

City of Maple Ridge

COUNCIL WORKSHOP AGENDA

November 26, 2019

1:30 p.m.

Blaney Room, 1st Floor, City Hall

The purpose of the Council Workshop is to review and discuss policies and other items of interest to Council. Although resolutions may be passed at this meeting, the intent is to make a consensus decision to send an item to Council for debate and vote or refer the item back to staff for more information or clarification. The meeting is live streamed and recorded by the City of Maple Ridge.

REMINDERS

November 26, 2019

Council Meeting

7:00 p.m.

1. APPROVAL OF THE AGENDA

2. ADOPTION OF MINUTES

2.1 Minutes of the November 12, 2019 Council Workshop Meeting

3. PRESENTATIONS AT THE REQUEST OF COUNCIL

4. UNFINISHED AND NEW BUSINESS

4.1 Abernethy Way Extension Study (232 Street to 256 Street)

Staff report dated November 26, 2019 recommending that the Abernethy Way Extension study be endorsed and that Option 7 as identified in Appendix A of the staff report be selected as the preferred route.

4.2 2020 Council Meeting Schedule

Staff report dated November 26, 2019 recommending that the proposed 2020 Council meeting schedule as attached to the staff report titled "2020 Council Meeting Schedule" be adopted.

4.3 **Maple Ridge Festival Verbal Update**

- Y. Chui, Manager of Arts and Community

4.4 **2019 Town Centre Business Walk Report**

Staff report dated November 26, 2019 providing information on the 2019 Town Centre Business Walk (no resolution required).

4.5 **Financial Plan Incremental Request**

** to be distributed separately*

CORRESPONDENCE

5.1 **Upcoming Events**

By Invitation to Mayor and Council:

Wednesday, November 27, 2019
7:30 - 9:00 am

Salvation Army – Dignity Breakfast
South Bonson Community Centre,
Pitt Meadows
Host: Salvation Army

Thursday, November 28, 2019
8:30 am – 4:00 pm

CivX 2019: Civil Ideas for Less Civil Times
Morris J. Wosk Centre for Dialogue in
Vancouver
Host: LMLGA & CivicInfo BC

Thursday, November 28, 2019
5:00 – 8:00 pm

Golden Ears Gogo – African Dinner
Fundraiser
SRT, 10445 245 Street, Maple Ridge
Host: Golden Ears Grandmothers to
Grandmothers Campaign

Friday, November 29, 2019
8:30 – 9:30 am

Operation Red Nose
23283 McKay Avenue, Maple Ridge
Host: Operation Red Nose

Open Houses:

Tuesday, November 26, 2019
5:50 – 8:30 pm

Sign Bylaw Update
City Hall's west entrance, 11995 Haney Place


Saturday, November 27, 2019
4:00 – 8:00 pm



232 Street Improvements: Dewdney Trunk
Road to 116 Avenue
City Hall Foyer, 11995 Haney Place

6. *BRIEFING ON OTHER ITEMS OF INTEREST/QUESTIONS FROM COUNCIL*

7. *MATTERS DEEMED EXPEDIENT*

8. *ADJOURNMENT*

Approved: 
Date: Nov. 21/19

Space below for Clerk's Department Use Only	
Checked by: 	Checked by: 
Date: <u>Nov 21/19</u>	Date: <u>Nov 21/19</u>

COUNCIL WORKSHOP MINUTES

November 12, 2019

The Minutes of the City Council Workshop held on November 12, 2019 at 1:32 p.m. in the Blaney Room at City Hall, 11995 Haney Place, Maple Ridge, British Columbia for the purpose of transacting regular City business.

<i>PRESENT</i>	<i>Appointed Staff</i>
<i>Elected Officials</i>	A. Horsman, Chief Administrative Officer
Mayor M. Morden	C. Carter, General Manager Planning & Development Services
Councillor J. Dueck	D. Pollock, General Manager Engineering Services
Councillor C. Meadus	D. Boag, Acting General Manager Parks, Recreation & Culture
Councillor G. Robson	L. Benson, Director of Corporate Administration
Councillor R. Svendsen	T. Thompson, Chief Financial Officer
Councillor A. Yousef	
	<i>Other Staff as Required</i>
<i>ABSENT</i>	C. Goddard, Director of Planning
Councillor K. Duncan	L. Zosiak, Manager of Community Planning
	R. Stott, Environmental Planner 2
	A. Bowden, Planner 1

Note: These Minutes are posted on the City Web Site at www.mapleridge.ca
Video of the meeting is posted at media.mapleridge.ca/Mediasite/Showcase

1. APPROVAL OF THE AGENDA

R/2019-637

It was moved and seconded

That the agenda of the November 12, 2019 Council Workshop Meeting be approved as circulated.

CARRIED

2. ADOPTION OF MINUTES

2.1 Minutes of the October 29, 2019 Council Workshop Meeting

R/2019-638

It was moved and seconded

That the minutes of the Council Workshop Meeting of October 29, 2019 be adopted as circulated.

CARRIED

3. ***PRESENTATIONS AT THE REQUEST OF COUNCIL – Nil***

4. ***UNFINISHED AND NEW BUSINESS***

4.1 **Green Infrastructure Management Strategy Policy Review Process Report**

Staff report dated November 12, 2019 recommending that the Green Infrastructure Management policy review process be endorsed.

R. Stott, Environmental Planner 2, gave a presentation and responded to questions from Council.

R/2019-639

It was moved and seconded

That the Green Infrastructure Management Strategy policy review process be endorsed.

CARRIED

4.2 **Albion Flats Concept Plan**

Staff report dated November 12, 2019 recommending that the Albion Flats concept plan be endorsed and that staff be directed to forward the plan to the Agricultural Land Commission.

A. Bowden, Planner 1, gave a presentation and re

R/2019-640

It was moved and seconded

1. That the Albion Flats concept plan, attached as Appendix A to the "Albion Flats Concept Plan" staff report dated November 12, 2019 be endorsed.

2. That staff be directed to forward the Albion Flats Concept Plan to the Agricultural Land Commission in advance of a meeting.

CARRIED

4.3 **Policy No. 3.02 – 2019 Proclamations Review**

Staff report dated November 12, 2019 providing information on the City's current practice of declining proclamation requests.

The Director of Corporate Support introduced the report, and noted that the item was for information only.

5. ***CORRESPONDENCE*** – Nil
6. ***BRIEFING ON OTHER ITEMS OF INTEREST/QUESTIONS FROM COUNCIL*** – Nil
7. ***MATTERS DEEMED EXPEDIENT*** – Nil
8. ***ADJOURNMENT*** – 2:32 p.m.

M. Morden, Mayor

Certified Correct

L. Benson, Corporate Officer



TO:	His Worship Mayor Michael Morden and Members of Council	MEETING DATE:	November 26, 2019
FROM:	Chief Administrative Officer	FILE NO:	11-5255-40-208
		MEETING:	Workshop
SUBJECT:	Abernethy Way Extension Study (232 Street to 256 Street)		

EXECUTIVE SUMMARY:

The City's 2014 Strategic Transportation Plan (STP) identifies that the City's highest traffic volumes are carried by three east west corridors: Lougheed Highway, Dewdney Trunk Road and Abernethy Way. The STP recommends improvements to the Abernethy Way Corridor in four phases. Phase 1 improvements (210 Street to 224 Street) have already been completed while Phase 2 improvements are currently in the design phase. This report presents the findings of the Abernethy Way Extension Study, from 232 Street to 256 Street.

The Abernethy Way extension project is expected to advance the growth and development of the industrial and employment lands in the north-east area of Maple Ridge. The future extension of 240 Street north includes a bridge crossing into the Silver Valley area to connect with the extension of Abernethy Way. This connection will provide another alternative route for visitors and residents heading to Golden Ears Provincial Park.

The study objectives were to assess the technical feasibility of various alignment options of the Abernethy Way extension, narrow these down to a select few and evaluate them relative to each other, while also seeking public feedback. Thirteen options were initially reviewed and were shortlisted to three preferred options for detailed comparison using a Multiple Account Evaluation (MAE) framework as shown in Appendix A. The MAE framework includes various criteria which then allows each option to be compared relative to each other and captures public input as a criteria. The analysis then helps arrive at the recommended alignment option in an unbiased manner.

Based on the MAE findings, Option 7 resulted in being the preferred alignment option and was also the preferred option identified at the public Open House. The Option 7 road alignment would connect to and widen 240 Street and Dewdney Trunk Road, as well as provide a new link on 124 Avenue between 244 Street and 246 Street to provide an alternative emergency access.

RECOMMENDATION:

That the Abernethy Way Extension Study (232 Street to 256 Street) be endorsed; and

That Option 7 as identified in Appendix A of the staff report be selected as the preferred route.

DISCUSSION:

a) Background Context:

The existing Abernethy Way is an important east-west transportation corridor in the City of Maple Ridge, connecting to the Golden Ears Bridge to the west and 232 Street to the east, and forms part of TransLink's Major Road Network (MRN).

The primary objectives for the Abernethy Way Extension Study is to:

- Improve access to the Industrial and Employment Lands in North East Maple Ridge, as per the City's Official Community Plan (OCP)
- Provide a connection to the future 240 Street Bridge Crossing and access to the Silver Valley Area
- Improve both local and regional traffic flow including access to Golden Ears Provincial Park
- Provide redundancy in the road network and an alternative emergency route

The City's 2014 Strategic Transportation Plan (STP) recommended road widening of Abernethy Way from 210 Street to 232 Street and also identified the potential extension of Abernethy Way from 232 Street to 256 Street.

This report focuses on the contemplated extension of Abernethy Way from 232 Street to 256 Street (Phase 3 and 4 as identified in the STP). Phase 1 of the improvements has been completed and included four-laning Abernethy Way from 210 Street to 224 Street. Phase 2 will focus on improving intersection capacity at 210 Street and 232 Street and is currently in the design stage.

The study reviewed a total of 13 road alignment options and segments to extend Abernethy Way from 232 Street to 240 Street (Phase 3), and from 240 Street intersection to 256 Street (Phase 4). The options were narrowed down to three using technical inputs such as:

- Previous studies
- Field reviews
- Environmental Desktop Review
- Drainage Desktop Review
- Geotechnical Desktop Review
- Archaeological Desktop Review
- Property Impacts
- Structural assessment (river and creek crossings)
- Roadway geometry
- Cost estimate

Phase 3 (232 Street to 240 Street):

The section of the Abernethy Way extension from 232 Street to 240 Street is the same for all three options. The alignment generally extends from the existing 124 Avenue Right-of-Way (ROW), then passes through rural properties to the southern part of Hackers Haven Golf Course before connecting to 240 Street.

Phase 4 (240 Street to 256 Street):

The section of the Abernethy Way extension from 240 Street to 252 Street has three alignment options:

1. Upper Route: Abernethy Way extension to 248 Street, then to 130 Avenue
2. Lower Route: Abernethy Way extension to 240 Street, 240 Street, Dewdney Trunk Road (excl. bridge replacement)
3. Middle Route: Abernethy Way extension to 248 Street, then along 124 Avenue

Traffic Forecasting

Traffic forecasting was used to determine the future roadway capacity (i.e. number of lanes) of the corridor, taking into account regional and local land use planning and other road network upgrades. The recommended number of lanes is shown in Appendix B.

Public Engagement

An Open House was held on June 25, 2019 at the Public Library from 4:00 pm to 8:00 pm. The event was advertised in the local newspaper, and all residents whose properties are located along all the three shortlisted alignments had invitations delivered to their homes. A series of project boards were presented which attendees were asked to review, and City staff and the project team were available to explain the project, answer questions and receive feedback. City Staff also met with representatives from the Academy Park neighborhood and Meadowridge School to discuss their concerns.

Attendees were encouraged to formally submit feedback and answer survey questions before leaving the Open House and had the option to return survey forms later. The survey was also made available online. Respondents were asked to rank which of the three options they preferred.

A total of 242 participants submitted survey responses, of which 39% (96 respondents) preferred the Lower Route (Option 7), 28% (68 respondents) preferred the Middle Route (Option 10), and 9% (21 respondents) preferred the Upper Route (Option 2C). 24% (57 respondents) did not select a preferred option.

Option Evaluation

The findings of the MAE as shown in Appendix A consists of various criteria such as environmental and archaeological impacts, the road network, Property/ALR Impacts, Public Preference, Social/Community Impacts, Utility relocation and the Cost related to each option. Importantly, the criteria were applied by comparing options relative to each other. Applying the evaluation, the Lower Route, the Dewdney Trunk Route (Option 7), resulted in being the preferred route. This option was also the public's preferred option.

b) Desired Outcome:

To identify the preferred alignment option to extend Abernethy Way from 232 Street to 256 Street, advancing the development of industrial and employment lands in north-east Maple Ridge, as per the City's OCP and STP goals.

c) Strategic Alignment:

The Abernethy Way Extension Project (232 Street to 256 Street) will support Council's Strategic Plan alignment for "Growth".

d) Citizen/Customer Implications:

Option 7 identified as the preferred option through the technical evaluation process is also the preferred option identified by the public at the Open House.

e) Interdepartmental Implications:

The Engineering Department will continue to work with the Planning and Operations Departments in the planning and design of the new roadway.

f) Business Plan/Financial Implications:

The current cost for the Abernethy Way Extension (Option 7) from 232 Street to 256 Street (Phase 3 & 4) is approximately \$66 Million (2019 Dollars). This Class D estimate includes a 40% contingency amount based on level of engineering done and excludes environmental compensation. The project is anticipated to be funded through Regional (TransLink) funding, the City's Capital Plan, and Federal Grant Opportunities.

g) Alternatives:

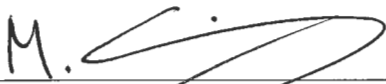
Council may elect to choose another route option possibly from the three shortlisted options.

CONCLUSIONS:

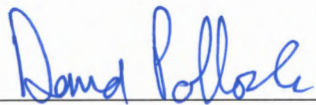
The Abernethy Way Extension Study (232 Street to 256 Street) has determined that an extension of Abernethy Way from 232 Street to 256 Street is technically feasible. The MAE process identifies the Lower Route (Option 7) as the most feasible option, extending Abernethy Way from 232 Street to 240 Street, down 240 Street, and east on Dewdney Trunk Road. Should Council endorse the selected option the next steps for this project is to proceed with a conceptual design to identify property requirements for the selected route (Option 7).



Prepared by: Purvez Irani, PEng., PTOE
Manager of Transportation



Reviewed by: Michael Canning, PEng.
Acting Municipal Engineer



Approved by: David Pollock, PEng.
General Manager Engineering Services



Concurrence: Al Horsman
Chief Administrative Officer

Attachments:

- (A) Appendix A , Multiple Account Evaluation (MAE)
- (B) Appendix B, Recommended Roadway Cross-Sections
- (C) Abernethy Way Extension Study Report (232 Street to 256 Street) prepared by McElhanney

APPENDIX A

Multiple Account Evaluation

Criteria	Option 2C		Option 7		Option 10	
	130 Ave. (Upper Route)		Dewdney (Lower Route)		124 Ave. (Middle Route)	
	Influencing Factors		Influencing Factors		Influencing Factors	
Relieves Traffic on Dewdney Trunk Rd & Provides Network Redundancy			<ul style="list-style-type: none"> Includes constructing the road segment Option 7C to provide network redundancy via 248 St and 130 Ave 			
Provides Access to NE Sector of the City						
Consistency with Strategic Transportation Plan (STP) / OCP						
Public Preference						
Directness of Route						
Utilization of Existing Roads & Property Impact						
Environmental Impact	<ul style="list-style-type: none"> Two new Latimer Creek crossings. Compensation Area: ~23,209m² 		<ul style="list-style-type: none"> No major creek crossings. Compensation Area: ~14,402m² 		<ul style="list-style-type: none"> Two new Latimer Creek crossings. Compensation Area: ~35,427m² 	
Possibility of Archaeological Impact						
ALR Impact						
Social / Community Impact, also including impact to schools and through-cutting						
Significant Utility Relocation			<ul style="list-style-type: none"> Traffic safety barriers will be required to avoid some BC Hydro pole relocations 			
Cost Estimate (Class D; \$2019)	<ul style="list-style-type: none"> \$71.8M \$37.3M (240 St Ext) 		<ul style="list-style-type: none"> \$66.0M \$37.3M (240 St Ext) 		<ul style="list-style-type: none"> \$69.4M \$37.3M (240 St Ext) 	
2 pts; 1 pt; 0 pts		14		18		15
Overall						

APPENDIX B

Recommended Roadway Cross-Sections

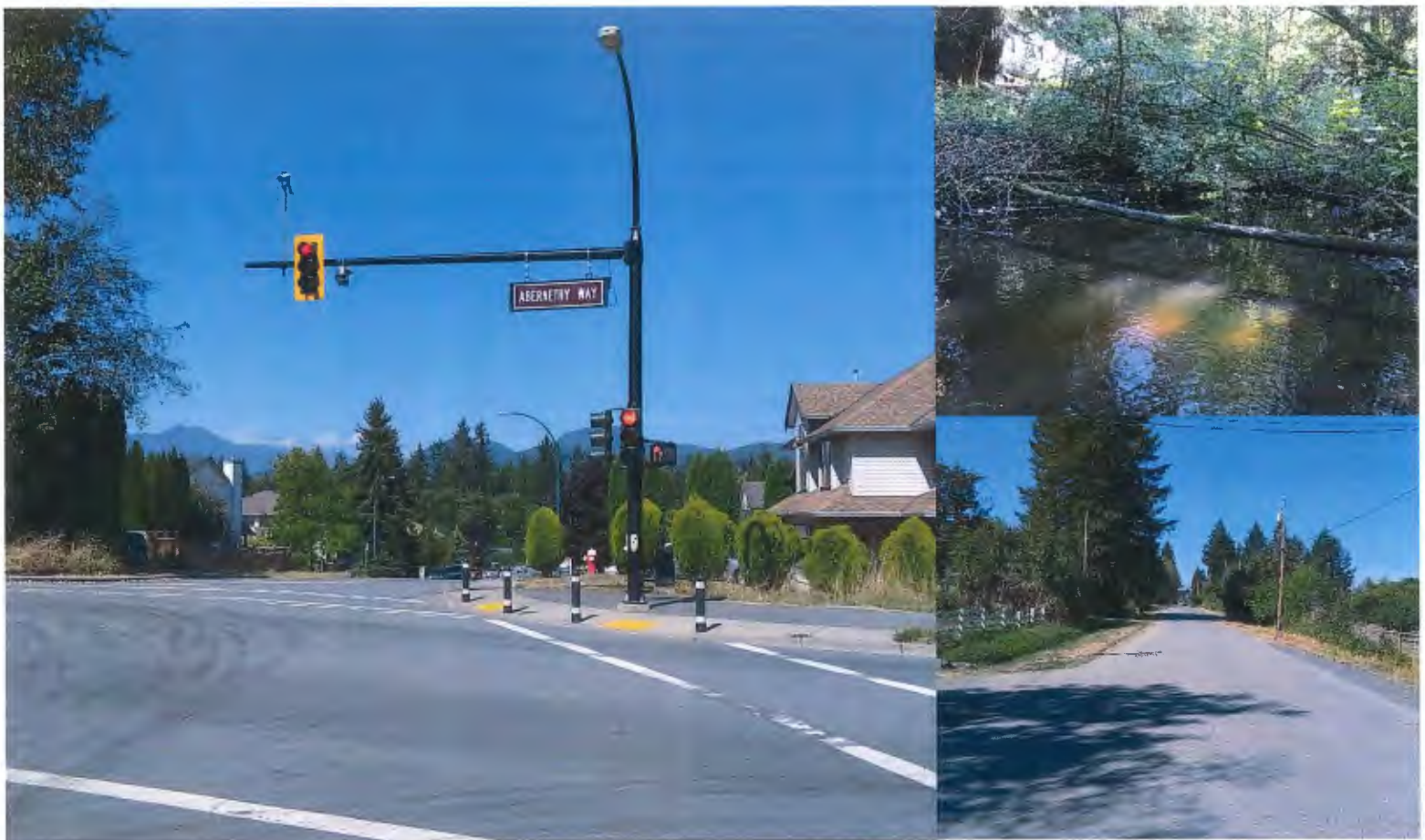
ROADWAY	SECTION	RECOMMENDED CROSS SECTION
Abernethy Way Extension	232 Street to 240 Street (Phase 3)	2 Lanes (Interim), 4 lanes (Ultimate)
	240 Street to 256 Street (Phase 4)	2 lanes
240 Street	Abernethy Way Extension North (240 Street Bridge Extension)	2 lanes
	Dewdney Trunk Road to Abernethy Way Extension (Phase 4)	4 lanes
Dewdney Trunk Road	240 Street to east of 252 Street (Phase 4)	4 lanes
	East of 252 Street to 256 Street (Existing Conditions)	2 lanes

FINAL

ABERNETHY WAY EXTENSION STUDY

232 STREET TO 256 STREET

November 18, 2019 | Project #: 2111-03980-00 | Submitted to: City of Maple Ridge



McElhanney Ltd.
Suite 2300 - 13450 102 Avenue
Surrey BC, V3T 5X3

Contact: Bernard Abelson, PEng, MEng, TOPS
Project Manager
604-424-4935 | babelson@mcelhanney.com

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APPENDICES

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Appendix C: Abernethy Way Drawings	Appendix D: Archaeological Overview Assessment
Appendix E: Geotechnical Desk Study Report	Appendix F: Traffic Demand Forecast
Appendix G: Property Summary	Appendix H: Class D Cost Estimate



EXECUTIVE SUMMARY

Abernethy Way is a key east-west arterial in the City of Maple Ridge and is part of TransLink's Major Road Network (MRN) connecting the Golden Ears Bridge to the west and 232 Street to the east. It generally parallels two other major routes in Maple Ridge: Lougheed Highway and Dewdney Trunk Road.

Extending Abernethy Way beyond 232 Street to 256 Street as an alternative to Dewdney Trunk Road was identified in the City's 2014 Strategic Transportation Plan (STP). This would provide better access to future proposed industrial land development in the north east sector of the City. The City has in the past developed corridor alignment options for this extension, and through this study wished to determine the technical feasibility of the corridor and to provide a recommended alignment. This new extension would be Phase 3 (to 240 Street) and Phase 4 (to 256 Street) of the Abernethy Way extension as per the STP.

The study objectives were to assess the feasibility of both the previously identified options as well as identify any new options, before shortlisting options for further assessment. The shortlisted options were then presented to the public for their input, before being compared to each other using a Multiple Account Evaluation (MAE) process. In addition, the study was to determine the technical feasibility of a possible new 240 Street extension over the Alouette River to Fern Crescent.

Thirteen alignment options or segments were reviewed as shown in **Figure ES - 1**, as well as the 240 Street extension.

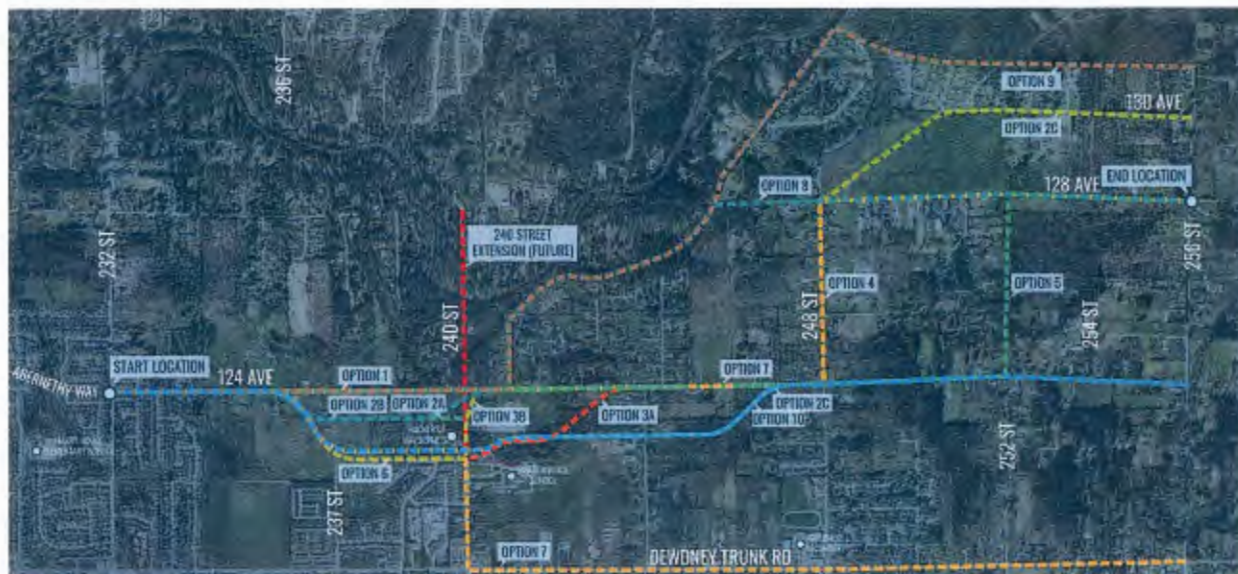


Figure ES - 1: Alignment and Segment Options Considered

Based on criteria such as the number of significant river and creek crossings, road geometry, terrain, cost effectiveness, and community, environmental, geotechnical, and archaeological impacts, three options were shortlisted for more detailed analysis. The three options are described below and have a consistent segment from 232 Street to 240 Street as shown in **Figure ES - 2**.

1. An alignment east of 240 Street to 124 Avenue that then continues along the existing 248 Street and 130 Avenue (Option 2C).

2. An alignment that would connect to and widen 240 Street and Dewdney Trunk Road (Option 7), as well as provide a new link on 124 Avenue between 244 Street and 246 Street.
3. An alignment east of 240 Street that generally follows the 124 Avenue greenfield alignment with a deviation south at Latimer Creek (Option 10).



Figure ES - 2: Three Shortlisted Options

The findings of the MAE are shown in [Table ES - 1](#).

Table ES - 1: Multiple Account Evaluation (comparison of options relative to each other)

Criteria	Option 2C		Option 7		Option 10	
	130 Ave. (Upper Route)		Dewdney (Lower Route)		124 Ave. (Middle Route)	
	Influencing Factors		Influencing Factors		Influencing Factors	
Relieves Traffic on Dewdney Trunk Rd & Provides Network Redundancy			<ul style="list-style-type: none"> Includes constructing the road segment Option 7C to provide network redundancy via 248 St and 130 Ave 			
Provides Access to NE Sector of the City						
Consistency with Strategic Transportation Plan (STP) / OCP						
Public Preference						
Directness of Route						
Utilization of Existing Roads & Property Impact						
Environmental Impact	<ul style="list-style-type: none"> Two new Latimer Creek crossings. Compensation Area: ~23,209m² 		<ul style="list-style-type: none"> No major creek crossings. Compensation Area: ~14,402m² 		<ul style="list-style-type: none"> Two new Latimer Creek crossings. Compensation Area: ~35,427m² 	
Possibility of Archaeological Impact						
ALR Impact						
Social / Community Impact, also including impact to schools and through-cutting						
Significant Utility Relocation			<ul style="list-style-type: none"> Traffic safety barriers will be required to avoid some BC Hydro pole relocations 			
Cost Estimate (Class D; \$2019)	<ul style="list-style-type: none"> \$71.8M \$37.3M (240 St Ext) 		<ul style="list-style-type: none"> \$66.0M \$37.3M (240 St Ext) 		<ul style="list-style-type: none"> \$69.4M \$37.3M (240 St Ext) 	
2 pts; 1 pt; 0 pts		14		18		15
Overall						

Based on the technical analysis and desktop and assessments undertaken as part of this study, extensions of both Abernethy Way from 232 Street to 256 Street, and 240 Street to Fern Crescent appear to be technically feasible.

Option 7 (Dewdney Trunk Road), shown in **Figure ES - 3**, is the preferred alignment option based on the MAE findings and was also the preferred option identified at the public Open House.

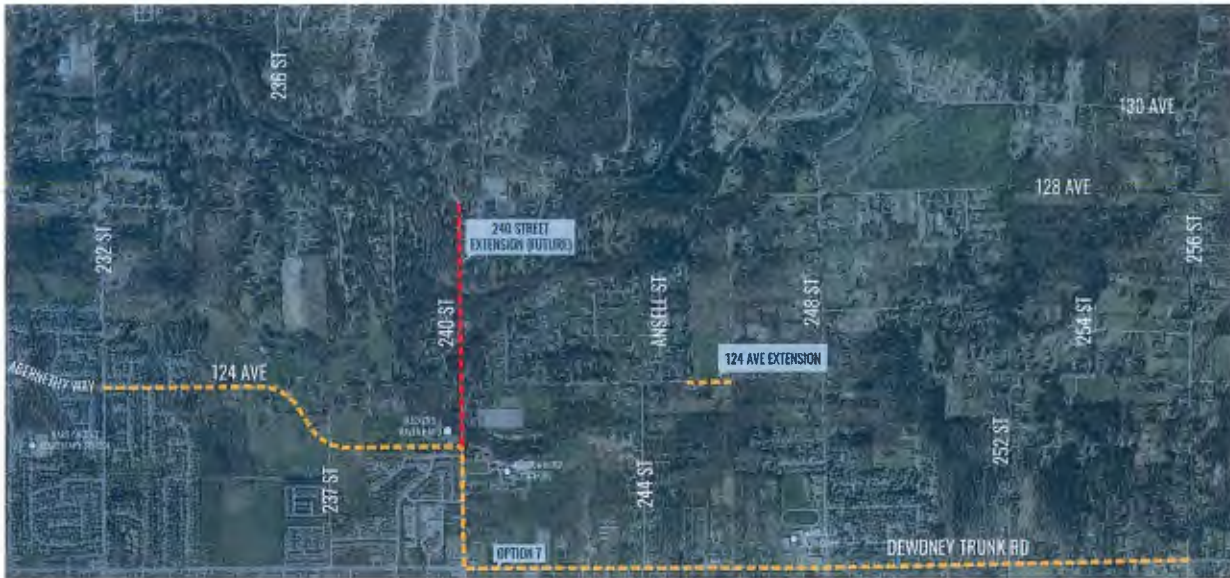


Figure ES - 3: Shortlisted Option

Based on the findings of this study, Option 7 (Dewdney Trunk Road) is recommended as the preferred option to investigate further. The future extension of 240 Street over the Alouette River can proceed as a separate project in future or as preferred by the City. Advancing these two projects to the conceptual design stage will allow some of the remaining unknowns to be determined, including more accurate property acquisition costs, and thereby prepare more reliable cost estimates (Class C or better).

Included as part of this preferred option in the widening to four lanes of the section of 240 Street from Dewdney Trunk Road to the new Abernethy Way extension in the vicinity of the Hackers Haven, just north of the existing Abernethy Way intersection. This is consistent with the future proposed extension of 240 Street north to Fern Crescent, and the eventual possible inclusion of 240 Street between Dewdney Trunk Road and Fern Crescent in TransLink's Major Road Network. The 240 Street connection to the Abernethy Way extension will also help better balance traffic on the section of Dewdney Trunk Road west of 240 Street and on 232 Street between to Dewdney Trunk Road and Abernethy Way. In the next design stage where road upgrades are in close proximity to schools, mitigation measures should be considered in the design.

To meet the objective of providing an alternative route to Dewdney Trunk Road, completing the link of 124 Avenue between 244 Street and 246 Street is recommended. This will then provide an alternative route for local and emergency vehicle traffic connecting 240 Street to 256 Street via 124 Avenue, 248 Street and 130 Avenue. It is proposed this route be heavy vehicle restricted.

As part of the next design stages, further public engagement is also recommended.



1. INTRODUCTION

1.1. OVERVIEW

The 128 Avenue / Abernethy Way corridor is a key east-west arterial route in the City of Maple Ridge (the City) with a direct connection to the Golden Ears Bridge through Golden Ears Way at the west boundary and 232 Street at its current eastern boundary. Abernethy Way is a winding road that is currently part of TransLink's Major Road Network (MRN) and generally parallels two other major east-west connectors to the south: Lougheed Highway and Dewdney Trunk Road.

1.2. CORRIDOR OBJECTIVES

Extending Abernethy Way to 240 Street as a long-term improvement option and eventually to 256 Street as an alternative route to Dewdney Trunk Road were identified in the City's 2014 Strategic Transportation Plan (STP). The primary objectives of the corridor are to:

1. Extend Abernethy Way from 232 Street to 256 Street to provide improved access to the industrial and employment lands in north east sector of Maple Ridge, as per the City's Official Community Plan (OCP) and the STP.
2. Provide an improved connection to a possible future extension of 240 Street north to access the Silver Valley area.
3. Improve both local and regional traffic flow (which includes access to the Golden Ears Provincial Park).
4. Provide redundancy in the road network and an alternative emergency route.

1.3. PROJECT OBJECTIVES

The objectives of this study are to:

1. **Assess the technical feasibility of extending 240 Street north to Fern Crescent to access the Silver Valley area and Golden Ears Provincial Park.** The study considers a preferred crossing option of the Alouette River taking into account hydrotechnical and environmental factors.
2. **Assess the technical feasibility of various options of the Abernethy Way extension from 232 Street to 256 Street.** The study considers alignments, road connections, construction costs, property impacts, structural, archaeological, environmental, drainage and social impacts using previously prepared alignment options as the starting point.
3. **Evaluate each option and identify a preferred option.** The study brings together quantitative and qualitative analysis in a structured Multiple Account Evaluation (MAE) framework.
4. **Provide information to support informed debate.** The study provides information about how the various options to extend Abernethy Way would compare to each other, highlighting both the pros and cons of each.

1.4. PROJECT SCOPE

To achieve the corridor and project objectives, the following tasks were performed:

1. Gather and review existing information and studies that might influence decision making
2. Conduct a field review

3. Evaluate previously prepared alignment options and identify any new options
4. Determine forecast traffic volumes to advise the corridor cross section
5. Conduct desktop studies and field assessments of archaeological, environmental, drainage, structural, geotechnical, and property impacts
6. Evaluate alternative options relative to each other
7. Conduct public engagement
8. Identify a preferred corridor alignment

In addition, a feasibility study of the extension of 240 Street north across the Alouette River was also done. This report details the study findings.

1.5. STUDY AREA

The study area is generally bounded by 232 Street to the west, Dewdney Trunk Road to the south, 256 Street to the east, and 124 Avenue / 130 Avenue to the north. The area overview is shown in **Figure 1**. Looking at the study area relative to the rest of the City, the need for a possible additional east-west connection is evident, as well as a north-south .

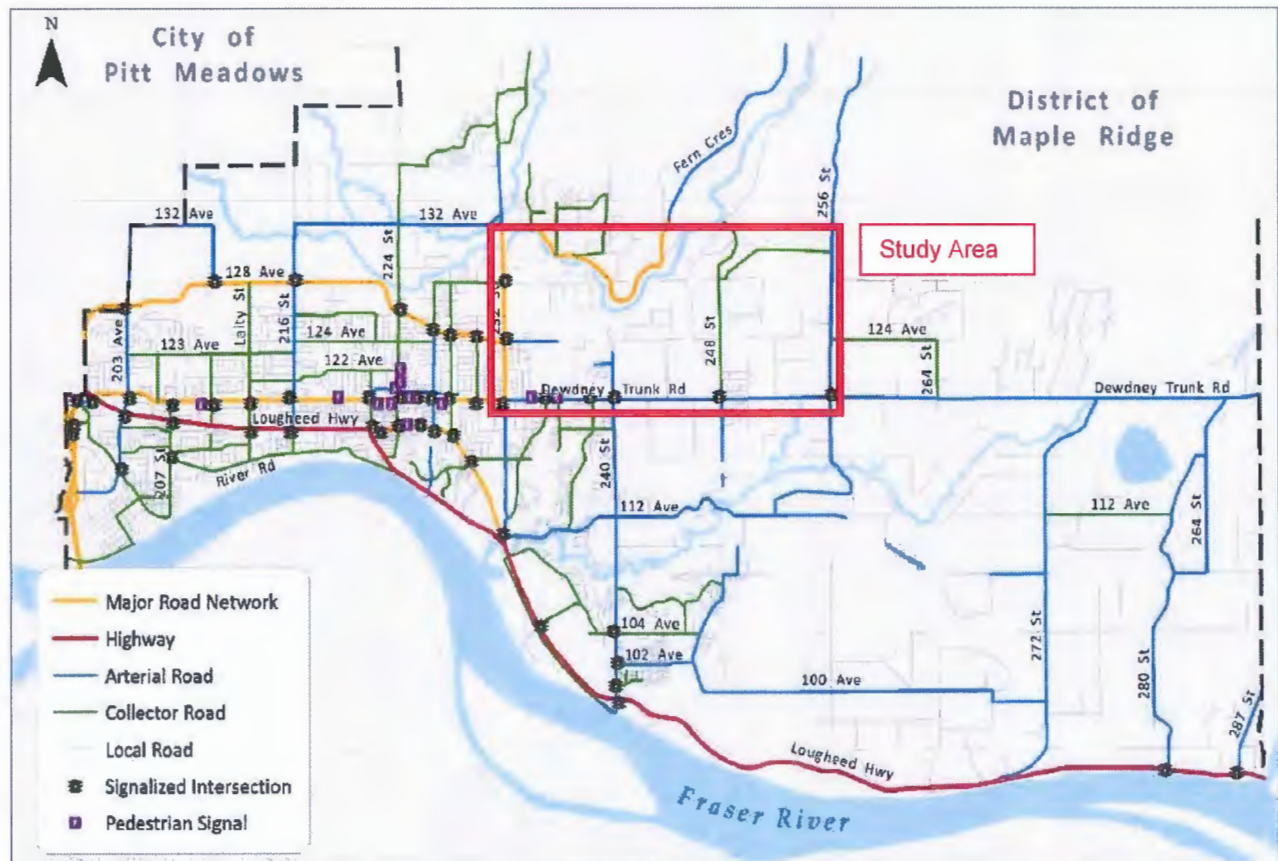


Figure 1: Area Overview (from the 2014 STP)

1.6. PREVIOUS STUDIES AND CITY REFERENCES

Previous studies and references pertaining to the Abernethy Way extension are detailed below.

1.6.1. Previous Abernethy Way Extension Studies

Previous Abernethy Way extension studies were undertaken by Delcan (now Parsons) between 2008 and 2010. These include:

- A memo dated November 17, 2008 – This memo summarizes the original seven options which were used as the starting point of this study.
- A memo dated August 25, 2009 – This memo provided a project update and summarized the extent of works completed.
- A letter dated March 31, 2010 – This letter summarized a meeting that was held with TransLink regarding possible funding for the extension.
- A draft technical brief dated September 2010 – This brief provided a Multiple Account Evaluation which showed Option 3, Option 4a, and Option 6 as being the highest rated.
- Draft plan and profile drawings of the alignment options dated November 14, 2008 – These alignments served as the starting point for this study.

1.6.2. Strategic Transportation Plan

The Strategic Transportation Plan (STP) includes discussion on the existing 128 Avenue / Abernethy Way corridor and its extension. The STP proposes the upgrade of this corridor be split into four phases:

- **Phase 1: 210 Street to 224 Street** – This segment was not included in this study. Phase 1 was to widen this segment of 128 Avenue / Abernethy Way from two lanes to four lanes as well as provide upgrades including traffic signals and left-turn lanes. This upgrade has since been constructed.
- **Phase 2: 224 Street to 232 Street** – This segment was also not included in this study. The STP discusses widening this segment from two lanes to four lanes and provide intersection upgrades. A separate City led project to widen this portion is underway; however, the scope has since changed to intersection upgrades only after an evaluation determined the widening is not yet warranted.
- **Phase 3: 232 Street to 240 Street** – This segment is also included in this study. The STP discusses this future connection as a four-lane roadway with a signalized intersection at 240 Street. The STP notes that this is considered a long-term improvement (approximately 10 to 20 years).
- **Phase 4: 240 Street to 256 Street** – This segment is included in this study. The STP notes that Phase 4 was considered and is not identified as a part of the long-term strategy since the OCP did not anticipate redevelopment of the area. It also notes that if development were to occur, the City may revisit this option further. This segment has; however, been considered in this study since decisions regarding Phase 3 options can impact the availability and viability of Phase 4 alignments, and the City issued an OCP Amendment for the north east sector which is discussed further in the *Traffic Forecasting* section of this report.

1.6.3. Previous 240 Street Extension Studies

In 2008, Associated Engineering (AE) prepared a bridge crossing concept of the Alouette River. A review of that report was done given the changing local context, and preliminary assessments and recommendations provided regarding environmental impacts, hydrology impacts, rationale for the previous bridge concept, and navigable waters regulation. An initial structural review of the bridge concept was also done, and an order of magnitude cost estimate prepared.



2. 240 STREET EXTENSION FEASIBILITY STUDY

2.1. OVERVIEW

The City received a development application for a proposed new residential subdivision between the northern limit of 240 Street and the Alouette River. The developer had prepared several layout options, including two roadway alignment options extending 240 Street through the proposed subdivision and across the Alouette River connecting to 128 Avenue. All options include filling the south flood plain of the Alouette River with a bridge crossing of approximately 170m.

Given these options and the previous work done, an independent study was done of the developer's design concept focused on the bridge concept design to determine a planning level cost estimate. For this, a report prepared by Northwest Hydraulic Consultants (NHC) in March 2018 was relied upon to assess the flooding impact from the proposed development to estimate the hydraulic design parameters for developing a bridge concept.

It was assumed that the developer will be responsible for environmental impacts, permitting, and restoration habitat associated with the subdivision impact, and these were therefore excluded from the scope of the study.

2.2. 240 STREET EXTENSION CONCEPT DESIGN

2.2.1. Roadway Alignment

A conceptual 240 Street alignment was prepared based on the developer's 2018 alignment and profile (Option 1B) and is provided in [Appendix B](#). South of the Alouette River, connections to 124 Avenue and 241 Street driveways will be maintained via a proposed access road between 240 Street and 241 Street. Properties west of 240 Street will have access via a new proposed access road from 240 to the former 240 Street alignment. On the north side of the Alouette River, the existing intersection of 240 Street and Fern Crescent is proposed to be closed due to both its skew with the proposed new roadway and the grade differential between the two roadways. Residences along Fern Crescent would access their properties via the intersection of 128 Avenue and Fern Crescent, with the western limit of Fern Crescent becoming a cul-de-sac.

The proposed alignment has a maximum gradient of 8% and a two-lane local urban road cross section ([Figure 2](#)) with a multi-use pathway and sidewalk. More refinement will be required in subsequent design stages to review alternatives to this concept, cost estimate, its optimization and refinement, and to determine property impacts.

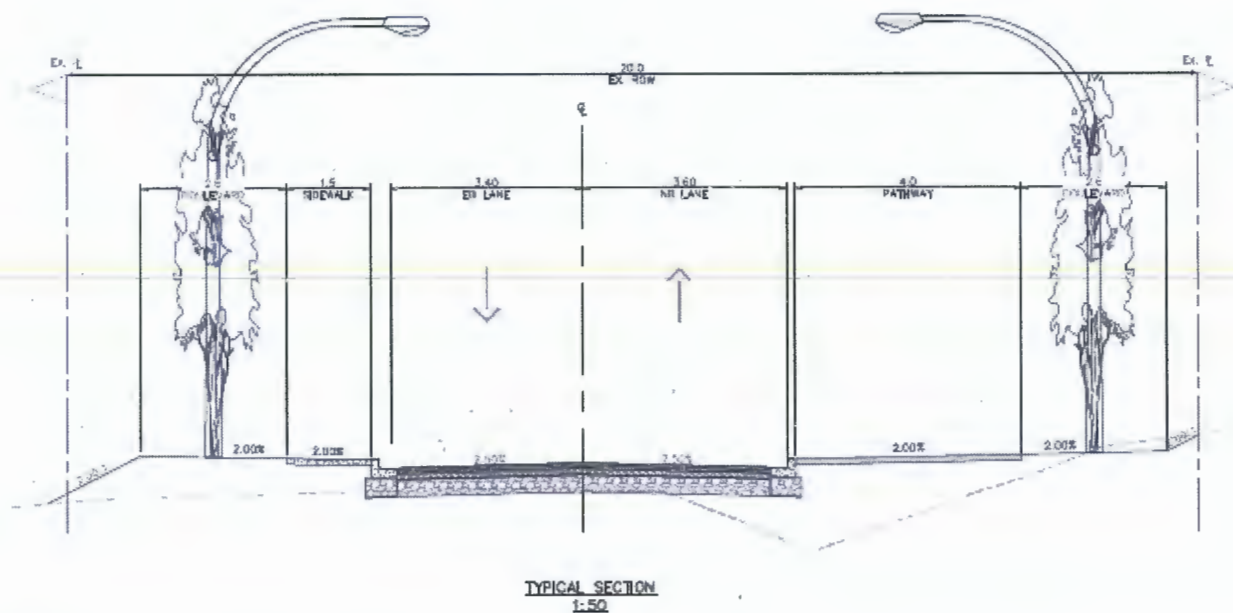


Figure 2: Proposed 240 Street Extension Concept Cross Section

2.2.2. Bridge Concept

Based on the alignment and profile prepared, a new bridge will be required through the new subdivision and over the Alouette River. The location and alignment of the proposed bridge and 240 Street extension is shown in **Figure 3**.



Figure 3: Plan View of Proposed 240 Street Bridge Crossing

The new bridge crosses the Alouette River immediately downstream from a natural widening where the river makes a sweeping 180-degree turn through a floodplain. Due to the topography at the north escarpment and the channel alignment, the bridge abutments and piers will be skewed. Although a skew of approximately 35-degrees is shown in the concept, the skew of the piers should match the river alignment to reduce the potential for scour immediately downstream of the piers. An appropriate skew should be determined during the next design stage and determined by a hydrotechnical assessment.

The slope of the existing escarpment at the north abutment is very shallow (between 6H:1V and 7H:1V) and the bridge length could potentially be shortened by up to 15m through regrading this slope (reduced length based on a 3H:1V slope). Since a geotechnical assessment was not done as part of this scope to determine the maximum stable slope based on the soil profile, the bridge length was determined using the existing escarpment slope at the north side and a 3H:1V slope at the south side (assuming all new fill).

The proposed bridge cross-section consists of a 10.2m wide roadway (two 3.6m lanes and two 1.5m shoulders), a 4m clear-width multi-use pathway (MUP) on the east side, and a 1.5m clear-width sidewalk on the west side, both separated from traffic by standard cast-in-place concrete parapets. The total bridge width including an allowance for fences is approximately 17m. Pedestrian and bicyclist height steel railings are assumed to be mounted on the parapets adjacent to the sidewalk and MUP and a fence of appropriate height installed at the outside edge of the deck. A typical superstructure cross-section is shown in [Figure 4](#).

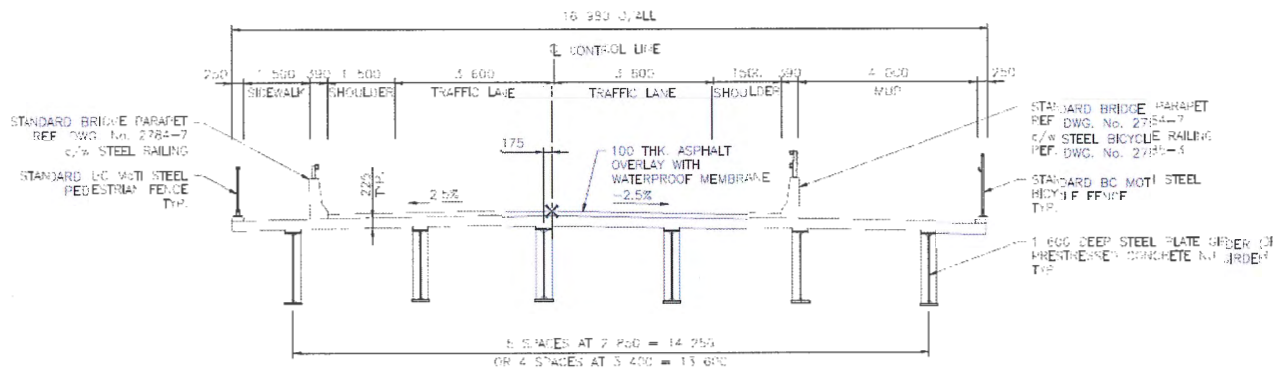


Figure 4: Typical 240 Street Superstructure Cross-Section

The concept bridge design is based on a five-span (28m-38m-38m-38m-28m) continuous bridge across the river with an overall span length of 170m. This is significantly shorter than the 440m in the previous 2008 report, primarily due to the proposed development infill which acts as a causeway and shortens the bridge length considerably. This reduction results in a significant reduction in the cost of the bridge structure. The proposed span configuration will allow the use of either steel girders or prestressed concrete girders which can be confirmed in the next design stage. A bridge profile is shown in [Figure 5](#).

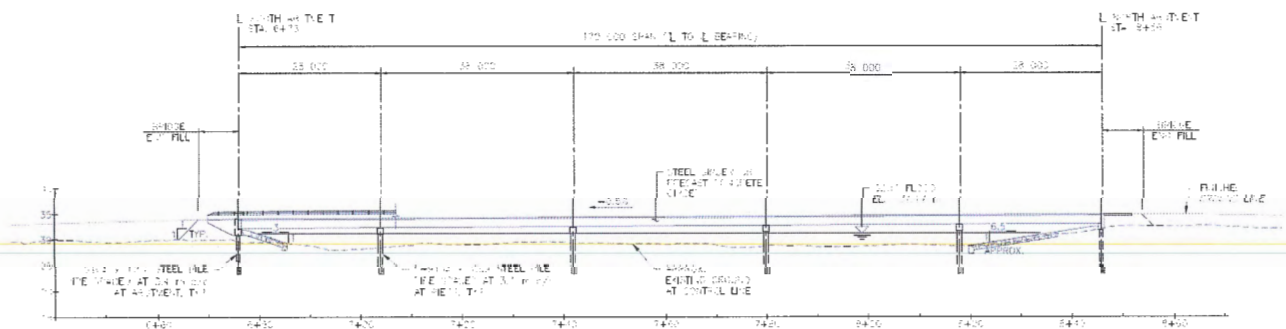


Figure 5: Proposed 240 Street Bridge Profile

2.2.3. Additional Bridge Design Elements

The recommended flood elevation for a 200-year return period event (Q200) is 31.14m based on the NHC report. The Q200 elevation incorporated the effects of the new subdivision infringing upon the floodplain area. As the water velocity through the floodplain is slow, the effect of the Q200 elevation in the primary channel of the river was not significant. Based on the recommendations from the Canadian Highway Bridge Design Code (CHBDC) S6-14, a minimum soffit clearance of 1m between the underside of the bridge superstructure and the Q200 flood elevation is recommended.

