Local	Collector	Industrial	Arterial	SCH	ERR	TR
Vertical Deflection	√						
- Raised Crosswalk	√	√			√	√*	√
- Raised Intersection	√	√					
- Rumble Strip	√	√	√	√	√	√	√
- Sidewalk Extension (unraised)	√						
- Speed Hump	√						
- Textured Crosswalk	√	√	√	√	√	√	√
Horizontal Deflection							
- Chicane – One Lane							
- Chicane – Two Lane	√						
- Curb Extension	√	√	√		√	√	√
- Curb Radius Reduction	√						
- On Street Parking	√	√		√	√	√	√
- Raised Median Island		√		√	√	√	√
- Traffic Circle	√				√	√*	√
Obstruction							
- Directional Closure	√					√*	√
- Diverter	√						
- Full Closure							
- Intersection Channelization	√	√					√
- Raised Median thru Intersection		√		√	√	√*	√
- Right In / Right Out Island	√	√			√	√*	√
Signage							
- Maximum Speed	√	√	√	√	√	√	√
- Right (Left) Turn Prohibited	√	√	√	√	√	√	√
- One Way	√	√					
- Stop	√	√			√	√	√
- Through Traffic Prohibited	√						
- Traffic-Calmed Neighbourhood	√	√			√	√	√
- Yield	√	√	√		√	√	√

* in consultation with Fire Dept

SCH = School Zone ERR = Emergency Response Route TR = Transit Route

7. Measure Community Support for Options

The options will be presented to the public, through resident surveys to affected residents and may also be presented at an open house. The public will be asked to rate the options as satisfactory, unsatisfactory or neutral.

8. Evaluate Options

The options will be evaluated, including both technical and social aspects.

9. Final Council Review

The Director of Community Development will prepare a report for Council outlining the results of the studies and a prioritized list of projects to proceed to installation of measures.

10. Implementation of Traffic Calming Measures

Upon receiving approval from Council, District staff will implement the Traffic Calming measure(s) by priority until funding is exhausted. Funding of Traffic Calming measures is to come from General Revenues, developer contributions, Local Improvement Programs or alternative sources of funding, such as the ICBC Safer Cities program.

11. Monitoring of Traffic Calming Measures

All Traffic Calming measures are to be monitored for a period of at least six months after implementation. The level of satisfaction with the measures should then be reported by the Director of Community Development to Council.

The Director of Community Development, at his discretion, may remove any traffic calming measure that is deemed to be inappropriate at the end of the monitoring period.

Roles

1. Role of the Public

Local residents and business owners will be involved in the problem identification and decision making processes related to traffic calming in their neighbourhood. The key responsibilities are to:

- Participate in public meetings or surveys for traffic calming studies
- Identify traffic related issues in the neighbourhood
- Review options presented by staff and rank the options as satisfactory, unsatisfactory or neutral

2. Role of District Staff

District staff will present a report with recommended traffic calming projects to Council prior to budget deliberations for the coming year. On Council approval of a budget, staff will proceed to work on traffic calming projects in order of priority. The key responsibilities are to:

- Assist the public in setting up education and enforcement
- Do preliminary evaluation / scoring of traffic calming requests
- Prepare a prioritized list of traffic calming requests for presentation to Council and recommendation for funding of further study
- Schedule and manage the public participation process for approved studies
- Define and quantify the nature and extent of traffic issues through public participation and data collection (may use outside consultant)
- Generate possible solutions (may use outside consultant)
- Facilitate a consensus building exercise with the public to discern preferred solutions (may use outside consultant)
- Communicate the outcome of the study with Council
- Implement and monitor approved traffic calming projects

3. Role of Council

Council will direct the traffic calming program at a strategic level. The key responsibilities are to:

- Based on staff recommendations, approve funding and resource allocations in the annual budget to conduct traffic calming studies
- Review and consider the preferred traffic calming plan initiatives as indicated by the public
- Allocate funding for approved traffic calming measures to be installed
- Review performance of traffic calming measures after they are installed