Based on the roadway profile, Q200 elevation, and minimum soffit clearance, the maximum superstructure depth is approximately 2150mm. Accounting for a 100mm thick asphalt wearing surface, a 225mm thick structural cast-in-place concrete deck, an allowance for haunch height, and a 2.5% cross-fall over the width of the deck; the maximum girder depth is approximately 1600mm. This depth enables multiple superstructure options, including the use of six lines of standard 'NU' precast I-girders or steel plate I-girders spaced at approximately 2.85m or five lines of steel plate I-girders spaced at approximately 3.4m center-to-center.

As this concept design did not include supplemental geotechnical investigations or desktop studies, the conceptual substructure and foundations design is based on the conclusions of the previous 2008 study. This study relied upon the geotechnical investigations upstream of the proposed crossing and recommended the use of either 610mm diameter by 12.7mm wall thickness piles driven to a depth of 40m or 914mm diameter by 15.9mm wall thickness piles driven to a depth of about 30m to 35m.

Based on the larger reactions at the piers, the new bridge concept is assumed to be founded on 610mm diameter piles at the abutments and 914mm diameter piles at the piers. The required number of piles is based on the anticipated reactions; however, this will need to be confirmed during the next design stage.

A general arrangement of the bridge concept is included in [Appendix B](#).

2.3. INFLUENCE OF THE PROPOSED DEVELOPMENT

Construction of the proposed subdivision development does not appear to have a detrimental impact on the City's ability to construct a 240 Street bridge crossing of the Alouette River. While the proposed development infills a sizeable area of the land area overtopped during a Q200 flood event and which has a minor impact on the flood elevation immediately at the proposed bridge location, the subdivision essentially acts as a causeway which serves to shorten the bridge length considerably. This is reflected in the change in anticipated elevated bridge length from 440m in the previous 2008 report to the approximately 170m crossing based on this study. This reduction results in a significant reduction in the cost of the bridge structure.

Because geotechnical investigations have not been conducted on site (with the intention to fill and construct a bridge crossing), there is inherent risk and unknowns with the design and construction requirements for the approach embankment fills leading up to the bridge crossing. For example, lightweight fill treatments and / or preload on 240 Street may be appropriate to limit settlement of the structure. It is therefore recommended to conduct a geotechnical investigation as part of the next design stage which will also allow refinement of the cost estimate.

Similarly, an environmental assessment has not yet been completed. Instream works proposed in this bridge concept will trigger various notifications and approvals with the regulators. Understanding the associated impacts and timelines will be an important next step in determining a schedule and budget for the project.



3. EXISTING CONDITIONS

3.1. OVERVIEW

This section describes the existing conditions in the study area which require consideration in the evaluation of technically feasible options for the Abernethy Way extension. Data was gathered primarily through desktop study and field visits.

3.2. SITE CONTEXT

A key issues and challenges map is included in the drawings in [Appendix C](#). This map includes photos showing the existing conditions and site context.

In addition, the existing section of Abernethy Way up to 232 Street is part of TransLink's Major Road Network (MRN), as are Dewdney Trunk Road up to 240 Street, and 240 Street south to Lougheed Highway. Fern Crescent to the north is also on the MRN as it provides access to a provincial park. These corridors are shown in [Figure 6](#). The MRN supports the safe and efficient movement of people and goods across the region, encompassing 675 kilometers of major arterial roads that carry multimodal commuter, transit, and truck traffic. It connects the provincial highway system with the local road network, and some corridors also serve cyclists and pedestrians. TransLink, in partnership with municipalities, plans the regions MRN and TransLink contributes funding for its on-going operation, maintenance and rehabilitation, however ownership and operational responsibility for the MRN remains with the respective municipalities. TransLink also shares the cost of road, cycling, and pedestrian improvement projects with municipal partners and other stakeholders to expand options for driving, cycling, and walking across the region. Given this context, it is feasible that the extension of Abernethy Way at least up to 240 Street could also become part of the MRN in future, as well 240 Street between Dewdney Trunk Road and its future extension northwards to Fern Crescent.

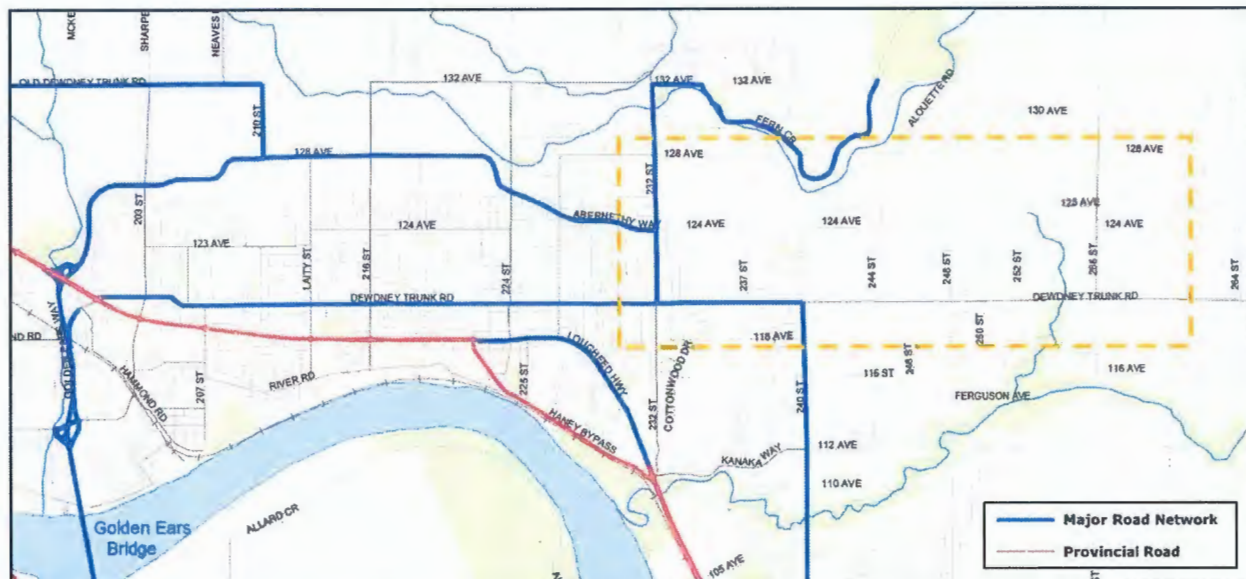


Figure 6 TransLink's Major Road Network

The study area is also substantially made up of Agricultural Land Reserve (ALR) as seen by the green shaded areas in **Figure 7**. The ALR is a collection of agricultural land in across BC in which agriculture is recognized as the priority. It is intended to permanently protect valuable agricultural land from being lost. To remove land from the ALR, an application is submitted to the Agricultural Land Commission (ALC) for review. Two recent applications in the study area were rejected. Given this context, it is unlikely that any sizeable portion of land in the study area would be redeveloped, therefore traffic generation from within the study area onto a future extension of Abernethy Way would be low.

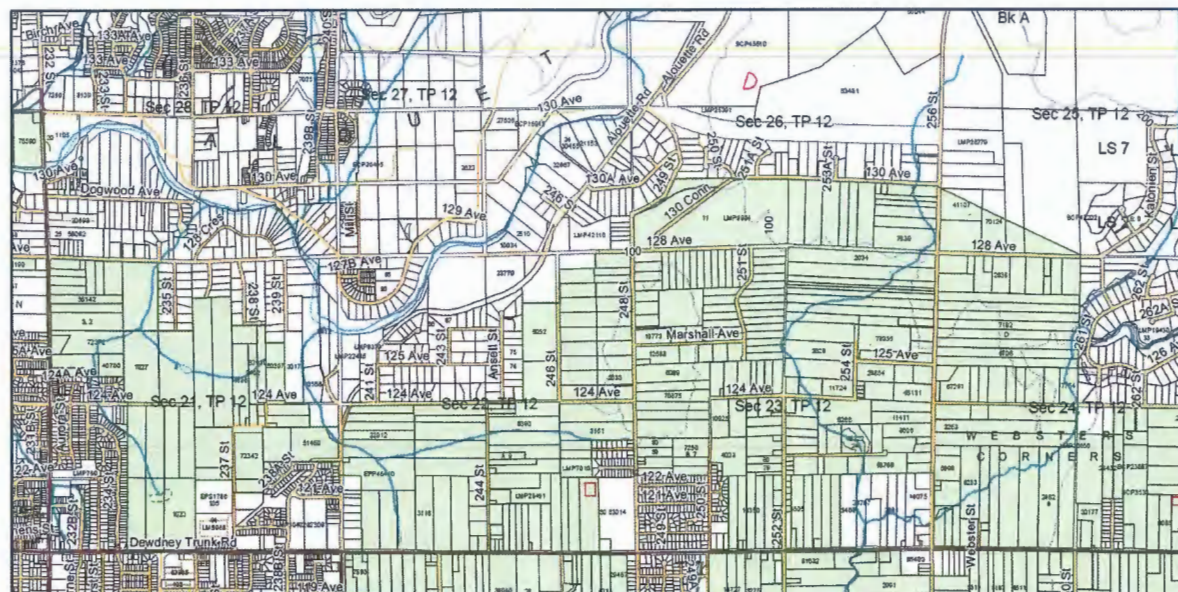


Figure 7 Study Area Agricultural Land Reserve

There are several schools in the study area, the majority of which front onto Dewdney Trunk Road as seen in **Figure 8**. Other schools surrounding the study area are also shown. As a result, there is student pedestrian traffic on the road network that should have suitable facilities provided.



Figure 8 Schools Located in and Around the Study Area

3.3. ARCHAEOLOGICAL OVERVIEW ASSESSMENT

An Archaeological Overview Assessment (AOA) was prepared by Antiquus Archaeological Consultants Ltd. for the proposed Abernethy Way extension based on several desktop studies and field visits. A copy of the report and addendum can be found in [Appendix D](#). Site potential notes have been added to the drawings in [Appendix C](#).

Using a low, medium, or high rating to reflect the likelihood of discovering items of archaeological significance, the assessment identified fifteen locations considered to have medium to high potential for archaeological impact. Two mitigation strategies are presented for these potential sites:

- Option 1: Complete avoidance of areas with medium or greater site potential. This is generally the preferred method since it is the simplest and least costly choice, however is not always feasible.
- Option 2: If a route falls within a medium or greater site potential, further investigations in the conceptual, preliminary and detailed design stages should be conducted through an Archaeological Impact Assessment (AIA).

There are some areas where medium or greater site potentials cannot be avoided such as at Coho Creek just east of 232 Street on Abernethy Way. As a result, an AIA is recommended during the conceptual, preliminary and detailed design stage once a preferred option has been selected.

3.4. ENVIRONMENTAL REVIEW

3.4.1. Commitment to Sustainable Development

The OCP identifies sustainability as a key objective and driver in decision-making. Regulatory considerations are critical in evaluating potential effects of proposed capital projects. Mitigation of effects through compensation is usually less preferred and often more costly, than can be achieved through alternate route planning and avoidance of impacts.

3.4.2. Desktop Review

A desktop environmental review was completed to provide a high-level assessment of potential impacts to watercourses and associated riparian areas. The review was centered around work that is likely to be regulated by the Ministry of Forests, Lands, Natural Resource Operations, and Rural Development (FLNRORD) and / or Fisheries and Oceans Canada (DFO) and would therefore require regulatory approvals. The review focused on work that would be in and around new and existing stream crossing locations.

The preferred alignment, when selected, will require detailed survey through established channel assessment procedures. This will provide the level of detail necessary to quantify impacts of the ultimate design and thus inform regulatory and compensatory requirements.

Preliminary information was collected from various databases including the Province's Habitat Wizard, Fisheries Information Summary System (FISS), City's GIS data, and other information deemed to be important in Data BC, iMAPBC, Community Atlas, and City of Maple Ridge Open Data.

Opinions on fish passage requirements at culvert locations (both new and existing) were based on several factors including but not limited to:

- Upstream reach conditions (such as the presence of ditches and open watercourses).
- Information related to historical fish presence/observation.
- Evaluation of natural or man-made barriers to fish and whether such barriers could be overcome with intervention.

- Location of a proposed crossing relative to stream order (i.e. lower order headwater location vs. higher order stream reaches such as those with a distinct channel).
- Evidence of stream permanence, and habitat complexity.

City-supplied Light Detection and Ranging (LiDAR) data was also analyzed to supplement the review with detailed terrain data. This analysis provided a means to reasonably delineate watercourses such as ditches, natural streams, ravine and channel slopes and associated riparian areas.

Supplied LiDAR was used in ArcGIS to create a digital elevation model along the proposed alignment corridors. A slope algorithm was applied to the model to generate a slope map in percent rise. A polygon representing a slope greater than 3:1 was extracted from the slope map; this served to effectively model the channel slopes and top of bank for streams and ditches. Mapped streams received a setback buffer of 5m, 15m, or 30m based on a relative measure of sensitivity. Ditches received a setback buffer of 5m. These setbacks should be confirmed with the City during future design stages. The road pavement edge was considered to be a permanent existing development and therefore any setback buffers extending onto a paved road surface were trimmed accordingly.

Temporal boundaries for potential stream and riparian effects were limited to the full 24m extent of the proposed right-of-way. Terrestrial sensitivity data available within a 100m buffer from the proposed alignment was reviewed.

Importantly, characterizing effects associated with greenfield areas such as forested land or land that has otherwise not undergone development and left largely in a naturalized state, was not included as part of this desktop environmental scope. These undeveloped areas should be further investigated for the presence of sensitive flora and fauna, wetland areas, and other sensitivities that may be revealed in detailed site assessment and which are protected by applicable environmental statute.

The following regulations were considered in the review:

- City of Maple Ridge no net habitat loss and 2:1 offsetting / compensation policy.
- FLNRORD notification for road crossings provided for less than 2m fill condition, approvals for ditch infilling / relocation, provincial environmental mitigation policy.
- DFO self-assessment and / or project review required when greater details are available such as in detailed design.

Based on the analysis outlined above, **Table 1** provides an estimate of riparian and channel areas that may require mitigation through offsetting.

Table 1: Compensation Areas

TYPE OF HABITAT	AREA (m ²)		
	OPTION 2C	OPTION 7	OPTION 10
Riparian Area Stream	531	2,586	14,347
Stream Channel (riparian area on channel slope + instream)	243	2,259	3,390
Ditch Riparian Area	17,029	7,530	13,617
Ditch Channel	5,406	2,027	4,073
Total Area	~23,209	~14,402	~35,427

3.5. GEOTECHNICAL DESKTOP REVIEW

Braun Geotechnical Ltd. conducted a geotechnical desktop study and site reconnaissance for the alignment options. The report is provided in [Appendix E](#).

Published surficial geology indicates the site is underlain by soils of the Fort Langley formation which comprises of gravel and sand & stony clayey silt to silty sand. Avoidance of the Latimer Creek ravine is desirable from a geotechnical perspective. Options which do cross the Latimer Creek ravine would require a bridge with a driven piled foundation and would require review for possible slope erosion. A preliminary minimum pavement structure would include 150mm of asphalt on 100mm of 19mm minus crushed granular base on 450mm of 75mm minus select granular subbase.

Geotechnical work in future conceptual, preliminary and detailed design stages should include:

- Geotechnical subsurface exploration and reporting.
- Detailed stream crossing designs.
- Structural assessment of the existing pavement areas and confirmation on pavement design section based on forecast traffic data.
- Detailed Geotechnical Assessment of slopes.
- Detailed slope stability analysis and development of retaining wall designs.

3.6. CREEK CROSSINGS REVIEW

Upon field review and examining the profiles from previously prepared studies, it is evident that some options would require substantial bridge crossings at Latimer Creek. Latimer Creek is a deep ravine with challenging geotechnical and environmental issues. The ravine gets significantly deeper (~16m) and wider (~170m) on the 124 Avenue alignment. The cost of a bridge structure crossing was estimated to be greater than \$20M. Options which deviate south of the ravine could avoid the need for a bridge which would be considerably more cost-effective and less impactful.

Some of the initial option alignments have crossings of Latimer Creek on the east side of 240 Street. Preliminary review indicates a corrugated steel plate arch structure could be used for this crossing given the required span and depth; however, it should be confirmed in conceptual, preliminary and detailed design.

There is an existing two-lane bridge on Dewdney Trunk Road just west of 256 Street. Widening this bridge to four lanes will require either widening, twinning or replacing of the bridge at significant cost. As a result, if widening Dewdney Trunk Road were a shortlisted option it would be reasonable to only extend the four-laning of to just west of this crossing.



4. OPTION REFINEMENT AND SHORTLISTING

4.1. OVERVIEW

This section describes all the options that were considered to connect Abernethy Way from 232 Street to 256 Street. It describes the process that was taken to develop the initial options as well as consideration for shortlisting options.

4.2. ALIGNMENT OPTIONS CONSIDERED

Overall, 13 options were considered as shown in **Figure 9**. Of these, seven were from the previous Delcan prepared options, and six additional options were identified. Note that an end to end corridor alignment is made up of an amalgamation of option segments as seen in the figure. Further specifics of each option are provided the drawings in **Appendix C**.

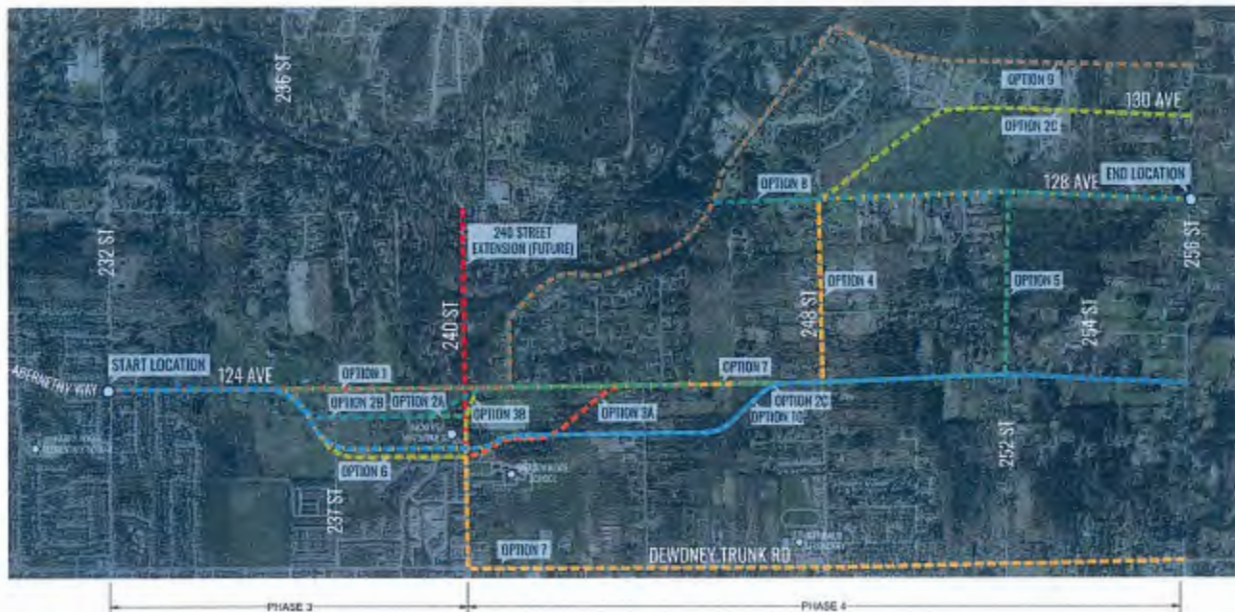


Figure 9: Alignment Options Considered

Each option is described below:

- **Option 1:** Option 1 follows a direct east-west alignment along 124 Avenue from 232 Street to 256 Street. This option crosses Latimer Creek which is a significant ravine at the crossing location.
- **Option 2A:** Option 2A follows a similar alignment to Option 1; however, it deviates south at the Latimer Creek crossing to a narrower, but still significant, crossing location.
- **Option 2B:** Option 2B follows a similar alignment to Option 2A; however, includes improved horizontal curve geometry at 240 Street.
- **Option 2C:** The key feature of Option 2C is that it makes use of the existing road along 248 Street north of 124 Avenue, the 130 Connector, and 130 Avenue to 256 Street.

- **Option 3A:** Option 3A makes use of the existing section of Abernethy Way just west of 240 Street by deviating south of the Hacker's Haven Golf Course. East of 240 Street, the alignment deviates back up to the 124 Avenue alignment by crossing the narrower section of Latimer Creek north of Meadowridge School.
- **Option 3B:** Option 3B is similar to Option 3A; however, it makes use of the existing culvert crossing at Latimer Creek and follows the existing 240 / 241 Street geometry north of Abernethy Way.
- **Option 4:** Option 4 makes use of 248 Street north of 124 Avenue and then 128 Avenue east to 256 Street.
- **Option 5:** Option 5 extends 252 Street north of 124 Avenue and then heads east to 256 Street.
- **Option 6:** Option 6 is similar to Option 3A; however, the transition back up to the 124 Avenue alignment was moved further east to reduce impact to the Academy Park / Ansell neighbourhoods.
- **Option 7:** Option 7 widens both Dewdney Trunk Road to four lanes and 240 Street between Dewdney Trunk Road and Abernethy Way extension. It also includes a short connection of 124 Street between 244 Street and 246 Street.
- **Option 8:** Option 8 makes use of the City-owned right-of-way along 241 Street north of 124 Avenue and continues east along 128 Avenue. Due to the extreme topography along this corridor with steep slopes, this option was determined not feasible.
- **Option 9:** Option 9 is similar to Option 8; however, it makes use of Alouette Road and the corridor north of 130 Avenue to get east to 256 Street. Like Option 8, this alignment was eliminated early on due to extreme topography with steep slopes.
- **Option 10:** Option 10 is similar to Option 6; however, instead of using the existing Abernethy Way south of Hacker's Haven golf course, it would purchase the southern portion of Hacker's Haven golf course. This would improve the alignment east of 240 Street.

4.3. OPTION SHORTLISTING

A review was completed to narrow down the 13 considered options up to three shortlisted for further detailed analysis. The criteria applied to evaluate the options were:

- Number of significant river and creek crossings required
- Suitable and safe road geometry
- Terrain suitability
- Cost effectiveness
- Community impacts
- Environmental, geotechnical, and archaeological impacts

The following sections provide more specific reasoning why each option was shortlisted or not.

4.3.1. Options 1, 2A, and 2B

Due to the topography at the Latimer Creek ravine, a bridge would be required. Although these options provide the most direct routes, the bridge required would add more than \$20M to the total cost which could be avoided with a more southerly option such as Options 6 or 10. Avoidance of the Latimer Creek ravine is also favourable from an environmental, geotechnical, and archaeological standpoint. For these reasons, **Options 1, 2A, and 2B were not shortlisted.**

4.3.2. Option 2C

Option 2C was shortlisted because it makes use of a large portion of existing roadway along 248 Street and 130 Avenue. This is beneficial from several reasons, including reduced cost, reduced geotechnical, archaeological, and environmental risks, and less property impacts. At the 248 Street / 130 Avenue intersection, there would be a five-leg intersection which would need to be designed in the conceptual design stage, for which a roundabout is proposed. This

route is however not direct, requiring 90° turns and intersections. The end to end corridor for this option is shown in **Figure 10**.

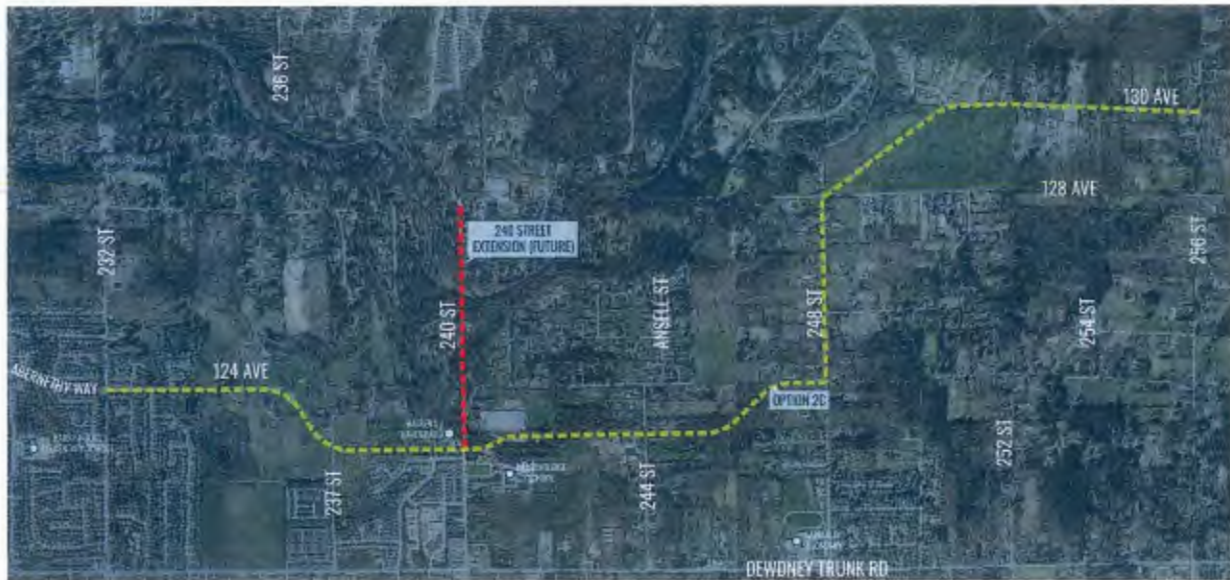


Figure 10: Shortlisted Option 2C

4.3.3. Options 3A and 3B

Option 3A would require several driveways in the Ansell neighbourhood to have direct access on the proposed roadway as well as require additional intersections to reestablish access to the neighbourhood. Option 3B is more circuitous and has challenging geometry both at the intersection of 240 Street and 241 Street and the horizontal curve where 241 Street turns into 124 Avenue.

A hybrid of Option 3B was assessed to determine the feasibility of a new T-intersection at the 124 Avenue right-of-way and 240 Street, thereby avoiding the 241 Street deviation. At this intersection location the elevation of 240 Street is below that of 124 Street. To achieve the maximum preferred 8% gradient on 124 Street would require significant excavations, with retaining walls, and property impacts. This impact combined with the community impacts of Option 3A resulted in **Options 3A and 3B not being shortlisted**.

4.3.4. Options 4 and 5

Option 4 is preferable to Option 5 from a cost, geotechnical, environmental, and archaeological standpoint since Option 4 requires upgrading the existing section of 248 Street where Option 5 requires building a new roadway along 252 Street. However, Option 2C also makes use of the existing 248 Street but also makes use of the existing 130 Avenue where Options 4 and 5 require building a new roadway extending 128 Avenue to 256 Street. Because of this, Option 2C was preferred, and **Options 4 and 5 were not shortlisted**.

4.3.5. Option 6

Option 6 is located on the existing section of Abernethy Way west of 240 Street. Although it would be preferred to use this existing section of roadway from a cost perspective, this alignment would significantly impact local residents and require two intersections to access the neighbourhood within 250 m of the 240 Street intersection. This intersection density is inconsistent with the requirements of an arterial roadway, or they would have to be right-in, right-out intersections. It would be preferred to establish the existing Abernethy Way as a frontage road, parallel to the proposed new extension to better limit community impact. A frontage road scenario is included in Option 10, and as a result **Option 6 was not shortlisted**.

4.3.6. Option 7

Option 7 was shortlisted since it makes use of existing established infrastructure along 240 Street and Dewdney Trunk Road. Dewdney Trunk Road would be widened to four lanes to increase capacity versus providing an alternative route to Dewdney Trunk Road. Although Dewdney Trunk Road would remain the only major east-west connector in the study area with this option, local connections would be proposed in conjunction to complete the local network in the area. A connector along 124 Avenue between Ansell Street and 246 Street is proposed to provide a local, possibly truck restricted link between 232 Street and 256 Street along 240 Street, 124 Avenue, 248 Street, and 130 Avenue. The extents of this route would be from Abernethy Way at 232 Street to west of the bridge at 256 Street and is shown in

Figure 11.

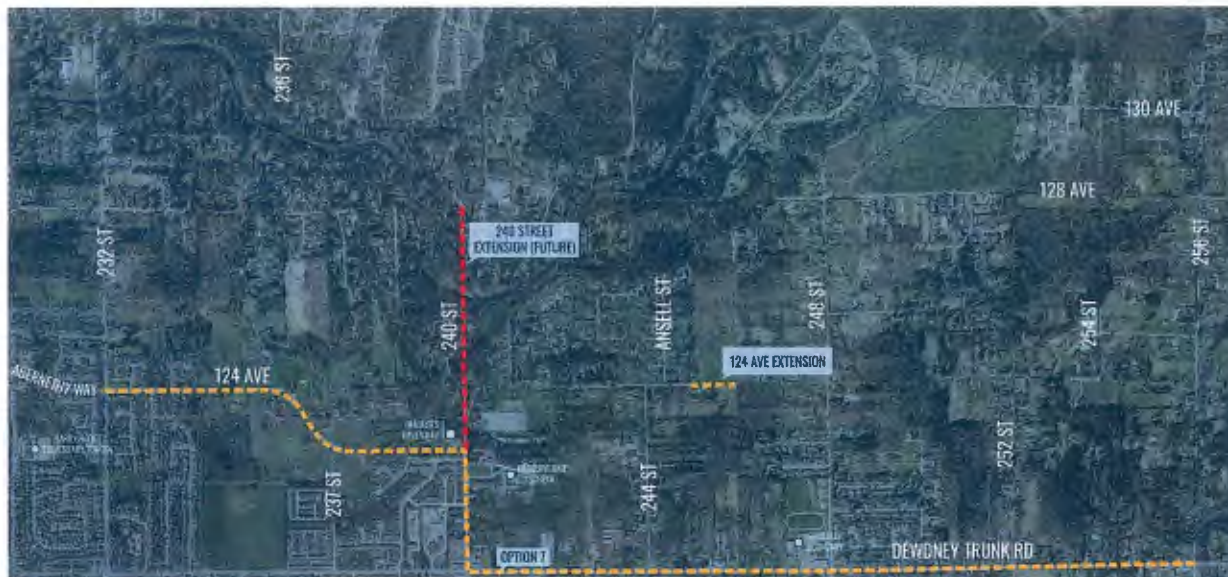


Figure 11: Shortlisted Option 7

4.3.7. Options 8 and 9

Although there is a City-owned right-of-way along these alignments, **Options 8 and 9 were not shortlisted** due to extreme topography, including significant corridor lengths of approximately 1:1 side slopes through the full width of the corridor and 40 m elevation changes at 37% grades.

4.3.8. Option 10

Option 10 was shortlisted since it roughly follows the 124 Avenue alignment and is the most direct of all the options. It avoids Latimer Creek crossings west of 240 Street and avoids developments / subdivisions as much as possible. The extents of this route would be from Abernethy Way at 232 Street to 124 Avenue at 256 Street and is shown in **Figure 12.**

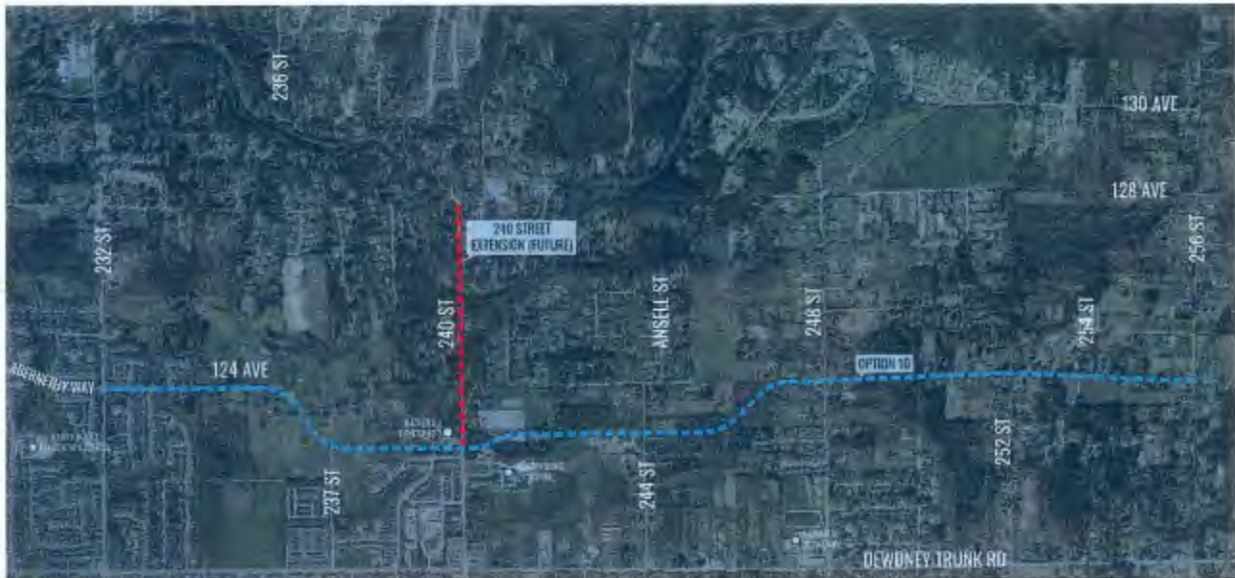


Figure 12: Shortlisted Option 10

4.3.9. Three Shortlisted Options

In summary, the three options shortlisted for more detailed analysis have a consistent segment from 232 Street to 240 Street as shown in **Figure 13**, and are described as follows:

1. An alignment east of 240 Street to 124 Avenue that then continues along the existing 248 Street and 130 Avenue (Option 2C).
2. An alignment that would connect to and widen 240 Street and Dewdney Trunk Road (Option 7), and a local connection on 124 Avenue between 244 Street and 246 Street.
3. An alignment east of 240 Street that generally follows the 124 Avenue greenfield alignment with a deviation south at Latimer Creek (Option 10).



Figure 13: Three Shortlisted Options



5. TRAFFIC FORECASTS AND LANING

5.1. OVERVIEW

This section presents the forecast of the traffic volumes that are anticipated to use the Abernethy Way extension. The forecast was developed using the Regional Transportation Model (RTM) version 3.2 received from TransLink. The RTM is a four-step EMME transportation demand model which depicts travel on the roadway infrastructure and transit services in the entire Metro Vancouver area.

In addition to replicating the multimodal transportation services, the RTM represents the region as 1,700 traffic analysis zones (TAZ), 44 of them within the City of Maple Ridge. Demographic information such as population, employment, households, school enrollment and auto ownership are contained in each zone and for each horizon year that is modelled.

The RTM contains assumptions for the base years 2017, 2035 and 2050 consistent with land use assumptions provided by Metro Vancouver. Network infrastructure assumptions for major projects are provided by TransLink and include MoTI projects. The assumptions provided in the RTM were applied.

5.2. ANALYSIS APPROACH

5.2.1. Base Case Travel Demand

As the RTM is a regionally focused tool, a review of the 2017 road network assumptions contained in the base model was performed and generally found to be consistent with present conditions within Maple Ridge. An indicative travel time validation was done for the AM, MD (mid-day) and PM peak periods comparing the model travel times to travel times measured using the Google Maps API for Lougheed Highway, Dewdney Trunk Road, and Abernethy Way. The travel times for all corridors were within the observed travel times from Google Maps and considered suitable for an indicative evaluation of the future corridor demand. The level of network detail was deemed sufficient to represent user choice to access the Abernethy Way extension.

5.2.2. Projected Travel Demand

Demographic Growth Assumptions

Population and employment growth for the region was assumed from the information in the RTM. A review of these assumptions noted that the majority of the growth anticipated in the current regional plan within Maple Ridge is concentrated to the west of the 232 Street corridor and provides limited growth potential further east. This limits the amount of future travel demand expected to be drawn to the Abernethy Way extension. The population and employment growth heat maps are shown in [Figure 14](#) and [Figure 15](#) respectively.

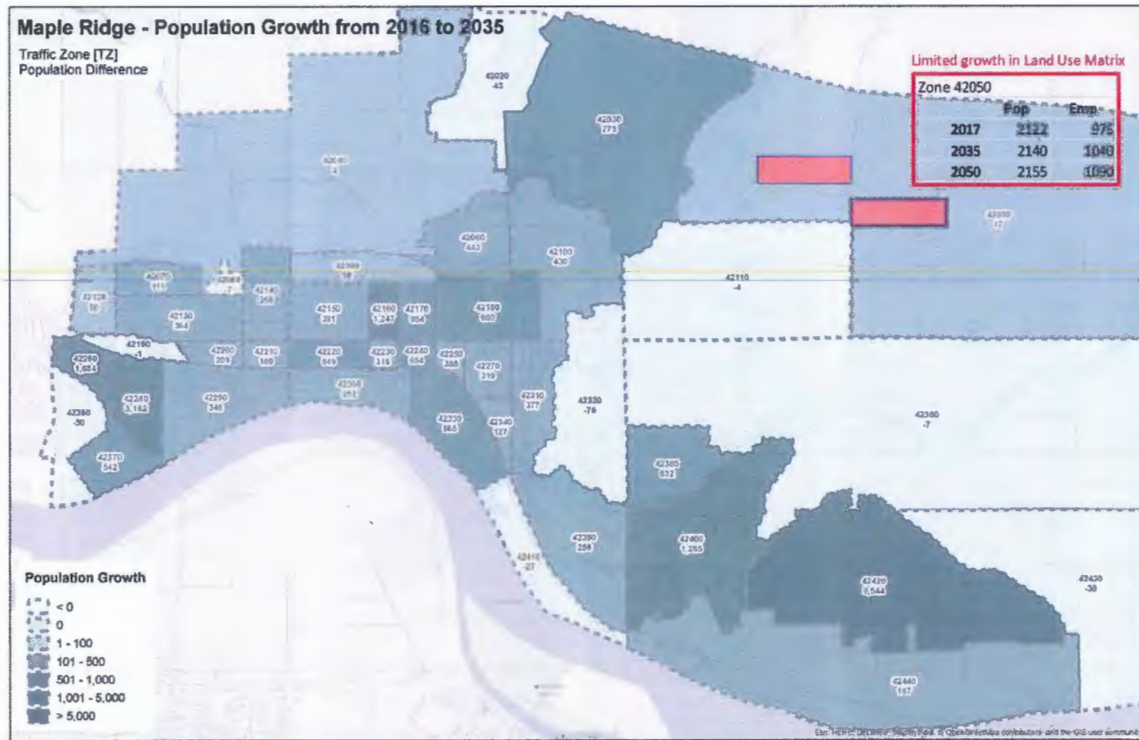


Figure 14: Population Growth by Traffic Analysis Zone 2016 to 2035 (from the RTM)

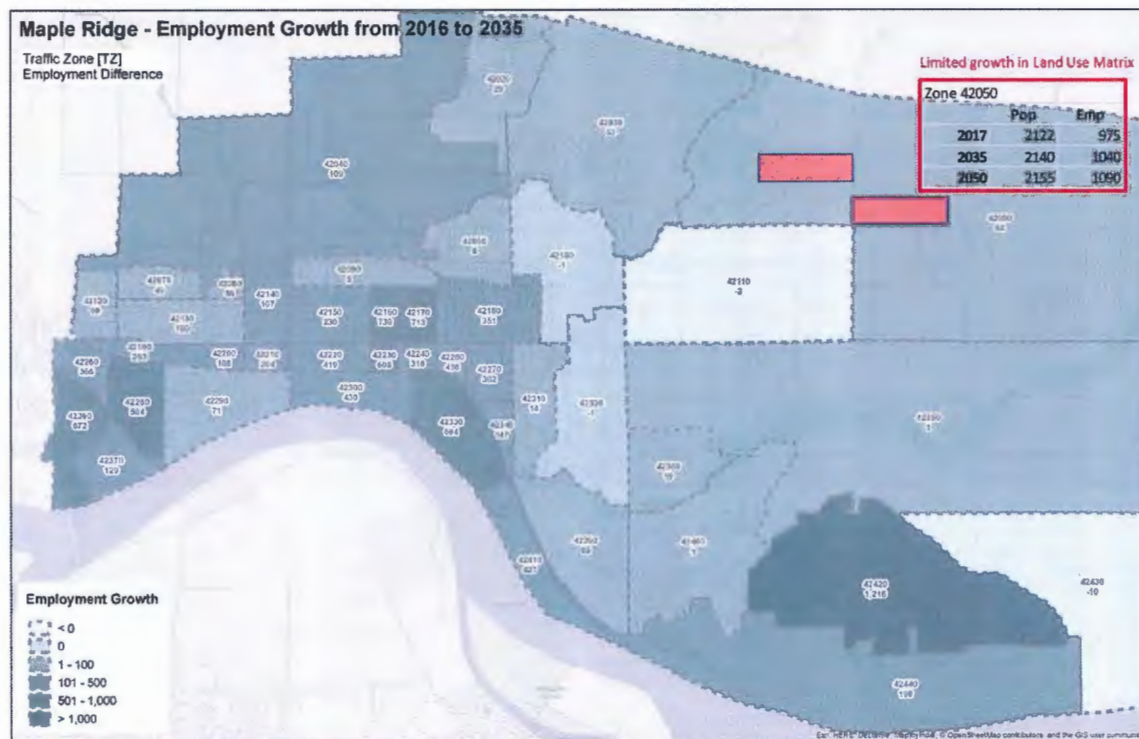


Figure 15: Employment Growth by Traffic Analysis Zone 2016 to 2035 (from the RTM)

Also highlighted in **Figure 14** and **Figure 15** are the significant areas to the north-east of the study corridor, in and around the Kanaka Business Park, that were rezoned by way of an OCP amendment to industrial uses. The rezoned areas are shown in **Figure 16**. The City advised the anticipated types of land use in these areas are likely to be as follows:

- Gravel extraction
- Industrial uses (which includes processing, fabricating, assembling, storage, transporting, servicing, etc.)
- Waste transfer stations
- Industrial repair
- Industrial trade schools
- Industrial vehicle sales
- Heavy equipment sales
- Indoor recreational facilities

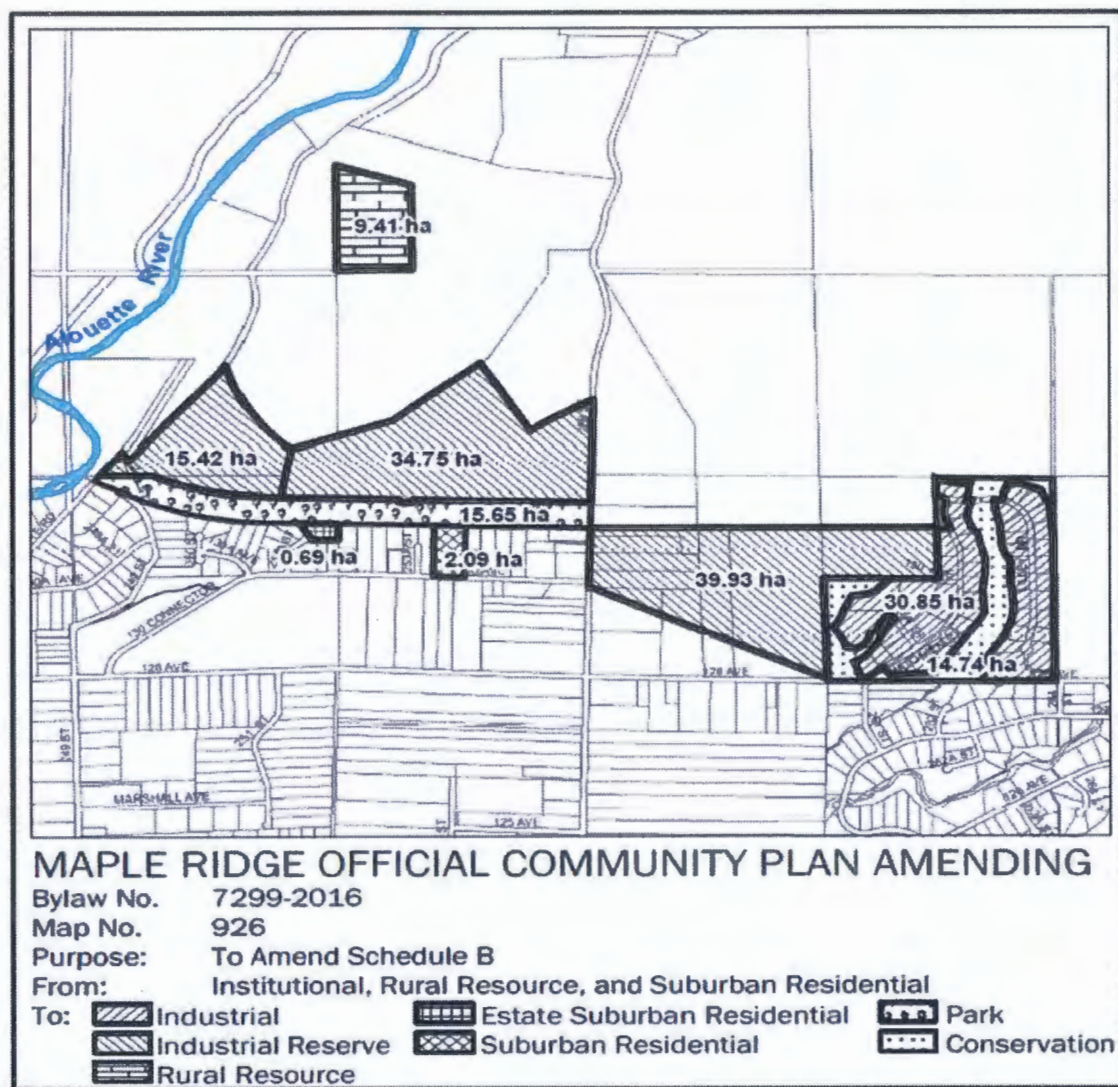


Figure 16: OCP Amendments in the North-East of the Study Area

The small changes in population and employment growth in the affected traffic analysis zones between 2017 and 2050 (as seen in [Figure 14](#) and [Figure 15](#)) suggest that this rezoning has not been incorporated into the current growth assumptions in the RTM model. As a result, a manual adjustment was done in addition to the regional demand forecast results. To translate these land use changes into trips Institute of Transportation Engineers (ITE) Trip Generation Rates were applied comparing the previously assumed land uses versus the amended. A Floor Area Ratio (FAR) of 0.2 was applied to the amended land use based on visual inspection of the current land use in the affected area, its semi-rural location, and taking into consideration the low probability of full buildout of the sites shown in [Figure 16](#). Even a FAR of 0.1 seems reasonable, however in discussion with the City a FAR of 0.2 was agreed to and is a more conservative approach.

The number of houses per 1000 sq.ft was estimated based on a visual count from Google Maps east of 248 Street, west of 256 Street and north of 130 Street. This resulted in 0.0157 houses per 1000 sq.ft, or 1.69 houses per Ha.

The resultant additional number of trips in the AM and PM peak hours for the previous and revised land uses is shown in [Table 2](#). These adjustments were then applied to the model's estimated traffic forecasts. As seen in the table, an additional 850 total trips are estimated to be generated by the OCP amendment.

Table 2: Change in Total Trips Due to OCP Amendments

Previous Land Use

Existing Land Use	Land Use Code	Size (Hectares)	Unit	Size sq. ft	Period	Rate	% In	% Out	Trips In	Trips Out	Total Trips
Institutional		2.09	Undeveloped								
		2.09									
Suburban Housing (Partially Developed)	210 (Single-Family Detached Housing)	39.93	Dwelling Units	7	AM	0.76	26	74	1	4	5
	210 (Single-Family Detached Housing)	39.93	Dwelling Units	7	PM	1	64	36	4	3	7
Industrial	130 (Industrial Park)	30.85	1000 Sq.ft	664	AM	0.41	87	13	237	35	272
	130 (Industrial Park)	30.85	1000 Sq.ft	664	PM	0.4	21	79	56	210	266
Institutional		0.69	Undeveloped								
		0.69									
Institutional		34.75	Undeveloped								
		34.75									
Suburban Residential		15.42	Undeveloped								
		15.42									
Institutional		9.41	Undeveloped								
		9.41									

Notes: FAR was applied in the size formula.

Total AM	238	39	277
Total PM	60	213	273

Revised Land Use

Future Land Use	Land Use Code	Size (Hectares)	Unit	Size sq. ft	Period	Rate	% In	% Out	Trips In	Trips Out	Total Trips
Suburban Real Estate	210 (Single-Family Detached Housing)	2.09	Dwelling Units	4	AM	0.76	26	74	1	2	3
	210 (Single-Family Detached Housing)	2.09	Dwelling Units	4	PM	1	64	36	3	1	4
Industrial Reserve	130 (Industrial Park)	39.93	1000 Sq.ft	860	AM	0.41	87	13	307	46	353
	130 (Industrial Park)	39.93	1000 Sq.ft	860	PM	0.4	21	79	72	272	344
Industrial	130 (Industrial Park)	30.85	1000 Sq.ft	664	AM	0.41	87	13	237	35	272
	130 (Industrial Park)	30.85	1000 Sq.ft	664	PM	0.4	21	79	56	210	266
Estate Suburban Residential	210 (Single-Family Detached Housing)	0.69	Dwelling Units	1	AM	0.76	26	74	0	1	1
	210 (Single-Family Detached Housing)	0.69	Dwelling Units	1	PM	1	64	36	1	0	1
Industrial Reserve	130 (Industrial Park)	34.75	1000 Sq.ft	748	AM	0.41	87	13	267	40	307
	130 (Industrial Park)	34.75	1000 Sq.ft	748	PM	0.4	21	79	63	236	299
Industrial Reserve	130 (Industrial Park)	15.42	1000 Sq.ft	332	AM	0.41	87	13	118	18	136
	130 (Industrial Park)	15.42	1000 Sq.ft	332	PM	0.4	21	79	28	105	133
Rural Resource	130 (Industrial Park)	9.41	1000 Sq.ft	203	AM	0.41	87	13	72	11	83
	130 (Industrial Park)	9.41	1000 Sq.ft	203	PM	0.4	21	79	17	64	81

Notes: This trip generation assumes all areas are developed. FAR was applied in the size formula.

Total AM	1002	153	1155
Total PM	240	888	1128

Change in Trips (Previous vs. Revised Land Use):

	Trips In	Trips Out	Total Trips
Total AM	764	114	878
Total PM	180	675	855

Travel Demand Assumptions

The model was run with the current network assumptions in the RTM and with two network options for the 2035 and 2050 horizon years:

1. The extension of Abernethy Way east of 232 Street to 256 Street. Since the analysis model used is a regional model, the actual alignment of the extension will not affect the forecast travel demand.
2. Abernethy Way extension with the addition of the new connection on 240 Street north across the Alouette River linking to the Silver Valley neighbourhood.

5.3. FORECAST TRAFFIC VOLUMES PRE & POST OCP AMENDMENT

Traffic volumes for the AM and PM peak hours were extracted for 2017, 2035 and 2050 to evaluate the traffic growth from land use changes and the traffic diversion when the Abernethy Way extension is introduced into the network.

The OCP Amendment generated traffic (from [Table 2](#)) was manually added to the 2050 forecast volumes, the assumed timeline for the build out of the planned land uses. The majority of these additional trips are industrial related and would be passing through primarily residential land uses along all of the Abernethy Way extension alignment options. Option 7 reroutes these industrial trips to Dewdney Trunk Road via 240 Street and provides for a local road connection from 240 Street to 256 Street. Since the RTM traffic volumes already include the trips generated by the initial land use assumptions, further adjustments were made to the forecast volumes to eliminate double counting.

The resultant forecast traffic volumes on the various segments for the three shortlisted options are shown in [Table 3](#) for the 2050 AM and PM peak hours. The total traffic volumes are shown in [Appendix F](#).

Table 3: 2050 AM (PM) Peak Traffic Forecast

EXTENSION SECTION	DIRECTION	2050 HORIZON YEAR (VPH)	OCP ADJUSTMENT (2050) (VPH)	2050 TOTAL TRAFFIC FORECAST (VPH)
Abernethy Way West of 232 St	EB	300 (730)	500 (50)	800 (780)
	WB	700 (450)	70 (400)	770 (850)
Abernethy Way 232 St to 240 St	EB	250 (350)	550 (100)	800 (450)
	WB	400 (200)	80 (450)	480 (650)
Options 2C & 10 East of 240 St	EB	100 (150)	600 (150)	700 (300)
	WB	200 (150)	90 (500)	290 (650)
Option 7 (Dewdney Trunk Rd) East of 240 St	EB	450 (600)	600 (150)	1050 (750)
	WB	700 (450)	90 (500)	790 (950)
240 St North of Abernethy Way	NB	260 (140)	-	260 (140)
	SB	160 (140)	-	160 (140)
240 St South of Abernethy Way	NB	440 (630)	-	440 (630)
	SB	750 (420)	-	750 (420)

5.4. LANING ASSESSMENT

Table 4 is an extract from the Highway Capacity Manual and shows estimated travel lane traffic volume capacities for various types of roadway facilities through different areas. The table suggests a maximum lane capacity of 700 vehicles per lane per direction on a Suburban Arterial with 10% Heavy Vehicles, which by 2050 likely best describes the corridor under investigation and assuming full build-out of the OCP Amendment. Based on this volume threshold, **Table 5** shows the proposed number of travel lanes for each of the shortlisted options. The existing two-lane cross section east of 252 Street should be retained as widening this section of Dewdney Trunk Road to 256 Street would require the replacement or twinning of the bridge crossing the Alouette River, which expense would only be justified when there is greater certainty on the traffic volumes forecast in future years.

Table 4: Lane Capacities by Facility and Area Type (Highway Capacity Manual)

Facility Type	Area Type	Free-Flow Speed (mph)	G/C	HCM PC Capacity (veh/ln)	90% PC Capacity (veh/ln)	80% PC Capacity (veh/ln)
Freeway	Downtown	55	n/a	2250	2000	1800
	Urban	60	n/a	2300	2100	1800
	Suburban	65	n/a	2350	2100	1900
	Rural	70	n/a	2400	2200	1900
Arterial	Downtown	25	0.45	860	800	700
	Urban	35	0.45	860	800	700
	Suburban	45	0.41	780	700	600
	Rural Multi-Lane	55	n/a	2100	1900	1700
	Rural 2-Lane	55	n/a	1600	1400	1300
	Downtown	25	0.41	780	700	600
Collector	Urban	30	0.41	780	700	600
	Suburban	35	0.37	700	600	600
	Rural Multi-Lane	45	n/a	1900	1700	1500
	Rural 2-Lane	45	n/a	1600	1400	1300

Arterial/Collector assume 1900 ideal sat flow rate

Table 5: Summary of Recommended Number of Lanes for each Roadway Segment

ROADWAY	SEGMENT	FACILITY & AREA TYPE	RECOMMENDED CROSS SECTION
Abernethy Way Extension	232 Street to 240 Street (Phase 3): All Options	Suburban Arterial	2 Lanes (Interim), 4 lanes (Ultimate)
	240 Street to 256 Street (Phase 4): Options 2C and 10	Suburban Arterial	2 lanes
240 Street	North of Abernethy Way Extension (240 Street Bridge Extension): All Options	Suburban Collector	2 lanes
	South of Abernethy Way Extension to Dewdney Trunk Road (Phase 4): Option 7	Suburban Arterial	4 lanes
Dewdney Trunk Road	240 Street to east of 252 Street (Phase 4): Option 7	Suburban Arterial	4 lanes
	East of 252 Street to 256 Street (Existing Conditions)	Suburban Arterial	2 lanes

5.4.3. Proposed Cross Sections for Each Shortlisted Option

For all shortlisted options the proposed cross section from 232 Street to 240 Street is a 24m right-of-way with a rural two-lane roadway in the short term (prior to 2035) and a four-lane urban roadway in the long term (2035 to 2050). The right-of-way for the long-term condition should be secured in the short term to allow for the construction of the long-term cross section without requiring additional property acquisition. The concept short term cross section is shown in **Figure 23** while the concept long term cross section is shown in **Figure 24**.

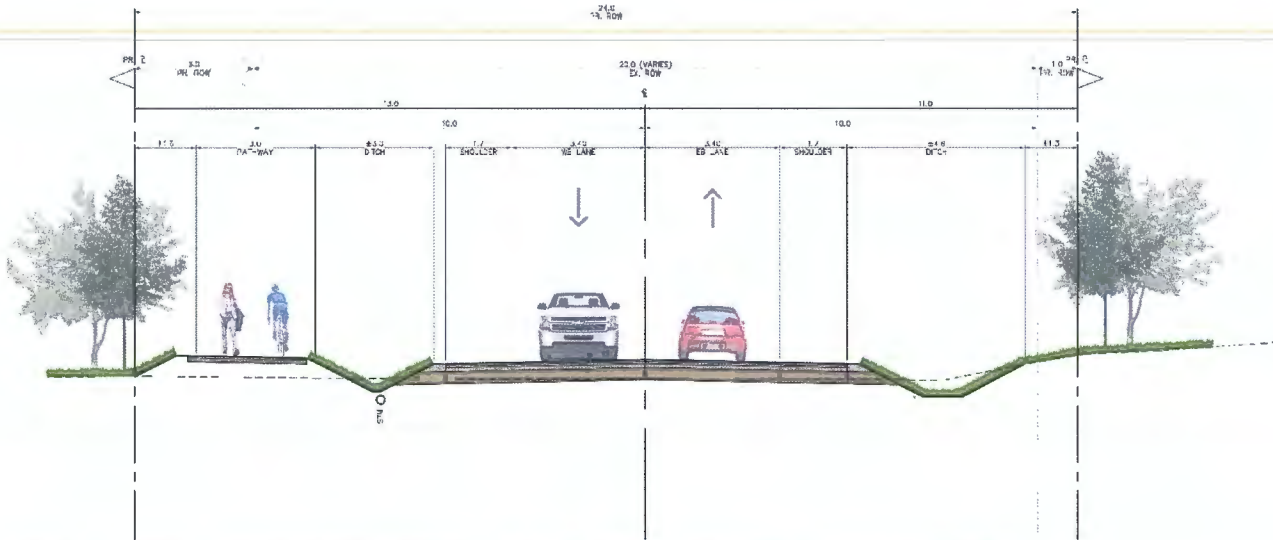


Figure 17: Concept Abernethy Way Extension: 232 St to 240 St - Short Term (to 2035): All Options

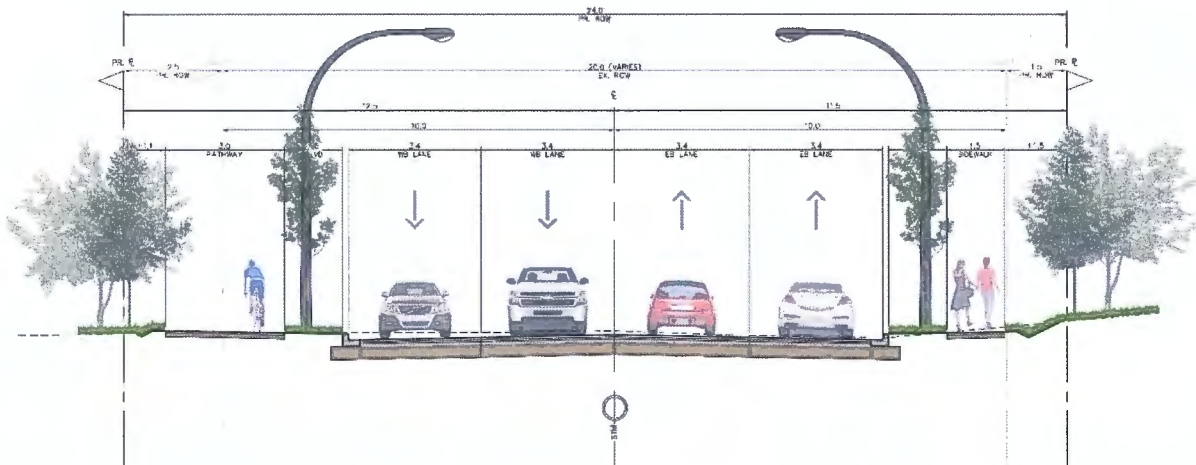


Figure 18: Concept Abernethy Way Extension: 232 St to 240 St - Long Term (after 2035): All Options

For Options 2C and 10 the proposed cross section of Abernethy Way extension from 240 Street to 256 Street is a two-lane rural cross section within a 24m right-of-way as shown conceptually in **Figure 25**. Property acquisition is required to achieve this cross section, the specifics of which will be determined in the next design stages.

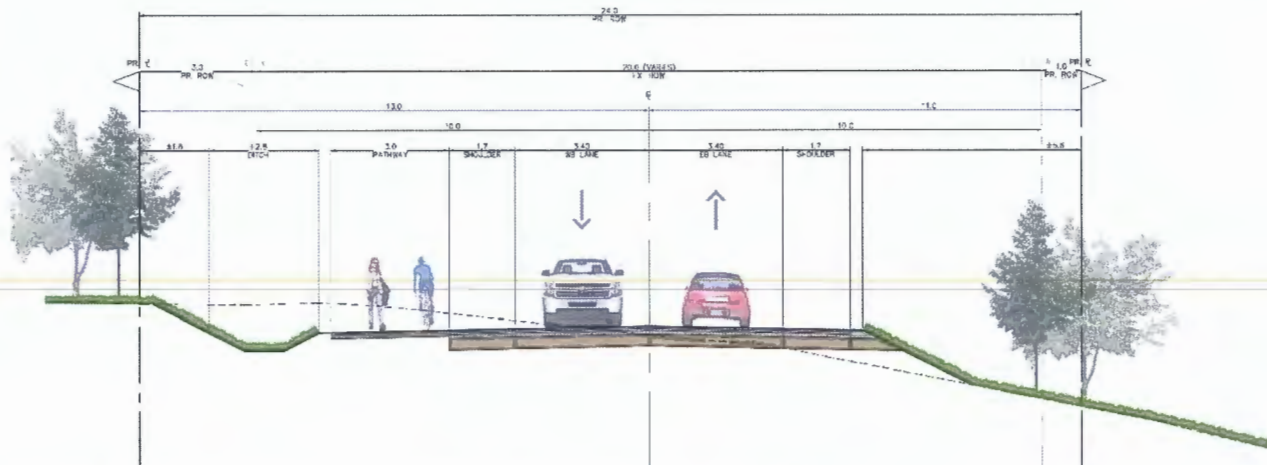


Figure 19: Concept Abernethy Way Extension: 240 St to 256 St: Options 2C and 10

For Option 7 the proposed cross section of 240 Street between Abernethy Way and Dewdney Trunk Road, and Dewdney Trunk Road between 240 Street and 252 Street is a four-lane urban cross section within a 24m right-of-way as shown conceptually in **Figure 26**. Property acquisition is required to achieve this cross section, the specifics of which will be determined in the next design stages.

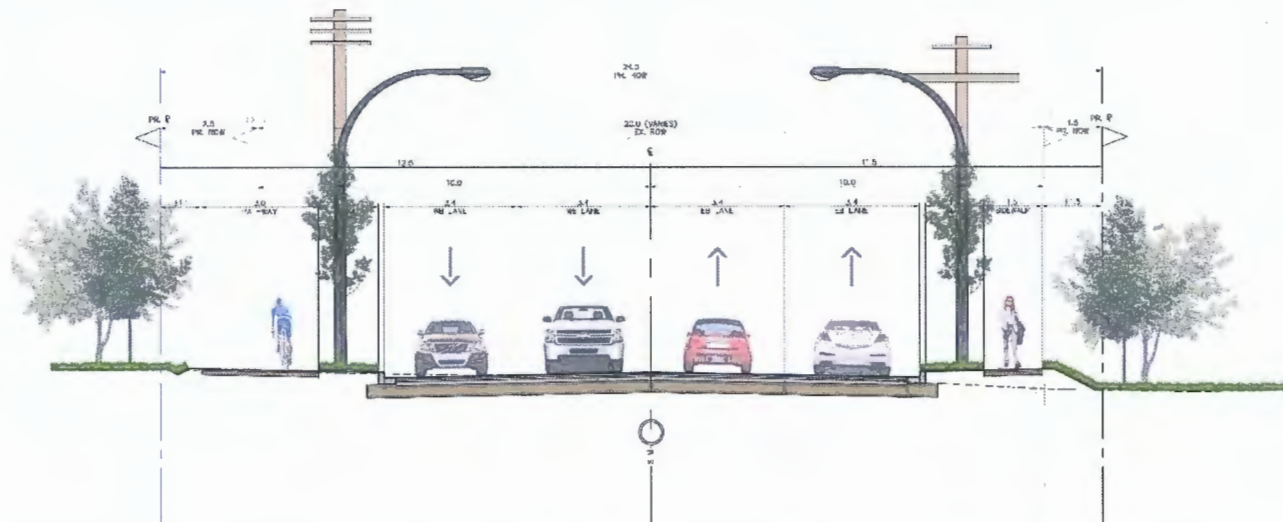


Figure 20: Concept 240 St (Abernethy to Dewdney Trunk Rd) and Dewdney Trunk Road (240 St to 252 St): Option 7



6. COST ESTIMATE

6.1. OVERVIEW

Cost estimates for the three shortlisted options are presented in this section.

6.1.1. Unit Rates

Average unit rates were selected from recent projects including the 232 Street: 132 Avenue to Silver Valley Road Design and Construction Project in Maple Ridge as well as various projects in nearby Langley. These rates were used to create an average linear road rate for each proposed typical cross section which was then applied to each option.

6.1.1. Drainage Considerations

Due to the number of creek crossings on each shortlisted option, to better prepare a corridor cost estimate a preliminary hydrologic and hydraulic analysis was done using the rational method. This determined catchment areas and flows to advise preliminary culvert sizing for these creek crossings. Although the site areas are larger than recommended for the rational method, it is generally considered overly conservative and should be refined by modelling in more detailed design stages. The preliminary sizing is shown in the notes on the drawings found in [Appendix C](#). A field review was also done to review the various crossings for topography to determine if a culvert or arch structure is more appropriate. Below is a summary of the preliminary culvert crossings. Note that these sizes are subject to change following a more detailed hydraulic analysis during the next design phases of the project:

- **Coho Creek Crossings:** Coho creek is east of 232 Street and crosses Abernethy Way twice. The west 750mmØ culvert (Crossing 1) is proposed to be upgraded to a 1400mmØ CSP culvert and is fish sensitive (All Options). The east 600mmØ culvert (Crossing 2) is proposed to be upgraded to a 1200mmØ CSP culvert (All Options).
- **Latimer Creek Crossings:** The west 600mmØ culvert near Hacker's Haven golf course (Crossing 4D) is proposed to be upgraded to a 1000mmØ CSP culvert (All Options). The crossings east of 240 Street don't have existing culverts but are proposed to use a corrugated plate arch structure (Crossing 7) and a 1200mmØ CSP culvert (Crossing 8). Both of these crossings are fish sensitive (Option 2C and 10).
- **Webster's Creek:** The culvert on 130 Avenue west of 256 Street at Webster's Creek (Crossing 17) is proposed to be upgraded from an 870x980 culvert to a 2440x1270 culvert (Option 2C). This crossing is fish sensitive.
- **Zirk Brook:** The existing culvert crossing Zirk Brook is a 2500x1720 culvert (Crossing 9). This culvert is proposed to be upgraded to a 3500x1750 culvert (Option 10). This crossing is fish sensitive.

6.1.2. Property Impacts

Based on average property value ranges for various zonings and lot characteristics, estimated property impact costs were determined and are included in the overall cost estimate. An average price of \$85 per square meter was used for ALR lands and \$560 per square meter for non-ALR lands. This price includes the negotiation fees and purchase of properties.

A conservative approach was taken which assumed total buyouts in cases where the alignment bisected a property (especially ALR) or went through a building structure. There is a possibility that acquisition costs could be limited to just the road right-of-way area itself through negotiation with the impacted landowner.

A summary of property costs (excluding the 240 Street Extension) is provided in [Appendix G](#). A more detailed cost estimate of property impacts is recommended during subsequent design stages of the preferred route as ALR lands in particular can vary greatly in cost to acquire depending on the location and use.

For the 240 Street extension, property estimates are based on BC Assessment, plus \$10K per lot for acquisition costs; the City should confirm property acquisition costs.

6.1.3. Engineering and Supervision

15% of the construction cost was used to estimate engineering services throughout design and construction phases. This would include conceptual, preliminary and detailed design, legal and topographic survey, geotechnical investigation, pavement analysis, environmental impact assessment, site staff, contract administration, and environmental monitoring.

6.1.4. BC Hydro Pole Relocation Costs

BC Hydro has transmission poles on both sides of Dewdney Trunk Road (Option 7). There is risk involved with this pricing since each pole is approximately \$45K to relocate as advised by BC Hydro, however they also advised that this estimate can vary considerably (+100% / -35%). Based on initial review, allowance was made for eight pole relocations in this estimate, but any additional relocations identified during conceptual and preliminary design stages would increase the cost estimate. Initial review of the pole locations provided by Hydro indicates that the eight relocations included in the cost estimate is a reasonable assumption.

6.1.5. Contingencies

Due to the high-level planning completed under this study, a contingency allowance of 40% was included to account for items and conditions unknown at this stage of the project. Additional items could include but are not limited to sub-excavation in soft soils, additional haul for embankment materials or gravels, environmental mitigation, archeological remediation, third-party utility costs, and market escalation.

6.1.6. Accuracy and Assumptions

The cost estimate prepared is a Class D estimate based on high-level planning and should be considered as an order of magnitude cost only and likely within a $\pm 40\%$ accuracy range. The cost analysis was developed for the purposes of comparing alignment options to one another and it is therefore subject to change during subsequent design stages. The cost estimates were based on the following assumptions:

- Property acquisition is for 24m right-of-way for all three shortlisted options.
- For Option 7 (Phase 4), excludes possible road upgrade on 256 Street from Dewdney Trunk Road to 124 Street. This possible upgrade should be revisited in the concept design stage.
- Assuming sufficient existing pavement structure for re-use and overlay along routes with existing asphalt.
- Environmental compensation area pricing has not been included; however, approximate compensation areas have been determined in the MAE to assess relative environmental impact associated with each route. Costs associated with these areas will be determined during the next design stages and are dependent on adjacent available lands, right-of-way, and other site-specific opportunities.
- Bridge structures upon initial assessments are not required for all three shortlisted options and therefore no cost has been allocated for bridge structures. Only culverts have been included.
- Watermain and sanitary sewer improvements have not been included in the cost estimates.
- Earthwork and road structure quantities are based on the geotechnical pavement recommendations. The pavement structure could change following geotechnical drilling investigations during preliminary and detailed design.
- No inflation was assumed in the cost estimate to forecast a specific construction year, so all costs are in 2019 dollars.

- Earthworks pricing is based on assumed granular sub surface conditions and no blasting and / or ground improvements have been included in pricing.
- For the 240 Street Extension concept design geotechnical / environmental assessments have not been completed.
- For the 240 Street Extension, utility costs (watermain, storm sewer, sanitary sewer / forcemain, third-party utilities) are not included in the estimate as they are assumed to be paid for by the developer.

6.2. COST ESTIMATE SUMMARY

The Class D cost estimates for the three shortlisted options are shown in **Table 5**. The detailed cost estimates can be found in **Appendix H**.

Table 6: Cost Estimate Summary

OPTION	DESCRIPTION	APPROXIMATE COST (\$ 2019) (refer assumptions)			
		PHASE 3 INTERIM (2-LANE 232 ST TO 240 ST)	PHASE 3 ULTIMATE (4-LANE – 232 ST TO 240 ST)	PHASE 4 (240 ST TO 256 ST)	TOTAL
Abernethy Way Extension (excludes environmental compensation and remediation)					
2C	Upper Route: Abernethy Way extension to 248 Street, 130 Avenue to 256 Street	\$24.3	\$7.4M	\$40.1	\$71.8M
7	Lower Route: Abernethy Way extension to 240 Street, 240 Street, Dewdney Trunk Road (excl. bridge replacement) to 256 Street, 124 Avenue between 244 Street and 246 Street	\$24.3	\$7.4M	\$34.3	\$66.0M
10	Middle Route: Abernethy Way extension to 248 Street, 124 Avenue to 256 Street	\$24.3	\$7.4M	\$37.7	\$69.4M
240 Street Extension					
-	240 Street Extension: Abernethy Way to Fern Crescent	-	-	-	\$37.3M



7. PUBLIC ENGAGEMENT

7.1. OVERVIEW

Having identified three shortlisted options, a public open house was held in order to provide the public with information about the project and to ask attendees to identify their preferred option. The engagement process and survey findings are provided in this section.

7.2. ENGAGEMENT PROCESS

A drop-in format open house event was held on June 25, 2019 at the City Library from 4 pm to 8 pm. The event was advertised in the local newspaper, on social media, and all residents whose properties are located along all the three shortlisted alignments had invitations delivered to their homes. A series of project boards were presented which attendees were asked to review, and City staff and the project team were available to explain the project, answer questions and receive feedback.

Attendees were encouraged to formally submit feedback and answer survey questions before leaving the open house and had the option to return survey forms later at their leisure. The survey form was also made available online, together with the project boards to allow those unable to attend the open house to also provide input. Besides gathering demographic information of respondents, they were asked to rank which of Options 2C, 7, or 10 they preferred in order of preference, and to explain why they ranked them as they did. Their place of residence or business in relation to the option alignments was also asked for.

In total, 237 participants submitted survey responses at the open house and five participants sent in their survey responses by the July 10, 2019 deadline. The surveys were then compiled into a single database and analyzed. The following section details the survey results.

Based on request, separate meetings were also held with representatives of Academy Park and Meadowridge School.

7.3. SURVEY RESULTS

7.3.1. Demographics & Place of Residence or Business

Survey responses indicate that 98% of respondents (227 respondents) live in Maple Ridge and 64% (148 respondents) live on the alignment of these options. Respondents indicated that 56% (129 respondents) have business on the alignment or would use the corridor to commute to work or school. These distributions are shown in [Figure 27](#).

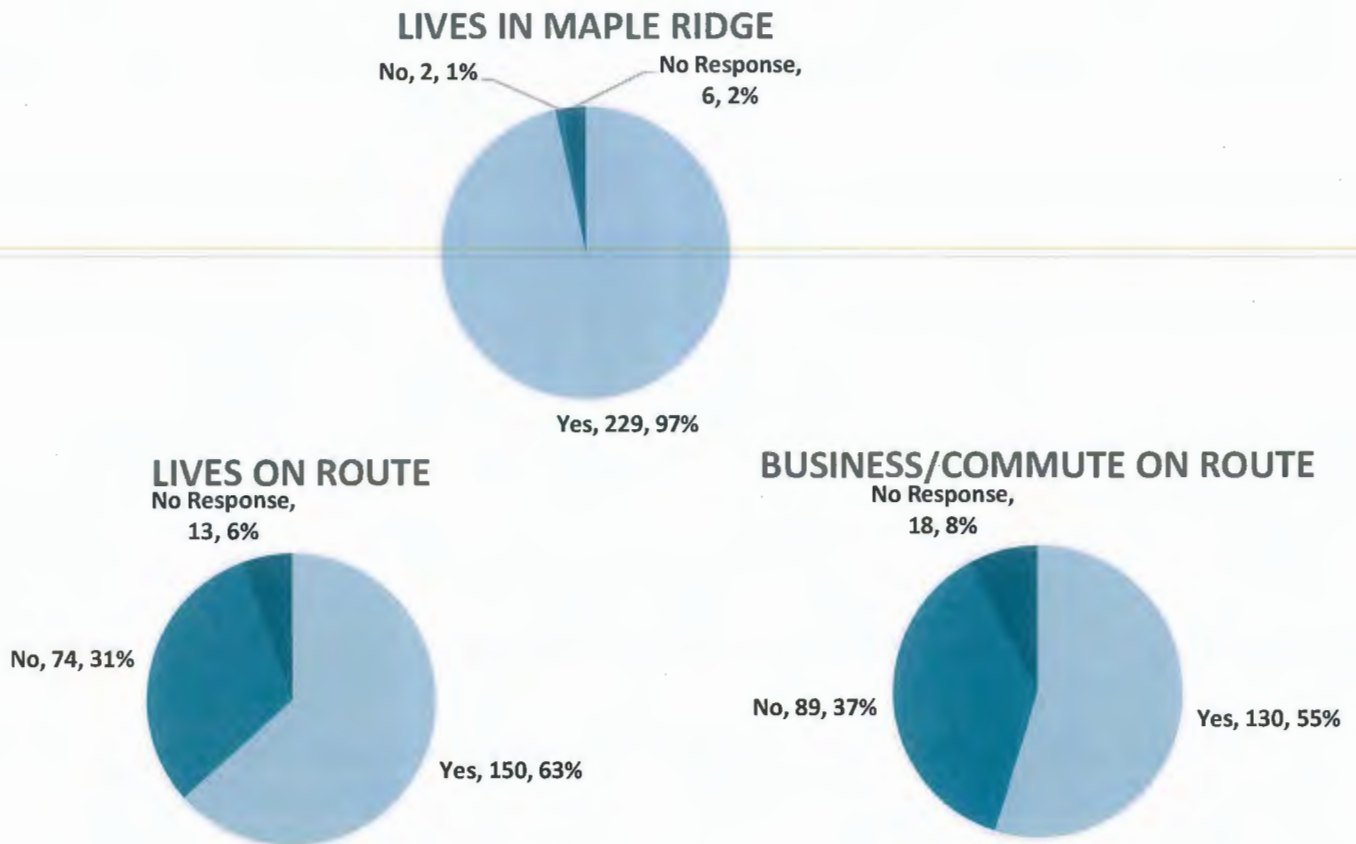


Figure 21: Demographics & Place of Residence or Business

Respondents included representation across a broad range of age cohorts. Around 60% (138 respondents) were between the ages of 50 and 69 years old, while 19% (45 respondents) were under the age of 50 and 18% (42 respondents) were above the age of 70. As is typical of most open houses, the cohort younger than 50 years old was underrepresented, or only 20% (47 respondents), and of these, 10% (23 respondents) were younger than 40 years old. These demographics are shown in Figure 28. Also shown in the figure is that 70% (165 respondents) have an interest in active transportation, highlighting the importance of providing these facilities along the proposed corridor.

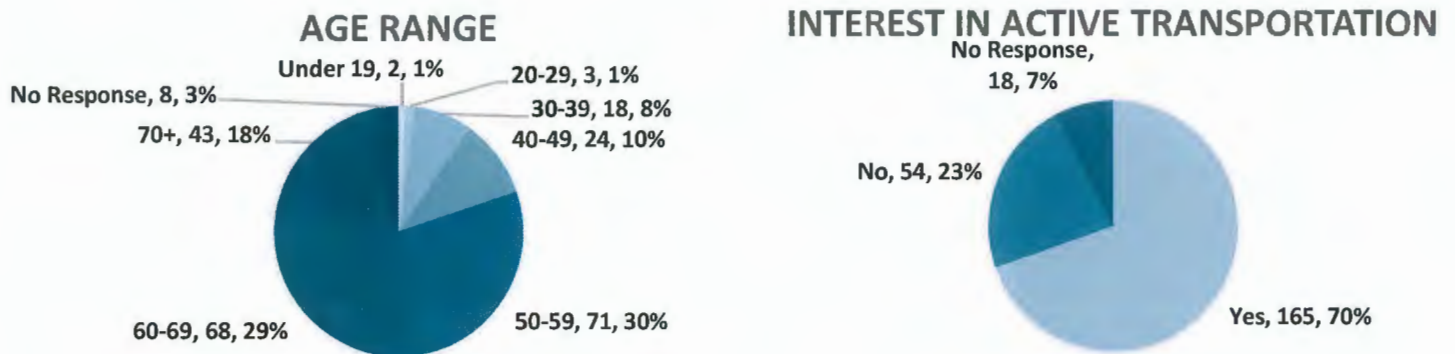


Figure 22: Demographics and Interest in Active Transportation

7.3.2. Preferred Option

Participants were asked to rank their preferred option of the three shortlisted with the responses shown in **Figure 29**. From the data received, 39% (96 respondents) preferred Option 7, 28% (68 respondents) preferred Option 10, and only 9% (21 respondents) preferred Option 2C. Of note, 24% (57 respondents) did not select a preferred option.

Although selecting a preferred option, some participants indicated in their justification that they do not support moving forward with construction of the corridor.

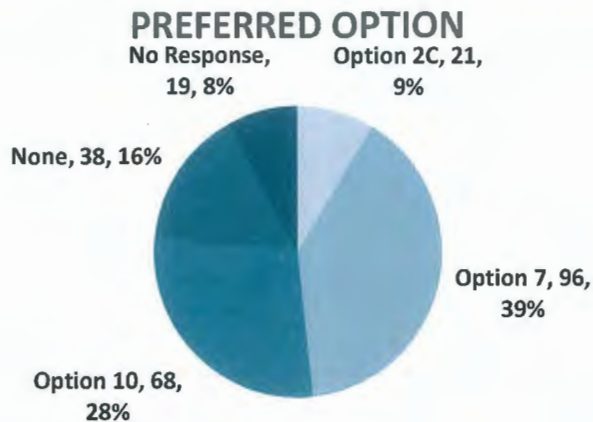


Figure 23: Preferred Option Selection

The preferred option results were then further analyzed on the basis of whether or not the participant lives on the route of the options or not. The results are shown in **Figure 30**. For respondents that live on the route of the options, Option 7 at 45% (67 respondents) was preferred, followed by 22% (32 respondents) for Option 10. However, of those who do not live on the corridor alignment, Option 10 at 40% (30 respondents) was preferred followed by Option 7 at 34% (25 respondents). See a distribution of the preferred shortlisted option broken out by those participants who do and do not live on the route.

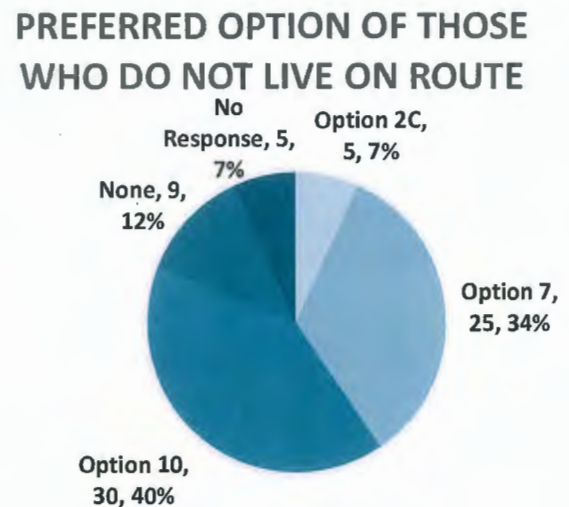
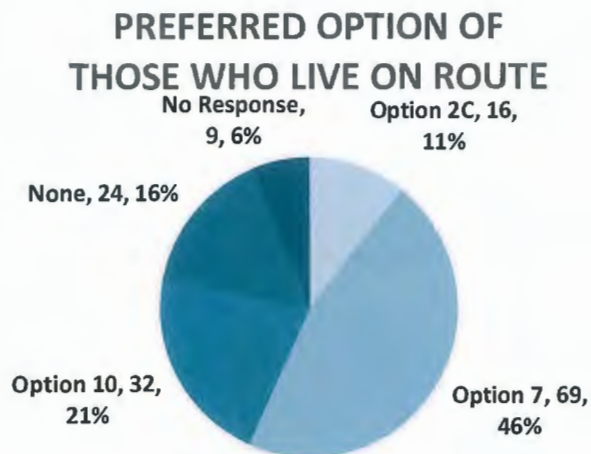


Figure 24: Preferred Option by Place of Residence

7.3.3. Respondent Feedback

165 respondents provided comments on their survey forms. These responses were categorized as detailed below.

- 28% (39 respondents) were concerned with the potential traffic increase and congestion
- 15% (21 respondents) were concerned with the impacts to the surrounding environment
- 15% (21 respondents) were concerned with the safety of students given the number of schools in the area
- 12% (17 respondents) were concerned with the change to the neighbourhood that may happen due to construction of any of the options
- 11% (15 respondents) were concerned with the amount of additional traffic noise
- 9% (13 respondents) were concerned with impacts to their properties and value
- 6% (9 respondents) suggested an alignment option further to the north
- 4% (5 respondents) wanted to ensure that equestrian routes were provided

Verbal concern was also expressed by several attendees about traffic through-cutting on local roads which intersect the new corridor, thereby increasing the impact to the local community.



8. EVALUATION OF SHORTLISTED OPTIONS

8.1. OVERVIEW











































A Multiple Accounts Evaluation (MAE) methodology was used to compare the shortlisted options. Due to the inherent bias of applying a scoring or ranking of the options, a simple coloured ball comparison was applied. In some instances, these indicate good, better, best comparisons, or improved, neutral, worse comparisons between the options, and does not undermine the impact of the criterion itself for each option. For example, for Environmental Impact, the green ball does not imply that there will be an improvement to the environment as a result of the project, but only the relative comparison between the options. In addition, since the alignment between 232 St and 240 St is consistent for all options, that segment has effectively been excluded from the evaluation.

8.2. MAE SUMMARY

The resultant MAE is provided in [Table 6](#), with evaluation criteria based on the project objectives, the technical review undertaken during this study, and public feedback. Since the cost estimate is $\pm 40\%$ and is in 2019 dollars, the estimates have been evaluated as equal.

Applying the evaluation, Option 7, the Dewdney Trunk Route option, is the preferred option.

Table 7: Multiple Account Evaluation (comparison of options relative to each other)

Criteria	Option 2C		Option 7		Option 10	
	130 Ave. (Upper Route)		Dewdney (Lower Route)		124 Ave. (Middle Route)	
	Influencing Factors		Influencing Factors		Influencing Factors	
Relieves Traffic on Dewdney Trunk Rd & Provides Network Redundancy			<ul style="list-style-type: none"> Includes constructing the road segment Option 7C to provide network redundancy via 248 St and 130 Ave 			
Provides Access to NE Sector of the City						
Consistency with Strategic Transportation Plan (STP) / OCP						
Public Preference						
Directness of Route						
Utilization of Existing Roads & Property Impact						
Environmental Impact	<ul style="list-style-type: none"> Two new Latimer Creek crossings. Compensation Area: ~23,209m² 		<ul style="list-style-type: none"> No major creek crossings. Compensation Area: ~14,402m² 		<ul style="list-style-type: none"> Two new Latimer Creek crossings. Compensation Area: ~35,427m² 	
Possibility of Archaeological Impact						
ALR Impact						
Social / Community Impact, also including impact to schools and through-cutting						
Significant Utility Relocation			<ul style="list-style-type: none"> Traffic safety barriers will be required to avoid some BC Hydro pole relocations 			
Cost Estimate (Class D; \$2019)	<ul style="list-style-type: none"> \$71.8M \$37.3M (240 St Ext) 		<ul style="list-style-type: none"> \$66.0M \$37.3M (240 St Ext) 		<ul style="list-style-type: none"> \$69.4M \$37.3M (240 St Ext) 	
 2 pts;  1 pt;  0 pts		14		18		15
Overall						



9. CONCLUSIONS & RECOMMENDATIONS

9.1. OVERVIEW

This section provides a summary of this report and outlines considerations for future conversations related to the Abernethy Way extension.

9.2. SUMMARY

The objectives of this report were to:

- Assess the technical feasibility of various options of the Abernethy Way extension from 232 Street to 256 Street.
- Evaluate each option and identify a preferred option.
- Provide information to support informed debate.
- Assess the technical feasibility of extending 240 Street north to Fern Crescent to access the Silver Valley area and Golden Ears Provincial Park

Based on the high level engineering and desktop reviews undertaken in this study, both an extension of Abernethy Way from 232 Street to 256 Street appears to be technically feasible, as well as the extension of 240 Street over the Alouette River.

Of the 13 alignment options initially considered for the Abernethy Way extension, three were shortlisted. The phasing, laning and preferred cross section was determined based on forecast traffic demand.

The three shortlisted options were presented to the public at an Open House, at which attendees were asked to rank which of the options they preferred for implementation, as well as to provide any other comments and feedback for consideration. 39% of respondents preferred Option 7, with Option 10 being preferred by 28% of respondents.

A Multiple Account Evaluation (MAE) was used to compare the three shortlisted alignment options against each other, with the findings of the MAE provided in [Table 6](#). The MAE resulted in Option 7, the Dewdney Trunk Route being the preferred option.

9.3. RECOMMENDATIONS AND NEXT STEPS

Based on the findings of this study, **Option 7** (Dewdney Trunk Road) is recommended as the preferred option to investigate further. The future extension of 240 Street over the Alouette River can proceed as a separate project in future or as preferred by the City. Advancing these two projects to the conceptual design stage will allow some of the remaining unknowns to be determined, including more accurate property acquisition costs, and thereby prepare more reliable cost estimates (Class C or better).

Included as part of this preferred option in the widening to four lanes of the section of 240 Street from Dewdney Trunk Road to the new Abernethy Way extension in the vicinity of the Hackers Haven, just north of the existing Abernethy Way intersection. This is consistent with the future proposed extension of 240 Street north to Fern Crescent, and the eventual possible inclusion of 240 Street between Dewdney Trunk Road and Fern Crescent in TransLink's Major Road

Network. The 240 Street connection to the Abernethy Way extension will also help better balance traffic on the section of Dewdney Trunk Road west of 240 Street and on 232 Street between to Dewdney Trunk Road and Abernethy Way. In the next design stage where road upgrades are in close proximity to schools, mitigation measures should be considered in the design.

To meet the objective of providing an alternative route to Dewdney Trunk Road, completing the link of 124 Avenue between 244 Street and 246 Street is recommended. This will then provide an alternative route for local and emergency vehicle traffic connecting 240 Street to 256 Street via 124 Avenue, 248 Street and 130 Avenue. It is proposed this route be heavy vehicle restricted. The end to end recommended corridor is shown in **Figure 31**.

As part of the next design stages, further public engagement is also recommended.

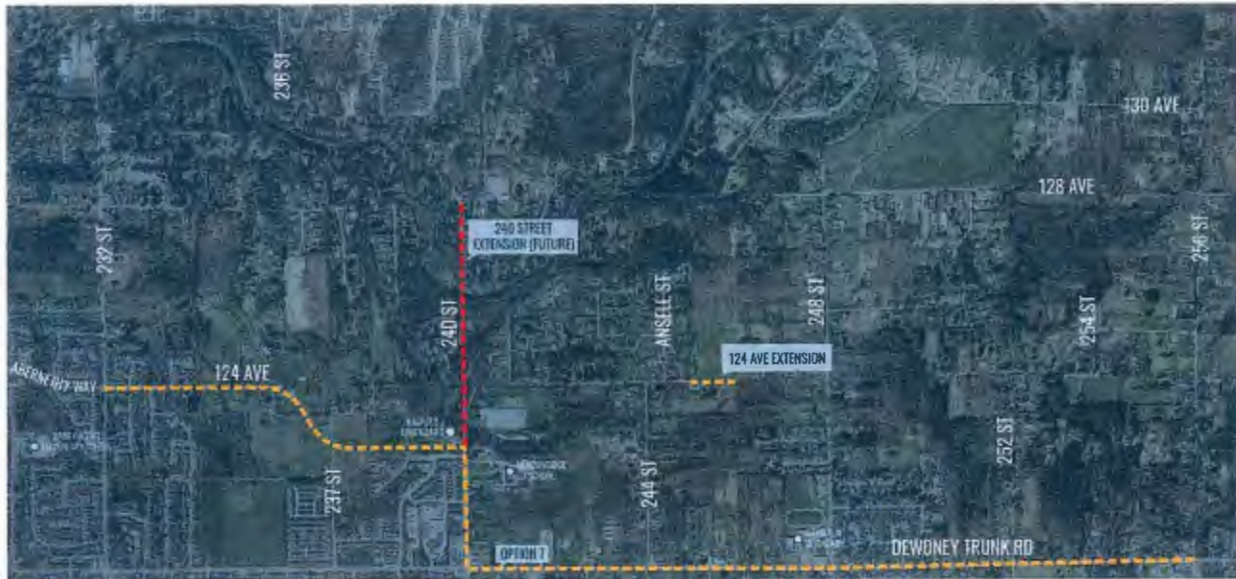


Figure 25: Recommended Abernethy Way Extension and Parallel 124 Ave Connection



APPENDIX A

2010 DELCAN STUDIES

Memorandum

To: Michael Eng (District of Maple Ridge)

Date: November 17, 2008

Copy:

Project: TV 1071

From: Colin Woollacott

Re: Abernethy Way Extension (232 St To 256 St), Maple Ridge

Mr. Eng,

The following memorandum is a description of the alternative routes proposed for the Abernethy Way Extension in Maple Ridge. The accompanying drawings, TV-1071-TVA01 to 07, show the alternative routes herein described. Also included is **Exhibit 1** that compares a number of issues for each of the alternative routes, such as overall length and subsequent works required.

Although it was our understanding from the District of Maple Ridge's Request for Proposal that two options be reviewed, in our search for a preferable solution we have produced 7 initial routes for you to review and comment upon.

It can be seen from the accompanying layouts that options 1-5 can be split into a separate route prior to the intersection of 124th Avenue and 248th Street, and a separate route after the intersection. For this reason, it should be noted that the finalized route(s) could be an amalgamation of more than one of the proposed options.

It should also be noted that the starting location for the proposed options is at the intersection of 124th Avenue and 232nd Street, with the end being at the intersection of 128th Avenue and 256th Street. This second location is situated between the easterly residential and industrial areas to which the flow of traffic is required to be improved as part of this proposal of works.

There are a number of common issues relevant to all of the alignment options and these are discussed here, however, more specific issues for each alignment are reviewed separately below.

- All existing Brook / Creek crossings points will need to be widened from the current width to accommodate the proposed final width of a four lane road, multi-use sidewalk and soft landscaped areas. Environmental Impact Assessments to be carried out on all situations where works are required to existing watercourses. Although the road layout will initially only be a two lane road, we suggest undertaking the necessary works to the crossings to accommodate the ultimate required width of road to avoid repeating the approval process.
- While the majority of the alignments follow existing rights of way, these will need to be widened to accommodate the land take for the proposed final width of the road layout as noted above. The new right-of-way width has been taken to be 30.0m wide, based on the final road section. The purchase of lands for the new right-of-way could be achieved in one attempt similar to that noted above for creek crossings, however, the purchasing of lands at

a later date could be undertaken should funding issues dictate. Drawings TV-1071-TVA01 to 07 indicate the land designation either side of the proposed alignment to assist in the review process.

- While it would be proposed to upgrade all major accesses and intersections for the final alignment option as requested in the original Request for Proposal, all works will be upgraded to suit the four lane road width to avoid revisiting the intersection details at a later stage. This would mean that, subsequent to that noted above, in some sections the full width of required right-of-way lands will need to be purchased to accommodate the proposed layout.
- Each of the alignments result in a number of conflicts with existing structures, mainly residential, due to the alignment directly or from the right-of-way required. Although it is understood that there will be a requirement to acquire third party lands, and subsequently existing structures, as no alignment can totally avoid conflict areas, the conflicts of the preferred option will be minimized.

The following sections detail the issues specific to each alignment option, although there will be a number that are repeated due to sections that overlap one another.

Option 1

The first option, as suggested in the original Request for Proposal, is a straight alignment along 124th Avenue, with a final section running north along 256th Street to the end location as noted above.

This option provides the most direct route and also follows for the most part existing rights-of-way along the 124th Avenue alignment, notwithstanding the fact that the existing right of way will need to be widened. It should be noted, however, that there are some short lengths of this alignment that require full land acquisition due to no right-of-way being present.

Due to this alignment crossing Latimer Creek and the topography in the area, there would be a requirement to construct a crossing feature, most likely a bridge structure. Based on an upper figure of \$5,000/m² (our experience suggests a figure ranging from \$3,000 to \$5,000), the cost for such a structure, say, 20.0m wide to the extents noted on drawing TV-1071-TVA01 would be \$25 million, (250.0m span)

The remainder of this option is straight forward apart from where it is proposed to connect to 256th Street. The existing intersection with 256th Street is via 125th Avenue, although this is unlikely to be a suitable route due to the required radii being in the order of 250.0m for the proposed road category. A signalized intersection at 124th Avenue and 256th Street would negate the need for the above mentioned radii and therefore would be the preferred solution.

Option 2

Similar to Option 1 above, this route follows the predominately straight route in an easterly direction. The only difference being that this option deviates to the 123rd Avenue to reduce the extent of ravine crossing, again likely to be a bridge structure, for crossing the Latimer Creek. There also may be a requirement to provide a westerly culvert crossing point also, although this will need to be confirmed at the detailed design stage.

Using the same figures as above, a proposed bridge structure in this location would cost approximately \$16.5 million, (165.0m span).

Using the 123rd Avenue also raises issues of land take from the Golf Course in the vicinity and the requirement of an oblique intersection layout with 240th Street, unless the existing greenhouse/nursery is agreed to be removed to allow the continuation of the 123rd Avenue alignment. In any case, the proposal is to return to the 124th Avenue alignment and follow the route as Option 1 above, raising the same issues as noted.

Option 3

The proposed alignment for this option avoids the need for a crossing to Latimer Creek to the west of 240th Street by diverting south from 124th Avenue to Abernethy Way to the south of the Golf Course. As with Option 2, this alignment impacts on Golf Course lands, but also has two south side residential access roads to accommodate in the vicinity. These accesses are too close to each other, and the intersection with 240th Street, to have individual signalized intersections such that a detailed solution will need to be provided for this residential area, (i.e. right-in, right-out).

From the intersection with 240th Street this alignment crosses Latimer Creek to avoid the existing school to the south of the creek, at an approximate cost of between \$5 - 10 million before tying back into 124th Avenue. This option would, however, seriously affect the existing stables to the north of the creek. Further investigation of creek crossing options is also required to identify bridge and / or culvert options.

The alignment shown indicates a diagonal route although this could follow the existing property lines and head north to 124th, resulting in a right angled intersection. It is worth considering, although also not shown, that a route along the existing 240th Street alignment from Abernethy Way north-west to 124th Avenue would totally negate the need for a bridge structure altogether.

Option 4

Drawing TV-1071-TVA04 shows the initial section of this alignment option to be that of Option 1, although as previously noted any of the above solutions could be used to get to the intersection of 124th Avenue and 248th Street.

As opposed to continuing the 124th Avenue alignment across open lands, as with Option 1, it is proposed to follow an existing right-of-way northward along 248th Street before returning eastward along 128th Avenue. As with all options, there are a number of access roads and intersection improvements to accommodate on this route along with the continuation of 128th Avenue, including the construction of a new creek crossing, to a new signalled intersection with 256th Street.

Option 5

Using the route for Option 1, and as such raising the same issues to the intersection of 124th Avenue and 252nd Street, this alignment is then proposed to turn along an existing narrow right-of-way, which will subsequently require further land acquisition, to a similarly proposed new route along 128th as noted above.

Further to the issues raised in Options 1 & 4 above, the section along 252nd Street not only requires a brook / creek crossing, likely to be a culvert solution, but this area is noted from Maple Ridge contoured plans as being prone to flooding. In addition to Environmental

Assessments for a crossing, a review of the implications to the flood plain area will also need to be considered.

Option 6

Following the same alignment as Option 3 to 240th Street, the route for this option remains to the south of 124th Avenue following an alignment closer to Abernethy Way, meandering slightly to avoid the school and residential areas.

The majority of land acquisition for this option is for open areas as opposed to existing rights-of-way with notable conflicts with existing structures that front the north / south Streets that this alignment proposes to cross.

It is unlikely, however, that the residential road, Hilland Avenue, would be suitable to upgrade to a four lane road as is the ultimate requirement for this scheme.

Option 7

While it is understood that one requirement for the Abernethy Way Extension is to reduce the existing traffic along Dewdney Trunk Road, we have proposed this route on the basis that there is an existing route for the "initial phase" which would reduce initial construction costs, although notwithstanding the disruption to upgrade Dewdney Trunk Road to a four lane road at a later stage.

There are also issues of passing the route past the frontage of the existing school on 240th Street, the existing Dewdney Trunk Road bridge structure that is likely to require upgrading between 252nd and 256th Streets, and also the fact that in basic travel terms the journey works somewhat further south of the proposed destination, 128th Avenue and 256th Street, than desired.

We trust the above is satisfactory and look forward to your comments regarding our proposals, however, should you wish to raise any further issues please do not hesitate to contact us.

Regards,



Colin Woollacott



ABERNETHY WAY EXTENSION

Project No.:TV 1071

Alignment Option Comparisons

	Approx. Length (m)	Existing Road ¹ (m)	%	New Road ² (m)	%	Creek Crossings			Intersection Improvements ⁴		Approx. Area of Land Acquisition ⁵ (m ²)	Res/ALR ⁷
						Existing ³	New		Signalled ⁵	Unsignalled		
							Culvert	Bridge				
Option 1	5700	3000	52.6	2700	47.4	3	0	1	5	11	83850	11900/71950
Option 2	5850	3200	54.7	2650	45.3	3	1	1	5	11	86600	11500/75100
Option 3	5950	2700	45.4	3250	54.6	3	0	1	5	12	104150	4150/100000
Option 4	5750	3600	62.6	2150	37.4	2	4	1	3	13	68100	11900/56200
Option 5	5700	2600	45.6	3100	54.4	2	5	1	4	10	82900	11900/71000
Option 6	6200	1700	27.4	4500	72.6	4	2	1	5	10	124350	2700/125650
Option 7 [†]	7100	6300	88.7	800	11.3	4	2	2 [‡]	8	10	70150	13600/56550

¹ - Length of existing road, notwithstanding the road structure being insufficient for proposed usage.

² - Length of road that is required to be constructed, including reconstruction of existing road too narrow for proposed usage.

³ - Existing Brook / Creek crossings assumed to be revised to suit Ultimate Phase Layout road width during Initial Phase.

⁴ - Improvements herein relate to major road intersections and does not include for individual residential access roads.

⁵ - Signalled Intersection Improvements to include revisions to sequencing at existing signalled intersections.

⁶ - Based on a Right of Way of 30.0m for the Ultimate Phase Layout.

⁷ - Ratio of Residential Lands (inc. school and commercial) over Agricultural Land Reserve, from approximate Land Acquisition total.

[†] - Length of Option 7 includes approximately 2250m new construction, 3250m of Dewdney Trunk Road and 1600m of 256 St.

[‡] - New Creek Crossings including replacement of existing bridge structure on Dewdney Trunk Road between 252 St and 256 St.

DRAFT

For Discussion Purposes Only

EXHIBIT 1.1

Option comparisons.xlsx

11/18/2008

→ File

E02-011-030

Memorandum

TERRY, P.J.
To: Michael Eng (District Of Maple Ridge)
Copy: File
From: Colin Woollacott

Date: August 25, 2009
Project: TV1071

Re: Abernethy Way Extension, Maple Ridge - Status Report

The following memorandum summarises the current extent of works for the above mentioned project to the middle of summer 2009.

Following the initial brief from the Engineering Department at The District of Maple Ridge, it was proposed that the start and end nodes should be as follows:

- 1) Start node – Intersection of 232 Street and 124 Avenue at the western end
- 2) End node – Intersection of 256 Street and 128 Avenue⁽¹⁾ at the eastern end

An evaluation matrix was compiled for a variety of route options with ratings from "good to fair to poor" based on the following criteria:

- Overall Length of route
- Approximate Travel Time⁽²⁾
- Impacts to existing buildings / structures from required land takes to provide addition to the existing right-of-way
- Impacts to existing Creeks and other Environmental aspects, including potential large culvert and bridge structures
- Impacts on Social / Community aspects, mainly taking into account the amount of land to be purchased for addition to the existing right-of-way
- Constructability
- Estimated Cost

The list of routes was presented to the Engineering Department at the District of Maple Ridge and after a number of meetings and correspondence the list of preferred routes was reduced to two options.

Option 1) 124 Avenue to 256 Street, and,

Option 2) 123 Avenue to 256 Street⁽³⁾

The Options were put to a Corporate Management Team in January 2009 to review the proposed Public Open House information. Following this meeting it was suggested to reduce the presented information on the basis that the funding for such a large project had yet to be finalised.

⁽¹⁾ The End node was revised from the originally stated Intersection of 256 Street and 124 Avenue to provide better access to a proposed Industrial area, as indicated on Maple Ridge OCP Plan, to the north east of the Intersection of 256 Street and 128 Avenue.

⁽²⁾ Travel times were based on findings during a Delcan field visit, 5 August, 2008.

⁽³⁾ As the starting node for both alignments is the same, the second alignment initially follows the route of the first alignment along 124 Avenue before switching to 123 Avenue at approximately 240 Street.

The reduced information was then taken to a Council Workshop meeting in February 2009 with Steve Russell in attendance with Maple Ridge representatives to put forward the proposal on the assumption of attaining funding.

In late May 2009, Maple Ridge requested a more accurate number of properties affected by the two preferred route options for further consideration.

During the late spring months Arcas finalized a literature search for the alignment areas to assess potential sites of archaeological significance that could potentially be impacted by the proposed roadworks. This review was forwarded with Delcan's additional comments to the District of Maple Ridge for information.

As of the end of July 2009, Maple Ridge confirmed that upon the return Andrew Wood from vacation in early September, there will be a Public House Presentation organised internally by Maple Ridge. A meeting may be required between the District of Maple Ridge and Delcan to review the proposed information to be presented and any new information that may be available, i.e. proposed agreed sanitary sewer alignment.



Suite 2300, Metrotower I, 4710 Kingsway
Burnaby, British Columbia V5H 4M2
Tel: 604.438.5300 • Fax: 604.438.5350
www.delcan.com

March 31, 2010

OUR REF: TV1071

Andrew Wood
Municipal Engineer
District of Maple Ridge
11995 Haney Place
Maple Ridge, B.C.
V2X 6A9

Dear Sir:

Re: Abernethy Way Extension

This is further to a meeting held in February 2010 between the District of Maple Ridge and TransLink, and attended by Delcan Corporation staff. The purpose of the meeting was to discuss possible future funding for the planned extension of Abernethy Way in the District of Maple Ridge. At that meeting Delcan was requested to gather and summarize previous transportation planning studies relevant to this area of Maple Ridge, and prepare a Strategic Objectives document for the Abernethy Way Extension project based on the technical merits highlighted in the previous studies, so that further participation in the project could be considered by TransLink. This letter presents a summary of the technical merits and strategic objectives of this project.

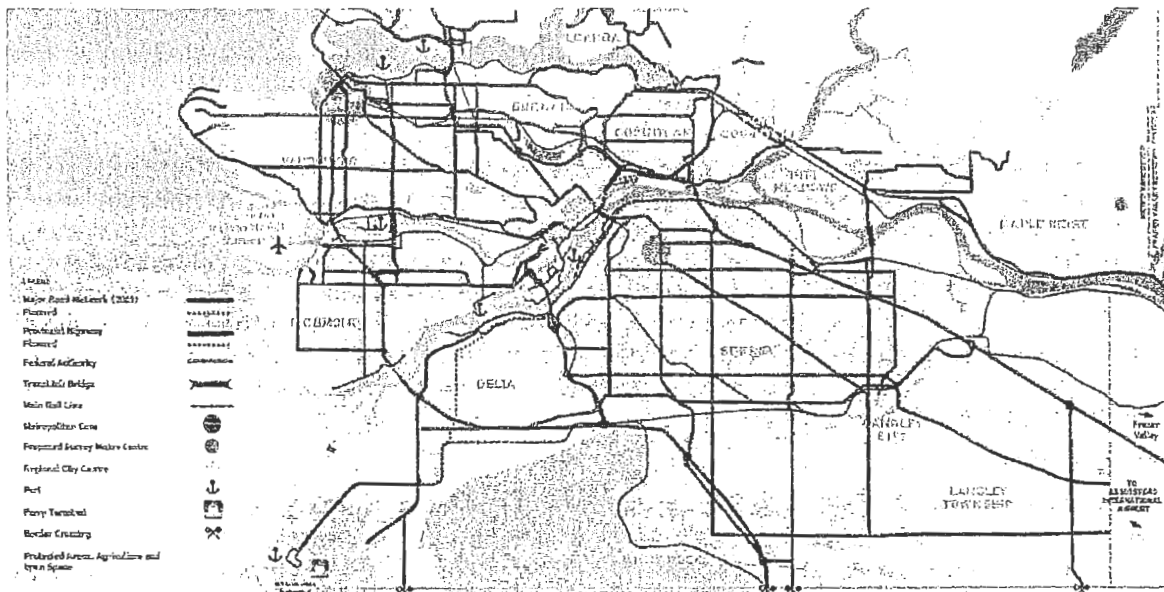
Background

The District of Maple Ridge has established the goal of extending the Abernethy Way Corridor beyond 232nd Street to 256th Street to ease the east/west traffic flows on the existing road infrastructure and provide sufficient travel capacity to service a planned area of industrial lands located east of 249th Street and north of 128th Avenue. The Official Community Plan designates about 300 acres of land in this location to be for industrial use. The land is identified as employment lands in the Northeast Sector of Metro Vancouver's Regional Growth Management Strategy. Improved connection to the major road network of the region would provide the convenient access to goods movement corridors, international trade gateways, and ports.

Currently about two thirds of the land has a zoning of Rural Resource and mining of a gravel resource is occurring on these lands. The gravel resource needs to be extracted from these lands prior to further development of the lands as an industrial business park and employment centre. To this end, the municipality desires to accelerate the extraction of the gravel resource to develop the industrial lands as soon as possible. However, the Official Community Plan requires that gravel extraction from these lands remain at historic levels until such time as an alternative access route can be provided to mitigate the negative impacts of additional truck traffic through residential areas and the Regional City Centre of Maple Ridge.

Abernethy Way Extension

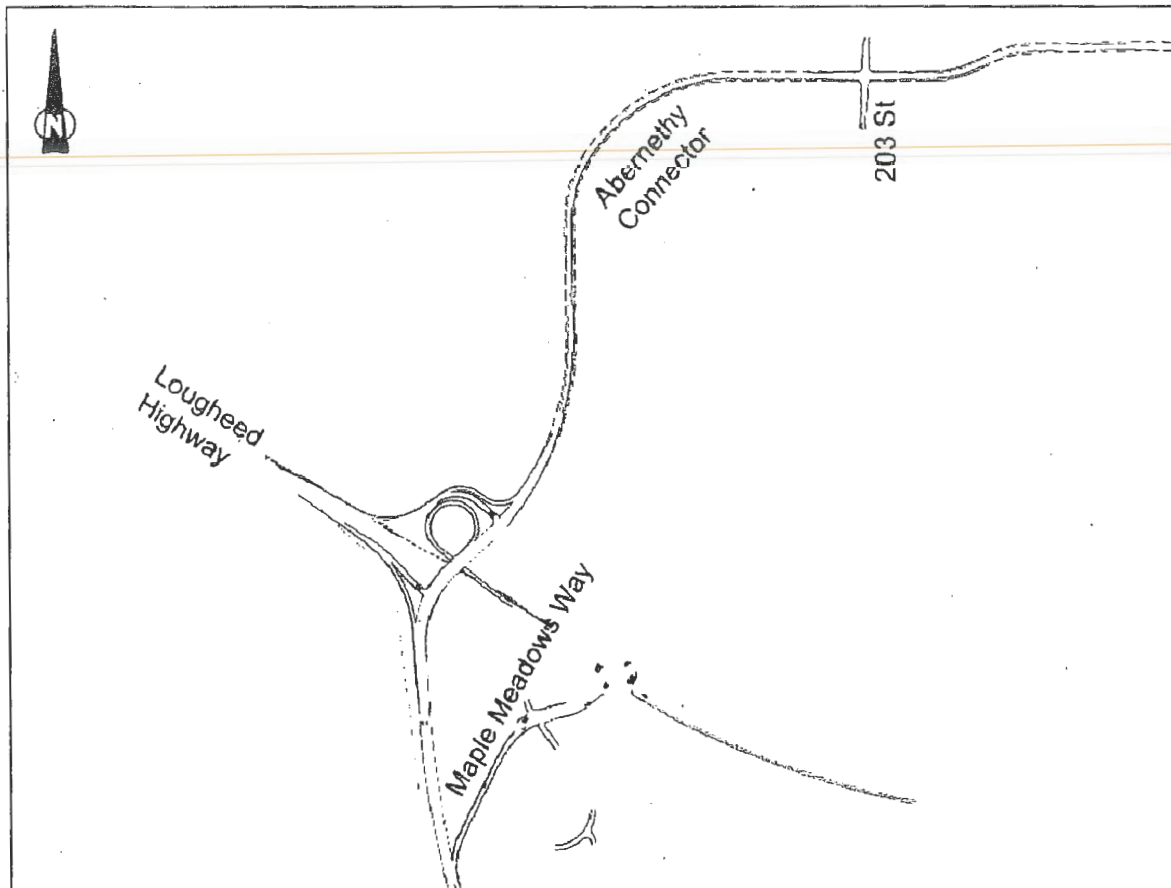
To provide regional access to the planned industrial lands, a major roadway needs to be extended from the Golden Ears Bridge and the Abernethy Way regional road to the intersection of 256th Street and 128th Avenue. Given the northeast location of the lands and their regional significance, it is likely that trips to and from the lands will be oriented to the west. There are three regional corridors traversing east-west across Maple Ridge, Lougheed Highway, Dewdney Trunk Road, and the Abernethy/124th Avenue Corridor, as shown on FIGURE 1. Lougheed Highway is located quite far to the south in relation to the lands and would be a very circuitous route to and from the lands. Dewdney Trunk Road travels through the core of the Regional City Centre which has short block lengths, many signalized intersections, and high volumes of pedestrian traffic that can conflict with industrial traffic, cause undue delay, and increase travel time for goods movement.



Source: Transport 2040

FIGURE 1 – TRANSLINK MAJOR ROAD NETWORK

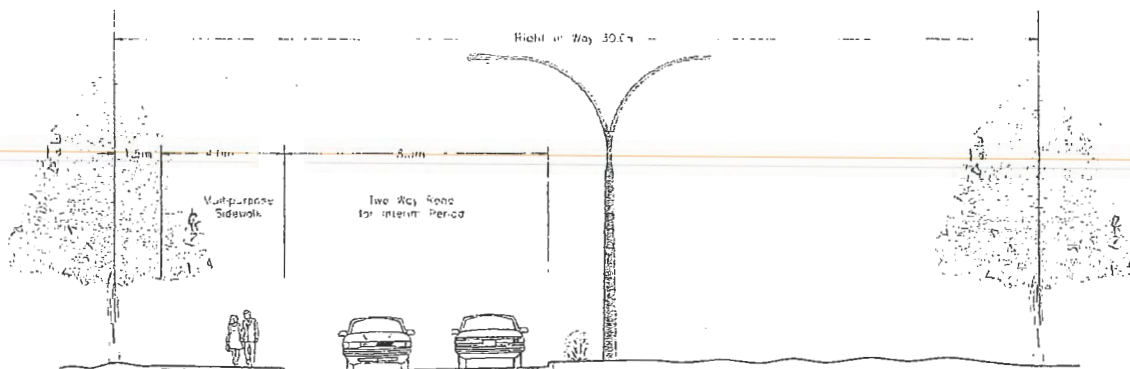
The Abernethy/124th Avenue Corridor bypasses the Regional City Centre on its northern edge and connects onto the Golden Ears Bridge, as shown on FIGURE 2. For these reasons, the Abernethy/124th Avenue Corridor was selected by the District of Maple Ridge as the preferred route to be extended eastward to the industrial lands. The current major roadway would be extended from the intersection of 124th Avenue and 232nd Street to the intersection of 128th Avenue and 256th Street. The alignment for this roadway is currently being studied by the District of Maple Ridge and is to include consultation with appropriate stakeholders.



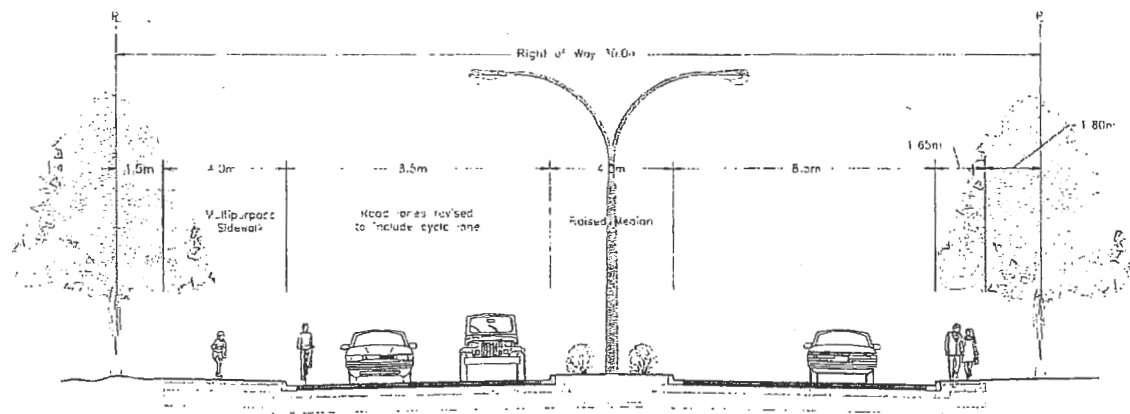
Source: The Golden Ears Bridge Study, Bunt & Associates, Nov. 2004

FIGURE 2 – ABERNETHY CONNECTOR TO THE GOLDEN EARS BRIDGE

The conceptual cross-section design for this roadway includes four travel lanes, two bike lanes, one sidewalk, one multi-use pathway, auxiliary turning lanes at key intersections, and roadway lighting. To facilitate increased truck traffic needed to accelerate extraction of the gravel resource from the lands, an interim cross-section of two travel lanes and a multi-use pathway is proposed. These conceptual cross-sections are shown on FIGURE 3.



TYPICAL CROSS SECTION (INTERIM)



TYPICAL CROSS SECTION (ULTIMATE)

FIGURE 3 – CONCEPTUAL ROAD CROSS SECTIONS**TransLink Participation in the Project**

Under the South Coast British Columbia Transportation Authority Act, TransLink is not responsible for construction, maintenance, or regulations of any part of any highway that is not part of the Major Road Network. Although the Abernethy/124th Avenue Corridor between the Golden Ears Bridge and 232nd Street is an MRN Road, the planned segment of roadway east of 232nd Street to 256th Street is not. For TransLink to continue to participate in this project beyond the planning stages, the Abernethy/124th Avenue Corridor between 232nd Street and 256th Street would need to be considered for potential inclusion in TransLink's Major Road Network.

TransLink's inclusion criteria for the Major Road Network are:

- Provides intra-regional access to a predefined regional activity centre;
- Carries a minimum of;
 - 70% of trips longer than 10 kilometres in peak hour & peak direction;
 - Total peak hour peak direction volume of traffic is greater than 800 vph;
 - 10 through buses in peak or peak direction; OR
 - 800 trucks per day; AND
- Meets an overall check for reasonableness and completeness.

The Abernethy/124th Avenue corridor does not currently meet any of these criteria as it is a planned roadway to a planned development, as it stands in its pre-employment lands status. However, TransLink has previously participated in the construction on new segments of the Major Road Network to service planned regional activity centres. The David Avenue Bridge and approaches within the City of Coquitlam, and the Coast Meridian Overpass in Port Coquitlam, are examples of this participation.

Large Industrial/Business Parks are considered to be regional activity centres by TransLink and as such, all existing large industrial parks within Metro Vancouver are serviced by the Major Road Network. When the planned 300 acres of industrial lands are fully developed, the lands would generate about 15,000 trips per day and about 2,000 trips during the afternoon peak hour, of which about 1,600 trips would be in the peak direction. These travel demand forecasts are based on average trip generation rates published by the Institute of Transportation Engineers for general light industrial lands. Therefore, when the industrial lands are fully developed, the Abernethy/124th Avenue corridor would meet the inclusion criteria to be part of TransLink's Major Road Network.

Further discussions with TransLink are needed to confirm the acceptance of Major Road Network additions to service planned regional activity centres and the requirements of TransLink for an application to extend the Major Road Network.

Should you have any questions regarding this summary of the technical merits and strategic objectives of this project in relation to the Major Road Network and TransLink, please contact us.

Yours truly,

Steve Russell, P.Eng.
Vice President, Transportation

Tim Murphy
Senior Project Manager

Enclosures:

1. Chief Administrative Officer Report, dated November 15, 2007
2. MRN Minor Capital Program Description and Guidelines, December 20, 2001
3. MRN Inclusion Criteria, TransLink, undated

c: Sany Zein, TransLink

EQ-011-030
DRAFT



TECHNICAL BRIEF

ABERNETHY WAY EXTENSION FEASIBILITY STUDY



SEPTEMBER 2010
TV1071

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Appendix B	Archaeological Overview Assessment Report (July 2009)
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Appendix D	Presentation to Closed Council Group (February 2009)

1.0 INTRODUCTION

This technical brief provides a high level assessment of the review process undertaken for the proposed Abernethy Way Extension for the District of Maple Ridge. The original feasibility study was started in the Spring of 2008.

The assessment will focus on the selection of preferred route options through a number of means from Multiple Account Evaluation reviews, and Presentations to Council Design Groups, but falling short of Public Open House events.

2.0 BACKGROUND OF PROJECTS

Delcan was appointed by the District to carry out a Feasibility Study for the Proposed Abernethy Way Extension, required to advance development of employment lands in the northeast area of the District as identified by Metro Vancouver, and in light of the recently opened Golden Ears Bridge to the west.

The road extension project was originally to be paired with a sanitary sewer trunk line extension project that was also proposed for the area, which may have allowed for an amount of cost sharing between the two projects. However, due to the timing between the projects, along with the difficulties in accommodating similar alignments, the two were kept separate.

A brief description of the base project procedures and incremental scope elements considered are provided below.

2.1 Corridor Options

It was agreed that while the westerly starting node would be at 124 Avenue and 232 Street, the current easterly end node of Abernethy Way would be relocated from 124 Avenue and 256 Street to 128 Avenue and 256 Street, which is the southwest corner of the proposed Industrial Zone.

With the proposed corridor options limited by the proximity of Dewdney Trunk Road to the south, and the steep topography to the north towards the South Alouette River, the main emphasis for the proposed route was along 124 Avenue (*Exhibit 1*).

To reduce the impact to the existing Coho Creek, and a possible future north-south bridge structure, both at 240 Street in the vicinity of 124 Avenue, Options 2 and 3 (*Exhibits 2 and 3*) allowed for sections that diverge to the south of 124 Avenue, to 123 Avenue and a section of road also named Abernethy Way, respectively.

In connection with early sewer alignment designs, Options 4 and 5 (*Exhibits 4 and 5*) provided alternative routes for the east-west alignment to the north of 124 Avenue, being in line with the relocated end node, as noted above. A further proposal to Option 4, Option 4a, was reviewed that utilized the existing 130 Avenue Connector corridor to the north of 128 Avenue.

It can be seen that each of the above options can be split east of 248 Street and west of 248 Street, and as such can produce a multitude of differing alignments than those noted herein. However, for presentation of alignment data, the above options were produced.

A final alignment, Option 6 (*Exhibit 6*), was proposed to reduce impact on existing residences fronting 124 Avenue, by providing a new corridor through open fields along an alignment at 123 Avenue.

Upon agreement from the District as to the acceptance of the above mentioned options, Delcan proceeded with a preliminary Multiple Account Evaluation of each of the proposals to present to the District, and upon approval, further presentation to Council Groups.

The proposed cross section of the Abernethy Way Extension was based on the existing Abernethy Way west of 232 Street, that being a four lane divided roadway, **Exhibit 7**. It was also required to include bicycle lanes for each direction and a 4.0 m wide multi-purpose trail that could be incorporated into the District's Equestrian Trail Network.

2.2 Multiple Account Evaluations

A simplified Multiple Account Evaluation was adopted to aid in the selection of the preferred options for the Abernethy Way Extension alignment. The selection criteria for the MAE included the following accounts:

- Length of alignment.
- Travel time, based on findings during Delcan field visits.
- Building impacts, including residences, garages, sheds, walls, etc.
- Creek / Environmental, with regards to either structural or culvert crossings to existing creeks.
- Social / Community, based on impact of public usage along the proposed alignment.
- Constructability, taking into account size and structure of creek crossings and proximity to residential areas.
- Estimated Costs, Class D construction cost estimates based on 2008 figures and best available data for land values, etc.
- Overall rating, ranking each of the above criteria.

Table 1 highlights the conclusions for the Multiple Account Evaluation as presented by Delcan and the District to Council Steering Groups and an In-Camera Council Information Session.

2.3 Preferred Route Options

Following the meetings and presentations mentioned above, and the unfeasibility to keep the road and sewer extension projects together, it was indicated that the two preferred route alignments were Options 1 and 6, those being, the original 124 Avenue alignment and that of an alignment corridor along 123 Avenue, respectively.

The remaining options, while being indicated as good on the MAE, became less attractive once the sewer extension works were removed, and were deemed to be too disruptive to the areas north of 124 Avenue.

With the two preferred options confirmed, the Design Team was to finalize Public Open House presentation information, however, as funding for the project became an issue this was put on hold as of the middle of the Summer of 2009.

The project has not progressed since that time, apart from the District's request to produce this report to summarize the works to date.

2.4 Funding

Delcan was requested to produce a letter report, **Appendix A**, to outline the possibility of Translink's participation in the Abernethy Way Extension project with the District.

It was concluded in the letter report that as the proposed section was not part of the Major Road Network, further discussions with Translink would be required to confirm that the Abernethy Way project would be acceptable as an extension to the current Major Road Network.

2.5 Additional Information

AMEC Earth and Environmental (previously Arcas Consulting Archeologists Ltd) provided an Archaeological Overview Assessment Report on the proposed alignment options, **Appendix B**, indicating that there were no known archaeological sites recorded within the project area. However, as possible evidence of settlement may be found along the creeks, it was suggested that these areas be monitored during construction for any evidence of archaeological findings which could then be reported back to the archaeologists for further investigation as required.

Table 1 – Multiple Account Evaluation

	Length	Travel Time	Building Impacts	Creek / Environmental	Social / Community	Constructability	Estimated Cost	Overall Rating
Option 1 (124)	●	●	○	○	○	○	● \$61M	●
Option 2 (124-123-124)	●	●	●	●	○	○	● \$50M	●
Option 3 (124-Abernethy Way-124)	●	●	●	●	●	●	● \$44M	●
Option 4 (124-248-128)	●	●	●	○	○	○	● \$59M	●
Option 4a (124-Abernethy Way-124-248-128)	●	●	●	●	●	●	● \$43M	●
Option 5 (124-252-128)	●	●	●	○	○	○	● \$61M	●
Option 6 (124-Abernethy Way-123)	●	●	●	●	●	●	● \$68M	●

Rating

- - Good
- - Fair
- - Poor



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NOTES:

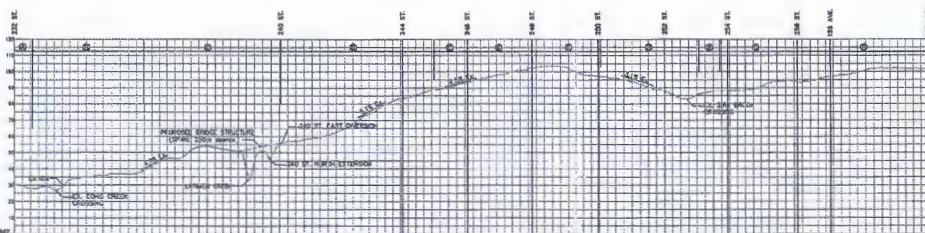
1. UTILIZE EXISTING PAVEMENT STRUCTURE FOR BOTH PHASES OF PROPOSED WORKS.
2. UTILIZE EXISTING PAVEMENT STRUCTURE FOR INITIAL PHASE OF PROPOSED WORKS, INCLUDING TO BOTH SIDES OF THE ROAD TO ACHIEVE PROPOSED 14.0M WIDE, CROWNED PAVEMENT FOR ULTIMATE PHASE OF PROJECT.
3. UTILIZE EXISTING 7.6M WIDE, SINGLE CROWNED PAVEMENT STRUCTURE FOR INITIAL PHASE OF PROPOSED WORKS, INCLUDING TO BOTH SIDES OF THE ROAD TO ACHIEVE PROPOSED 14.0M WIDE, CROWNED PAVEMENT FOR ULTIMATE PHASE OF PROJECT.
4. EXISTING NARROW PAVEMENT STRUCTURE REPLACED WITH PROPOSED 7.6M WIDE, SINGLE CROWNED PAVEMENT FOR INITIAL PHASE OF WORKS, INCLUDING TO BOTH SIDES OF THE ROAD TO ACHIEVE PROPOSED 14.0M WIDE, CROWNED PAVEMENT FOR ULTIMATE PHASE OF PROJECT.
5. PROPOSED ALIGNMENT PLAN & ELEVATION DETAILS BASED ON LDM CONTOUR DATA PROVIDED BY THE DISTRICT OF MAPLE RIDGE, BASED FOR HORIZONTAL, VERTICAL CURVE FOR VERTICAL.
6. ALL BRIDGE/CROSSING CONDITIONS TO BE REVIEWED OR CONTRASTED TO REQUIRED EXTENTS FOR ULTIMATE PHASE OF PROJECT.
7. PROPOSED BRIDGE/CROSSING CONDITIONS AND ROAD GRADIENTS TO BE SIZED FOR A 1 IN 100 YEAR STORM EVENT BASED ON LAYOUT OF ULTIMATE PHASE OF PROJECT.
8. LAND ACQUISITION REQUIRED BASED ON RIGHT OF WAY OF 30.0M FOR ULTIMATE PHASE OF PROJECT.

PLAN LEGEND

- EXISTING BRIDGE/CROSSING
- PROPOSED BRIDGE/CROSSING-CULVERT CROSSING
- PROPOSED BRIDGE/CROSSING-BRIDGE STRUCTURE
- PROPOSED STOP SIGN INTERSECTION
- PROPOSED TRAFFIC SIGNALIZED INTERSECTION
- PROPOSED ALIGNMENT CLOSE TO OR IN CONFLICT WITH EXISTING STRUCTURE
- PROPOSED ALIGNMENT IN AREA OF FLOODING

PROFILE LEGEND

- AGRICULTURAL
- SUBURBAN RESIDENTIAL
- ESTATE SUBURBAN RESIDENTIAL
- URBAN RESIDENTIAL
- SCHOOLS/RECREATIONAL
- PARKS WITHIN THE AIR
- COMMERCIAL
- CONSERVATION



STATIONING	ELEVATION (M)
100	100.00
110	100.00
120	100.00
130	100.00
140	100.00
150	100.00
160	100.00
170	100.00
180	100.00
190	100.00
200	100.00
210	100.00
220	100.00
230	100.00
240	100.00
250	100.00
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280	100.00
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920	100.00
930	100.00
940	100.00
950	100.00
960	100.00
970	100.00
980	100.00
990	100.00
1000	100.00

ROAD NAME	12th AVENUE	12th AVENUE	12th AVENUE
PROPERTY	RESIDENTIAL	AGRICULTURAL	AGRICULTURAL
NOTE:	PROPERTY IDENTIFICATION TAKEN FROM MAPLE RIDGE OFFICIAL COMMUNITY PLAN BYLAW No. 842-2006, SCHEDULE B, PROPOSED GENERALIZED LAND USE PLAN		

PROFILE SCALE: H 1:10000, V 1:1000

	MAPLE RIDGE British Columbia		THE DISTRICT OF MAPLE RIDGE ABERNETHY WAY EXTENSION	SHEET NO. 01
			ALIGNMENT OPTION 1	DATE 07/2010
			PROJECT NO. TV-1071-TVA01	



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NOTES:

1. UTILISE EXISTING PAVEMENT STRUCTURE FOR BOTH PHASES OF PROPOSED WORKS.
2. UTILISE EXISTING PAVEMENT STRUCTURE FOR INITIAL PHASE OF PROPOSED WORKS, NEEDING TO BUILD BODY OF THE ROAD TO ACHIEVE PROPOSED 14.5M WIDE, CROWNED PAVEMENT FOR ULTIMATE PHASE OF PROJECT.
3. PROPOSED 7.5M WIDE, SINGLE CROWNED PAVEMENT STRUCTURE FOR INITIAL PHASE OF PROPOSED WORKS, NEEDING TO BUILD BODY OF THE ROAD TO ACHIEVE PROPOSED 14.5M WIDE, CROWNED PAVEMENT FOR ULTIMATE PHASE OF PROJECT.
4. EXISTING WAREHOUSE PAVEMENT STRUCTURE REPLACED WITH PROPOSED 7.5M WIDE, SINGLE CROWNED PAVEMENT FOR INITIAL PHASE OF PROJECT, NEEDING TO BUILD BODY OF THE ROAD TO ACHIEVE PROPOSED 14.5M WIDE, CROWNED PAVEMENT FOR ULTIMATE PHASE OF PROJECT.
5. PROPOSED ALIGNMENT PLAN & ELEVATION DETAILS BASED ON LHM CONTOUR DATA PROVIDED BY THE DISTRICT OF MAPLE RIDGE, MAINT FOR HORIZONTAL, MAINT FOR VERTICAL.
6. ALL BROOKS/CREEK CROSSINGS TO BE DESIGNED ON CONTRACTED TO REQUIRED EXTENTS FOR ULTIMATE PHASE OF PROJECT.
7. PROPOSED BROOK/CREEK CROSSINGS AND ROAD BRIDGES TO BE DESIGNED FOR A 1 IN 100 YEAR STORM EVENT BASED ON LAYOUT OF ULTIMATE PHASE OF PROJECT.
8. LAND ACQUISITION REQUIRED BASED ON RIGHT OF WAY OF 30.5M FOR ULTIMATE PHASE OF PROJECT.

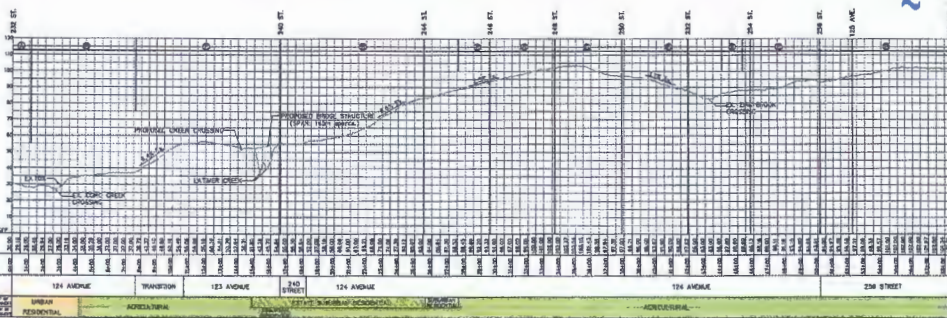
PLAN LEGEND

- EXISTING BROOK/CREEK CROSSING
- PROPOSED BROOK/CREEK CROSSING-DAM/NOT CROSSING
- PROPOSED BROOK/CREEK CROSSING-BRIDGE STRUCTURE
- PROPOSED STOP SIGN INTERSECTION
- PROPOSED TRAFFIC SIGNALIZED INTERSECTION
- PROPOSED ALIGNMENT CLOSE TO OR IN CONFLICT WITH EXISTING STRUCTURE
- PROPOSED ALIGNMENT IN AREA OF FLOODING

PROFILE LEGEND

- AGRICULTURAL
- SUBURBAN RESIDENTIAL
- ESTATE SUBURBAN RESIDENTIAL
- URBAN RESIDENTIAL
- SCHOOLS/INSTITUTIONAL
- PARKS WITHIN THE AREA
- COMMERCIAL
- CONSERVATION

PLAN SCALE: 1:1000

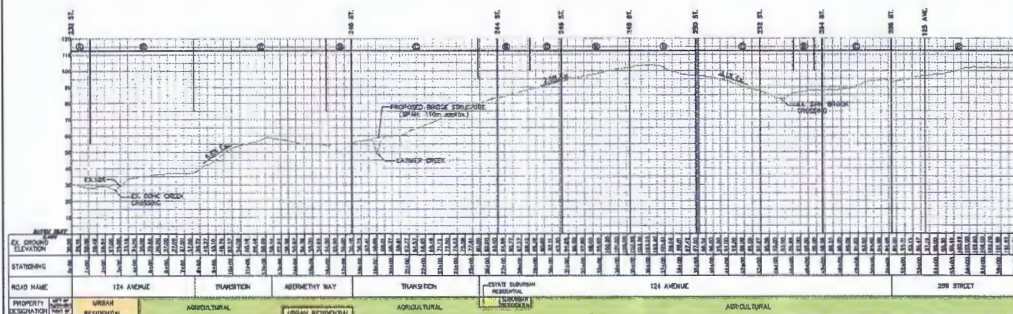


PROFILE SCALE: 1:1000, V: 1:100

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	PROJECT DESCRIPTION: ABERNETHY WAY EXTENSION, ALIGNMENT OPTION 2 SCALE: 1:1000, V: 1:100			
	PREPARED BY: [Name] DATE: [Date]			



PLAN SCALE: 1:1000



PROFILE SCALE: H 1:1000, V 1:1000

- NOTES:**
1. @ ULTIMATE EXISTING PAVEMENT STRUCTURE FOR BOTH PHASES OF PROPOSED ROAD.
 2. @ ULTIMATE EXISTING PAVEMENT STRUCTURE FOR INITIAL PHASE OF PROPOSED ROAD, REGARDING TO BOTH SIDES OF THE ROAD TO JOINTED PROPOSED 11.5M WIDE, SHOWN PAVEMENT FOR ULTIMATE PHASE OF PROJECT.
 3. @ PROPOSED 3.5M WIDE, SINGLE CROWN PAVEMENT STRUCTURE FOR INITIAL PHASE OF PROPOSED ROAD, REGARDING TO BOTH SIDES OF THE ROAD TO JOINTED PROPOSED 11.5M WIDE, SHOWN PAVEMENT FOR ULTIMATE PHASE OF PROJECT.
 4. @ EXISTING PAVEMENT STRUCTURE REPLACED WITH PROPOSED 7.5M WIDE, SINGLE CROWN PAVEMENT FOR INITIAL PHASE OF PROPOSED ROAD, REGARDING TO BOTH SIDES OF THE ROAD TO JOINTED PROPOSED 11.5M WIDE, SHOWN PAVEMENT FOR ULTIMATE PHASE OF PROJECT.
 5. PROPOSED ALIGNMENT PLAN & ELEVATION DETAILS BASED ON L.S.M. CONTOUR DATA PROVIDED BY THE DISTRICT OF MAPLE RIDGE, HAZZ FOR HORIZONTAL, PAVED CURVE FOR VERTICAL.
 6. ALL BRIDGE/SEWER CROSSINGS TO BE REVIEWED OR CONSTRUCTED TO REQUIRED EXTENTS FOR ULTIMATE PHASE OF PROJECT.
 7. PROPOSED BRIDGE/SEWER CROSSINGS AND ROAD DRAINAGE TO BE SIZED FOR A 1 IN 100 YEAR STORM EVENT BASED ON LAYOUT OF ULTIMATE PHASE OF PROJECT.
 8. LAND ACQUISITION REQUIRED BASED ON RIGHT OF WAY OF 30.0m FOR ULTIMATE PHASE OF PROJECT.
- PLAN LEGEND**
- EXISTING BRIDGE/SEWER CROSSING
 - PROPOSED BRIDGE/SEWER CROSSING-ON-VEHICLE CROSSING
 - PROPOSED BRIDGE/SEWER CROSSING-GRASS STRUCTURE
 - PROPOSED STOP SIGN INTERSECTION
 - PROPOSED TRAFFIC SIGNALIZED INTERSECTION
 - PROPOSED ALIGNMENT CLOSE TO, OR IN CONFLICT WITH, EXISTING STRUCTURE
 - PROPOSED ALIGNMENT IN AREA OF FLOODING
- PROFILE LEGEND**
- AGRICULTURAL
 - SUBURBAN RESIDENTIAL
 - ESTATE SUBURBAN RESIDENTIAL
 - URBAN RESIDENTIAL
 - SCHOOLS/INSTITUTIONAL
 - PARKS WITHIN THE A.R.
 - COMMERCIAL
 - CONSERVATION

MAPLE RIDGE

British Columbia

THE DISTRICT OF MAPLE RIDGE

ABERNETHY WAY EXTENSION

ALIGNMENT OPTION 3

03

07

TV-1071-TV003

DATE	04	
NO	07	REV
REVISED BY		
TV-1071-TV004		



PLAN SCALE: 1:10000

NOTES:

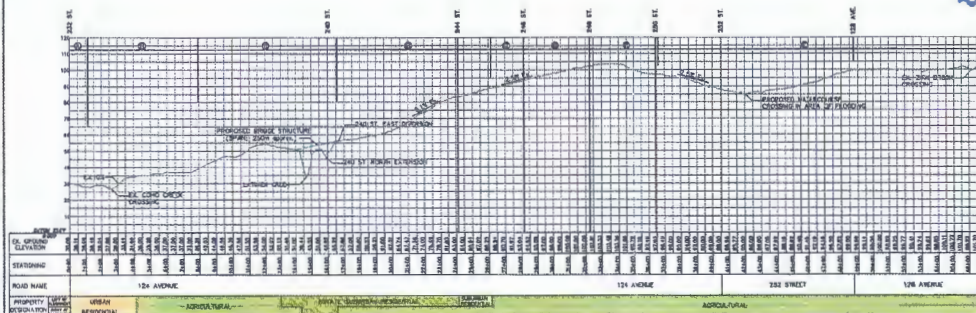
1. UTILISE EXISTING PAVEMENT STRUCTURE FOR BOTH PHASES OF PROPOSED WORKS.
2. UTILISE EXISTING PAVEMENT STRUCTURE FOR INITIAL PHASE OF PROPOSED WORKS, REDUCING TO 14.0m WIDE, UNPAVED PAVEMENT FOR ULTIMATE PHASE OF PROJECT.
3. PROPOSED 7.5m WIDE, SINGLE CIRCULAR PAVEMENT STRUCTURE FOR INITIAL PHASE OF PROPOSED WORKS, REDUCING TO 14.0m WIDE, UNPAVED PAVEMENT FOR ULTIMATE PHASE OF PROJECT.
4. EXISTING PAVEMENT STRUCTURE REPLACED WITH PROPOSED 14.0m WIDE, SINGLE CIRCULAR PAVEMENT FOR INITIAL PHASE OF WORKS, REDUCING TO 14.0m WIDE, UNPAVED PAVEMENT FOR ULTIMATE PHASE OF PROJECT.
5. PROPOSED ALIGNMENT PLAN & ELEVATION DETAILS BASED ON 1:50m CONTOUR DATA PROVIDED BY THE DISTRICT OF MAPLE RIDGE, BASED FOR HORIZONTAL, VERTICAL CURVE FOR VERTICAL.
6. ALL BRIDGE/BOX CULVERTS TO BE REVIEWED OR CONSTRUCTED TO ASSURED EXISTING FOR ULTIMATE PHASE OF PROJECT.
7. PROPOSED BRIDGE/BOX CULVERTS AND ROAD DRAINAGE TO BE SIZED FOR A 1 IN 100 YEAR STORM EVENT BASED ON LAYOUT OF ULTIMATE PHASE OF PROJECT.
8. LAND ACQUISITION REQUIRED BASED ON RIGHT OF WAY OF 30.0m FOR ULTIMATE PHASE OF PROJECT.

PLAN LEGEND

- EXISTING BRIDGE/BOX CULVERT
- PROPOSED BRIDGE/BOX CULVERT-ULTIMATE CROSSING
- PROPOSED BRIDGE/BOX CULVERT-SINGLE STRUCTURE
- PROPOSED STOP SIGN INTERSECTION
- PROPOSED TRAFFIC SIGNALIZED INTERSECTION
- PROPOSED ALIGNMENT CLOSE TO OR IN CONFLICT WITH EXISTING STRUCTURE
- PROPOSED ALIGNMENT IN AREA OF FLOODING

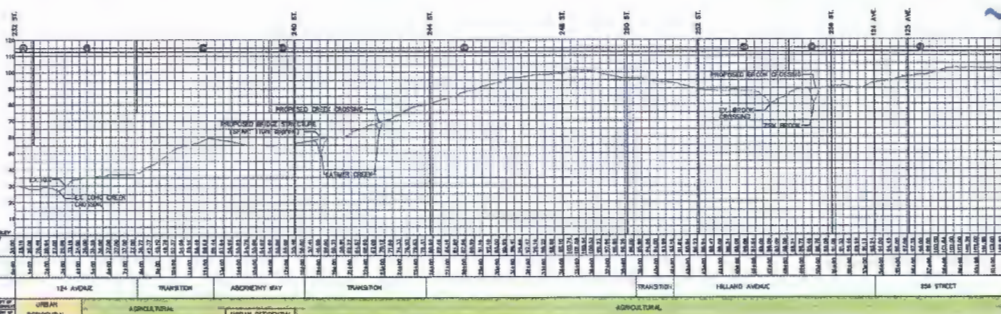
PROFILE LEGEND

- AGRICULTURAL
- SUBURBAN RESIDENTIAL
- ESTATE SUBURBAN RESIDENTIAL
- URBAN RESIDENTIAL
- SCHOOLS/INSTITUTIONAL
- PARKS/RECREATION
- COMMERCIAL
- CONSERVATION



PROFILE SCALE: 1:10000

MAPLE RIDGE British Columbia	THE DISTRICT OF MAPLE RIDGE ABERNETHY WAY EXTENSION ALIGNMENT OPTION 5		REF. NO. 05 DRAWING NO. 07 TV-1071-TVA05
	PROJECT NO. 1071 DATE: 2011-11-15 BY: [Name] CHECK: [Name]		
	PROJECT NO. 1071 DATE: 2011-11-15 BY: [Name] CHECK: [Name]		










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NOTES:

- 2. **UTILITY EXISTING PAVEMENT STRUCTURE FOR BOTH PHASES OF PROPOSED WORKS.**
- 3. **EXISTING HARMON PAVEMENT STRUCTURE FOR INITIAL PHASE OF PROPOSED WORKS. INSHOUL TO BE DESIGNS FOR THE 3.0m TO ACHIEVE PROPOSED 14.0m WIDE, GRONDED PAVEMENT FOR ULTIMATE PHASE OF PROJECT.**
- 4. **PROPOSED 7.3m WIDE, SINGLE CROSSFALL PAVEMENT STRUCTURE FOR INITIAL PHASE OF PROPOSED WORKS. INSHOUL TO BE DESIGNS FOR THE 3.0m TO ACHIEVE PROPOSED 14.0m WIDE, GRONDED PAVEMENT FOR ULTIMATE PHASE OF PROJECT.**
- 5. **EXISTING HARMON PAVEMENT STRUCTURE REPLACED WITH PROPOSED 3.0m WIDE, SINGLE CROSSFALL PAVEMENT STRUCTURE FOR INITIAL PHASE OF PROPOSED WORKS. INSHOUL TO BE DESIGNS FOR THE 3.0m TO ACHIEVE PROPOSED 14.0m WIDE, GRONDED PAVEMENT FOR ULTIMATE PHASE OF PROJECT.**
- 6. **PROPOSED ALIGNMENT PAVEMENT & ELEVATION DETAILS BASED ON 1:500 CONTIGUOUS DATA PROVIDED BY THE ROAD DESIGNER FOR THE INITIAL PHASE OF ULTIMATE PHASE OF PROJECT.**
- 7. **ALL BRICK/CORNER CROSSINGS TO BE REVISED OR CONSTRUCTED TO REDUCED EXTENTS FOR ULTIMATE PHASE OF PROJECT.**
- 8. **PROPOSED BRICK/OPEN CROSSINGS AND BRICK DRAINAGE TO BE DESIGNS FOR A 1:100 NEW ELEVATION DATA PROVIDED BY THE ROAD DESIGNER FOR ULTIMATE PHASE OF PROJECT.**
- 9. **LAND ACQUISITION REQUIRED BASED ON RIGHT OF WAY OF 30.0m FOR ULTIMATE PHASE OF PROJECT.**

PLAN LEGEND

- | | |
|---|---|
|  | EXISTING BROOK/CREEK CROSSING |
|  | PROPOSED BROOK/CREEK CROSSING—CULVERT CROSSING |
|  | PROPOSED BROOK/CREEK CROSSING—BRIDGE STRUCTURE |
|  | PROPOSED STOP SIGN INTERSECTION |
|  | PROPOSED TRAFFIC SIGNALIZED INTERSECTION |
|  | PROPOSED ALIGNMENT CLOSE TO, OR IN CONTACT WITH, EXISTING STRUCTURE |
|  | PROPOSED ALIGNMENT IN AREA OF FLOODING |

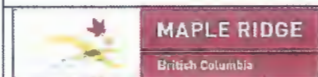
PROFILE LEGEND

- | | |
|---|-----------------------------|
|  | AGRICULTURAL |
|  | SUBURBAN RESIDENTIAL |
|  | ESTATE SUBURBAN RESIDENTIAL |
|  | URBAN RESIDENTIAL |
|  | SCHOOLS/INSTITUTIONAL |
|  | PARKS WITHIN THE AREA |
|  | COMMERCIAL |
|  | CONSERVATION |

[illegible]

NOTE: PROPERTY DESIGNATION TAKEN FROM MAPLE RIDGE OFFICIAL COMMUNITY PLAN BYLAW No. 6425-2004: SCHEDULE D: PROPOSED COUNTRYSIDE LAND USE PLAN

PROFILE SCALE: H 1:10000; V 1/4"=100'

[illegible][illegible]

THE DISTRICT OF MAPLE RIDGE

ABERNETHY WAY EXTENSION

ALIGNMENT OPTION 6

NET 46

06

[illegible]

TV-1071-TVA06










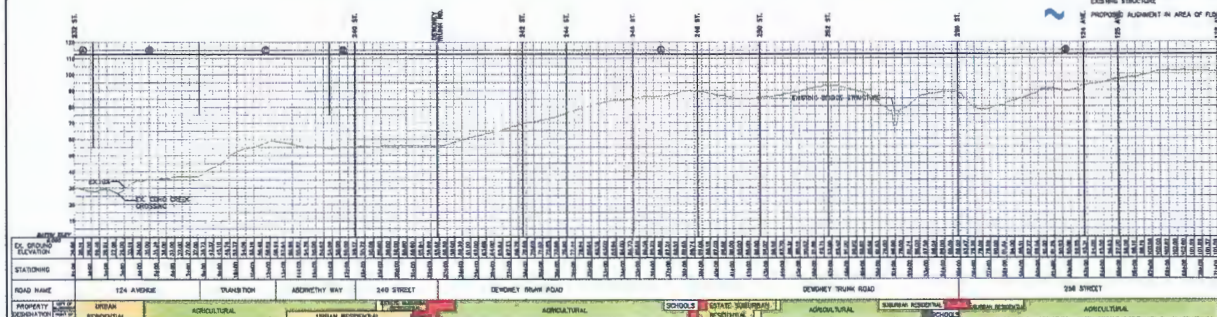
DRAFT
FOR DISCUSSION ONLY

NOTES:

- [illegible]

PLAN LEGEND

- | | |
|---|--|
|  | EXISTING BRIDGE/CREEK CROSSING |
|  | PROPOSED BRIDGE/CREEK CROSSING-CULVERT CROSSING |
|  | PROPOSED BRIDGE/CREEK CROSSING-BRIDGE STRUCTURE |
|  | PROPOSED STOP SIGN INTERSECTION |
|  | PROPOSED TRAFFIC SIGNALIZED INTERSECTION |
|  | PROPOSED ALIGNMENT CLOSE TO, OR IN CONFLICT WITH, EXISTING STRUCTURE |
|  | PROPOSED ALIGNMENT IN AREA OF FLOODING |



PROFILE LEGEND

-  AGRICULTURAL
  ESTATE SUBURBAN RESIDENTIAL
  SCHOOLS/INSTITUTIONAL
  COMMERCIAL
 SUBURBAN RESIDENTIAL
 URBAN RESIDENTIAL
 PARKS WITH THE AIR
 CONSERVATION



THE DISTRICT OF MAPLE RIDGE

ABERNETHY WAY EXTENSION

ALIGNMENT OPTION

07

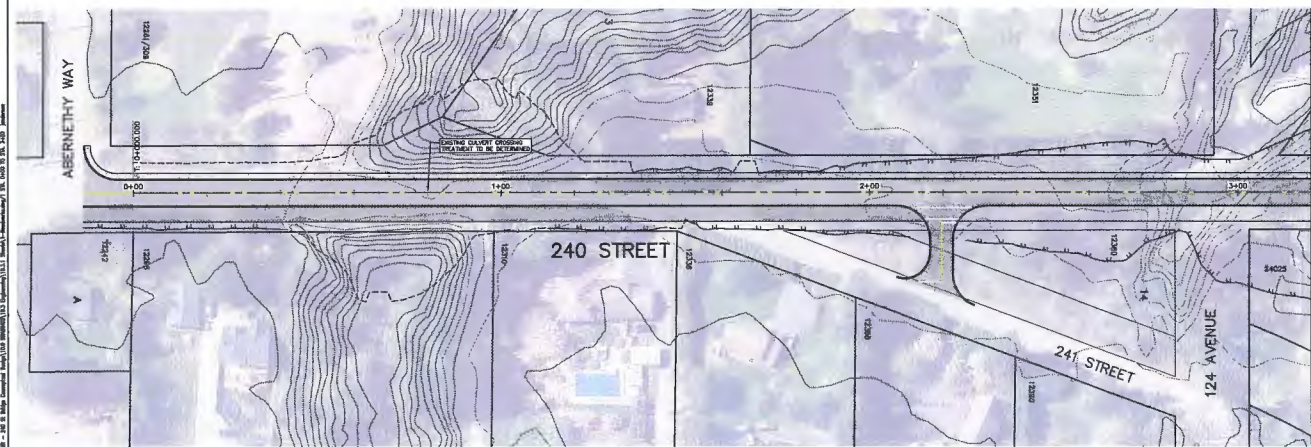
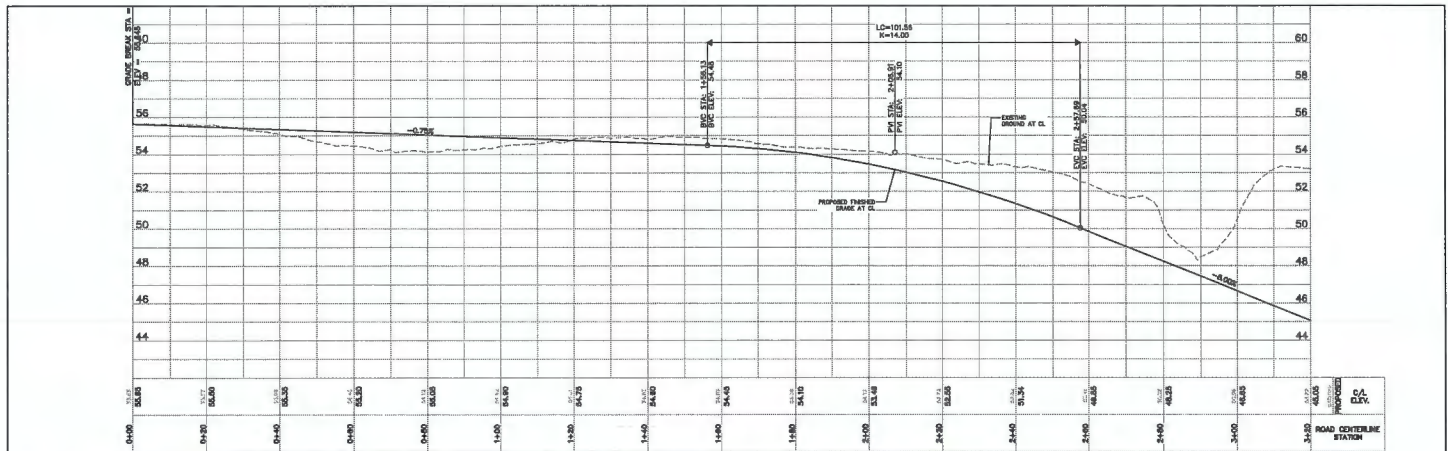
185

TV-1071-TVA07

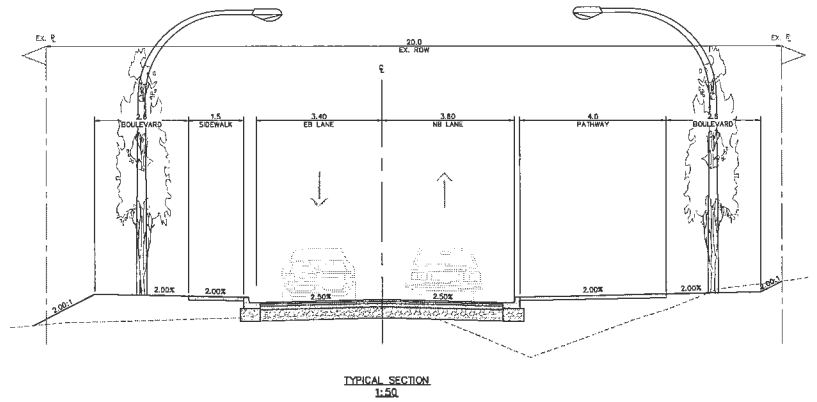
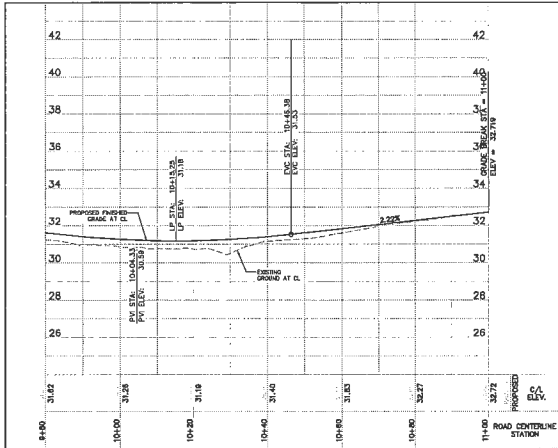


APPENDIX B

240 STREET EXTENSION FEASIBILITY

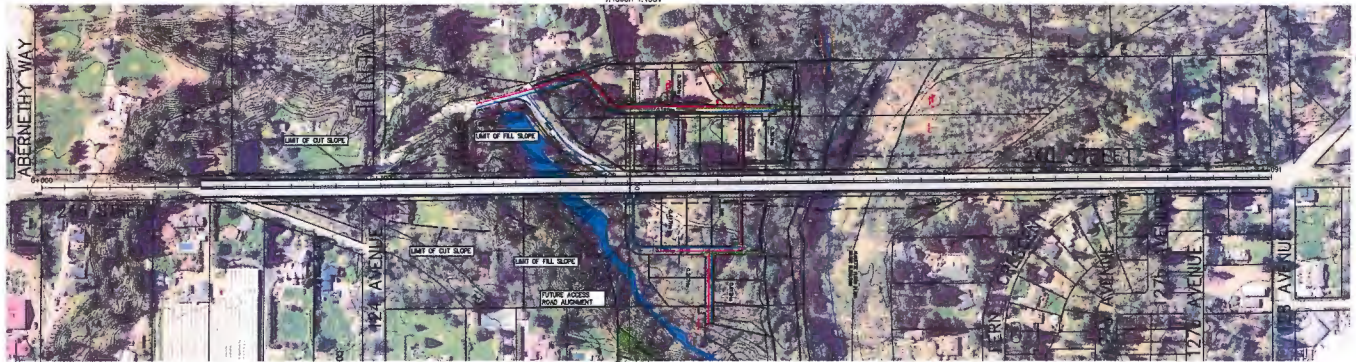
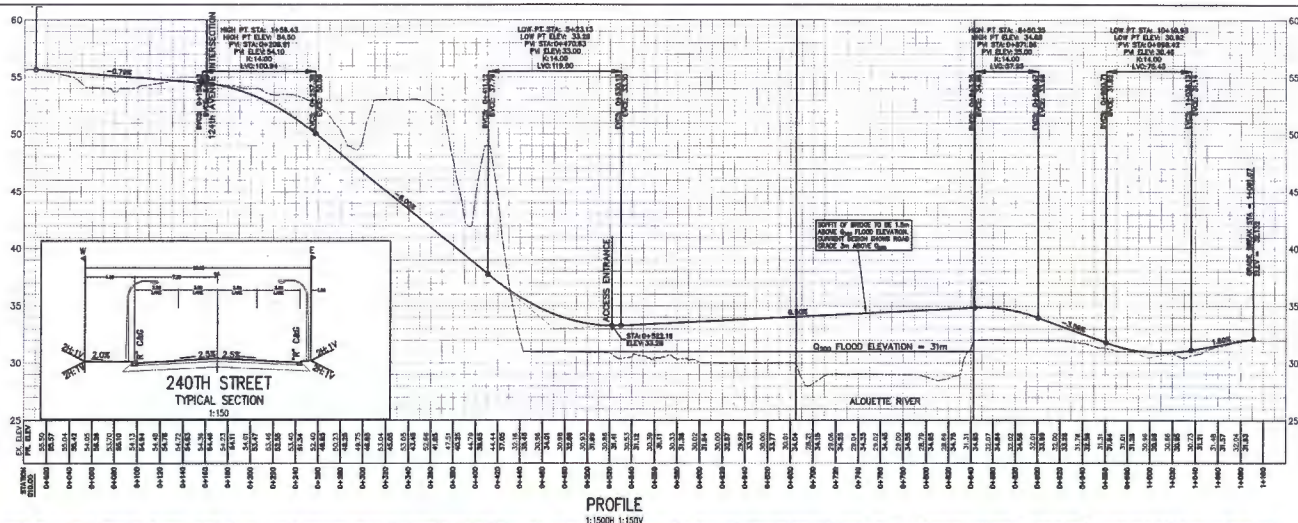


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<p>PA 18/11/22 ISSUED FOR CONCEPT REVIEW</p> <p>DATE: 18/11/22</p>	<p>REVISION</p>	<p>REVISION</p> <p>1. 18/11/22 ISSUED FOR CONCEPT REVIEW</p>	<p>DESIGNED: JA</p> <p>CHECKED: SW</p> <p>APPROVED: SW</p> <p>FIELD BOOK: --</p> <p>SCALES: HORIZ. 1:500</p> <p>VERT. 1:100</p>	<p>CITY OF MAPLE RIDGE ENGINEERING DEPARTMENT</p> <p>PLAN AND PROFILE STA. 9+80 TO STA. 11+00</p> <p>DATE: SEPTEMBER 2018</p> <p>SHEET: 4 OF 4</p> <p>DWG. NO.</p>
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Benchmark Notes: Elevations Are Double Referenced to Benchmark: 14.00m Located At: 332nd St and 332nd Ave		D.K. BOWING & ASSOCIATES INC. 800 EAST STREET, WILLOW, B.C. V6V 1A6 604-626-0400, 604-626-0401		DESIGN: AD DESIGNED: DWS CHECKED: DWS APPROVED: DWS SCALE: HORIZ. 1:500 VERT. 1:50		CITY OF MAPLE RIDGE ENGINEERING DEPARTMENT 240TH STREET OPTION 1B Date: MAY 2018 Sheet: 2 OF 5 Dwg. No.: 00	
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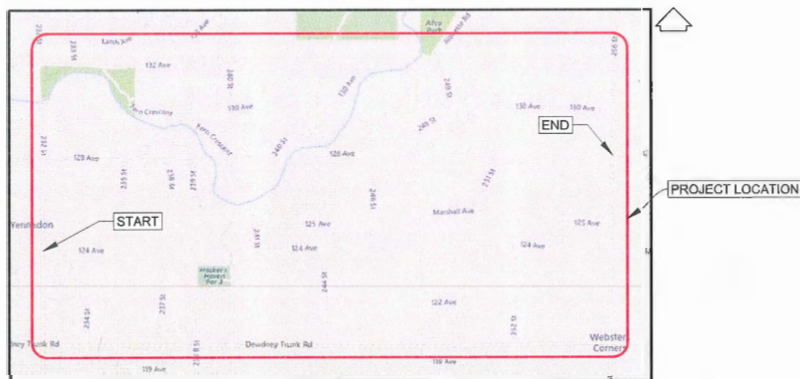


APPENDIX C

DRAWINGS

 **McElhanney**

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ABERNETHY WAY EXTENSION STUDY
232 STREET TO 256 STREET

SHEET LIST TABLE		
SHEET NUMBER	SHEET TITLE	SHEET DESCRIPTION
0	COVER	DRAWING INDEX AND LOCATION MAP
1	KEY PLAN	ABERNETHY WAY
2	KEY PLAN	OPTION 1
3	KEY PLAN	OPTION 2
4	KEY PLAN	OPTION 3A
5	KEY PLAN	OPTION 2B
6	KEY PLAN	OPTION 4
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8	KEY PLAN	OPTION 6
9	KEY PLAN	OPTION 7
10	KEY PLAN	OPTION 8
11	KEY PLAN	OPTION 9

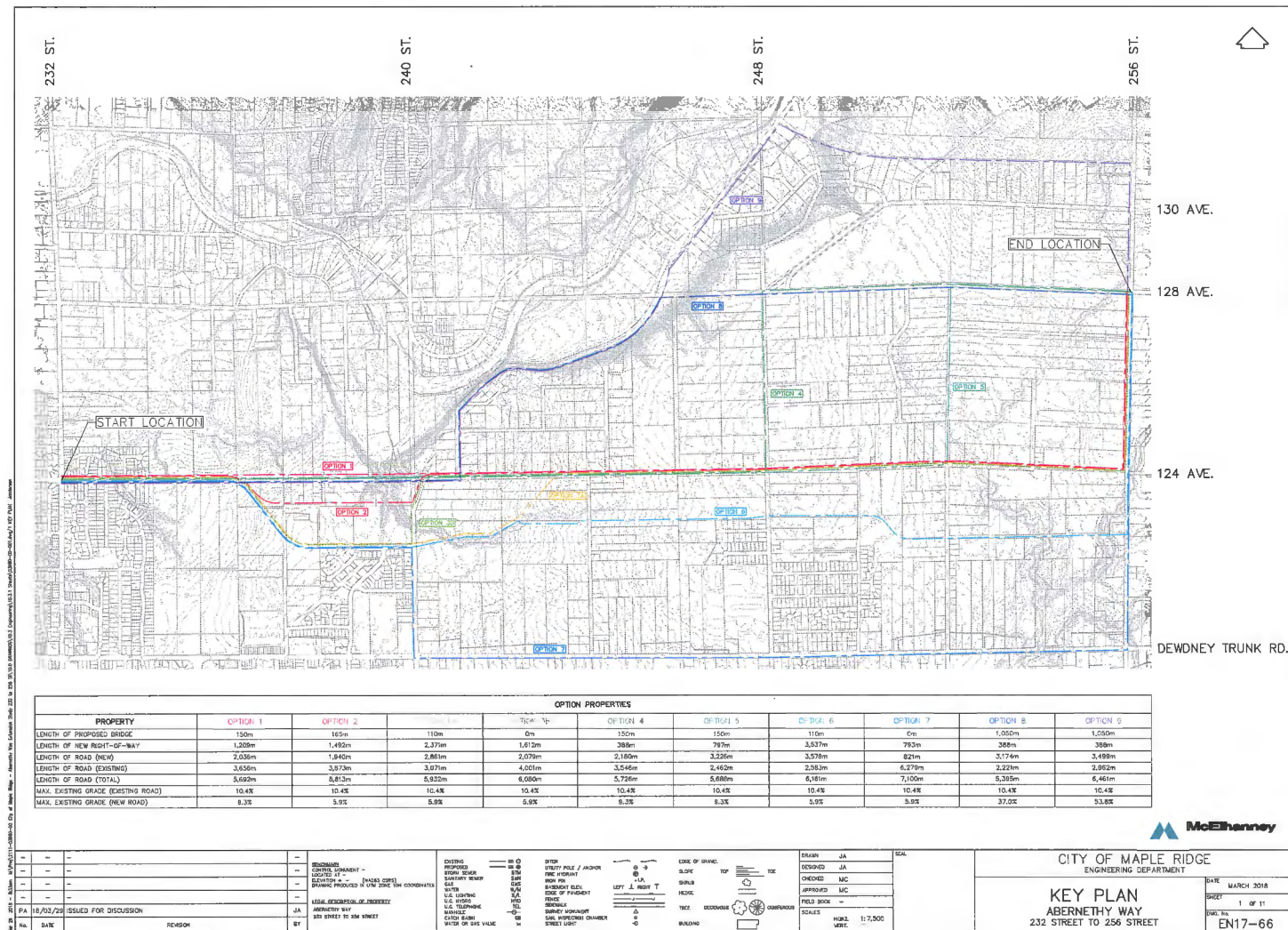
ISSUED FOR DISCUSSION
2018-03-29

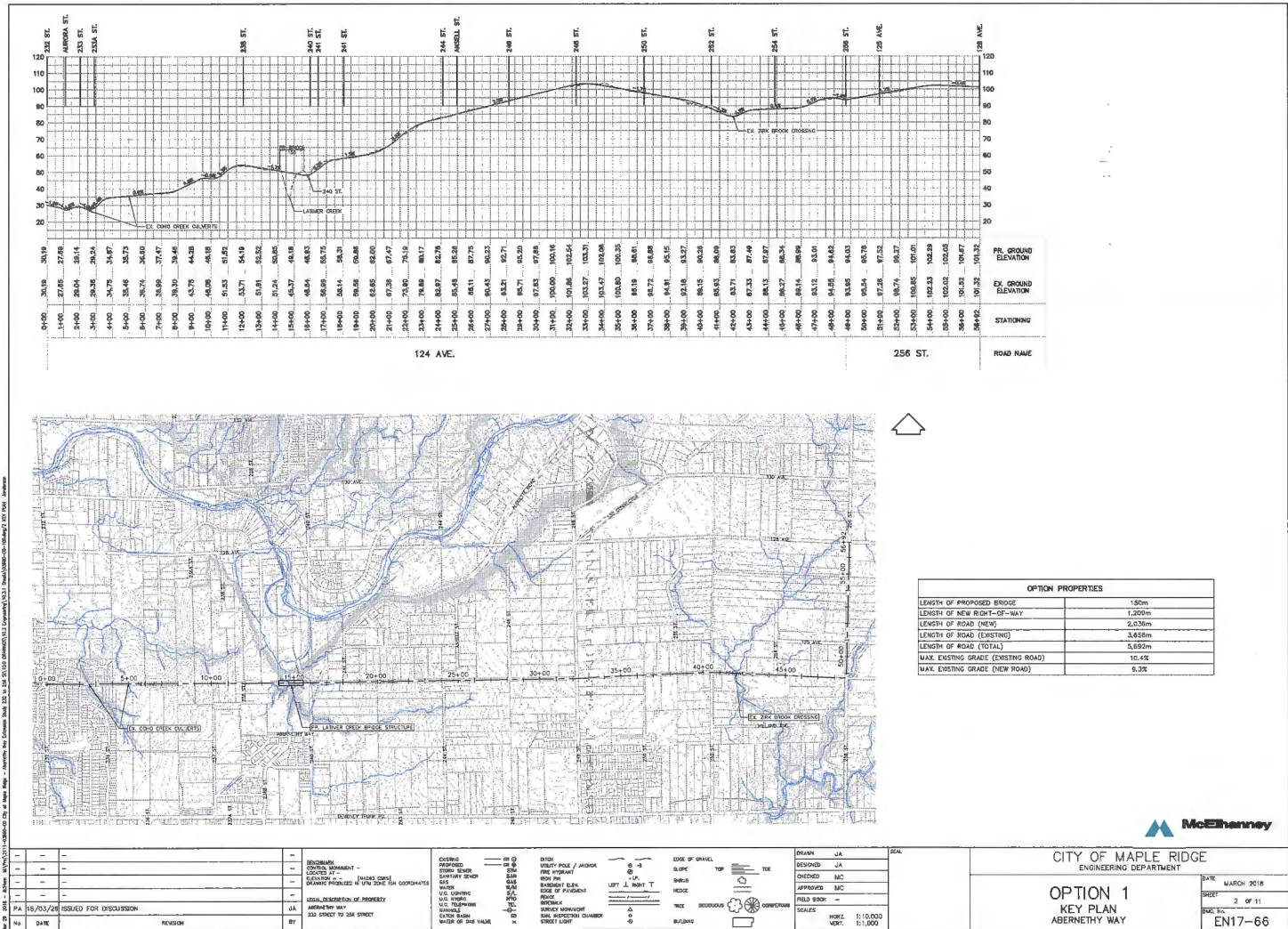


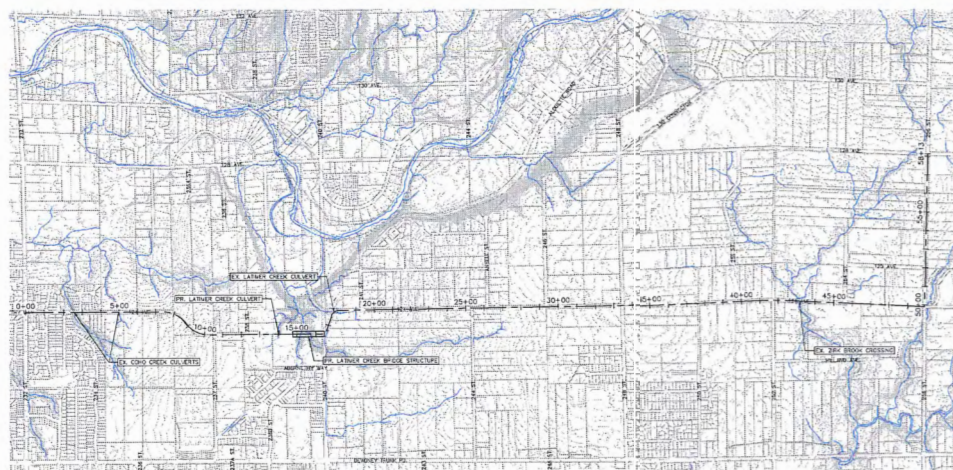
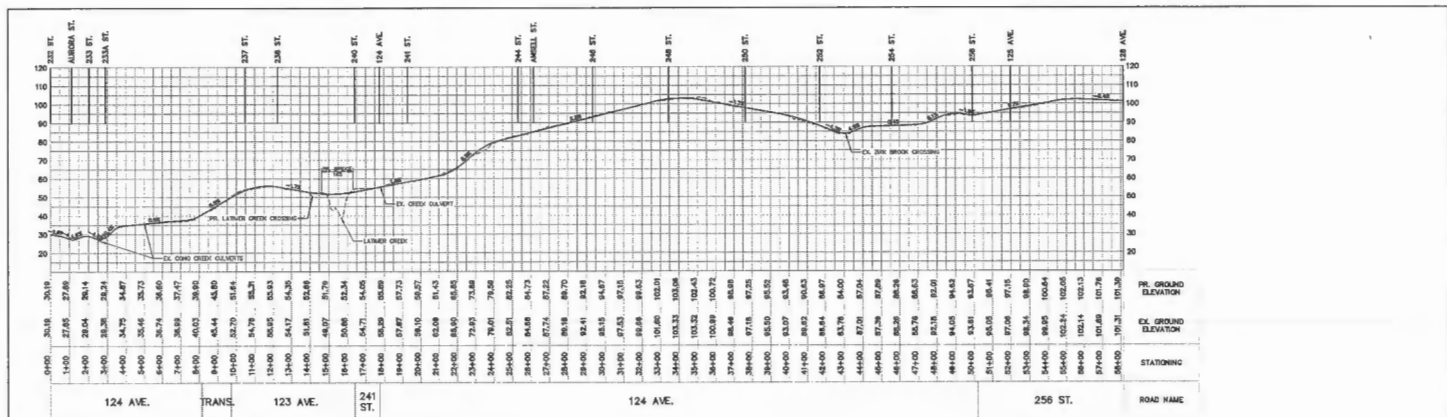
McElhanney

Suite 2300 Central City Tower
13450-102 Ave., Surrey, B.C. V3T 5X3 Tel. 604-596-0391

DATE: 18/03/2018	BY: [Signature]	FOR: [Signature]	DESIGN: JA CHECKED: JA APPROVED: MC SCALE: 1:1 TITLE: COVER DRAWING INDEX AND LOCATION MAP	CITY OF MAPLE RIDGE ENGINEERING DEPARTMENT DATE: MARCH 2018 SHEET: 0 OF 11 EN17-66
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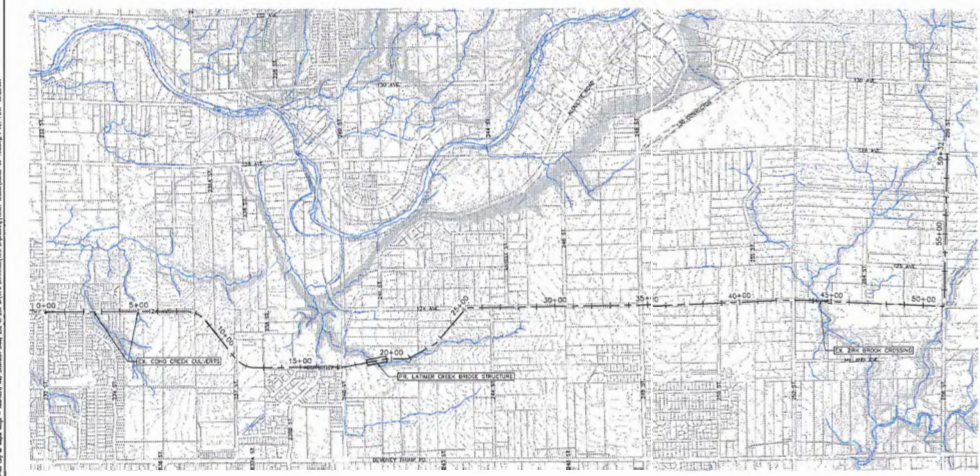
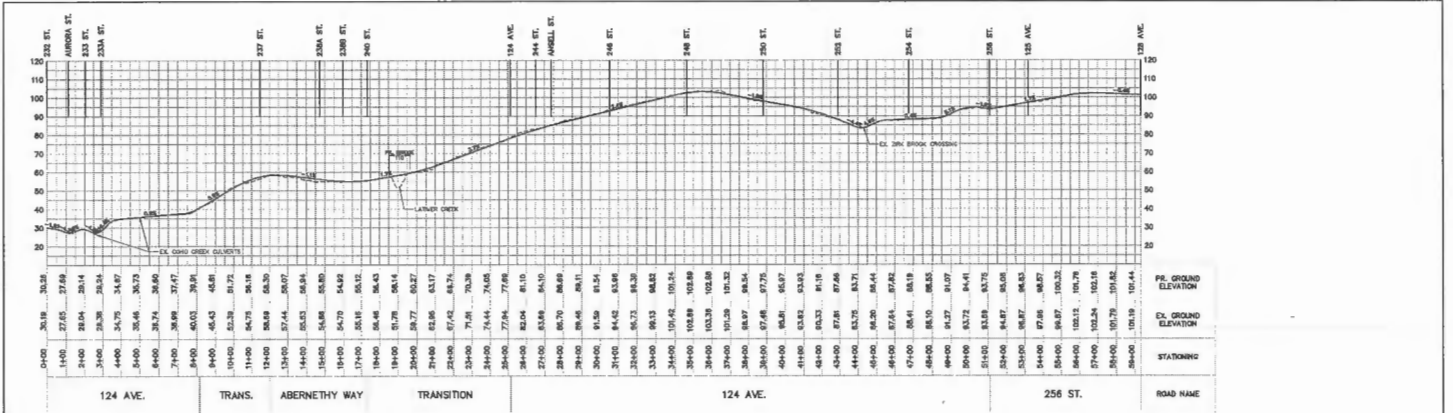






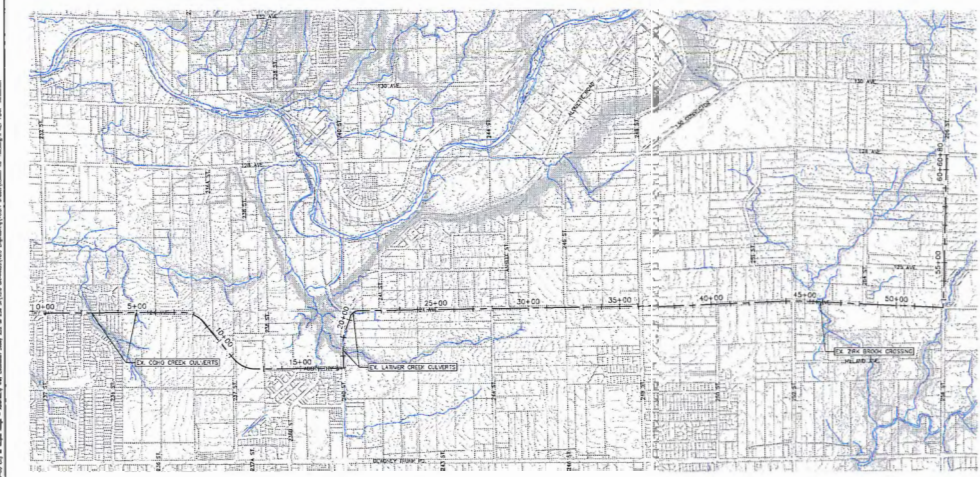
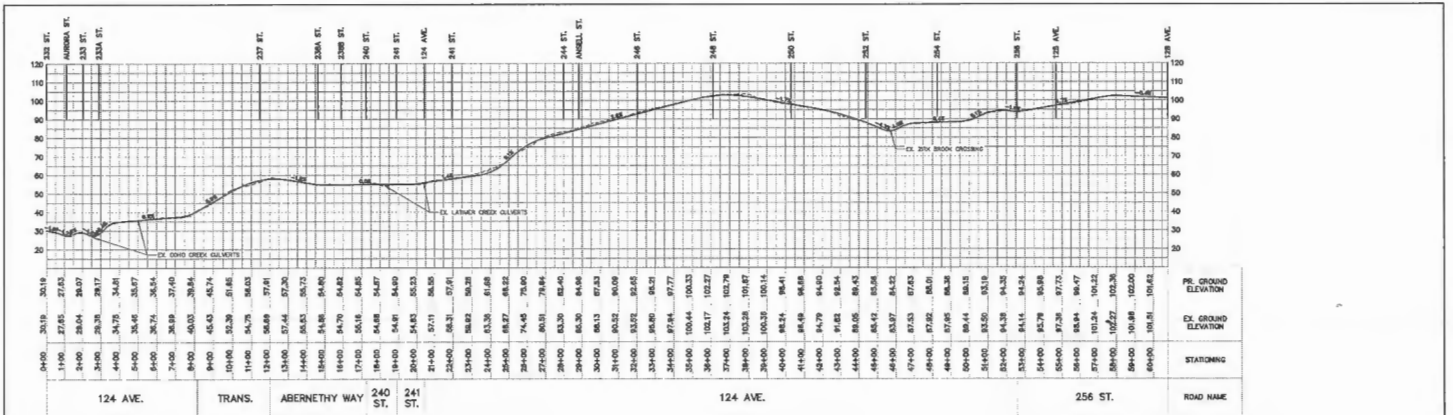
OPTION PROPERTIES	
LENGTH OF PROPOSED BRIDGE	160m
LENGTH OF NEW RIGHT-OF-WAY	1,492m
LENGTH OF ROAD (NEW)	1,910m
LENGTH OF ROAD (EXISTING)	3,870m
LENGTH OF ROAD (TOTAL)	5,813m
MAX. EXISTING GRADE (EXISTING ROAD)	10.4%
MAX. EXISTING GRADE (NEW ROAD)	5.8%

DRAWN: JA DESIGNED: JA CHECKED: MC APPROVED: MC FIELD BOOK: - SCALES: HORIZ. 1"=10,000 VERT. 1"=1,000		CITY OF MAPLE RIDGE ENGINEERING DEPARTMENT OPTION 2 KEY PLAN ABERNETHY WAY		DATE: MARCH 2018 SHEET: 3 OF 11 DRAWING NO.: EN17-66
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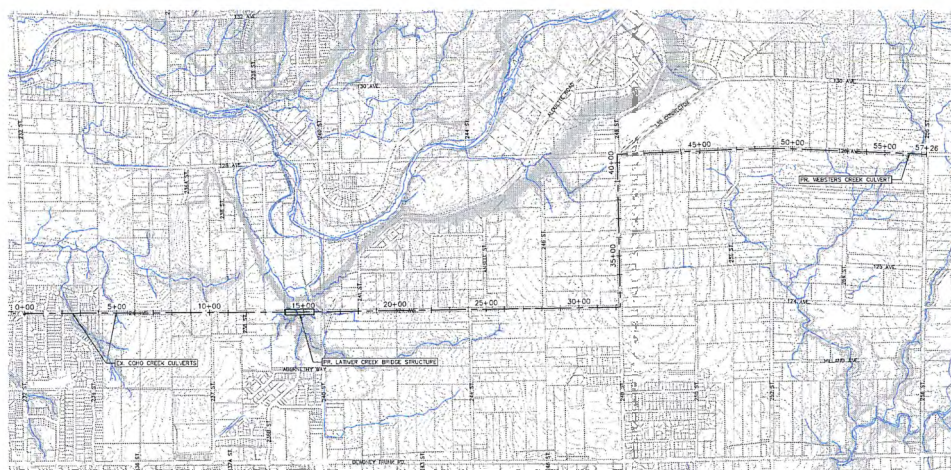
OPTION PROPERTIES	
LENGTH OF PROPOSED BRIDGE	110m
LENGTH OF NEW RIGHT-OF-WAY	3.37m
LENGTH OF ROAD (NEW)	2.86m
LENGTH OF ROAD (EXISTING)	3.07m
LENGTH OF ROAD (TOTAL)	5.93m
MAX. EXISTING GRADE (EXISTING ROAD)	10.4%
MAX. EXISTING GRADE (NEW ROAD)	5.9%

DRAWN: JA DESIGNED: JA CHECKED: MC APPROVED: MC REVISION: 1 SCALE: 1:10,000 DATE: MARCH 2016		CITY OF MAPLE RIDGE ENGINEERING DEPARTMENT OPTION 3A KEY PLAN ABERNETHY WAY		SHEET: 4 OF 11 PLAN NO.: EN17-66
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OPTION PROPERTIES	
LENGTH OF PROPOSED BRIDGE	0m
LENGTH OF NEW RIGHT-OF-WAY	1,613m
LENGTH OF ROAD (NEW)	2,079m
LENGTH OF ROAD (EXISTING)	4,000m
LENGTH OF ROAD (TOTAL)	6,079m
MAX. EXISTING GRADE (EXISTING ROAD)	10.4%
MAX. EXISTING GRADE (NEW ROAD)	5.9%

DESIGN JA CHECKED MC APPROVED MC FIELD BOOK SCALES: HORIZ. 1:10,000 VERT. 1:1,000		CITY OF MAPLE RIDGE ENGINEERING DEPARTMENT OPTION 3B KEY PLAN ABERNETHY WAY		DATE: MARCH 2016 SHEET: 5 OF 11 DRAWN BY: EN17-66
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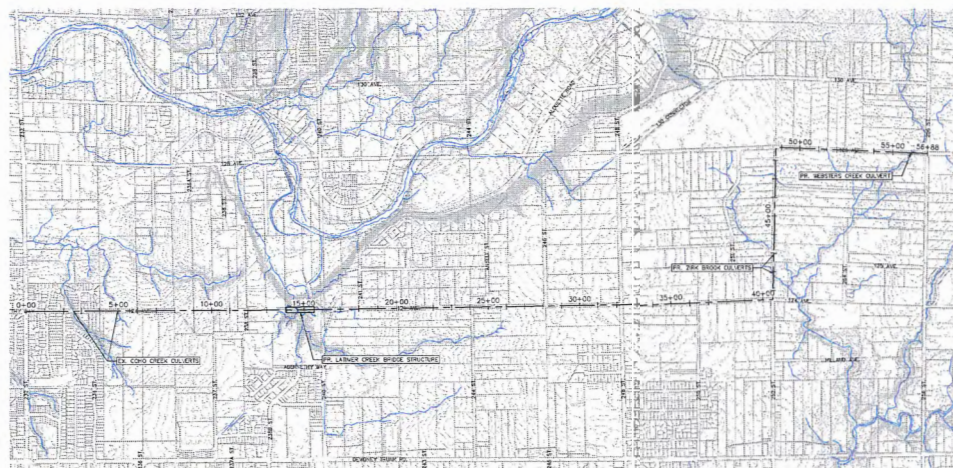
OPTION PROPERTIES	
LENGTH OF PROPOSED BRIDGE	150m
LENGTH OF NEW RIGHT-OF-WAY	398m
LENGTH OF ROAD (NEW)	2,180m
LENGTH OF ROAD (EXISTING)	3,546m
LENGTH OF ROAD (TOTAL)	5,726m
MAX. EXISTING GRADE (EXISTING ROAD)	10.4%
MAX. EXISTING GRADE (NEW ROAD)	4.3%

CITY OF MAPLE RIDGE
ENGINEERING DEPARTMENT

OPTION 4
KEY PLAN
ABERNETHY WAY

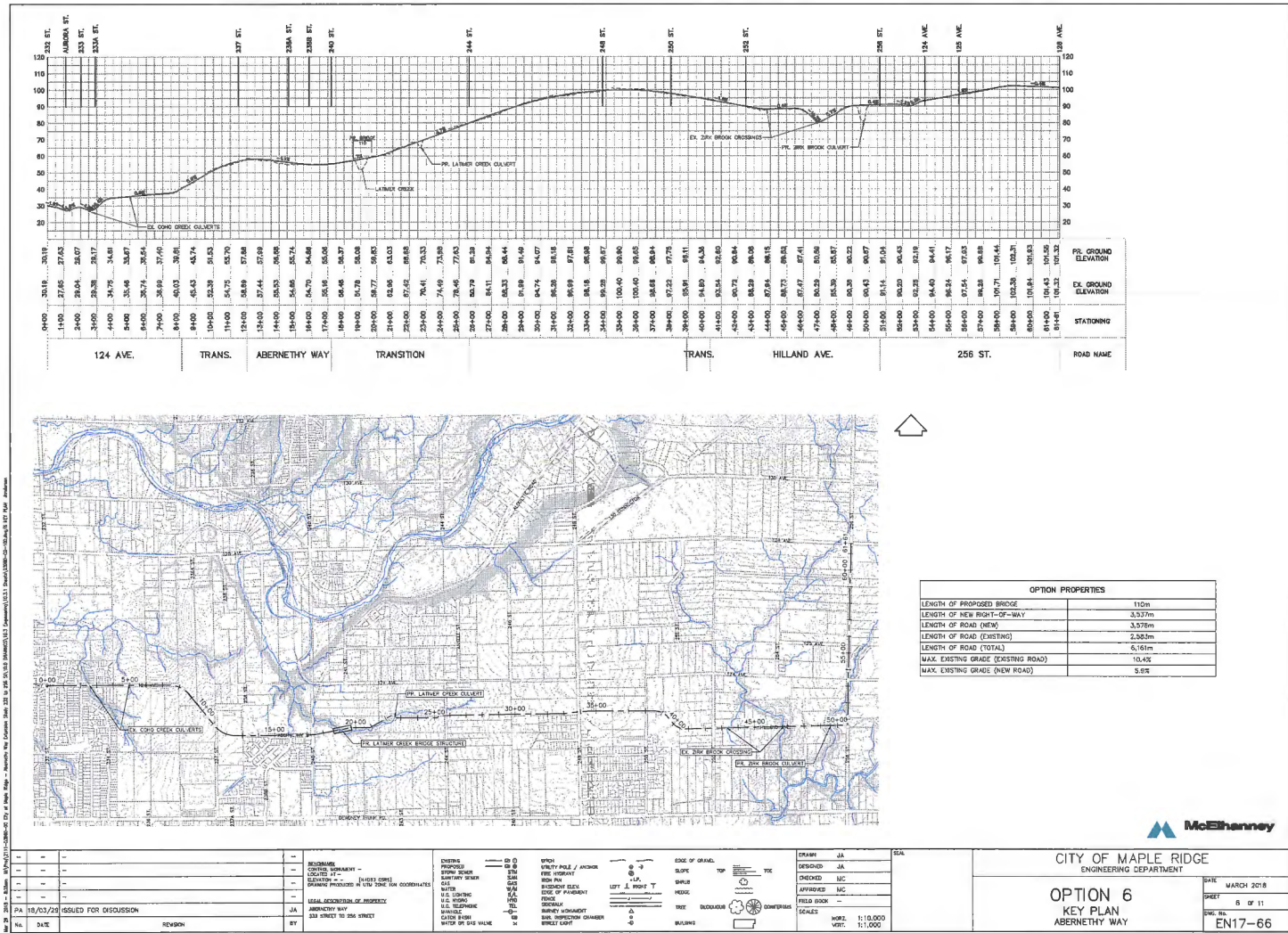
DATE	MARCH 2018
SHEET	5 of 11
DWG. No.	EN17-66

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OPTION PROPERTIES	
LENGTH OF PROPOSED BRIDGE	150m
LENGTH OF NEW RIGHT-OF-WAY	797m
LENGTH OF ROAD (NEW)	3,226m
LENGTH OF ROAD (EXISTING)	2,462m
LENGTH OF ROAD (TOTAL)	5,688m
MAX. EXISTING GRADE (EXISTING ROAD)	10.4%
MAX. EXISTING GRADE (NEW ROAD)	9.3%

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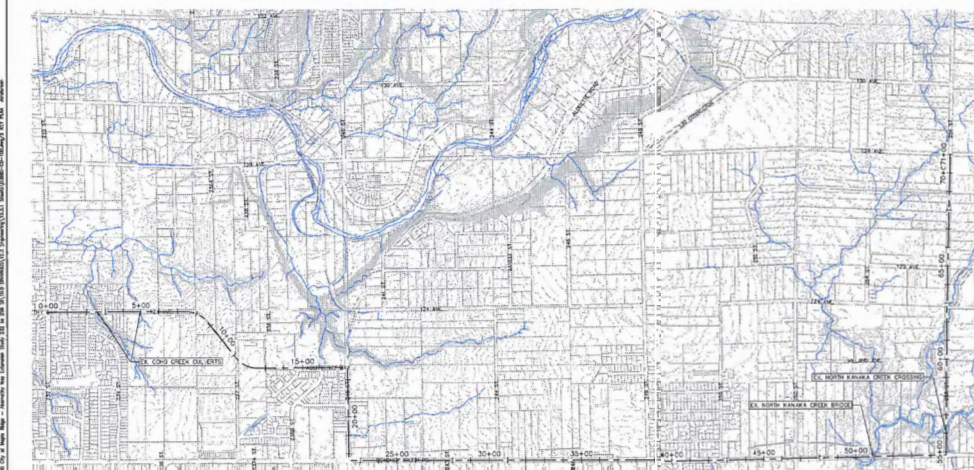


OPTION PROPERTIES	
LENGTH OF PROPOSED BRIDGE	110m
LENGTH OF NEW RIGHT-OF-WAY	3.337m
LENGTH OF ROAD (NEW)	3.576m
LENGTH OF ROAD (EXISTING)	2.523m
LENGTH OF ROAD (TOTAL)	6.101m
MAX. EXISTING GRADE (EXISTING ROAD)	10.4%
MAX. EXISTING GRADE (NEW ROAD)	9.8%



CITY OF MAPLE RIDGE ENGINEERING DEPARTMENT		DATE: MARCH 2018
OPTION 6 KEY PLAN ABERNETHY WAY		SHEET: 8 OF 11
		EN17-66

PA 18/03/28 DATE	ISSUED FOR DISCUSSION	BY	REVISION
STATIONING: 1+00 TO 5+00			
PROJECT: ABERNETHY WAY			
SHEET: 8 OF 11			
SCALE: 1:10,000			
V.P.C. 1:10,000			

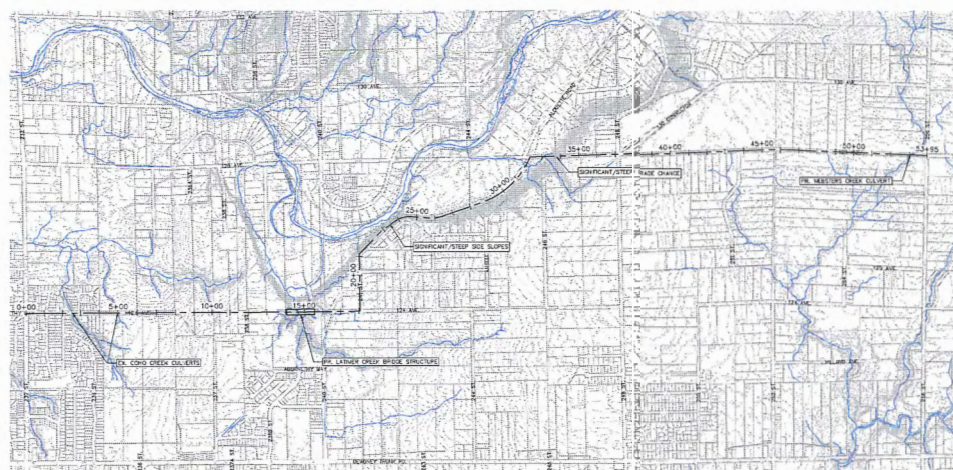
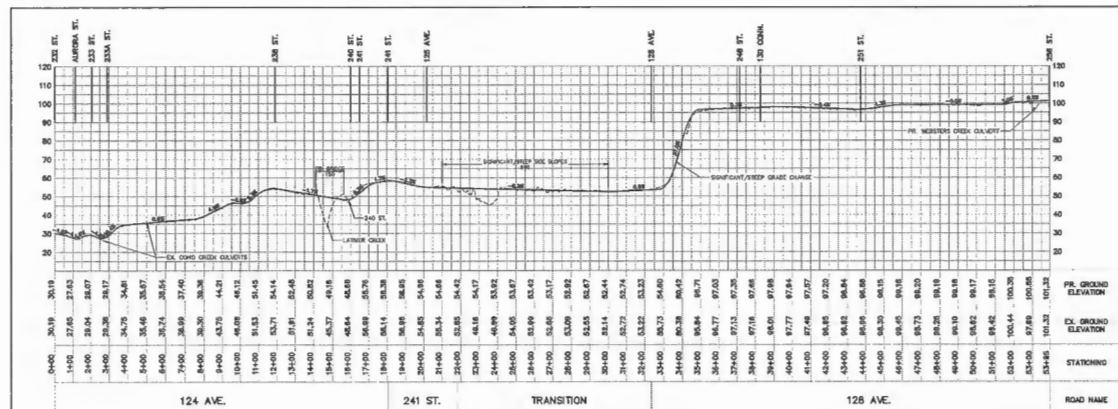


OPTION PROPERTIES	
LENGTH OF PROPOSED BRIDGE	0m
LENGTH OF NEW RIGHT-OF-WAY	793m
LENGTH OF ROAD (NEW)	821m
LENGTH OF ROAD (EXISTING)	6,279m
LENGTH OF ROAD (TOTAL)	7,100m
MAX. EXISTING GRADE (EXISTING ROAD)	10.4%
MAX. EXISTING GRADE (NEW ROAD)	5.5%

CITY OF MAPLE RIDGE
ENGINEERING DEPARTMENT

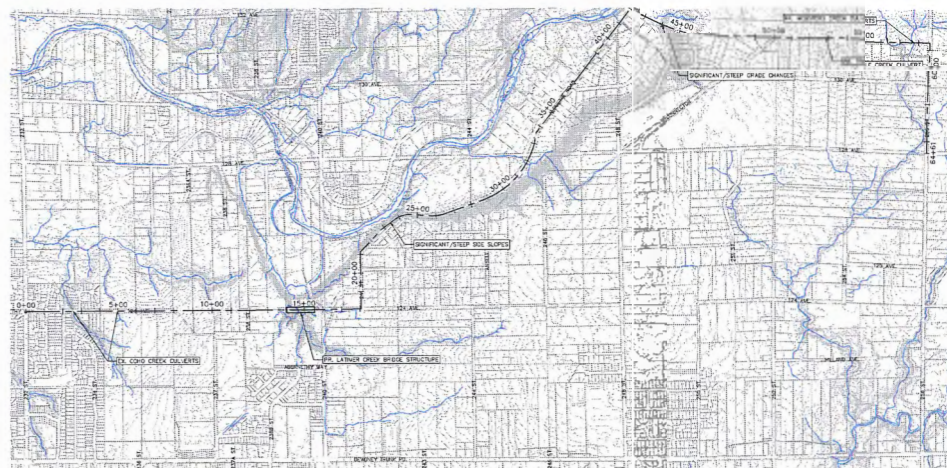
OPTION 7
KEY PLAN
ABERNETHY WAY

DATE	MARCH 2018
SHEET	8 OF 11
DWG. No.	EN17-66



OPTION PROPERTIES	
LENGTH OF PROPOSED BRIDGE	105m
LENGTH OF NEW RIGHT-OF-WAY	36m
LENGTH OF ROAD (NEW)	3.77m
LENGTH OF ROAD (EXISTING)	2.27m
LENGTH OF ROAD (TOTAL)	5.39m
MAX. EXISTING GRADE (EXISTING ROAD)	10.4%
MAX. EXISTING GRADE (NEW ROAD)	37.6%

DESIGN: JA CHECKED: MC APPROVED: MC FIELD BOOK:		SCALE: 1:10,000 DATE: 11-1-2000	
CITY OF MAPLE RIDGE ENGINEERING DEPARTMENT		DATE: MARCH 2018 SHEET: 10 OF 11 DRAWING: EN17-66	



OPTION PROPERTIES	
LENGTH OF PROPOSED BRIDGE	1,050m
LENGTH OF NEW RIGHT-OF-WAY	380m
LENGTH OF ROAD (NEW)	3,495m
LENGTH OF ROAD (EXISTING)	2,892m
LENGTH OF ROAD (TOTAL)	6,411m
MAX. EXISTING GRADE (EXISTING ROAD)	10.4%
MAX. EXISTING GRADE (NEW ROAD)	53.8%

[illegible]



APPENDIX D

ARCHAEOLOGICAL OVERVIEW ASSESSMENT

**AN ARCHAEOLOGICAL OVERVIEW ASSESSMENT
(AOA) CONDUCTED FOR PROPOSED POTENTIAL
R-O-W ROUTE OPTIONS RELATED TO EASTWARD
EXTENSION OF ABERNETHY WAY FROM 232nd
STREET TO 256th STREET IN MAPLE RIDGE, B.C.;**

A NON-PERMIT AOA REPORT



Mike K. Rousseau (MA; RPCA)

and

Geoffrey Homel (BA)



Antiquus Archaeological Consultants Ltd.
Maple Ridge, B.C.

October 20, 2018

**AN ARCHAEOLOGICAL OVERVIEW ASSESSMENT
(AOA) CONDUCTED FOR PROPOSED POTENTIAL
R-O-W ROUTE OPTIONS RELATED TO EASTWARD
EXTENSION OF ABERNETHY WAY FROM 232nd
STREET TO 256th STREET IN MAPLE RIDGE, B.C.;**

A NON-PERMIT REPORT

Prepared for:

Ms. Selena Wilson
Division Manager, Infrastructure
McElhanney Consulting Services Ltd.
Suite 2300 Central City Tower,
13450 – 102 Avenue,
Surrey, B.C., V3T 5X3

Prepared by:

Mike K. Rousseau (MA; RPCA)
and
Geoffrey Homel (BA)



Antiquus Archaeological Consultants Ltd.,
23021 - 132 Avenue, Maple Ridge, B.C. V4R 0A8; Email: antiquus@shaw.ca

October 20, 2018

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Executed this 20th day of October, 2018, by Mike K. Rousseau

Signature of Copyright Owner



Affiliation: Antiquus Archaeological Consultants Ltd.

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AOA Project Field Director

Mike K. Rousseau

Antiquus Field Technicians

Kirsten Boettger, Lauren Hearty, and Geoffrey Homel (Archaeologists, Antiquus)

First Nation Field Technician Representatives

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Kirsten Boettger, Lauren Hearty, Geoffrey Homel, and Mike K. Rousseau

Report Authors

Mike K. Rousseau
and
Geoffrey Homel

Report Production and Distribution

Mike K. Rousseau

ACKNOWLEDGEMENTS

We would first like to thank McElhanney Consulting Services Ltd. for partnering and retaining Antiquus to conduct this AOA study. Special thanks go to Ms. Selena Wilson (Division Manager of Infrastructure) who oversaw this study on behalf of McElhanney, provided us with information and maps related to the proposed ROW routes, and reviewed a draft of this AOA report prior to finalizing. Thanks also go to James Anderson of McElhanney for his involvement, and for his map consultation services prior to our field inspection.

We would also like to thank Ms. Cara Brendzy of the Stó:lō Nation, and Ms. Ashley Doyle from the Kwantlen First Nation for granted us permits relating to this AOA study. Ms. Chantelle Wegwitz of Kwantlen First Nation, and Ms. Denise Heron of Katzie First Nation are thanked for arranging for their field technician representatives to assist us during fieldwork. We are also grateful to Mr. Curtis Chapman from Katzie First Nation and Mr. Jonathan Brignall from Kwantlen First Nation for their involvement and help during the in-field visual inspection.

We also thank Ms. Shea Henry of the Maple Ridge Museum and Community Archives for providing us with a map of early Euro-Canadian settler land holdings in Maple Ridge, for conducting a brief historic background information search of their archives on our behalf, and for answering our question about why the Alouette Rivers were mistakenly known as the “Lillooet” Rivers prior to 1910.

Antiquus archaeologist Mike Rousseau directed the AOA fieldwork, and Antiquus staff archaeologists Ms. Kirsten Boettger (MA), Ms. Lauren Hearty (BA), and Mr. Geoffrey Homel (BA) assisted in the fieldwork and took the photos that appear in this report. This AOA report text and maps were prepared by Mike Rousseau and Geoffrey Homel.

SYNOPSIS

On September 1st, 2018, Antiquus Archaeological Consultants Ltd. conducted an in-field preliminary field reconnaissance (PFR) visual inspection of the majority of the proposed ROW routes relating to the eastward extension of Abernethy Way from 232nd Street to 256th Street in Maple Ridge. Several sections of route options are being considered, and the length of the proposed new road ROW is about 5.5 km. This inspection was conducted on behalf of McElhanney Consulting Services Ltd. for the City of Maple Ridge.

The primary objectives of this AOA study were: (1) to consult the BC Archaeology Branch's "Remote Access Archaeological Database" (RAAD) to identify and revisit any previously identified sites, to seek and present general background information for this locality, and provide a summary account of background information on the study area; (2) to identify (locate and map) areas deemed to have medium or high archaeological or heritage site potential within the proposed route option impact zones for future management, and for consideration during selection of the final road ROW routing; (3) to consider the general nature, extent, intensity and duration of proposed future potential land-altering activities relating to the road ROW development project, and assess how they might affect any intact cultural deposits lying within the impact zones; (4) to formulate and present recommendations that will ensure effective management, assessment, protection, and/or mitigation of any significant archaeological deposits within proposed impact zones; and (5) to prepare and submit this AOA report to all stakeholders for future permitting and archaeological resource management purposes.

Our PFR inspection conducted on September 1, 2018, identified 13 specific locations designated as "A" to "M" that are associated with streams and creeks and deemed to have medium or high archaeological site potential for pre-contact period buried "lithic scatters". These 13 locations are described in general terms, their potential impact status with regard to the proposed road construction is assessed and discussed, and future investigation and management recommendations are provided for each site potential location to assist in the eventual formulation and implementation of an effective archaeological site discovery and impact management plan. The remaining intervening sections of proposed road construction impact zone route options are deemed to lie within areas considered to have low archaeological site potential due to the lack of associated aquatic features and topographic landforms conducive to human occupation and use. In our opinion, these low site potential areas do not deserve any additional pre-development archaeological resource management attention.

Comments, suggestions, potential impact status, and recommendations presented for each of the 13 site potential areas discussed in Sections 4.0 and 5.0 of this AOA report should be considered along with comments and recommendations provided. This information will be useful for eventual selection of the final road ROW route, and will ensure proper identification, assessment and management of any buried archaeological deposits that may be threatened with adverse impacts relating to road construction activities.

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AN ARCHAEOLOGICAL OVERVIEW ASSESSMENT (AOA) CONDUCTED FOR PROPOSED POTENTIAL R-O-W ROUTE OPTIONS RELATED TO EASTWARD EXTENSION OF ABERNETHY WAY FROM 232nd STREET TO 256th STREET IN MAPLE RIDGE, B.C.

1.0 INTRODUCTION AND BACKGROUND

On September 1st, 2018, Antiquus Archaeological Consultants Ltd. conducted an in-field preliminary field reconnaissance (PFR) visual inspection as part of an archaeological overview assessment (AOA) for the majority of the proposed ROW routes relating to the eastward extension of Abernethy Way from 232nd Street in the west, to 256th Street in the east, following many E-W trending existing sections of 124th Avenue in the city of Maple Ridge (Figures 1 to 6). While several sections of route options are being considered in the central sections of the ROW, the approximate length of the proposed new road ROW is about 5.5 km. This inspection was conducted by Antiquus on behalf of McElhanney Consulting Services Ltd. who has been contracted by the City of Maple Ridge. Ms. Selena Wilson oversaw this AOA study on behalf of McElhanney. This archaeological overview assessment (AOA) included a background information search, and a PFR visual inspection of the majority of the proposed ROW route options (Figures 3 to 6). The fieldwork component of this AOA was directed by Antiquus senior archaeologist Mike Rousseau, who was assisted by staff members Kirsten Boettger, Lauren Hearty and Geoff Homel. Katzie First Nation community representative Curtis Chapman, and Kwantlen First Nation representative Jonathan Brignall also participated in the field inspection.

The primary objectives of this AOA study were: **(1)** to consult the BC Archaeology Branch's "Remote Access Archaeological Database" (RAAD) to identify and revisit any previously identified sites, to seek and present general background information for this locality, and provide a summary account of background information on the study area; **(2)** to identify (locate and map) areas deemed to have medium or high archaeological or heritage site potential within the proposed route option impact zones for future management, and for consideration during selection of the final road ROW routing; **(3)** to consider the general nature, extent, intensity and duration of proposed future potential land-altering activities relating to the road ROW development project, and assess how they might affect any intact cultural deposits lying within the impact zones; **(4)** to formulate and present recommendations that will ensure effective management, assessment, protection, and/or mitigation of any significant archaeological deposits within proposed impact zones; and **(5)** to prepare and submit this AOA report to all stakeholders for future permitting and archaeological resource management purposes.

1.1 Natural Setting

The proposed Abernethy Way eastward extension proposed ROW option impact zones lie within the Coastal Western Hemlock Biogeoclimatic Zone (Ministry of Forests 1992). Overall, the study area experiences a typical range of mild, wet, mid-latitude, coastal climate and an average annual precipitation of between 100 and 250 cm. Mean daily temperatures range approximately between 6.7 and 17.6 C (Environment Canada 2008). Dominant flora includes western hemlock, Douglas fir, western red cedar, and Sitka spruce. Major fauna include black bear, black tailed deer, bull trout, rainbow trout and various species of salmon.

Natural topography is characterized by relatively flat and occasionally undulating glacial ablation terrain that has been capped with Holocene age aeolian sediments and moderately to deeply incised by numerous stream and creek channels. Noteworthy year-round drainages associated with the AOA inspection study areas include two tributary arms of Coho Creek near the west end of the study area that cross 224th Street (Figures 3 and 8 to 10), prominent Latimer Creek in the central aspect of the study area at 240th Street which is associated with several proposed ROW route options (Figures 4, 5 and 11 to 25), and Zirk Brook near the eastern end of the ROW on 124th Avenue (Figures 5, 6 and 28 to 31). These aquatic features are directly associated with numerous flat habitable landforms that could have been visited and occupied by people in the pre-contact period (prehistoric) past, and several specific areas with medium or greater pre-contact period site potential were observed and identified during the field inspection relating to this AOA study. Undeveloped areas with natural vegetation contain moderate to thick stands of cedar, maple, alder, fir and other deciduous trees and shrubs, and dense understory species (see Figures 3 to 6).



Figure 1. General location of the study area in southwestern B.C. Base Map Source: Atlas of Canada 2002.



Figure 2. Map showing location of proposed Route Options being considered for the Abernethy Way eastern extension from 232nd Street to 256th Street in Maple Ridge, B.C. See also Figures 3 to 6. The majority of these route ROW options were visually inspected to assess archaeological site potential during the PFR fieldwork component of this AOA. Map adapted from McElhanney Consulting Services Ltd. and City of Maple Ridge Key Plan Map Sheet 0-2, March 2018.



Figure 3. Aerial image map showing proposed west end ROW route options and identified areas of medium and high archaeological site potential between 232nd Street and 240th Street in Maple Ridge. Adapted from Google Earth imagery.



Figure 4. Aerial image map showing proposed ROW route options and areas considered to have medium and high archaeological site potential between 240th Street and 244th Street in west-central section of the route option corridor. *Adapted from Google Earth imagery.*

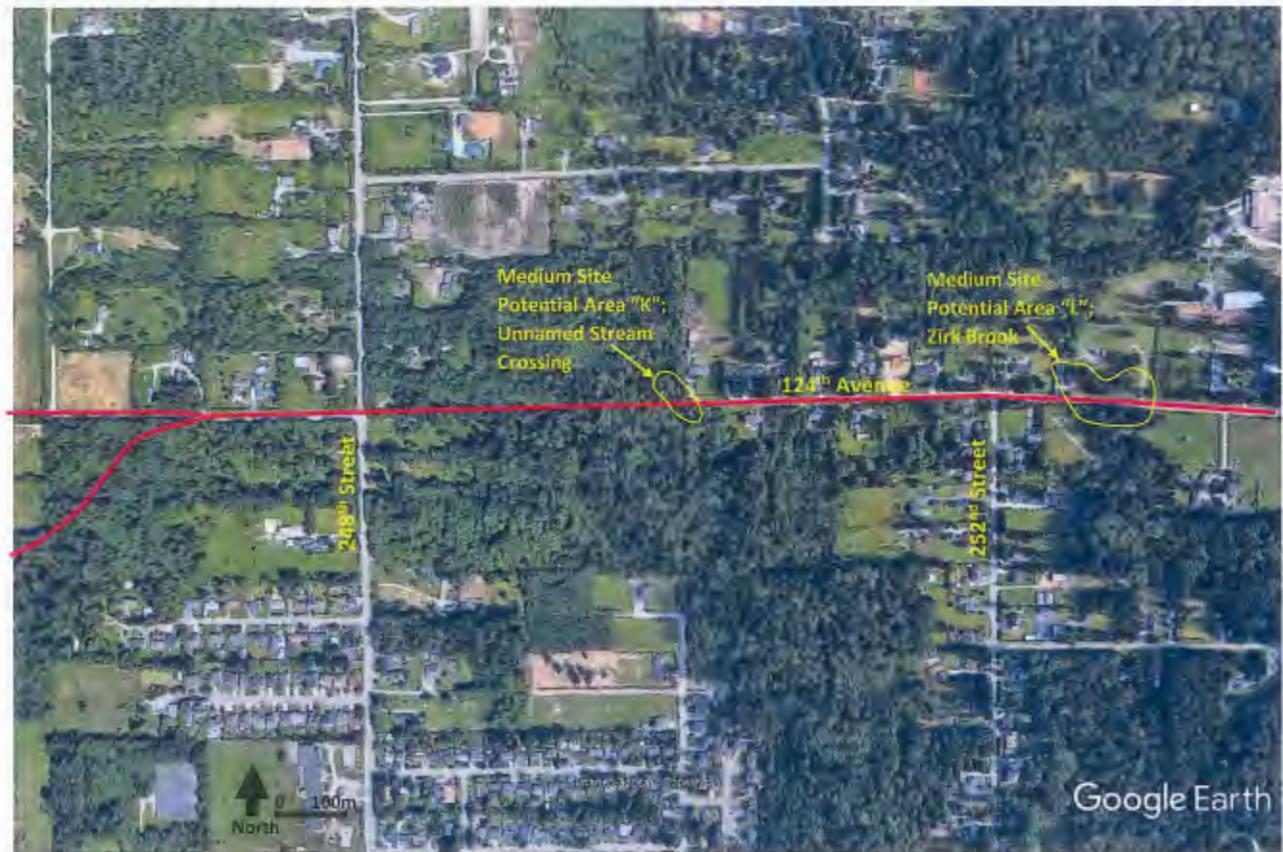


Figure 5. Aerial image map showing the proposed ROW route on 124th Avenue, and areas considered to have medium site potential in the east-central route section. *Adapted from Google Earth imagery.*

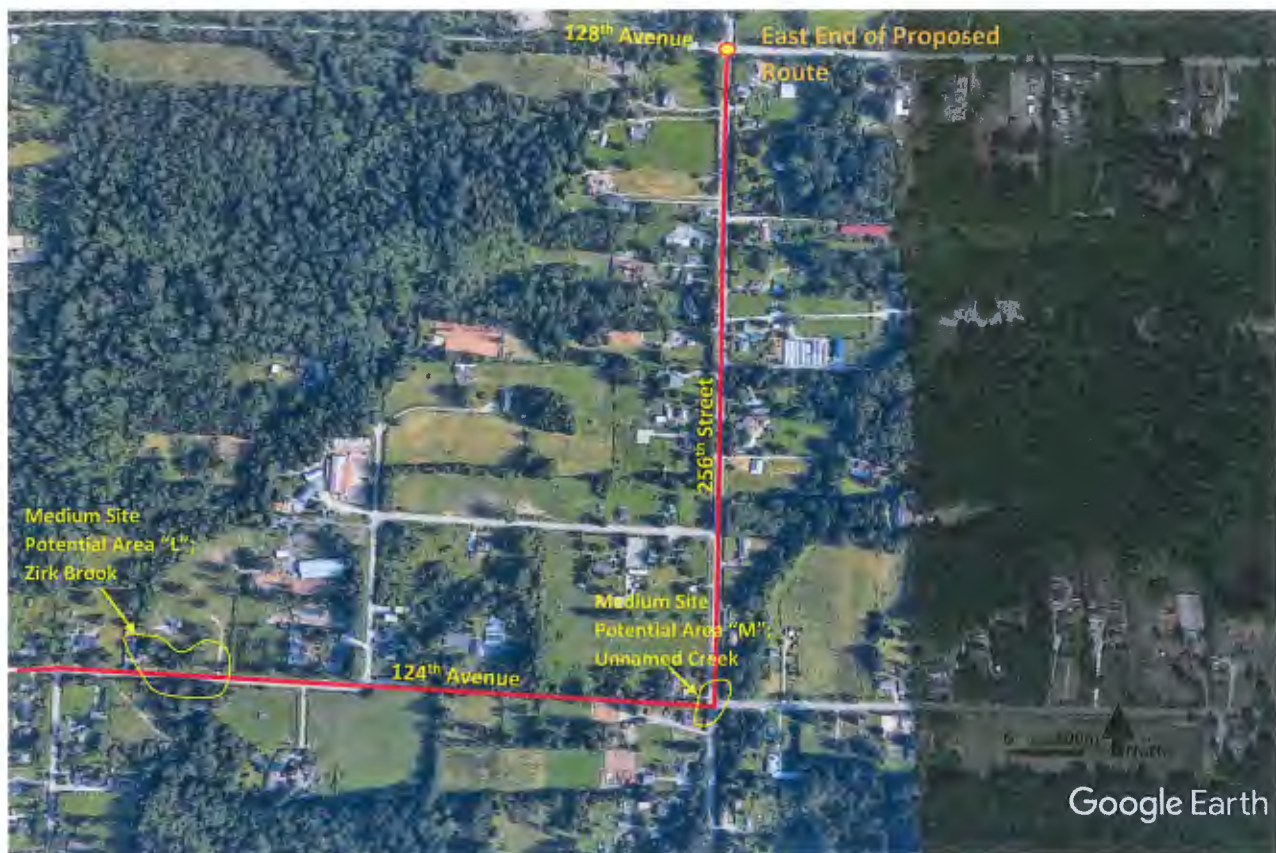


Figure 6. Aerial image map showing identified areas considered to have medium site potential in the east route section on 124th Avenue and 256th Street (Note that site potential area "L" is also shown on Figure 5). *Adapted from Google Earth imagery.*

1.2 Cultural Setting and First Nation Consultation

The proposed Abernethy Way eastward extension ROW route options study area lies within the traditional territories of the Katzie First Nation, Kwantlen First Nation, and Stó:lō Nation, who speak dialects of the Halq'emeylem linguistic family. Heritage inspection permits were obtained from the Kwantlen First Nation (Seyem' Qwantlen Business Group Permit No. SQ 2018-88), and from Stó:lō Nation's Stó:lō Research and Resource Management Centre (Stó:lō Heritage Investigation Permit No. 2018-060). A permit was not required from Katzie First Nation. Ms. Ashley Doyle reviewed and issued the permit on behalf of Kwantlen First Nation, and Ms. Cara Brendzy did the same for Stó:lō Nation. Electronic and hard (paper) copies of this AOA final report have been submitted to the above First Nation agencies for their review, archives, and future management purposes. We will be available to address any questions or concerns these First Nation agencies may have regarding the content of this report, or recommendations presented.

1.3 Previous Archaeological Investigations

The Remote Access Archaeological Database (RAAD) registry maintained by the Archaeology Branch in Victoria indicates ***there are no previously recorded sites lying within 1.5 km of the proposed ROW route option impact zones.*** This does not mean that archaeological sites do not exist or are not expected within or near the study area, it is merely a reflection of the fact that this northeastern part of Maple Ridge has not been subjected to any previous intensive in-field archaeological site inventory surveys.

1.4 Local Early Post-Contact Period Settlement

The earliest non-First Nation people to settle in the Maple Ridge locality in the mid-1950s were of Hawaiian decent, and they were referred to as “Kanakas”. The Hudson Bay Company's Samuel Robertson from Scotland was reportedly the first Euro-Canadian landowner and settler in the area around 1858 (<http://mapleridgemuseum.org/discover-our-stories/our-neighbourhoods/albion/sam-robertson-family/>), and John McIver settled in the area around the same time. In September 1874, a group of local landowners and farmers met at McIver's farm and decided to incorporate as a municipality under the name “Maple Ridge” (www.mapleridge.ca/324/History-Heritage). Figure 7 shows the locations of these early farming properties and names of the persons and families who purchased and occupied them in the mid- to late 1800s and early 1900s. The proposed Abernethy Way eastward extension will pass along and through properties initially owned by the Baillie, Carlson, Cook, Czar, Dockstader, Gustav, Hinch, McKechnie, Smedly, Smith, Trethewey, Wilson, and York families. Structures relating to some of these early Euro-Canadian occupations of the study area may still exist (see Section 4.13), but none were observed in directly within the proposed Abernethy Way ROW route option impact zones.

Several small distinct autonomous local communities emerged within the Maple Ridge municipality, with “Yennadon” and “Webster's Corner” being of relevance to this study. Yennadon lies near the west end of the proposed Abernethy Way extension ROW routes, and was so-named in 1911, encompassing localities associated with the Upper and Lower Alouette Rivers. The earliest Euro-Canadian settler was Samuel Edge Jr. in 1876 (www.mapleridge.ca/1632/Yennadon). Webster's Corner near the east end of the proposed ROW was first settled by Euro-Canadian James Murray in 1888, who established a post office there in 1891. In 1905, Finnish families began settling the Webster's Corner locality following the awarding of a large single-bolt contract (producing large thick cedar board/beams that were split into shakes and

2.0 PROPOSED DEVELOPMENT AND SCHEDULE

The proposed further eastward extension of Abernethy Way from 232nd Street to 256th Street in northeast Maple Ridge will run east-west, providing and improving access to numerous residential and farming properties in the communities of Yennadon in the west, and Webster's Corner in the East (Figures 2 to 6). While the western and eastern aspects of the proposed ROW route corresponds with many existing sections of 124th Avenue, it will also pass through several farm fields and natural forested areas between these sections where previous land-altering disturbance has been moderate to none (Figures 3 and 4). Some sections will pass along or through more recent high-density residential subdivisions. The proposed central aspect of the route has several possible routing options that are being proposed and assessed for feasibility (Figures 2 to 6), and they include route options "2", "2A", "2B", "3", "3A", "3B" and "6". A number of considerations need to be addressed for each of these options before a final route design will be decided and adopted for road construction. The potential for adversely impacting archaeological resources is one of those considerations, and the results of our preliminary field reconnaissance presented in this AOA report (Section 4.0) will be useful for selecting a final ROW route and for providing recommendations for future archaeological investigations.

Depending on which road ROW routing option is finally chosen in the central aspect of the proposed study area, the total length of the road construction project will be between 5.5 and 6.0 km. Most of the proposed new road ROW impact zone will be approximately 30 m wide, especially on flat open terrain, and along and within existing high density residential subdivisions, or institutions (i.e., Hacker's Haven golf course and Meadowridge School). In some sections passing through sloped terrain that will require cut-and-fill to create the roadbed, or in locations where large unsafe timber removal may be required, or where materials are being stockpiled, the maximum width of the impact zone *may* be a few metres more. Impacts to most adjacent property will be avoided. The proposed routes pass along and through several stream and creek channels (e.g., Coho Creek, Latimer Creek, and Zirk Brook) that have immediately adjacent undisturbed and recently disturbed landforms that may have attracted people in the past, and it is these areas that deserve the most attention from an archaeological perspective. Of primary concern to archaeologists are the uppermost Holocene age (post-glaciation) aeolian (wind-blown) sediments that have accumulated over the last 11,000 years or so.

The greatest potential adverse impacts to the upper ground deposits will be caused by heavy equipment activity during timber felling and removal in some forested sections, widening of existing road ROWs, removal of existing houses and structures lying within the ROW, construction of new road sections, excavation of drainage ditches and utility service trenches along the road bed, installation of culverts at stream crossings, and creating new stream channels in some locations.

Results of the various pre-construction feasibility studies being commissioned for the proposed ROW options, and detailed engineering assessments and recommendations will be presented to the City of Maple Ridge in December, 2018. Once a final routing is decided, private and public land acquisition within the selected ROW will proceed. Initial land-altering construction activities along some sections of the final route could begin in late 2019, with the majority of the new road construction occurring in 2020.

3.0 AOA OBJECTIVES AND METHODOLOGY

The primary objectives of this desktop archaeological overview assessment (AOA) and preliminary field reconnaissance (PFR) were to gather background information and identify any previously recorded archaeological sites associated with the proposed Abernethy Way eastward extension ROW route options, and to identify and assess areas considered to have medium or greater archaeological site potential along the proposed routes (Figures 2 to 6, 8, 12, 15, 16, 21, 22, 26, 28, 29, 32 and 33). This involved searches through existing literary and online resources, consultation with the Maple Ridge Museum and Community Archives, the Archaeology Branch's archaeological site registry (RAAD), consideration of environmental information provided by satellite and topographic imagery, and a one-day preliminary field reconnaissance visual inspection.

The remote access archaeological database (RAAD) is a registry managed by the Archaeology Branch of the Ministry of Forests Lands and Natural Resources. It is based on collective input from various government agencies, First Nation groups, consulting archaeologists, academic and amateur sources to provide information of previously recorded archaeological sites, and for predictive modeling of archaeological site potential. RAAD was consulted to determine if any previously recorded sites exist along or in proximity (within 1.5 km) to the proposed road ROW route options. *No previously recorded archaeological sites exist within 1.5 km of the proposed ROW route options.*

The preliminary field reconnaissance (PFR) for this AOA was conducted in a day, and involved a crew of six persons split into two groups working towards the center of the study area from the west and east ends. These crews focused on identifying any obvious heritage concerns, and areas considered to have medium or high pre-contact period archaeological site potential lying within or beside the proposed road ROW route options. It included inspection of areas that have already been impacted by roads, structures, yards, agriculture, and public facilities (school yard and golf course). In order to ensure ample ground coverage for the proposed ROW options, we made every effort to inspect a 50 m-wide corridor (25 m on each side of proposed center line) along the entire lengths of the various proposed routes.

Heritage and archaeological site potential assessments are based on a collective consideration of the nature and location of landforms suitable for human occupation or use, their immediate environmental and geological contexts, vantage over creek gullies, and location of nearby natural resources (see ranking categories below).

Our archaeological site potential rating scheme and criteria are summarized as follows:

Nil/Low archaeological site potential (e.g., areas on extreme slopes, areas within marshes/swamps, physically inaccessible areas, areas within active stream or river channel beds; areas distant from food and natural resources; areas containing exposed "sterile" glacially generated sediments; areas capped with several metres of imported fill, areas stripped of Holocene age topsoil, etc.). These areas were ignored during our inspection, as they do not deserve any future site inventory or management attention.

Medium archaeological site potential (e.g., flat to moderately sloping areas adjacent or near extinct and extant aquatic features such as springs, marshes, ponds, lakes, oceans, streams, creeks and rivers; areas adjacent to observed or suspected natural food, textile and lithic resources;

areas with habitable topographic landforms such as terrace edges and promontories, flat-top ridges, mounds, large depressions and swales, fluvial channel margins and shorelines; areas along known or suspected travel corridors [trails], areas that provide good vantage over an important locality, areas where early historic settlement or activities are known to have transpired, etc.). These areas have been indicated in Figures 3 to 6, 8, 12, 15, 16, 21, 22, 26, 28, 29, 32 and 33, and if threatened with any adverse impacts, they deserve and should receive future management attention.

High archaeological site potential (e.g., same considerations listed above but also includes areas where pre-contact period and early post-contact period sites have already been recorded and/or have been observed and confirmed; slightly inclined to flat areas immediately adjacent to major attractive aquatic features where prime habitable landforms exist and local resources are varied and/or abundant [fishing stations, game migration trails]; areas with optimal exposure to the sun; areas where human remains are known to exist or are suspected; areas where early pre-contact period sites are suspected; areas with well-drained silty/sandy sediments and are protected from the elements; natural rock features [large boulders and overhangs] that would have attracted human occupation or use; major trail/travel routes, etc.). These areas have been indicated in Figures 3, 4, 12, 15 to 17, 21 and 22, and if threatened with any adverse impacts they deserve, and should receive, future management attention.

The study area experienced Euro-Canadian settlement beginning in the mid-1800s, and our crews were vigilant for any standing or ruined early post-contact period (historic) structures or earthworks, but none were observed within the proposed impact zones associated with the ROW route options. However, we did observe two rather old-looking standing buildings near the west end of the study area near 238th Street that may have local heritage significance and importance (see Section 4.14).

The most expected pre-contact period (prehistoric) site types within the study area are buried scatters of stone tools and waste (lithics) and faunal remains that were deposited during the occupation of small field camps and resource extraction and processing locations established directly beside or near important aquatic features. The study area contains many such areas located immediately beside small streams and creeks along the proposed road ROW route options, and these specific locations are shown in Figures 3 to 6. A few small circular and oval depressions were observed at several locations considered to have medium or greater site potential, and some of these may have cultural origins that relate to use as small dwelling foundations, or food processing pits,

The information and recommendations presented in this AOA report will be useful for helping to decide which final ROW routing is eventually chosen in the central aspect of the study area, and as a basis for planning and implementing further field investigations required within areas of medium or greater archaeological site potential that are potentially threatened with partial or complete adverse impacts relating to eventual road construction land-altering activities.

4.0 ARCHAEOLOGICAL OVERVIEW ASSESSMENT RESULTS

Our PFR inspection conducted on September 1, 2018, identified 13 specific locations (designated as “A” to “M”) associated with streams and creeks that are deemed to have medium or high archaeological site potential for pre-contact period buried “lithic scatters” within or adjacent to the proposed Abernethy Way eastward extension ROW route options (Sections 4.1 to 4.13; Figures 3 to 6). These 13 locations are described below in general terms, their potential impact status with regard to the proposed road construction is assessed and discussed, and future investigation and management recommendations are provided for each site potential location to assist in the eventual formulation and implementation of an effective archaeological site discovery and impact management plan. We succeeded in undertaking a close visual inspection of the majority (90%) of the proposed road ROW route options, the exceptions being a few densely vegetated (impenetrable) short sections near the east-central section of the proposed route/study area. For the greater part, the proposed routes correspond with existing roadways, which allowed easy access and quick effective assessments. Permission to access the route via property associated with “Hacker’s Haven” golf course, Meadowridge School, and private residential property was granted by persons we approached during our field inspection.

4.1 Archaeological Site Potential Area “A”

Site potential area “A” is located near the west end of the proposed Abernethy Way eastward extension ROW at the intersection of 124th Avenue and the western tributary of Coho Creek (Figures 3, 8 and 9). The existing road (124th Street) and adjacent yard development have already impacted this location, but there are small isolated remaining sections of habitable natural landforms on both sides of the road within the bottom of the creek gully, and on the adjacent creek channel bank in four residential yards, that may have retained most of their stratigraphic integrity (Figures 8 and 9). These isolated smaller locations are considered to have **medium archaeological site potential** for the presence of pre-contact period buried lithic and bone scatters, as they occupy slightly sloping to flat terrain immediately beside the creek, and are well-suited for establishing field camps and/or resource extraction and processing foci. That this permanent stream is a main tributary of “Coho Creek” suggests the possibility that salmon may have been easily accessible and processed in this immediate locality.

It is presumed that both sides of 124th Street will be impacted during construction of the Abernethy Way eastward extension. Consequently adverse machine impacts are expected to impact and detrimentally affect several specific small areas that could contain archaeological deposits within the existing road ROW and immediately adjacent residential yards. Once the exact maximum impact footprint is identified for this location, the potential impact status can be refined and more accurately predicted. *Any of the small relatively intact “natural” areas within area “A” that are considered to have medium or greater site potential that may be threatened with direct adverse impacts should be subjected to an appropriate subsurface shovel testing program to determine whether or not any cultural materials are buried in these selected specific locations.* Consultation with the Archaeology Branch and local First Nation agencies, and ensuing necessary permitting will be required in order to initiate a subsurface testing program that would be part of an intensive “archaeological impact assessment” (AIA) inspection. This inspection would be conducted under a Heritage Conservation Act (HCA) Section 14 Site Inspection Permit issued from the Archaeology Branch. See Section 5.1.2 for more details.

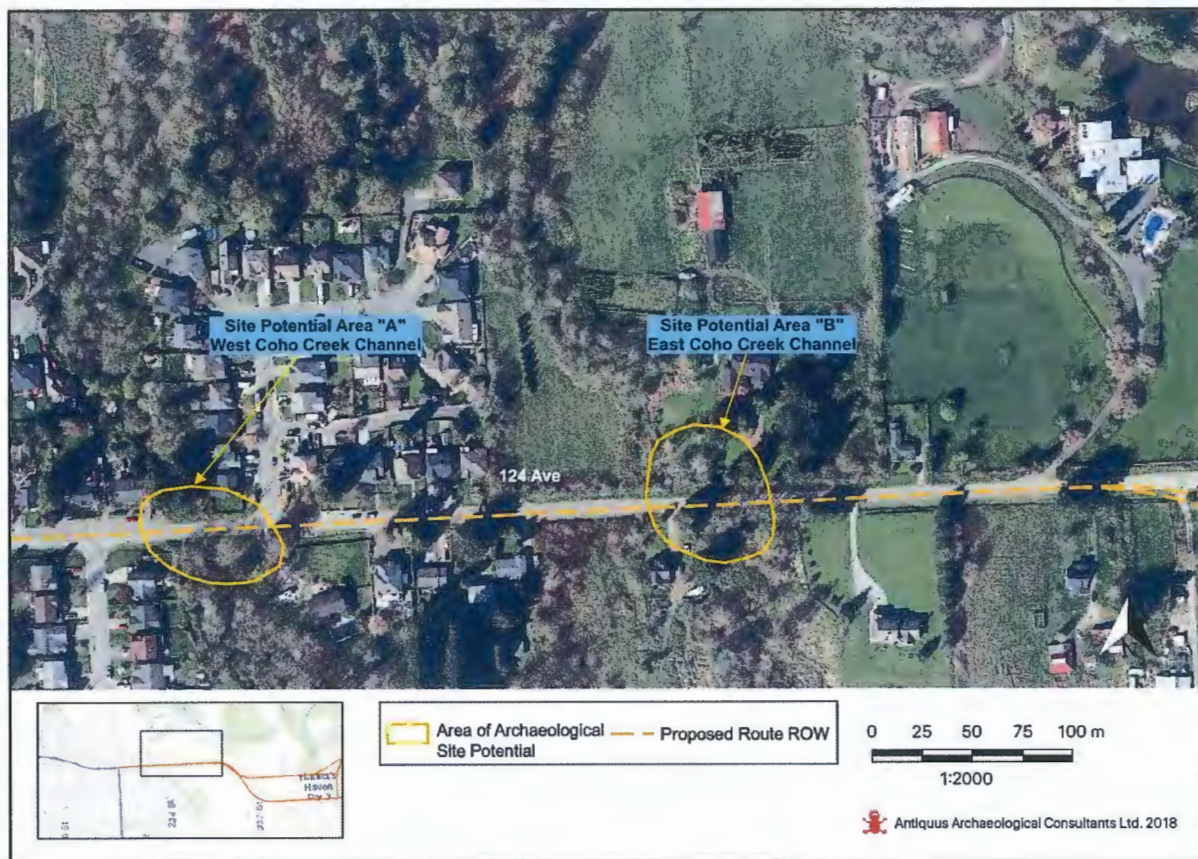


Figure 8. Map showing location of archaeological site potential areas "A" and "B" on tributaries of Coho Creek. Adapted from City of Maple Ridge's "Ridgeview" aerial imagery archives.



Figure 9. General view of Site Potential Area “A” (at 10U, 0530890 E; 5452854 N) (center photo) on 124th Avenue associated with the west tributary channel of Coho Creek near the western end of the proposed Abernethy Way expansion ROW route, looking west toward 232nd Street. This location has several small areas of natural “intact” ground that are considered to have medium potential for pre-contact period lithic scatter sites, since Coho Creek passes through it (from left to right in center photo).

4.2 Archaeological Site Potential Area “B”

Site potential area “B” is also located near the west end of the proposed Abernethy Way eastward extension ROW at the intersection of 124th Avenue and eastern main tributary of Coho Creek (Figures 3, 8 and 10). The existing road (124th Street) and adjacent yard development have already impacted this location, but there are small isolated remaining sections of habitable natural landforms on both sides of the road immediately beside the creek gully within adjacent residential yards (Figures 8 and 10). These specific slightly disturbed and relatively intact locations are considered to have **medium archaeological site potential** for the presence of pre-contact period buried lithic and bone scatters, as they occupy slightly sloping to flat terrain immediately beside the creek, and are well-suited for establishing field camps and/or resource extraction and processing foci. Since it lies on a main tributary of “Coho Creek”, salmon may have been easily accessible and processed in this immediate locality.

It is presumed that both sides of 124th Street will be impacted during construction of the Abernethy Way eastward extension. Consequently adverse machine impacts are expected to impact and detrimentally affect the observed specific small areas that could contain archaeological deposits within the existing road ROW, and also in immediately adjacent residential yards. Once the exact maximum impact footprint is identified for this location, the potential impact status can be refined and more accurately predicted.

Any of the small relatively intact “natural” areas within area “B” that are considered to have medium or greater site potential that may be threatened with direct adverse impacts should be subjected to an appropriate subsurface shovel testing program to determine whether or not any cultural materials are buried in these selected specific locations. This subsurface testing would be conducted under a HCA Section 14 permit for a detailed AIA inspection. See Section 5.1.2 for more details.



Figure 10. General view of site potential area “B” (at 10U, 0531139E; 5452848N) (lower half of photo) on 124th Avenue on the east tributary channel of Coho Creek, looking west. This area is considered to have medium site potential for buried lithic scatters because it occupies flat terrain on both sides of the eastern tributary channel of Coho Creek, and is a good setting for a small field camp.

4.3 Archaeological Site Potential Area “C”

Site potential area “C” is located immediately north of “Hacker’s Haven” golf course on the south side of Latimer Creek about 300 m west of 240th Street (Figures 3, 11, 12 and 15). This is a fairly prominent, large, flat, moderately treed terrace beside and overlooking Latimer Creek, and an unnamed tributary lies along its eastern edge. There are no readily obvious past land-altering impacts to this specific area, and most of it is in a natural state. This location is considered to have **high archaeological site potential** for the presence of pre-contact period buried lithic and bone scatters since it is beside the creek, it is well-suited for establishing field camps and/or resource extraction and processing foci, and it may relate to a pedestrian travel corridor (trail). Salmon and/or other species of freshwater fish, various game, and freshwater mussels could have been exploited and processed in this immediate locality.

This site potential area lies directly within the location where proposed road ROW Route Options “2A” and “2B” diverge on the south side of Latimer Creek (Figures 3 and 12), and if either of these routes are eventually selected, direct adverse machine impacts will threaten natural Holocene age deposits in this location. It is assumed that extensive land-alteration and infilling of the gully in this general locality will be required to create a crossing of Latimer Creek. Once an exact proposed routing and maximum impact footprint are identified in this locality (should the

final ROW pass through it), the potential impact status to this high site potential area can be more accurately assessed.

Complete avoidance of this specific locality could perhaps be accomplished by relocation of the road ROW to another feasible location option further to the north, but it should be kept in mind that all habitable landforms immediately adjacent to Latimer Creek will likely have medium or greater archaeological site potential, and any new proposed ROW routings in this general locality should be identified and subjected to another visual reconnaissance inspection to assess archaeological site potential.

If the final ROW route will pass through site potential area “C”, and all or portions of it will be threatened with direct adverse impacts, it is strongly recommended that the proposed impact zone should be subjected to an appropriate subsurface shovel testing program to determine whether or not any cultural material deposits are buried there. Since this site potential area is fairly large, and anticipated impacts will be intensive and extensive in this locality, a fair number of subsurface tests would be required to adequately investigate the proposed impact zone. This subsurface testing would be conducted under a HCA Section 14 permit during an AIA inspection. See Section 5.1.2 for details.



Figure 11. A general view of the northeastern terrace edge (upper left) in the northeastern aspect of site potential area “C” (at 10U, 0532104 E; 5452765 N), on the south side of Latimer Creek (lower right), looking northwest. This area is considered to have high pre-contact period site potential for buried lithic scatters, as it is an ideal setting for a small field camp.



Figure 12. Aerial map showing location of archaeological site potential areas "C" and "D" on the south side of Latimer Creek. Adapted from City of Maple Ridge's "Ridgeview" aerial imagery archives.

4.4 Archaeological Site Potential Area “D”

Site potential area “D” is located immediately north of “Hacker’s Haven” golf course on the south side of Latimer Creek about 375 m west of 240th Street (Figures 3, 12, 13 and 15). This is a small area occupying relatively flat treed terrain on both sides of a small intermittent stream that flows into Latimer Creek. It lies directly within a proposed ROW route option. There are no readily obvious past land-altering impacts to this specific area, and most of it appears to be in a natural state. Fresh water is available in the stream channel during the wetter months of the year. This location is considered to have **medium archaeological site potential** for the presence of pre-contact period buried lithic and bone scatters since it is beside a small stream channel, it is well-suited for establishing a small field camp and/or resource extraction and processing foci, and it is relatively close to high site potential area “C” to the immediate east (Figures 12 and 15).



Figure 13. General view of site potential area “D” (at 10U, 0532008 E; 5452735 N) on a small tributary stream channel (center photo) located immediately north of “Hacker’s Haven” golf course south of Latimer Creek, looking west. Both sides of the stream channel in this location are considered to have medium site potential for buried pre-contact period lithic scatters.

Site potential area “D” lies directly within the location where proposed road ROW route options “2A” and “2B” (same shared ROW) pass along the northern boundary of the golf course (Figures 3, 12 and 15). If this proposed ROW route is selected for road construction, it will impose direct adverse machine impacts will threaten the uppermost Holocene age natural deposits in this location. Once an exact proposed routing and maximum impact footprint are identified in this locality (should the final ROW pass through it), its potential impact status can be more accurately assessed. While complete avoidance of this specific location could be accomplished by relocation

of the road ROW further to the north, it should be kept in mind that new proposed ROW routing in this general locality should be identified and subjected to another visual reconnaissance inspection to assess archaeological site potential.

If the final road ROW route will pass through site potential area “D”, and it will be threatened with direct adverse impacts, it is strongly recommended that the proposed impact zone should be subjected to an appropriate subsurface shovel testing program to determine whether or not any cultural material deposits are buried there. This area is not very large, and only a few subsurface tests would be required. This subsurface testing would be conducted under a HCA Section 14 permit during an AIA inspection. See Section 5.1.2 for details.

4.5 Archaeological Site Potential Area “E”

Site potential area “E” is located within the northeast aspect of “Hacker’s Haven” golf course property on the south side of Latimer Creek about 100 m west of 240th Street (Figures 3, 14 and 15). This is a small area occupying a flat-top treed promontory flanked on the east and west by two small intermittent steep-sided stream channels that contribute to Latimer Creek. There has been some past land-altering impacts to this specific area, including tree removal and machine levelling, but the upper Holocene age soils appear to still remain in their original context, but may be moderately disturbed. Fresh water is available in the two adjacent stream channels during the wetter months of the year, and it is a short steep walk down to Latimer Creek. This location is considered to have **medium archaeological site potential** for the presence of pre-contact period buried lithic and bone scatters as it has ready access to water, it is very well-suited for establishing a small field camp and/or resource extraction and processing foci, and a well-used pedestrian trail may have once passed very close to the south of this location.



Figure 14. General view of site potential area “E” (at 10U, 0532141 E; 5452705 N) on a flat-top promontory on the south side of Latimer Creek in the northeast aspect of “Hacker’s Haven” Golf Course, looking north. This location has medium archaeological site potential for buried lithic scatters as it overlooks Latimer Creek and is flanked by two tributary stream/spring channels.

Site potential area “E” does **not** lie directly within the proposed impact zone associated with route option “2A”. However, we have included this prominence in this AOA report because it is only about 25 m south of the route option centerline (Figure 15), and we surmised it could be impacted during construction if this route is eventually chosen. Land-altering machine impacts to this location would impose direct adverse threat to the remaining moderately disturbed uppermost Holocene-age natural deposits. Since it is very close to the proposed crossing of Latimer Creek, we assumed that creation of the crossing by infilling of the creek gully will involve a larger than usual impact zone (e.g., bridge construction). This promontory has a potential to be used as fill, or perhaps it could be subjected to some slope modification in order to address land stability concerns. Regardless, it is our opinion complete avoidance of this specific location should be fairly easy to accomplish. Once an exact final routing and maximum impact footprint is identified and adopted, the potential impact status of this specific locus can be more accurately assessed.

If the final road ROW route development plans will threaten to detrimentally affect site potential area “E”, and the top of this promontory will be disturbed, it is strongly recommended that the proposed impact zone be subjected to an appropriate subsurface shovel testing program to determine whether or not any cultural material deposits are buried there. This area is not very large, and only a few subsurface tests would be required. This subsurface testing would be conducted under a HCA Section 14 permit during an AIA. See Section 5.1.2 for details.

4.6 Archaeological Site Potential Area “F”

Site potential area “F” is located north of “Hacker’s Haven” golf course on the north side of Latimer Creek and a few metres west of 240th Street (Figures 3 and 15 to 17). It is fairly large, and occupies the southwestern edge and adjacent top of a fairly extensive, flat, mostly open terrace overlooking Latimer Creek. The majority of this area has been impacted by timber removal, machine levelling, construction of several residential and related structures, yard enhancement, gardening, and driveway construction. Nevertheless, it appears that the original natural Holocene age deposits remain, with some areas that remain relatively intact, and other having only been slightly to moderately disturbed. This location is considered to have **high archaeological site potential** for the presence of pre-contact period buried lithic and bone scatters because it is beside the creek, it is very well-suited for establishing field camps and/or resource extraction and processing foci, and it may relate to a well-used pedestrian travel corridor (trail). Salmon and/or other species of freshwater fish, various game, and freshwater mussels could have been exploited and processed in this location.

Site potential area “F” contains proposed road ROW Route Options “2A” (south), “2B” (north) and a small southern edge is associated with option “3B” (Figures 15 and 16). If any of these routes are eventually selected, direct adverse machine impacts will threaten to adversely disturb intact and disturbed natural Holocene age deposits that could contain archaeological cultural materials and features. This is especially true of options “2A and “2B”. Moreover, if either of these routes are selected, we suspect that impacts related to creating the crossing of Latimer Creek may be more extensive than elsewhere on the proposed routes. If the final ROW route will pass through this area of site potential, and an exact proposed routing and maximum impact footprint are identified, a potential impact status for this high site potential area can be more accurately assessed.

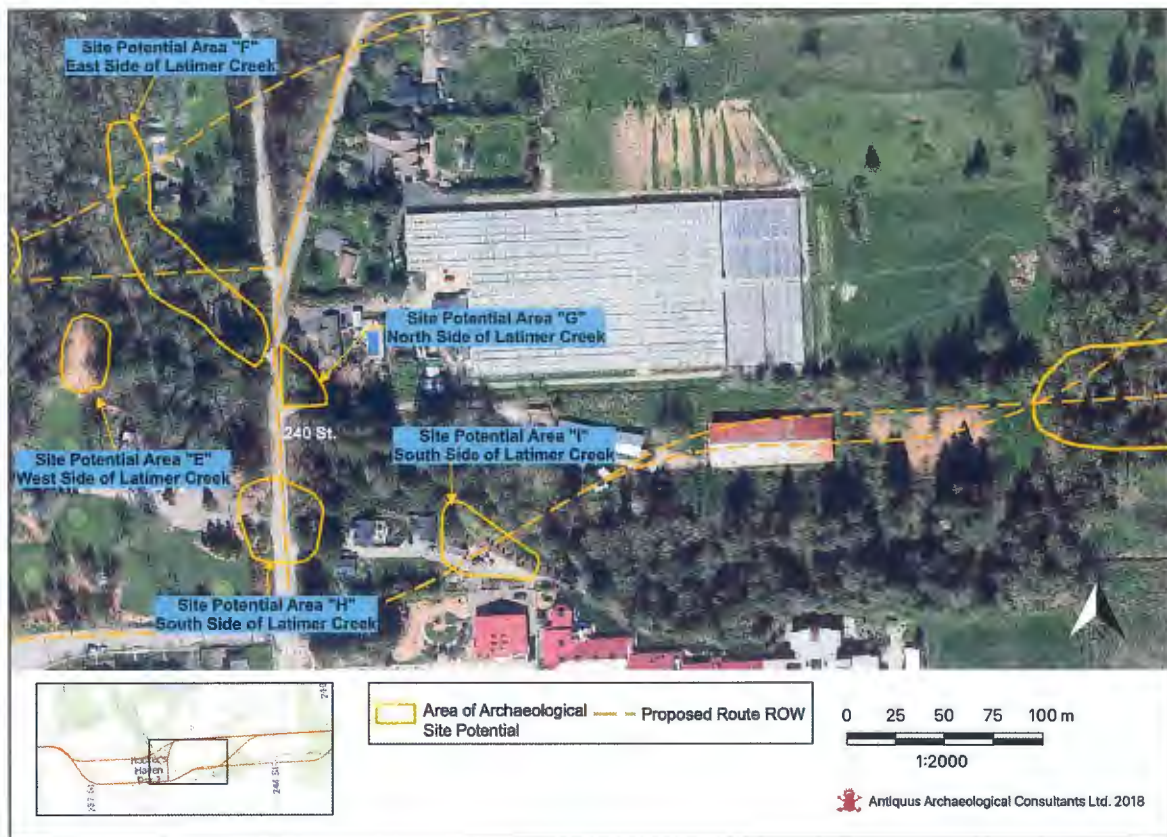


Figure 15. Aerial map showing location of archaeological site potential areas "E", "F", "G", "H" and "I" on the south and north sides of Latimer Creek and west and east sides of 240th Street. Adapted from City of Maple Ridge's "Ridgeview" aerial imagery archives.

Complete avoidance of this high site potential area is recommended from an archaeological perspective, and this would mean adopting either route option “3A”, “3B” or “6” as the final route, or perhaps choosing another suitable location for crossing Latimer Creek further to the north. Any alternate proposed routes passing through habitable terraces or promontories adjacent to Latimer Creek will likely be considered to have medium or greater archaeological site potential, especially at confluences with tributary streams. It should be kept in mind that any new proposed ROW routing(s) to the north of this area should be identified and subjected to another visual reconnaissance inspection to assess archaeological site potential.

If the final ROW route will pass through high site potential area “F”, it is strongly recommended that the impact zone(s) should be subjected to an appropriate subsurface shovel testing program to determine whether or not any archaeological material deposits are buried there. Since this high site potential area is fairly large, and anticipated impacts could be intensive and extensive in this locality, a large number of subsurface shovel tests will be required to adequately investigate the proposed impact zone (especially if both proposed routes are examined). This subsurface testing would be conducted under a HCA Section 14 permit during an AIA inspection. See Section 5.1.2 for details.



Figure 16. Slightly oblique aerial view of site potential area “F” on the west side of 240th Street and north side of Latimer Creek (upper left), looking west. This large area is considered to have high site potential and three proposed route options (“2A”, “2B” and “3B”) all have potential to impact any archaeological deposits that may lie within this area.



Figure 17. A general view of the terrace top on the north side of Latimer Creek at large site potential area “F”, which extends along the southwestern edge of the terrace, looking west towards Latimer Creek gully (behind the house) from 240th Street. Two proposed route options are proposed for this property. It is considered to have high potential for buried lithic scatters, especially along the terrace edge overlooking the creek.

4.7 Archaeological Site Potential Area “G”

Site potential area “G” is located northeast of “Hacker’s Haven” golf course on the immediate west of 240th Street on the north side of Latimer Creek gully (Figures 4, 15 and 18). This is a small area occupying a residential yard, that has experienced tree removal and machine levelling, yard enhancement, and residence construction, but the upper Holocene-age deposits appear to remain in their approximate original context, and they have been moderately disturbed (Figure 18). It is essentially a southeastern extension of site potential area “F” that lies on the west side of 240th Street. This area is considered to have **medium archaeological site potential** for the presence of pre-contact period buried lithic and bone scatters as it has easy access to water (Latimer Creek), it is very well-suited for establishing a small field camp and/or resource extraction and processing foci, and a well-used pedestrian trail may have once passed through this location.

Site potential area “G” lies on the east side of route option “3B”, which is the existing 240th Street ROW. Land-altering machine activity in this site potential area would impose further direct adverse impacts to moderately disturbed uppermost Holocene-age natural deposits. If this route option is selected for construction, once an exact final routing and maximum impact footprint is identified and adopted, the potential impact status of this specific locus can be more accurately assessed. *If the final road ROW route development plans will threaten to detrimentally affect site potential area “G”, it is strongly recommended that the proposed impact zone be subjected to an appropriate subsurface shovel testing program to determine whether or not any cultural material deposits are buried there.* This area is not very large, and only a few subsurface tests would be required. This subsurface testing would be conducted under a HCA Section 14 permit during an AIA. See Section 5.1.2 for details.



Figure 18. A general view of small site potential area “G” (at 10 U, 532255 E; 5452665 N) within the residential yard on the east side of 240th Street and north side of Latimer Creek, looking northeast. This location is considered to have medium potential for buried lithic scatters, as it is a flat area overlooking Latimer Creek.

4.8 Archaeological Site Potential Area “H”

Site potential area “H” is located east of “Hacker’s Haven” golf course on both the west and east sides of 240th Street, and on the south side of Latimer Creek gully (Figures 4, 15 and 19). This is a small area whose western aspect lies within the golf course, and eastern aspect occupies the western edge of a residential yard. Both sides of the road have experienced tree removal and machine levelling, road and driveway construction, and yard enhancement. Upper Holocene-age deposits appear to remain in their approximate original context, but they have been slightly to moderately disturbed. This area is considered to have **medium archaeological site potential** for the presence of pre-contact period buried lithic and bone scatters as there is easy access to water (Latimer Creek), it is very well-suited for establishing a small field camp and/or resource extraction and processing foci, and a well-used pedestrian trail may have once passed through this location.



Figure 19. A view of site potential area “H” (at 10 U 532248 E; 5452596 N) on the east (right) and west (upper left) side of 240th Street and south side of Latimer Creek, looking northwest. This area is considered to have medium site potential for buried lithic/bone scatters.

Site potential area “H” is bisected by route option “3B”, which is the existing 240th Street ROW (Figures 15 and 19). Any land-altering machine impacts to this site potential area would impose further direct adverse damage to the uppermost Holocene-age natural deposits. *If the final road ROW route development plans will threaten to detrimentally affect site potential area “H”, it is strongly recommended that the proposed impact zones on both sides of 240th Street be subjected to an appropriate subsurface shovel testing program to determine whether or not any cultural material deposits are buried there.* This area is not very large, and only a few subsurface tests would be required. This subsurface testing would be conducted under a HCA Section 14 permit during an AIA. See Section 5.1.2 for details.

4.9 Archaeological Site Potential Area “I”

Site potential area “I” is located within the west-central aspect of property owned by Meadowridge School on the east side of 240th Street and immediately south of Latimer Creek gully (Figures 4, 15 and 20). This is a small flat-topped terrace area that is presently being used as a garden. Past tree removal, machine levelling, driveway construction, and yard enhancement have all occurred there. Upper Holocene age deposits appear to remain in their approximate original context, but have been slightly to moderately disturbed. This area is considered to have **medium archaeological site potential** for the presence of pre-contact period buried lithic and bone scatters as there is easy access to water (Latimer Creek), it is very well-suited for establishing a small field camp and/or resource extraction and processing foci, and a well-used pedestrian trail may have once passed through or near this location.



Figure 20. A view of the majority of site potential area “I” (at 10U, 0532335 E; 5452593 N) about 100 m east of 240th Street on the south side of Latimer Creek (left), looking northeast. This area is considered to have medium site potential for buried lithic scatters.

Site potential area “I” lies in direct potential conflict with route options “3A” and “6” (shared ROW route in this location), and the proposed center line passes directly through the middle of it (Figures 15 and 20). Any land-altering machine impacts to this site potential area would impose further direct adverse damage and disturbance to the uppermost Holocene age natural deposits. ***If the final road ROW route development plans threaten to detrimentally affect site potential area “I”, it is strongly recommended that this locus be subjected to an appropriate subsurface shovel testing program to determine whether or not any cultural material deposits are buried there.*** A subsurface testing program involving a moderate number of tests would be required for this area under a HCA Section 14 permit during an AIA. See Section 5.1.2 for details.

4.10 Archaeological Site Potential Area “J”

Site potential area “J” is located east of the northeastern corner of Meadowridge School property on the north and south sides of Latimer Creek between 240th Street in the west, and 244th Street in the east (Figures 4 and 21 to 25). It is a very large area, and it is characterized by moderate to dense forests on the north side of Latimer Creek, with mixed forest and open cleared fields on the south side of the creek. Terrain varies from slightly hummocky to relatively flat throughout most of this area, and the creek is readily accessed because the channel has not been deeply incised as it has been in the canyon-like creek gully to the immediate west. The majority of the southern half of this site potential area has been impacted by timber removal, machine levelling, construction of several residential and related structures, small-scale agriculture and grass crop cultivation, gardening, yard enhancement, and driveway construction. Most of the northern half of this site potential area remains in its natural forested state, with the eastern end at 244th Street having residential development with similar prior impacts to those listed above.

During our visual reconnaissance we considered a fairly wide inspection corridor for this section, since it was reasoned that the exact proposed road ROWs adjacent to the creek (route options “3A” and “6”) could easily be relocated during future planning (e.g., route option “6” being moved to the immediate north side of Latimer Creek). We wanted to ensure that this potential alternative routing would be covered.



Figure 21. An oblique aerial view of site potential area “J” along both (north and south) sides of Latimer Creek, looking west. This is the largest area of high archaeological site potential identified during the AOA field inspection.



Figure 22. Aerial map showing location of archaeological site potential area "J" on the south and north sides of Latimer Creek between 240th Street and 244th Street. This is the largest area of site potential identified during this AOA study, and the chance of potential conflict(s) with sites is considered to be high. Adapted from City of Maple Ridge's "Ridgeview" aerial imagery archives.

This area is considered to have **high archaeological site potential** for the presence of pre-contact period buried lithic and bone scatters. This is because Latimer Creek runs through its entire length and it is easily accessed, it has numerous closely-spaced locations within it that are well-suited for establishing field camps and/or resource extraction and processing foci, it surely had a well-used pedestrian travel corridor (trail) on one or both sides of the creek, there is an abundance of natural plant species, and salmon and/or other species of freshwater fish, various game, and freshwater mussels could have been exploited and processed in numerous locations along both sides of Latimer Creek. We also observed several randomly-spaced small circular and oval depressions averaging about 5 m in diameter by 0.5 to 1.0 m deep in several locations in the western aspect of this site potential area that may have a cultural origin (e.g., small dwellings or food processing pits), but they are also consistent with similar features created by large rotted-out tree stumps.

Site potential area “J” contains proposed road ROW route options “3A” and “6”, with option “6” occupying most of it and posing the greatest threat of potential impacts to any archaeological sites that may be present along the creek channel banks (Figures 21 and 22). If either of these routes are eventually selected for road construction, direct machine impacts may threaten to adversely disturb intact and disturbed natural Holocene age deposits that could contain archaeological cultural materials and features. This possibility of impacts is much greater along route option “6”, which closely parallels the creek for several hundred metres. If this latter routing option is chosen, a detailed plan showing proposed routing and maximum impact footprint should be generated to allow the detailed impact status for this high site potential area to be more accurately assessed.



Figure 23. General view of the west aspect of site potential area “J” immediately east of the northeast corner of the school property on the north side of Latimer Creek (upper right), looking east. This flat area is considered to have high site potential for buried lithic scatters. Several circular depressions that may have cultural origins were also observed in this locality.



Figure 24. Another general view of the west aspect of site potential area “J” (at 10U, 0532727 E; 5452659 N) about 75 m east of the northeast corner of the school property on the north side of Latimer Creek (upper left), looking southwest. This relatively flat area is considered to have high site potential for buried lithic scatters, as it is well-suited for habitation and has direct creek access.

If the final ROW route will pass through the western end or along the entirety of high site potential area “J”, it is strongly recommended that the impact zone should be subjected to an appropriate subsurface shovel testing program prior to any land-alteration to determine whether or not any archaeological material deposits are buried along Latimer Creek. Since this high site potential area is very large, it is likely that a substantial number of subsurface shovel tests will be required to adequately investigate the proposed impact zone. This subsurface testing would be conducted under a HCA Section 14 permit during an AIA inspection. See Section 5.1.2 for details.

Since currently proposed route option “6” passes through the entire length of this very large high archaeological site potential area, it would be very costly to determine the presence, nature and extent of any archaeological sites potentially threatened by this route. Since route option “3A” only passes through the western end of site potential area “J” and most of it is far-removed from Latimer Creek, significantly less subsurface testing would be required, and thus it is a better choice from an archaeological perspective.

If the section of ROW route option “6” passing through site potential area “J” was relocated more than 100 m south of Latimer Creek, the probability of impacting archaeological deposits would be significantly reduced. However, note that any proposed alternate routing of the ROW through this gently sloping locality could possibly conflict with small peripheral lithic scatters relating to larger sites existing by the creek, and any new ROW location options should be properly assessed for site potential.



Figure 25. View of high site potential locus in the northeastern aspect of site potential area “J” (at 10U, 0533047 E; 5452686 N) on the north side of Latimer Creek, looking southwest. This location does not conflict with the currently proposed impact zone associated with route option “6”, but it is nearby.

4.11 Archaeological Site Potential Area “K”

Site potential area “K” is located along the east-central aspect of the study area at the western end of an existing section of 124th Avenue between 248th Street and 252nd Street (Figures 5, 26 and 27). This area is associated with a small intermittent stream channel that flows a few metres west of the west end of 124th Avenue. It is moderately forested, and the majority appears to still be in a natural state. Habitable flat areas exist on both sides of the stream channel (Figure 27). This location is considered to have **medium archaeological site potential** for the presence of pre-contact period buried lithic and bone scatters, as it occupies relatively flat well-drained terrain immediately beside the stream channel, and it is well-suited for establishing field camps and/or resource extraction and processing foci.

It is presumed that future construction of the proposed road ROW in this location will align with existing 124th Street, thus the central aspect of site potential area “K” will be directly and adversely impacted. Complete avoidance of this location will not be practical from an engineering perspective. *We recommend that site potential area “K” should be subjected to an appropriate subsurface shovel testing program prior to any land-alteration to determine whether or not any cultural materials are buried in this specific location.* This subsurface testing would be conducted under a HCA Section 14 permit for a detailed AIA inspection. Since this area is relatively small, a low number of shovel tests would be sufficient to determine if any archaeological concerns lie there. See Section 5.1.2 for more details.

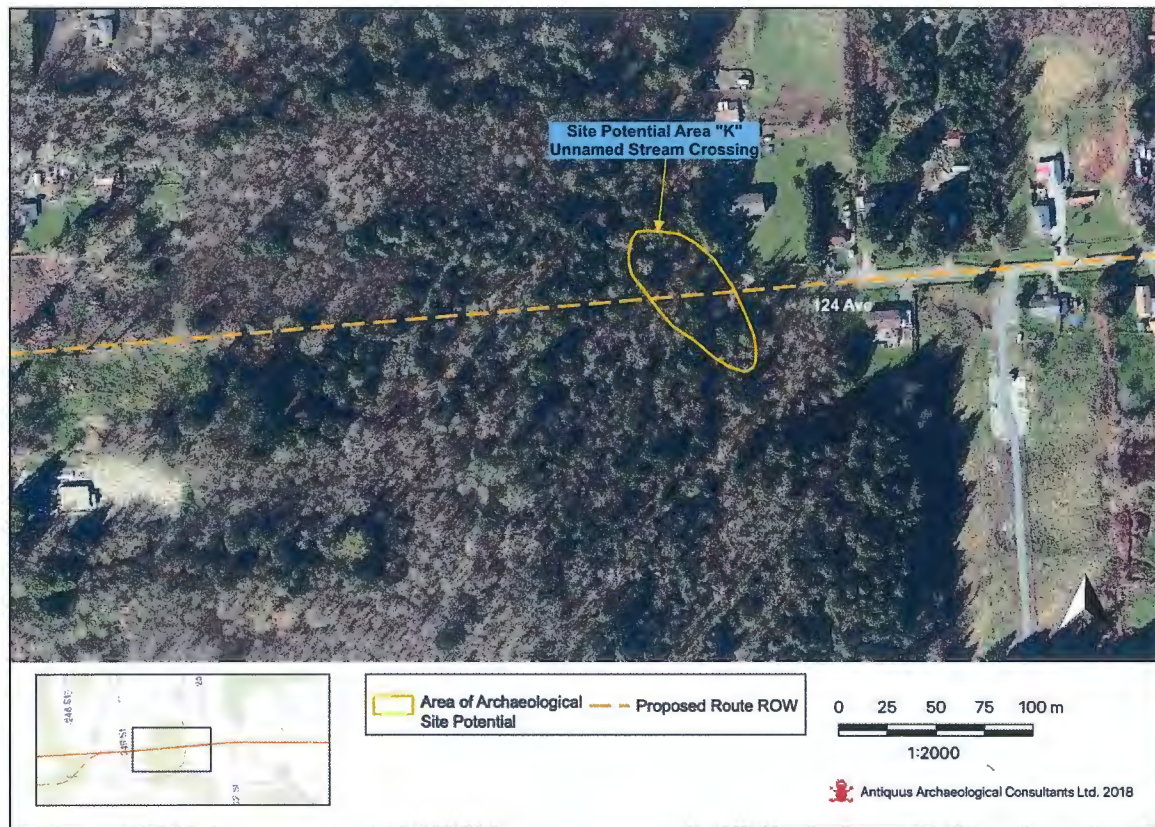


Figure 26. Aerial map showing location of archaeological site potential area "K" at the western end of a section of 124th Avenue associated with a small unnamed stream. *Adapted from City of Maple Ridge's "Ridgeview" aerial imagery archives.*



Figure 27. View of the central aspect of site potential area “K” (at 10U, 0534279 E; 5452896 N) at the west end of 124th Avenue, looking southwest. This area is associated with a small unnamed stream (lower half of photo) and relatively flat areas on both sides of the stream, and it is considered to have medium site potential for small buried lithic scatters.

4.12 Archaeological Site Potential Area “L” (Zirk Brook)

Site potential area “L” is located along the eastern aspect of the study area on an existing section of 124th Avenue about 150 m east of 252nd Street and it is associated with the confluence of two south-flowing tributary channels of Zirk Brook (Figures 5, 6, and 28 to 31). This area has been subjected to previous road construction, and disturbances related to residential development and small-scale farming. Some small loci immediately beside the stream channel appear to still be in a natural undisturbed state, and they are habitable (Figures 29 to 31). This location is considered to have **medium archaeological site potential** for the presence of pre-contact period buried lithic and bone scatters, as it occupies relatively flat well-drained terrain immediately beside the stream channels, and it is very well-suited for establishing field camps and/or resource extraction and processing foci. A pedestrian trail may have passed through this area in pre-contact period times.

Complete avoidance of this specific location will not be practical from an engineering perspective. It is presumed that future construction of the proposed road ROW in this location will involve widening that will impact both sides of 124th Street, thus the portions of site potential area “L” that lie immediately beside the existing roadway will be directly and adversely impacted (see Figures 30 and 31). There are a few small loci immediately beside the existing road that should be shovel tested should they be threatened with direct impacts. Consideration of the final road construction plans would allow a more accurate assessment of impact potential to these areas, and help to identify and select specific locations that may require subsurface shovel testing.



Figure 28. Aerial map showing location of archaeological site potential area "L" at Zirk Brook on 124th Avenue. Adapted from City of Maple Ridge's "Ridgeview" aerial imagery archives.



Figure 29. Oblique aerial image of site potential area “L” on 124th Avenue, looking northeast. This locality contains several habitable flat landforms adjacent to the confluence of two tributaries of Zirk Brook (left half of photo).



Figure 30. View of the northwest aspect of site potential area “L” (at 10U, 0534840 E; 5452904 N) on north side of 124th Avenue showing the northwest tributary channel of Zirk Brook (right), looking northwest from 124th Avenue. The eastern edge of the fenced yard in the upper half of the photo is considered to have medium potential for buried lithic scatters.



Figure 31. View of the northeast aspect of site potential area “L” on the north side of 124th Avenue showing the northeast channel of Zirk Brook (upper left), looking east along 124th Avenue. The area in the upper left and center of the photo is considered to have medium site potential for lithic scatters.

We recommend that once exact impact details are known for 124th Avenue within site potential area “L”, selected loci should be subjected to an appropriate subsurface shovel testing program within the proposed ROW impact zone prior to any land-alteration to determine whether or not any cultural materials are buried there. This subsurface testing would be conducted under a HCA Section 14 permit for a detailed AIA inspection. See Section 5.1.2 for more details. Since this impact zone is relatively small, and only a few selected areas within the proposed ROW may require subsurface testing, a relatively low number of shovel tests should be sufficient to determine if any archaeological concerns lie there.

4.13 Archaeological Site Potential Area “M”

Site potential area “M” is located near the eastern aspect of the study area at the intersection of 124th Avenue and 256th Street, and it is directly associated with a permanent unnamed stream channel and flat terrain on the west side of the channel (Figures 6 and 32 to 34). The existing roadway on 256th Street and immediately adjacent sections of residential yards have been subjected to previous road construction, occasional disturbances related to residential development and yard enhancement, and activities related to small-scale farming. Construction of 256th Street has imposed the greatest damage to natural deposits in this location, but there are still a few small relatively intact places at this intersection that could be subjected to shovel testing. This location is considered to have **medium archaeological site potential** for the presence of pre-contact period buried lithic and bone scatters, as it occupies relatively flat well-drained terrain immediately beside the stream channel, and it is well-suited for establishing field camps and/or resource extraction and processing foci. A pedestrian trail may have passed through this area in pre-contact period times.



Figure 32. Aerial map showing location of archaeological site potential area "M" at the intersection of 124th Avenue and 256th Street. Adapted from City of Maple Ridge's "Ridgeview" aerial imagery archives.



Figure 33. Oblique aerial image view of site potential area “M” at the intersection of 124th Avenue and 256th Street, looking west. It lies immediately west of a small stream channel, and is considered to have medium site potential for buried lithic scatters.



Figure 34. View of the northwest aspect of site potential area “M” (at 10U, 0535508E; 5452879 N) at the intersection of 256th Street (lower photo) and 124th Avenue, looking west. The existing road ROW and eastern edge of the residential yard (upper half of photo) lie immediately west of a small stream, and this area is considered to have medium site potential for buried lithic scatters.

Complete avoidance of site potential area “M” may not be practical from an engineering perspective, as it is most logical and practical to maintain the new Abernethy Way ROW so that it aligns with existing sections of 124th Avenue. It is presumed that future construction at this intersection will involve an impact for the new ROW as well as widening that will impact both sides of 256th Street (see Figures 32 to 34). There are a few small loci immediately beside the existing road and adjacent to the road in residential yards that should be shovel tested if they are threatened with direct impacts. Consideration of the final road and intersection construction plans would allow a more accurate assessment of impact potential to these areas, and help to identify specific locations that may require subsurface shovel testing.

We recommend that once exact impact details are known for the intersection at 124th Avenue and 256th Street within site potential area “M”, selected loci should be subjected to an appropriate subsurface shovel testing program within the proposed ROW impact zone prior to any land-alteration to determine whether or not any cultural materials are buried there. This subsurface testing would be conducted under a HCA Section 14 permit for a detailed AIA inspection. See Section 5.1.2 for more details. Since this site potential area is relatively small, and only a few selected areas within the proposed ROW may require subsurface testing, a relatively low number of shovel tests should be sufficient to determine if any archaeological concerns lie there.

4.14 Possible Early Post-Contact Period (Historic) Residential Structures

During our visual inspection of the west-central aspect of the proposed ROW route option “2A/2B” at the intersection of 123rd Avenue and 238th Street we glimpsed two older structures about 50 to 75 m south of 123rd Avenue in the back yard of a residence (Figures 3 and 12). While these structures, which appear to be a house and barn, are not within the proposed new road ROW impact zone they may be of potential local historic interest. Admittedly, we did not get a close look at them, but from a distance they had general structural features that suggest they *might* date to the early 1900s. Consultation of the early first lot-holder map for the late 1800s and early 1900s (Figure 7) suggests that this property was previously owned by F. Czar “*et al.*” (family?), and the Baillie family. It is possible that these structures could relate to either of these early settler families, or perhaps another more recent occupation dating to the mid-1900s.

Since there is no potential conflict between these *possible* early farming structures and the proposed new road ROW impact zone, no further management actions or recommendations are necessary. Nevertheless, since the structures are near the proposed ROW, the current occupants of the property may be able to provide some general oral information about the age of the buildings and the people who constructed and used them. If they predate 1950, a brief accounting of their age and purpose, and photographs of the structures, may be considered prudent and included in a subsequent AIA report.

5.0 MANAGEMENT RECOMMENDATION OPTIONS AND COMMENTS

Antiquus' 2018 AOA field inspection identified 13 specific locations ("A" to "M") considered to have either medium or high archaeological site potential that lie within and/or immediately adjacent to the currently proposed ROW route options related to the eastward extension of Abernethy Way between 232nd Street and 256th Street in Maple Ridge (Sections 2.0 and 4.0; Figures 2 to 6). The remaining intervening sections of proposed road construction impact zone route options are deemed to lie within areas considered to have low archaeological site potential due to the lack of associated aquatic features and topographic landforms conducive to human occupation and use. In our opinion, these latter low site potential areas do not deserve any additional pre-development archaeological resource management attention.

This section of the AOA report presents several future management recommendation options for medium and high archaeological site potential areas "A" to "M". Comments, suggestions, potential impact status, and recommendations presented for each site potential area in Section 4.0 should be considered along with comments and recommendations provided below. This will ensure proper identification, assessment and management of any buried archaeological deposits that may be threatened with adverse impacts relating to road construction activities.

5.1 Future Management Considerations and Options for Site Potential Areas "A" to "M"

Archaeological site potential areas "A" to "M" have all been assessed as having either medium or high archaeological site potential for pre-contact period lithic/faunal scatters. Most of these are in potential direct conflict with the currently proposed ROW option routes (Sections 2.0 and 4.0; Figures 3 to 6). Future land-altering machine activities related to tree removal and road bed excavation and construction could pose a threat of direct adverse impacts to any buried cultural deposits that may be located within these specific areas. The general management options presented below are aimed at eliminating or mitigating identified potential adverse impact conflicts.

5.1.1 Option 1: Complete Avoidance of Areas with Medium or Greater Site Potential

The most preferred management option for conflicts identified between a proposed impact zone and an area of identified archaeological potential is complete avoidance. This option is the simplest and least costly management choice from an archaeological management perspective, and it would ensure continued protection and integrity of any buried cultural deposits. However, complete relocation of the proposed route to avoid these 13 site potential areas is simply not practical or feasible in some cases, especially along existing sections of 124th Avenue (i.e., site potential areas "A", "B", "K", "L" and "M"). Sections of these latter areas lying within the proposed new road ROW that cannot be avoided, or are being considered as a possible final route option, should be subjected to some subsurface testing during an AIA inspection (Option 2 below).

The central aspect of the ROW corridor study area has several proposed route options that are currently being considered for the eventual final location (Figures 2 to 4). Route options located along or near Latimer Creek are in potential conflict with archaeological site potential areas "C" to "J" (Figures 3, 4, 12, 15, 21 and 22). *High site potential areas "C", "F" and "J" are the largest, and potentially the most problematic and expensive from archaeological site identification and management perspectives. If possible, these three high site potential areas should be completely avoided to reduce costs associated with intensive subsurface testing to*

determine whether or not any sites exist within them during and AIA (see below), and to avoid the possibility of needing to engage in expensive detailed archaeological hand-excavations to mitigate direct adverse impact conflict situations prior to any land-altering construction activities. When considering and assessing each of the road ROW route options vis-à-vis potential conflicts with archaeological sites, **proposed route options “3A” and “3B” would require the least amount of further site discovery and attention during an AIA (and any future follow-up management) compared to other proposed routes.**

It is important to keep in mind that some of these medium and high site potential areas may actually ***not*** contain any buried archaeological deposits, ***but it remains that actual presence or absence of archaeological sites can only be properly determined by conducting a systematic and judgmental subsurface shovel testing program during an archaeological impact assessment (AIA) as outlined in Option 2 below.***

5.1.2 Option 2: Conducting an Archaeological Impact Assessment for Areas of Medium or Greater Site Potential Conflicting With the Final Road ROW Impact Zone

When a final road ROW route is determined, portions of the identified site potential areas that lie within the proposed final road construction impact zone should be subjected to further field investigations to determine whether or not any buried archaeological deposits are present. ***It is our opinion that an “archaeological impact assessment” (AIA) study involving systematic and judgmental shovel testing programs should be conducted in order to identify and adequately assess any buried archaeological concerns lying within the proposed impact zones at threatened site potential areas prior to initiation of any land-altering construction activities.*** An AIA inspection will identify and determine the nature, spatial extent and overall significance ranking of any archaeological deposits in direct conflict with the proposed road ROW impact zones, and will also provide data necessary to develop an appropriate management plan for avoiding and/or mitigating conflicts. Keep in mind that the AIA shovel testing program ***may*** yield negative results in most or all of the 13 locations that we have identified as having medium or greater site potential, thus intentional avoidance by relocation and/or the need for any additional mitigation measures could be negated, or significantly minimized. The size and scope of an AIA inspection to be conducted for the final road ROW route will depend on which route option is eventually adopted.

An AIA study must be carried out under a “Heritage Conservation Act (HCA) Section 14 Heritage Inspection Permit” that is applied for by the archaeological consultant on behalf of the proponent, and obtained from the Archaeology Branch in Victoria. This detailed permit application is prepared by the consulting archaeologist with assistance from the proponent, and the review process includes a 30-day First Nation review period. Time required for the Archaeology Branch to review and issue an AIA permit can vary, but the current standard issuing time is about 90 days. Relevant First Nation permits are also required, and they are usually issued within two or three weeks following application submission.

5.2 Concluding Remarks

The results and recommendations presented in this AOA report are those of Antiquus and we alone are responsible for the content of this report and any errors and/or shortcomings. It should also be noted that some of the findings and recommendations may, or may not, be supported by the Archaeology Branch in Victoria or local First Nations communities and governing agencies involved. Lastly, this AOA report was prepared without prejudice to Aboriginal rights and title.

6.0 REFERENCES CITED

Archaeology Branch,

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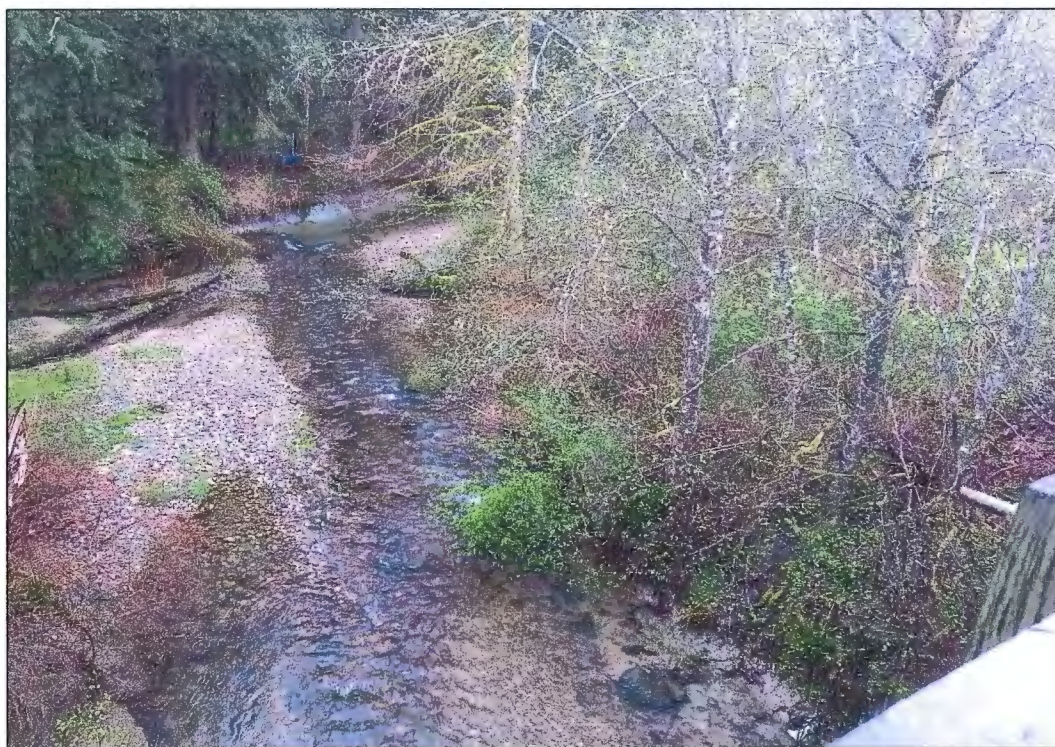
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**ADDENDUM FOR ADDITIONAL ROUTES FOR AN
ARCHAEOLOGICAL OVERVIEW ASSESSMENT (AOA) CONDUCTED
FOR PROPOSED POTENTIAL R-O-W ROUTE OPTIONS RELATED TO
EASTWARD EXTENSION OF ABERNETHY WAY FROM 232ND STREET
TO 256TH STREET IN MAPLE RIDGE, B.C.**

A NON-PERMIT REPORT



Kirsten Boettger (MSc.)

Lauren Hearty (BA)



Antiquus Archaeological Consultants Ltd.

Maple Ridge, B.C.

April 18, 2019

**ADDENDUM FOR ADDITIONAL ROUTES FOR AN
ARCHAEOLOGICAL OVERVIEW ASSESSMENT (AOA) CONDUCTED
FOR PROPOSED POTENTIAL R-O-W ROUTE OPTIONS RELATED TO
EASTWARD EXTENSION OF ABERNETHY WAY FROM 232ND STREET
TO 256TH STREET IN MAPLE RIDGE, B.C.**

A NON-PERMIT REPORT

Prepared for:

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Prepared by:

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April 18, 2019

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Affiliation: Antiquus Archaeological Consultants Ltd.

ADDENDUM FOR ADDITIONAL ROUTES FOR AN ARCHAEOLOGICAL OVERVIEW ASSESSMENT (AOA) CONDUCTED FOR PROPOSED POTENTIAL R-O-W ROUTE OPTIONS RELATED TO EASTWARD EXTENSION OF ABERNETHY WAY FROM 232ND STREET TO 256TH STREET IN MAPLE RIDGE, B.C.

1.0 INTRODUCTION AND BACKGROUND

On April 17th, 2019 Antiquus Archaeological Consultants conducted an in-field preliminary field reconnaissance (PFR) visual inspection as part of an archaeological overview assessment (AOA) for two additional ROW routes relating to the eastward extension of Abernethy Way from 240th Street to 256th Street. Antiquus previously conducted an AOA for 5 ROW routes proposed for the Abernethy Way extension project (232nd Street to 256th Street) on behalf of McElhanney Consulting Services Ltd. who has been contracted by the City of Maple Ridge. Ms. Selena Wilson oversaw this AOA study on behalf of McElhanney. This archaeological overview assessment (AOA) included a background information search, and a PFR visual inspection of the proposed ROW route options (Figure 1). The fieldwork component of this AOA was directed by Antiquus senior archaeologist Mike Rousseau, who was assisted by staff members Kirsten Boettger and Lauren Hearty. Dale Wadsworth from Seyem Qwantlen and Shane Leboeuf from Katzie First Nation

This report is to be considered as an addendum to the AOA report ‘**An Archaeological Overview Assessment (AOA) Conducted for Proposed Potential R-O-W Route Options Related to Eastward Extension of Abernethy Way From 232nd Street to 256th Street in Maple Ridge, B.C.**’ due to the addition of two new proposed routes.

The primary objectives of this AOA study were: **(1)** to consult the BC Archaeology Branch’s “Remote Access Archaeological Database” (RAAD) to identify and revisit any previously identified sites, to seek and present general background information for this locality, and provide a summary account of background information on the study area; **(2)** to identify (locate and map) areas deemed to have medium or high archaeological or heritage site potential within the proposed route option impact zones for future management, and for consideration during selection of the final road ROW routing; **(3)** to consider the general nature, extent, intensity and duration of proposed future potential land-altering activities relating to the road ROW development project, and assess how they might affect any intact cultural deposits lying within the impact zones; **(4)** to formulate and present recommendations that will ensure effective management, assessment, protection, and/or mitigation of any significant archaeological deposits within proposed impact zones; and **(5)** to prepare and submit this AOA report to all stakeholders for future permitting and archaeological resource management purposes.

1.2 Cultural Setting and First Nation Consultation

The proposed Abernethy Way eastward extension ROW route options study area lies within the traditional territories of the Katzie First Nation, Kwantlen First Nation, and Stó:lō Nation, who speak dialects of the Halq'emeylem linguistic family. Heritage inspection permits were obtained from the Kwantlen First Nation (Seyem' Qwantlen Business Group Permit No. SQ 2019-69), and from Stó:lō Nation's Stó:lō Research and Resource Management Centre (Stó:lō Heritage Investigation Permit No. 2019-067). Ms. Ashley Doyle reviewed and issued the permit on behalf of Kwantlen First Nation, and Ms. Cara Brendzy did the same for Stó:lō Nation. Electronic and hard (paper) copies of this AOA final report have been submitted to the above First Nation agencies for their review, archives, and future management purposes. We will be available to address any questions or concerns these First Nation agencies may have regarding the content of this report, or recommendations presented.

1.3 Previous Archaeological Investigations

The Remote Access Archaeological Database (RAAD) registry maintained by the Archaeology Branch in Victoria indicates ***there are no previously recorded sites lying within 1.5 km of the proposed ROW route option impact zones.*** This does not mean that archaeological sites do not exist or are not expected within or near the study area, it is merely a reflection of the fact that this northeastern part of Maple Ridge has not been subjected to any previous intensive in-field archaeological site inventory surveys.

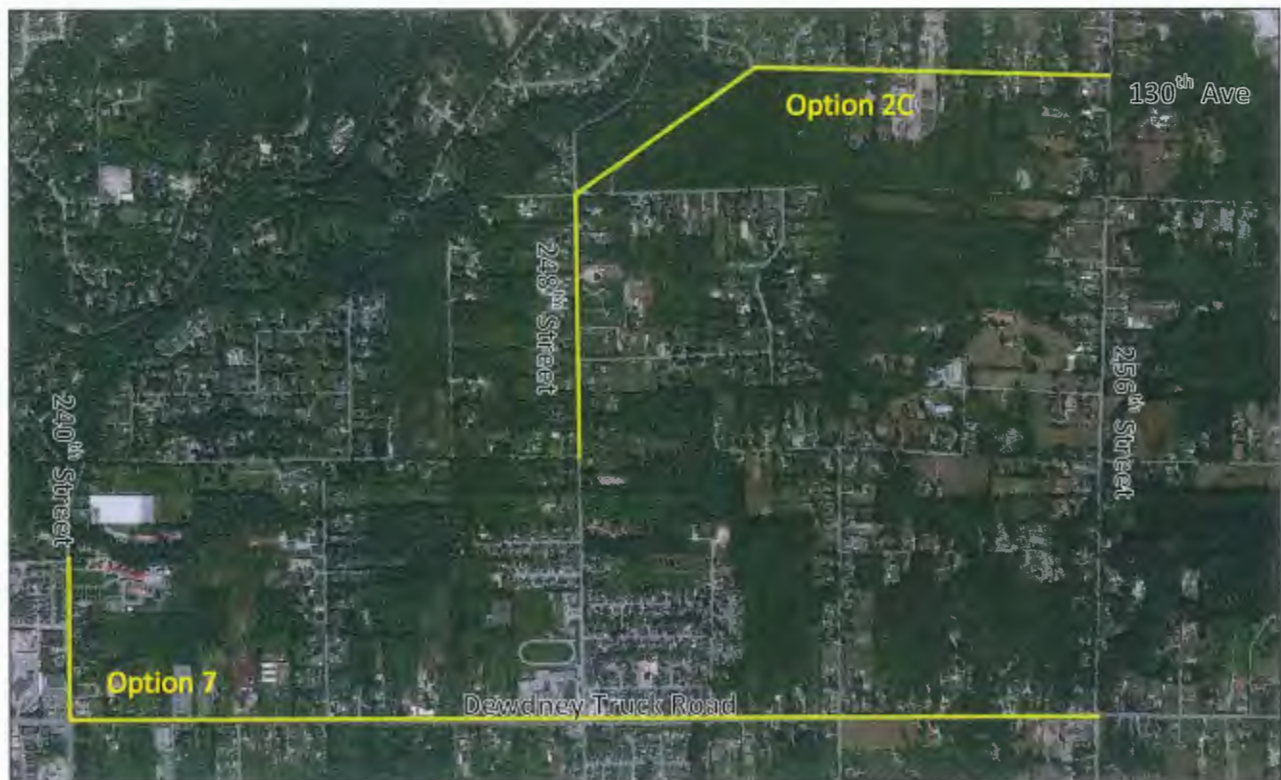


Figure 1. Map showing the location of the two new additional routes from 240th Street to 256th Street and 248th Street to 130th Ave in Maple Ridge, B.C. The route options were visually inspected to assess archaeological site potential during the PFR fieldwork component of this AOA. Map, Google Satellite Map, 2019.

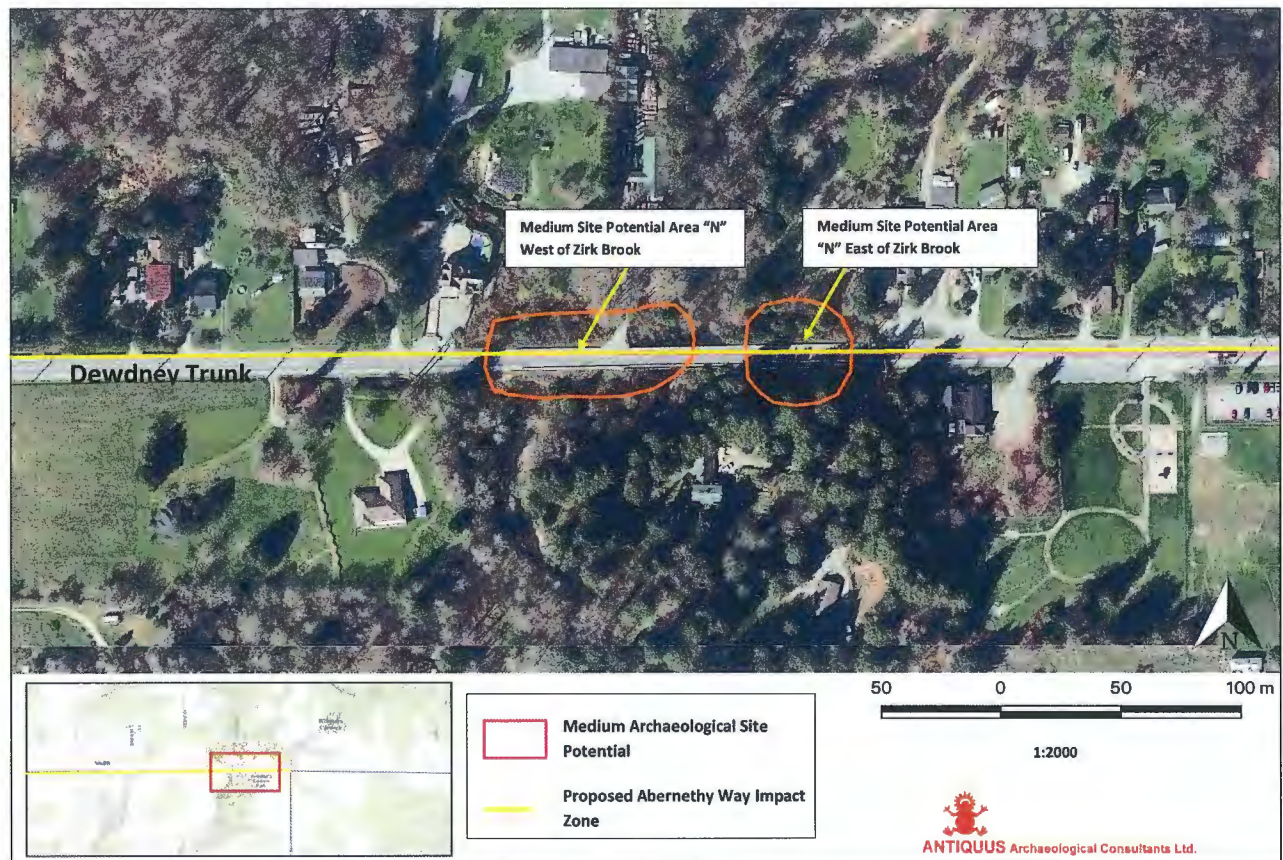


Figure 2. Aerial image showing the proposed route ROW 'Option 7' and identified areas of medium archaeological site potential. Ridgeview Maps, 2019.

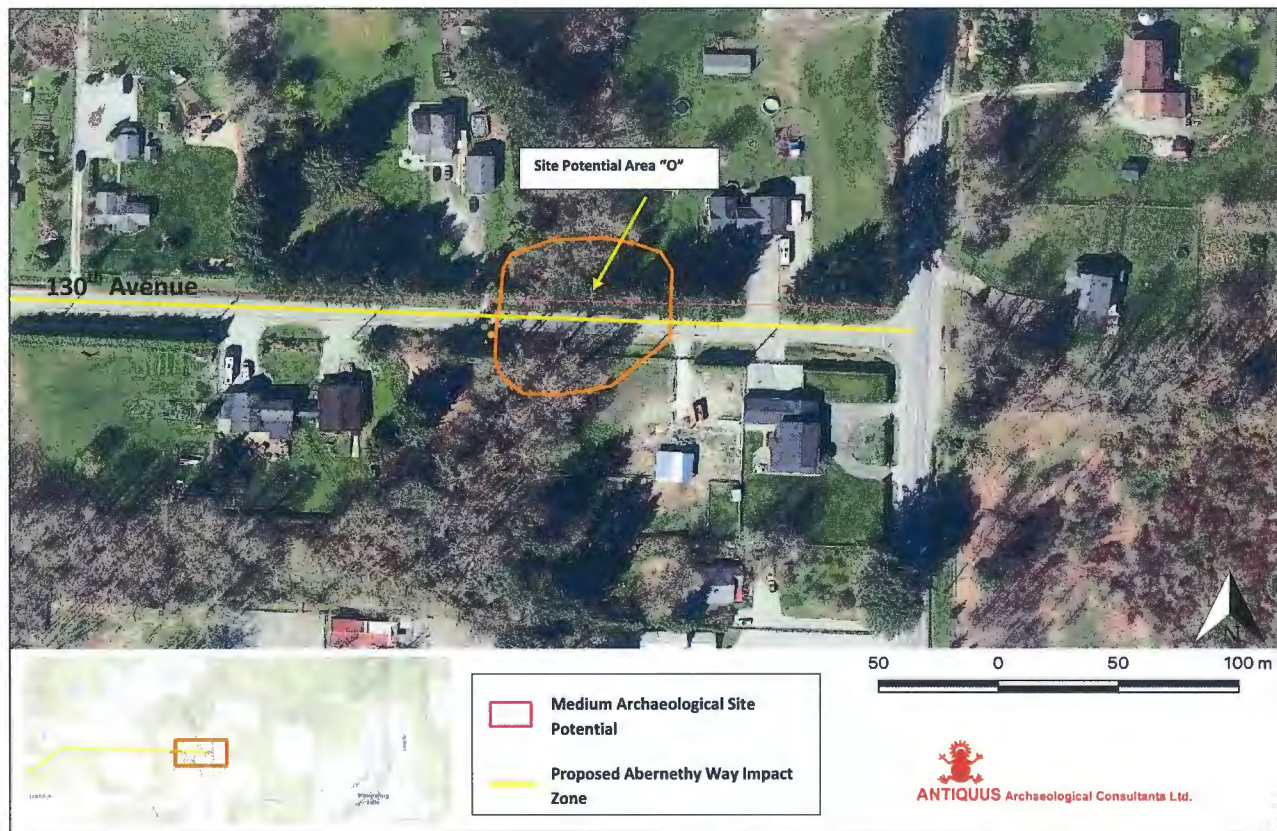


Figure 3. Aerial image showing the proposed route ROW 'Option 2C' and identified medium archaeological site potential. *Ridgeview Maps, 2019.*

2.0 ARCHAEOLOGICAL OVERVIEW ASSESSMENT RESULTS

The PFR inspection conducted on April 17, 2019, identified 2 specific locations (designated as “N” and “O”; previous locations were designated “A” through “M”) associated with streams and creeks that are deemed to have medium or high archaeological site potential for pre-contact period buried “lithic scatters” within or adjacent to the proposed Abernethy Way eastward extension ROW route. These 2 locations are described below in general terms, their potential impact status with regard to the proposed road construction is assessed and discussed, and future investigation and management recommendations are provided for each site potential location to assist in the eventual formulation and implementation of an effective archaeological site discovery and impact management plan. We succeeded in undertaking a close visual inspection of the proposed road ROW route options. The proposed routes generally correspond with existing roadways, which allowed easy access and quick effective assessments.

2.1 Area of Archaeological Site Potential “N”



Figure 4. View of Zirk Brook from the bridge crossing looking southwest. The areas adjacent to the brook are flat and well drained and relatively undisturbed from the previous bridge development.



Figure 5. Another view of Zirk Brook looking south, flat areas can be observed in close proximity to bridge. Areas immediately adjacent to the bridge should be tested if Option 7 is chosen.

Site potential area “N” is located approximately 300 m west of the intersection of Dewdney Truck Road and 256th Street overlooking the bridge crossing of Zirk Brook. The existing road (Dewdney Truck Road), bridge crossing and adjacent residential developments have already subjected to severe disturbances due to the urbanization of the area. The Dewdney Truck Road bridge crossing would have required the deposition of fill to narrow the channel to allow for the construction of the bridge. Despite the fill being deposited on the banks of Zirk Brook there are still low-laying flat areas immediately adjacent to the Brook on the north and south sides of the bridge. Some small flat loci immediately beside the brook appear to still be in a natural undisturbed state. This location is considered to have **medium archaeological site potential** for the presence of pre-contact period buried lithic and bone scatters, as it occupies relatively flat well-drained terrain immediately side the brook channel. Specific development recommendations for this AOP can be found in Section 3.1

2.2 Area of Archaeological Site Potential “O”



Figure 6. View looking south from 130th Ave looking onto the unnamed creek. A flat area can be observed in the background which would be a loci for shovel testing should Option 2C be chosen as the final route.

Site potential area “O” is located approximately 100 m west of the intersection of 256th Street and 130th Avenue. Area “O” is located on 130th Ave crossing an unnamed creek. On both north and south side of 130th Ave there are small flat loci immediately beside the creek which appear to be undisturbed and well-drained (Figure 3). This location is considered to have **medium archaeological site potential** for the presence of pre-contact period buried lithic and bone scatters. It occupies relatively flat well-drained terrain immediately beside the stream channel, and it is well-suited for establishing field camps and/or resource extraction and processing foci. Specific development recommendations for this AOP can be found in Section 3.1.

3.0 MANAGEMENT RECOMMENDATION OPTIONS AND COMMENTS

Antiquus' 2019 AOA field inspection identified 2 specific locations ("N" to "O") considered to have medium archaeological site potential that lie within and/or immediately adjacent to the currently proposed ROW route options related to the eastward extension of Abernethy Way between 240th Street and 256th Street in Maple Ridge. The remaining intervening sections of proposed road construction impact zone route options are deemed to lie within areas considered to have low archaeological site potential due to the lack of associated aquatic features and topographic landforms conducive to human occupation and use. In our opinion, these latter low site potential areas do not deserve any additional pre-development archaeological resource management attention.

3.1 Future Management Considerations and Options for Site Potential Areas "N" to "O"

Archaeological site potential areas "N" to "O" have all been assessed as having either medium or high archaeological site potential for pre-contact period lithic/faunal scatters. Most of these are in potential direct conflict with the currently proposed ROW option routes. Future land-altering machine activities related to tree removal and road bed excavation and construction could pose a threat of direct adverse impacts to any buried cultural deposits that may be located within these specific areas. The general management options presented below are aimed at eliminating or mitigating identified potential adverse impact conflicts.

3.1.1 Option 1: Complete Avoidance of Areas with Medium or Greater Site Potential

The most preferred management option for conflicts identified between a proposed impact zone and an area of identified archaeological potential is complete avoidance. This option is the simplest and least costly management choice from an archaeological management perspective, and it would ensure continued protection and integrity of any buried cultural deposits. However, complete relocation of the proposed route to avoid these 2 site potential areas is simply not practical or feasible in some cases, especially along existing sections of Dewdney Truck Road. Sections within the proposed new road ROW that cannot be avoided, or are being considered as a possible final route option, should be subjected to some subsurface testing during an AIA inspection (Option 2 below).

It is important to keep in mind that these medium site potential areas may actually *not* contain any buried archaeological deposits, *but it remains that actual presence or absence of archaeological sites can only be properly determined by conducting a systematic and judgmental subsurface shovel testing program during an archaeological impact assessment (AIA)* as outlined in Option 2 below.

3.1.2 Option 2: Conducting an Archaeological Impact Assessment for Areas of Medium or Greater Site Potential Conflicting With the Final Road ROW Impact Zone

When a final road ROW route is determined, portions of the identified site potential areas that lie within the proposed final road construction impact zone should be subjected to further field investigations to determine whether or not any buried archaeological deposits are present.

It is our opinion that an “archaeological impact assessment” (AIA) study involving systematic and judgemental shovel testing programs should be conducted in order to identify and adequately assess any buried archaeological concerns lying within the proposed impact zones at threatened site potential areas prior to initiation of any land-altering construction activities.

An AIA inspection will identify and determine the nature, spatial extent and overall significance ranking of any archaeological deposits in direct conflict with the proposed road ROW impact zones, and will also provide data necessary to develop an appropriate management plan for avoiding and/or mitigating conflicts. Keep in mind that the AIA shovel testing program *may* yield negative results in most or all of the 2 locations that we have identified as having medium or greater site potential, thus intentional avoidance by relocation and/or the need for any additional mitigation measures could be negated, or significantly minimized. The size and scope of an AIA inspection to be conducted for the final road ROW route will depend on which route option is eventually adopted.

An AIA study must be carried out under a “Heritage Conservation Act (HCA) Section 14 Heritage Inspection Permit” that is applied for by the archaeological consultant on behalf of the proponent, and obtained from the Archaeology Branch in Victoria. This detailed permit application is prepared by the consulting archaeologist with assistance from the proponent, and the review process includes a 30-day First Nation review period. Time required for the Archaeology Branch to review and issue an AIA permit can vary, but the current standard issuing time is about 90 days. Relevant First Nation permits are also required, and they are usually issued within two or three weeks following application submission.

3.2 Concluding Remarks

The results and recommendations presented in this AOA report are those of Antiquus and we alone are responsible for the content of this report and any errors and/or shortcomings. It should also be noted that some of the findings and recommendations may, or may not, be supported by the Archaeology Branch in Victoria or local First Nations communities and governing agencies involved. Lastly, this AOA report was prepared without prejudice to Aboriginal rights and title.

4.0 REFERENCES CITED

Archaeology Branch,

1998 British Columbia Archaeological Impact Assessment Guidelines. Archaeology Branch, Victoria, B.C.

Environment Canada

2008 Natural Weather Data Information. weather.gc.ca

Ministry of Forests

1992 *Biogeoclimatic Zones of British Columbia.*

Rousseau, Mike and Geoff Homel

2018 *An Archaeological Overview Assessment (AOA) Conducted for Proposed Potential ROW Route Option Related to Eastward Extension of Abernethy Way from 232nd Street to 256th Street in Maple Ridge, B.C.* Non-Permit Report. Report on File at the Archaeology Branch, Victoria B.C.



APPENDIX E
GEOTECHNICAL
DESK STUDY
REPORT

**Foundations,
Excavation &
Shoring
Specialists**

April 24, 2019

Reference: 18-7850

Via email: swilson@mcelhanney.com

Braun Geotechnical
102 – 19049 95a Ave
Surrey, BC
V4N 4P3
Tel: 604-513-4190
Fax: 604-513-4195
info@braungeo.com

www.braungeo.com

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Natural Hazards

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and Management**

**Reinforced Soil
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McElhanney Consulting Services Ltd.
Suite 2300 – Central City Tower
Surrey, BC V3T 5X3

Attn: Selena Wilson, P.Eng.

**Re: Geotechnical Desk Study Report
City of Maple Ridge – Abernethy Way Extension
Abernethy Way, 232 to 256 Street, Maple Ridge, BC**

1.0 INTRODUCTION

This report provides preliminary geotechnical comments and discussion of relating to route selection for the Abernethy Way Extension between 232 and 256 Street, in the City of Maple Ridge, BC. It is understood that the proposed roadway extension may comprise four travel lanes (ultimate) to link with the widened 128 Avenue/Abernethy Way. The geotechnical work was limited to a desk study review and site reconnaissance completed in general accordance with the Braun Geotechnical proposal dated September 8, 2017 (our ref. P17-5608).

2018 Alignments - Selected Options:

Initial work during the study considered five roadway alignment options as shown on the enclosed McElhanney Key Plan – Selected Options (PB 18/07/05 Issued for discussion) and generalized as follows.

Options 2A & 2B followed 124 Avenue east to 236 Street, then southeast to 237 Street, and east along 123 Street and traversed the north side of Hackers Haven golf course. The options then headed northeast to 124 Avenue, with options 2A and 2B crossing Latimer Creek at different locations. The proposed options then head east to 256 Street, predominantly on existing roadway, with some greenfield rural land.

Options 3A, 3B & 6 followed 124 Avenue east to 236 Street alignment, then southeast to 237 Street and east along the south side of Hackers Haven golf course. From 240 Street the various options tend northeast to rejoin with 124 Avenue alignment.

The five proposed options merge by 248 Street and follow 124 Avenue east to 256 Street, then north along 256 Street to 128 Avenue, where the study area is complete.

2019 Alignments – 3 Options:

Initial work was used to develop three preferred alignments as shown on the enclosed McElhanney Key Plan – 3 Options (PB 19/03/29 Issued for discussion) and generalized as follows:

Route options were consistent between 232 Street and 240 Street following the existing 124 Avenue east to 236 Street, then southeast to 237 Street and east to 240 Street. The alignment approaching 240 Street was located within the south side of the Hackers Haven golf course, slightly north of earlier alignments at this section while still avoiding some of the deep Latimer Creek gullies that exist to the north.

Alignment option 7 proceeds south along 240 Street to Dewdney Trunk Road (DTR) and follows the DTR alignment east to the limit of the study at 256 Street.

Historical air photos available for all decades dating from 2004 back to 1940's were reviewed. Obvious visible features and/or tones to indicate past or incipient slope movements on or in the immediate vicinity of the proposed Abernethy extension were not observed on the air photographs. However, the slope areas along the proposed alignment are typically tree covered and may have obscured slope movements especially within the deep gullies of Latimer Creek.

A map of the study area, showing the location of the study area (SA) and the location of the study area (SA) in the study area. The map includes labels for various locations: PT, FLb, FLe, FLc, and SA. A red rectangle highlights the study area (SA) and the location of the study area (SA) in the study area.

3.0 PRELIMINARY GEOTECHNICAL DISCUSSION

Avoidance of the deep Latimer Creek Gully within the north area of Hackers Haven golf course (immediately west of 240 Street) as shown on some of the 2018 routes would be desirable for

geotechnical considerations. The 2019 alignment options are considered favourable with respect to geotechnical aspects. The roadway extension is generally aligned along Fort Langley Formation soils, with the soil condition expected to be reasonably consistent.

Soils are expected to be suitable for direct subgrade support of embankments and road pavements using conventional municipal roadway construction methods. Permanent cuts and fills should be sloped at gradients of 2H:1V or flatter.

It is noted that soil variations can be expected through the different types of the Fort Langley Formation and where topographic changes occur along the alignment. Intrusive geotechnical exploration along the roadway alignment/s is should be used to evaluate actual subsurface conditions in order to provide specific geotechnical roadway and crossing recommendations.

The following sections discuss some specific route aspects by segment:

232 to 240 Street (Options 2C, 7, 10)

Crossing of Coho Creek would likely be achieved using a culvert which is satisfactory for geotechnical considerations. Mechanically stabilised earth (MSE) type headwalls are appropriate if selected for this crossing.

240 to 248 Street

Options 2C & 10

West Crossing of Latimer Creek

- If required a Bridge crossing should likely be founded on driven steel pipe piles (~0.6m diameter steel pile). Culvert crossing with substantial fills would also be feasible for geotechnical aspects.
- Erosion of Latimer Creek slopes in the vicinity of proposed crossings should be evaluated during advancement of project designs.

East Crossing of Latimer Creek

- Crossing likely achieved using culvert, which is satisfactory for geotechnical considerations.
- Mechanically stabilised earth (MSE) headwalls are appropriate if selected for the crossing.

Option 7

- Alignment is on existing roads which would be desirable for geotechnical/pavement aspects (ie construction cost pavement rehabilitation vs full road construction).

248 to 256 Street

Option 2C

- Zirk Brook crossing likely achieved using culvert, which is satisfactory for geotechnical considerations. Mechanically stabilised earth (MSE) headwalls are appropriate.

Option 7

- For stream east of 252 Street and west of 256 Street, bridge founded on driven steel pipe piles (~0.6m diameter steel pile) or potentially gully fill with culvert would be feasible.

Option 10

- Zirk Brook crossing likely achieved using culvert, which is satisfactory for geotechnical considerations. Mechanically stabilised earth (MSE) headwalls are appropriate.

4.0 ASPHALT PAVEMENT – DESIGN SECTION

Preliminary recommended minimum design pavement structure for the Abernethy Connector extension is provided below.

Preliminary Pavement Design – Abernethy Way Extension

Thickness	Materials
150mm ¹	Hot Mix Asphalt Surface
100mm	19mm minus Crushed Granular Base (CGB)
450mm	75mm minus Select Granular Subbase (SGSB)

Notes: ¹Asphalt surfacing should be placed in two lifts of 100mm and 50mm for the base and surface course may comprise MMCD compliant Lower Course #1 and Upper Course #1, respectively.

5.0 FUTURE GEOTECHNICAL WORK

Future Geotechnical work would include, but not be limited to the following:

- Geotechnical subsurface exploration & reporting;
- Detailed stream crossing designs;
- Structural assessment of the existing pavement areas and confirmation on pavement design section based on forecast traffic data;
- Detailed Geotechnical Assessment of slopes;
- Detailed slope stability analysis and development of retaining wall designs.

6.0 CLOSURE

The work was completed to assist with identifying a preferred route selection for development of a conceptual design. This preliminary report is prepared for the exclusive use of McElhanney Consulting Ltd and their designated representatives and may not be used by other parties without the written permission of Braun Geotechnical Ltd. The City of Maple Ridge may also rely on the findings of this geotechnical report.

We hope the above meets with your requirements. Should any questions arise, please do not hesitate to contact the undersigned.

Yours truly,
Braun Geotechnical Ltd.

DRAFT

Hugh MacMurray, EIT.
Geotechnical Engineer

Encl: McElhanney Key Plans (2018, 2019)

Braun Geotechnical Ltd.

DRAFT

Stuart Hrysio, P.Eng.
Geotechnical Engineer



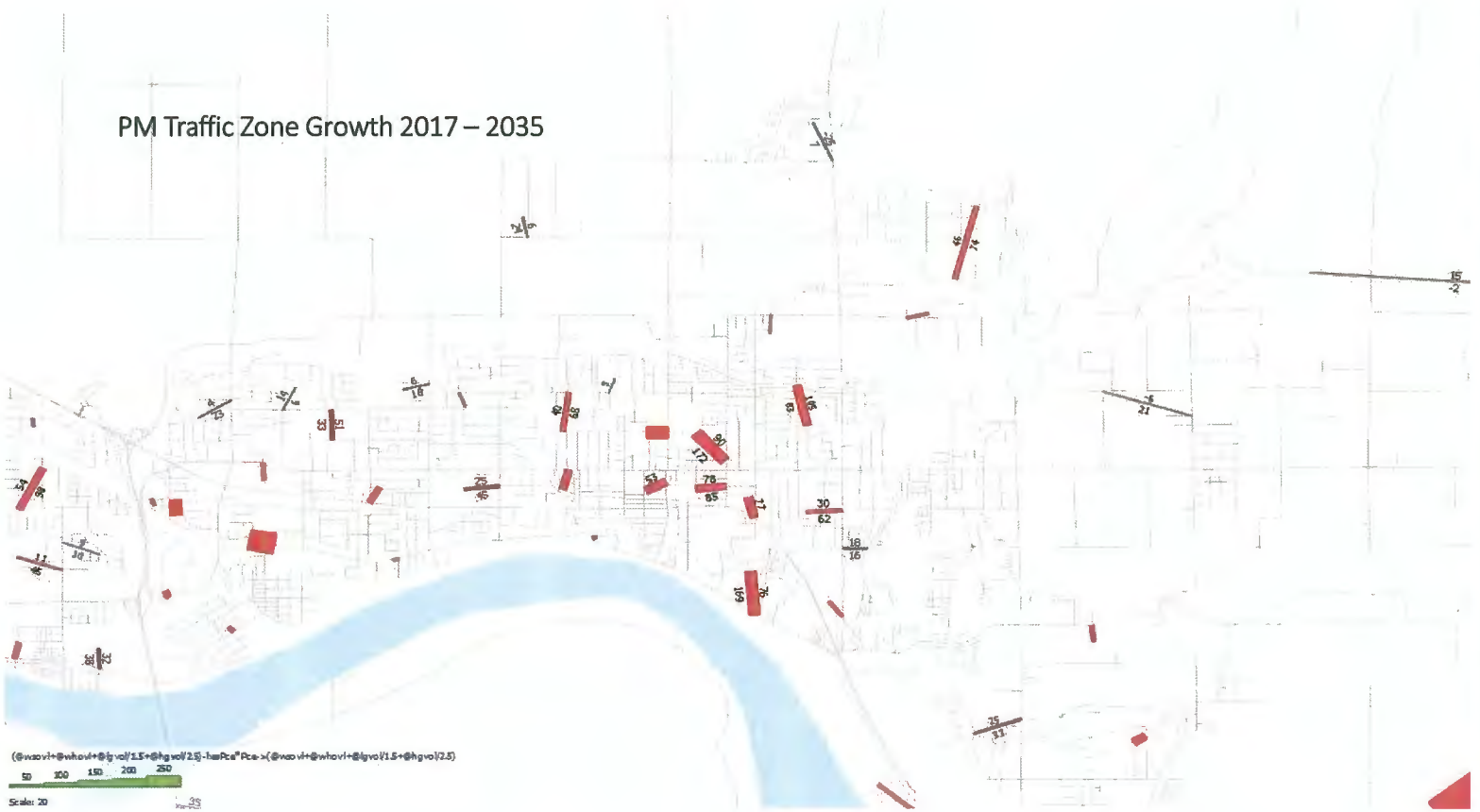
APPENDIX F

TRAFFIC DEMAND FORECAST

AM Traffic Zone Growth 2017 – 2035



PM Traffic Zone Growth 2017 – 2035



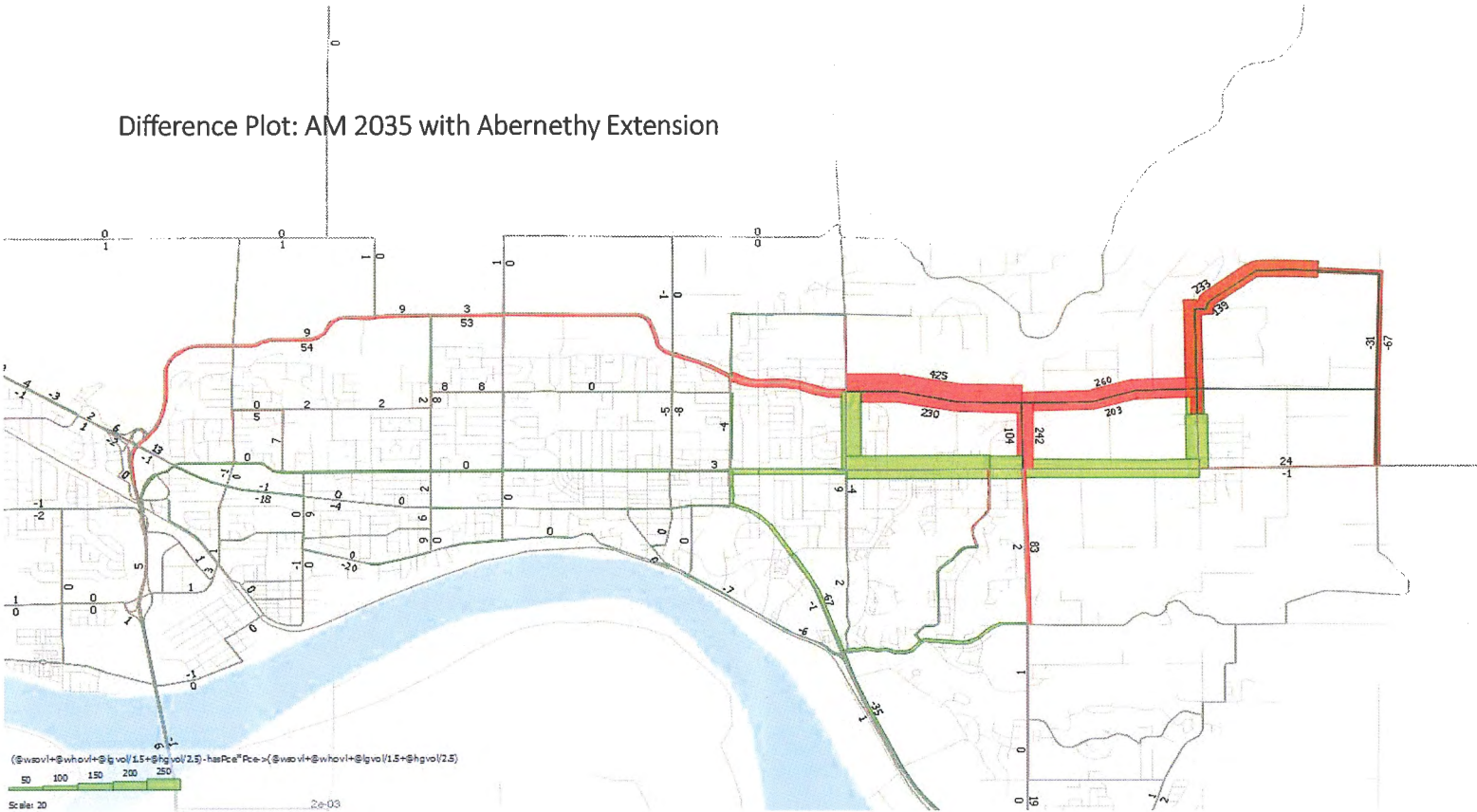
Difference Plot: AM Traffic Growth 2017 – 2035



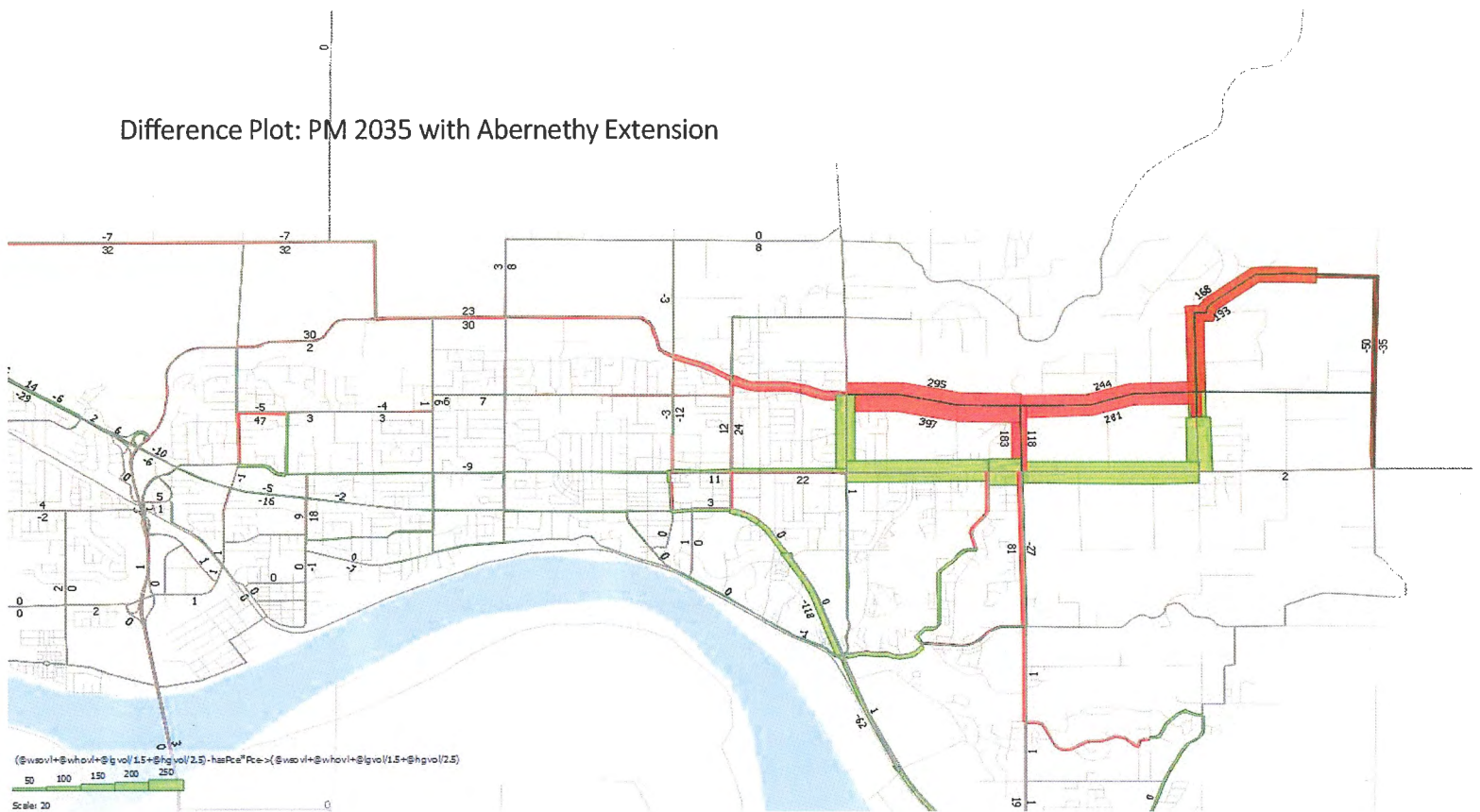
Difference Plot: PM Traffic Growth 2017 – 2035



Difference Plot: AM 2035 with Abernethy Extension



Difference Plot: PM 2035 with Abernethy Extension



AM 2035 Base Volumes (excl. Abernethy Way Extension)



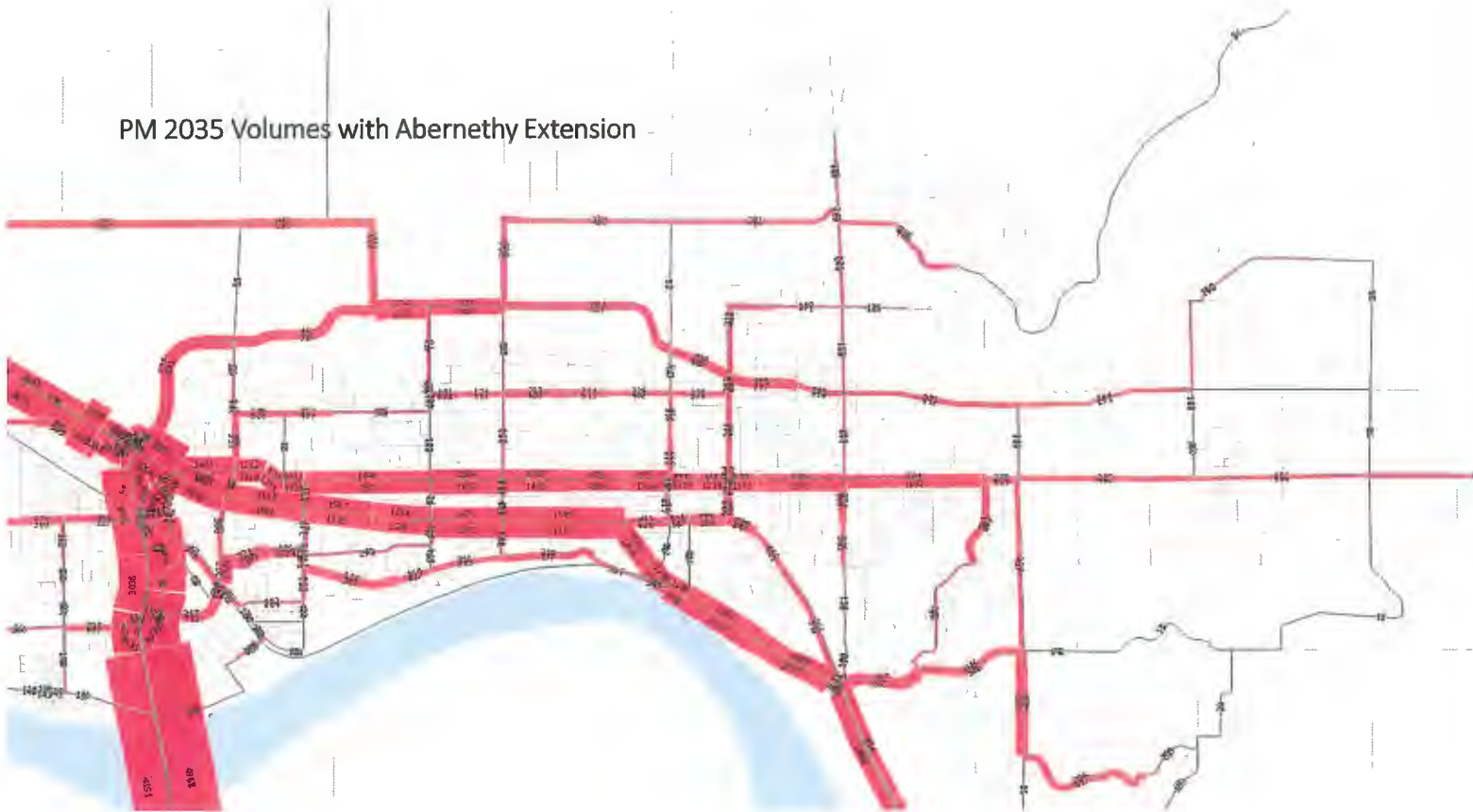
AM 2035 Volumes with Abernethy Extension



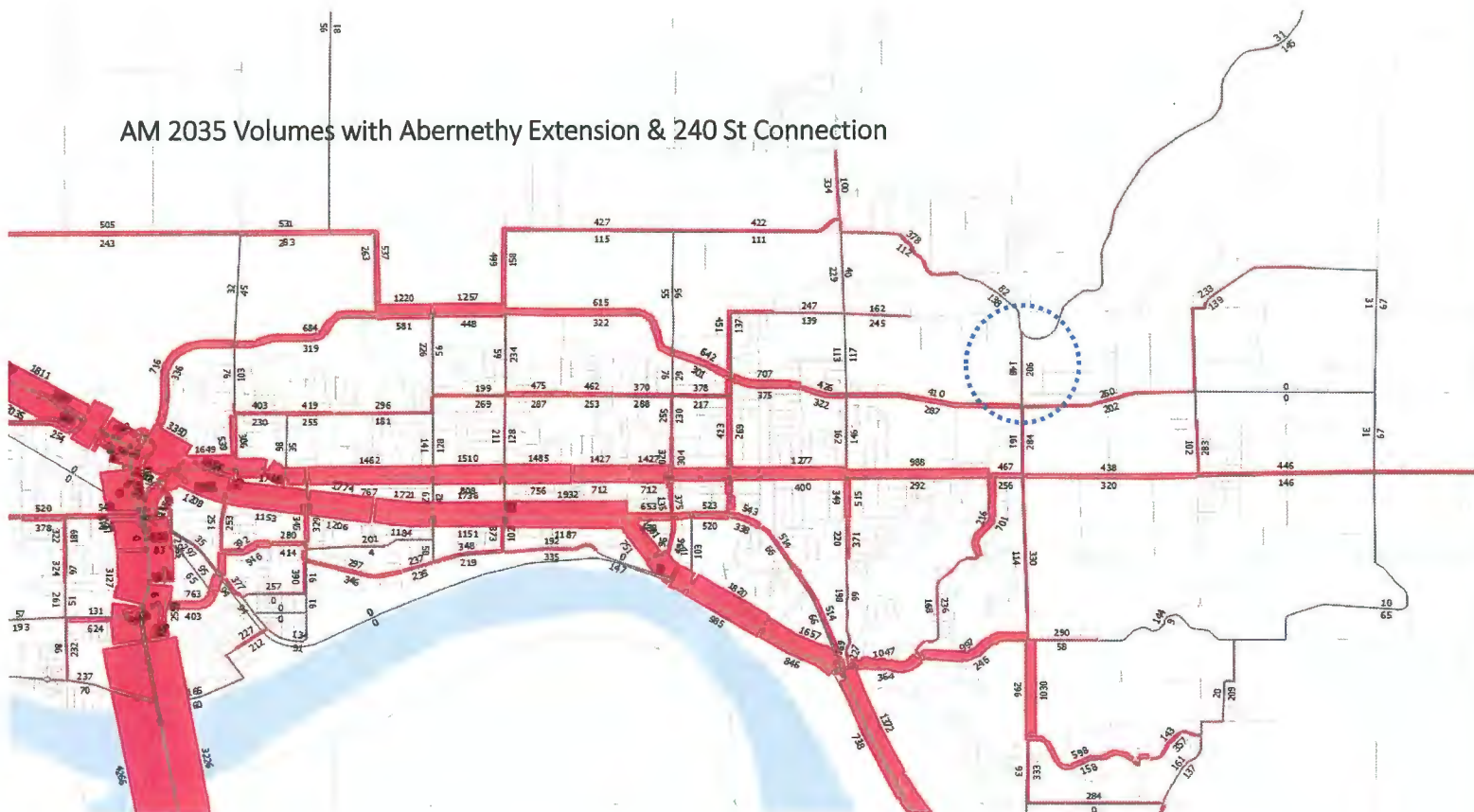
PM 2035 Base Volumes (excl. Abernethy Way Extension)



PM 2035 Volumes with Abernethy Extension

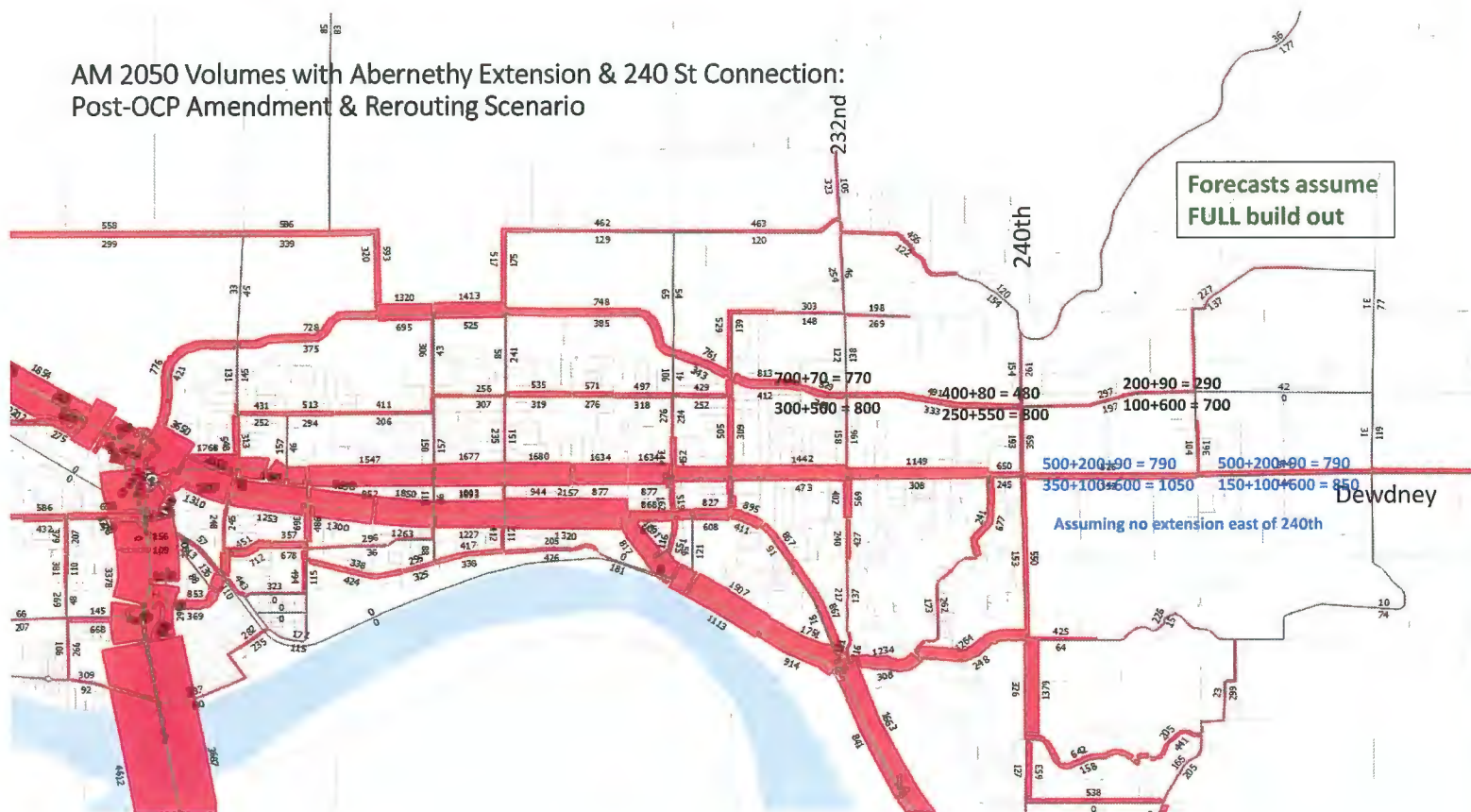


AM 2035 Volumes with Abernethy Extension & 240 St Connection

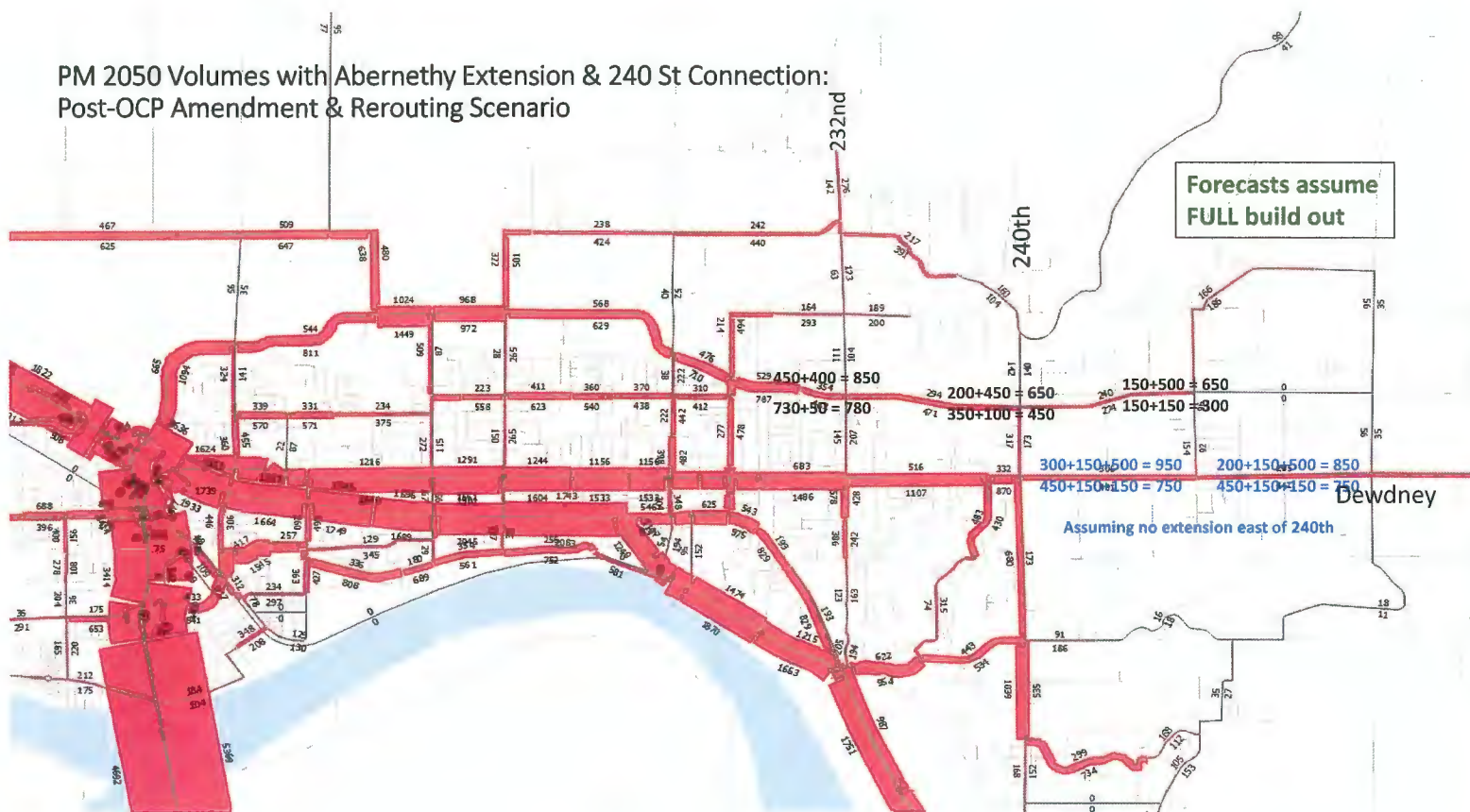


PM 2035 Volumes with Abernethy Extension & 240 St Connection

AM 2050 Volumes with Abernethy Extension & 240 St Connection:
Post-OCP Amendment & Rerouting Scenario



PM 2050 Volumes with Abernethy Extension & 240 St Connection:
Post-OCP Amendment & Rerouting Scenario





APPENDIX G

PROPERTY SUMMARY

Option 2C (Phase 3)

	Widening Area (m ²)	Land Cost	# Total Buyouts (Improvements)	Improvement cost	Additional Land Area (m ²)	Add. Land Cost	Total
ALR	23422.98	\$ 1,970,107.26	2	\$ 444,824.44	70246.03	\$ 5,908,393.35	\$ 8,323,325.05
Non-ALR	367.81	\$ 206,317.10	0	\$ -		\$ -	\$ 206,317.10
Total	23790.79	\$ 2,176,424.36	2	\$ 444,824.44	70246.03	\$ 5,908,393.35	\$ 8,529,642.15

Option 2C (Phase 4)

	Widening Area (m ²)	Land Cost	# Total Buyouts (Improvements)	Improvement cost	Additional Land Area (m ²)	Add. Land Cost	Total
ALR	45433.68	\$ 3,821,427.03	3	\$ 667,236.66	79450.01	\$ 6,682,540.42	\$ 11,171,204.10
Non-ALR	3117.41	\$ 1,748,679.52	0	\$ -		\$ -	\$ 1,748,679.52
Total	48551.09	\$ 5,570,106.54	3	\$ 667,236.66	79450.01	\$ 6,682,540.42	\$ 12,919,883.62

Option 7 (Phase 3)

	Widening Area (m ²)	Land Cost	# Total Buyouts (Improvements)	Improvement cost	Additional Land Area (m ²)	Additional Land Cost	Total
ALR	23422.98	\$ 1,970,107.26	2	\$ 444,824.44	70246.03	\$ 5,908,393.35	\$ 8,323,325.05
Non-ALR	367.81	\$ 206,317.10	0	\$ -		\$ -	\$ 206,317.10
Total	23790.79	\$ 2,176,424.36	2	\$ 444,824.44	70246.03	\$ 5,908,393.35	\$ 8,529,642.15

Option 7 (Phase 4)

	Widening Area (m ²)	Land Cost	# Total Buyouts (Improvements)	Improvement cost	Additional Land Area (m ²)	Additional Land Cost	Total
ALR	6750.93	\$ 567,820.96	0	\$ -	0.00	\$ -	\$ 567,820.96
Non-ALR	1953.69	\$ 1,095,905.00	0	\$ -		\$ -	\$ 1,095,905.00
Total	8704.63	\$ 1,663,725.96	0	\$ -	0.00	\$ -	\$ 1,663,725.96

Option 10 (Phase 3)

	Widening Area (m ²)	Cost	# Total Buyouts (Improvements)	Improvement cost	Additional Land Area (m ²)	Additional Land Cost	Total
ALR	23422.98	\$ 1,970,107.26	2	\$ 444,824.44	70246.03	\$ 5,908,393.35	\$ 8,323,325.05
Non-ALR	367.81	\$ 206,317.10	0	\$ -		\$ -	\$ 206,317.10
Total	23790.79	\$ 2,176,424.36	2	\$ 444,824.44	70246.03	\$ 5,908,393.35	\$ 8,529,642.15

Option 10 (Phase 4)

	Widening Area (m ²)	Cost	# Total Buyouts (Improvements)	Improvement cost	Additional Land Area (m ²)	Additional Land Cost	Total
ALR	58589.65	\$ 4,927,975.13	5	\$ 1,112,061.10	98051.71	\$ 8,247,129.29	\$ 14,287,165.52
Non-ALR	0.00	\$ 0.00	0	\$ -		\$ -	\$ 0.00
Total	58589.65	\$ 4,927,975.13	5	\$ 1,112,061.10	98051.71	\$ 8,247,129.29	\$ 14,287,165.52

	Area \$/sq.m	Area Improvement
ALR	\$ 84.11	\$ 222,412.22
Non-ALR	\$ 560.04	\$ 243,278.35

Address Impacted (ordered from west to east)	C2C	C7	C10	Additional Land (m ²)*	Total Buyout
12250 237 St	y	y	y	35317.36	y
12309 240 St	y	y	y	34928.67	y
12266 240 St	y	n	y	29231.85	y
12283 244 St	y	n	y	29684.67	y
12312 244 St	y	n	y	20533.49	y
12410 254 St**	n	n	y	729.34	y**
12421 256 St	n	n	y	17872.36	y

*Additional land is land beyond the widening area.
Ex. for total buyouts, additional area is lot area minus road widening area for that lot.
** Aerial in CAD does not show building on lot. However, BC Assessment indicates there is building on site, as do aerial image



APPENDIX H

CLASS D COST ESTIMATE



SUMMARY SHEET
ABERNETHY WAY OPTIONS
CLASS 'D' CONSTRUCTION COST ESTIMATE

Date: 2019-11-18

File: 2111-03880-00

Estimator: SH

Reviewed By: JA / BA

Client: CITY OF BRATTLEBORO

Project: ABERNETHY WAY EXTENSION OPTIONS FROM 232 STREET TO 246 STREET

ITEM	SECTION LENGTH (ft)	OPTION 2C	OPTION 2C	OPTION 2C	OPTION 2C	OPTION 7	OPTION 7	OPTION 7	OPTION 7	OPTION 10	OPTION 10	OPTION 10	OPTION 10	246 STREET
		(2 LANE) PHASE 3 1,715	(4 LANE) PHASE 3 1,715	PHASE 4 4,335	PHASE 3 & 4 6,650	(2 LANE) PHASE 3 1,715	(4 LANE) PHASE 3 1,715	PHASE 4 3,365	PHASE 3 & 4 5,100	(2 LANE) PHASE 3 1,715	(4 LANE) PHASE 3 1,715	PHASE 4 3,365	PHASE 3 & 4 5,065	EXTENSION 1,100
1.0 ROAD & SITE WORKS		5,838,260	2,863,135	10,882,880	19,584,275	5,838,260	2,863,135	15,032,540	23,733,935	5,838,260	2,863,135	8,981,820	17,683,315	16,855,880
2.0 STORM SEWERS AND CULVERTS		323,880	1,885,520	582,230	2,791,680	323,880	1,885,520	2,480,400	4,688,880	323,880	1,885,520	514,500	2,723,880	389,880
3.0 SANITARY SEWERS		0	0	0	0	0	0	0	0	0	0	0	0	0
4.0 WATERMAIN		0	0	0	0	0	0	0	0	0	0	0	0	0
5.0 BC HYDRO/TEL/GAS		80,000	0	810,000	870,800	80,000	0	1,040,000	1,100,000	80,000	0	0	80,000	0
6.0 STREET LIGHTING		561,000	0	0	561,000	561,000	0	873,000	1,434,000	561,000	0	0	561,000	409,880
7.0 SIGNAGE & PAVEMENT MARKINGS		34,000	0	66,000	100,000	34,000	0	66,000	100,000	34,000	0	66,000	100,000	0
8.0 MISCELLANEOUS		0	0	0	0	0	0	0	0	0	0	0	0	1,800,000
9.0 EROSION AND SEDIMENT CONTROL		340,860	0	617,050	957,920	340,860	0	974,600	1,315,460	340,860	0	478,120	818,980	389,880
10.0 PROPERTY ACQUISITIONS		8,529,640	0	12,919,890	21,449,530	8,529,640	0	1,663,720	16,193,360	8,529,640	0	14,287,170	23,816,810	5,000,000
SUB-TOTAL		15,687,640	4,748,655	25,878,080	48,314,375	15,687,640	4,748,655	22,130,260	42,566,555	15,687,640	4,748,655	24,327,710	44,764,805	24,855,000
ENGINEERING	@ 15%	2,353,146	712,298	3,881,712	6,947,156	2,353,146	712,298	3,319,539	6,384,983	2,353,146	712,298	3,649,157	6,714,861	3,688,250
CONSTRUCTION CONTINGENCY	@ 40%	6,275,056	1,899,462	10,351,232	18,525,750	6,275,056	1,899,462	8,852,104	17,026,622	6,275,056	1,899,462	9,731,084	17,905,602	9,622,000
TOTAL CONSTRUCTION COST (\$ 2019)		24,315,842	7,360,416	40,111,024	71,787,282	24,315,842	7,360,416	34,301,903	65,978,161	24,315,842	7,360,416	37,707,951	69,384,268	37,265,250

DETAILED COST ESTIMATE

ABERNETHY WAY OPTIONS OPTION 2C - Phase 3 CLASS 'D' CONSTRUCTION COST ESTIMATE

ITEM	DESCRIPTION	UNIT	QUANTITY	INFLATION 0%	UNIT PRICE	AMOUNT	
1.0	ROAD & SITE WORKS	1,715 m					
	Clearing and Grubbing	ha	3.42	\$30,000	\$30,000	\$ 102,480	
	Common Excavation and Removal	m³	16,780.00	\$45	\$45	\$ 755,100	
	Import Embankment Fill (75mm Pitrun Gravel)	tonne	26,616.00	\$22	\$22	\$ 585,550	
	232 STREET TO 240 STREET (2 LANE INTERIM - 24m ROW)	m	1,715.00	\$1,626	\$1,626	\$ 2,788,800	
	INTERSECTIONS						
	Abernethy Way and 232 Street	l.s.	1.00	\$50,000	\$50,000	\$ 50,000	
	Abernethy Way and 240 Street	l.s.	1.00	\$100,000	\$100,000	\$ 100,000	
	WALLS (Lock Block w/ MMCD-C14 Handrail)						
	Right Side - STA 0+250 to 0+280	m²	135.00	\$670	\$670	\$ 90,450	
	Left Side - STA 0+230 to 0+315	m²	382.50	\$670	\$670	\$ 256,280	
	Left Side - STA 0+630 to 0+800	m²	510.00	\$670	\$670	\$ 341,700	
	Left Side - STA 1+050 to 1+160	m²	330.00	\$670	\$670	\$ 221,100	
	Left Side - STA 1+290 to 1+670	m²	1,140.00	\$670	\$670	\$ 763,800	
	EX. Asphalt and Base Structure Re-Use and Overlay						
	0+000 to 0+700 - 6.0m	m	700.00				
		m	700.00	(\$310)	(\$310)	\$ (217,000)	
	SUB-TOTAL ROAD & SITE WORKS					\$ 5,838,260	
2.0	STORM SEWERS AND CULVERTS						
	CULVERTS						
	Crossing 1 - Coho Creek (0+255)	1400mm ID	m	30.00	\$2,125	\$2,125	\$ 63,750
	Crossing 2 - Coho Creek (0+498)	1200mm ID	m	35.00	\$1,625	\$1,625	\$ 56,880
	Crossing 4D - Lallimer Creek (1+568)	1000mm ID	m	30.00	\$1,250	\$1,250	\$ 37,500
	Headwalls <1800mm ID	ea.	6.00	\$27,625	\$27,625	\$ 165,750	
	SUB-TOTAL STORM SEWER					\$ 323,880	
3.0	SANITARY SEWERS						
					\$0	\$ -	
					\$0	\$ -	
	SUB-TOTAL SANITARY SEWER					\$ -	
4.0	WATERMAIN						
					\$0	\$ -	
					\$0	\$ -	
	SUB-TOTAL WATERMAIN					\$ -	
5.0	BC HYDRO/TEL/GAS						
	BCH Pole Relocation	ea.	2.00	\$30,000	\$30,000	\$ 60,000	
					\$0	\$ -	
	SUBTOTAL BC HYDRO/TEL					\$ 60,000	
6.0	STREET LIGHTING / SIGNALS						
	LIGHTING						
	Streetlighting	ea.	49.00	\$9,000	\$9,000	\$ 441,000	
	INTERSECTION SIGNALS						
	Abernethy Way and 232 Street	l.s.	1.00	\$20,000	\$20,000	\$ 20,000	
	Abernethy Way and 240 Street	l.s.	1.00	\$100,000	\$100,000	\$ 100,000	
	Abernethy Way and 244 Street	l.s.	1.00		\$0	\$ -	
	248 Street and 124 Avenue	l.s.	1.00		\$0	\$ -	
	248 Street and 128 Avenue	l.s.	1.00		\$0	\$ -	
					\$0	\$ -	
	SUB-TOTAL STREET LIGHTING					\$ 561,000	
7.0	SIGNAGE & PAVMENT MARKINGS						
	Signage/Pavement Markings	l.s.	1.00		\$34,000	\$ 34,000	
					\$0	\$ -	
	SUBTOTAL SIGNAGE & PAVEMENT MARKINGS					\$ 34,000	
8.0	MISCELLANEOUS						
					\$0	\$ -	
					\$0	\$ -	
	SUB-TOTAL MISCELLANEOUS					\$ -	
9.0	EROSION AND SEDIMENT CONTROL						
	Costs of Items 1 through 8	l.s.	1	\$6,817,140	5%	\$ 340,860	
	SUB-TOTAL EROSION AND SEDIMENT CONTROL					\$ 340,860	
10.0	PROPERTY ACQUISITIONS						
	Land - ALR	m²	23,422.98	\$84.11	\$84.11	\$ 1,970,110	
	Land - NON-ALR	m²	367.81	\$560.94	\$560.94	\$ 206,320	
	Additional Land - ALR	m²	70,246.03	\$84.11	\$84.11	\$ 5,908,390	
	Additional Land - NON-ALR	m²	0.00	\$560.94	\$560.94	\$ -	
	Improvements - ALR	ea.	2	\$222,412.22	\$222,412.22	\$ 444,820	
	Improvements - NON-ALR	ea.	0	\$248,278.95	\$248,278.95	\$ -	
	SUB-TOTAL PROPERTY ACQUISITIONS					\$ 8,529,640	
	TOTAL					\$ 15,687,640	

DETAILED CONSTRUCTION COST

DETAILED COST ESTIMATE

ABERNETHY WAY OPTIONS
OPTION 2C - Phase 4
CLASS 'D' CONSTRUCTION COST ESTIMATE

ITEM	DESCRIPTION	UNIT	QUANTITY	INFLATION 0%	UNIT PRICE	AMOUNT
1.0	ROAD & SITE WORKS	4,335 m				
	Clearing and Grubbing	ha	7.82	\$30,000	\$30,000	\$ 234,570
	Common Excavation and Removal	m ³	39,820.00	\$45	\$45	\$ 1,791,900
	Import Embankment Fill (75mm Pitrun Gravel)	tonne	43,188.00	\$22	\$22	\$ 950,140
	240 STREET TO 256 STREET (2 LANE - 24m ROW)	m	4,335.00	\$1,596	\$1,596	\$ 6,919,180
	INTERSECTIONS					
	Abernethy Way and 244 Street	l.s.	1.00	\$50,000	\$50,000	\$ 50,000
	248 Street and 124 Avenue	l.s.	1.00	\$50,000	\$50,000	\$ 50,000
	248 Street and 128 Avenue - Roundabout	l.s.	1.00	\$1,000,000	\$1,000,000	\$ 1,000,000
	WALLS (Lock Block w/ MMC-C14 Handrail)					
	Left Side - STA 1+820 to 1+870	m ²	412.50	\$670	\$670	\$ 276,380
	Right Side - STA 1+820 to 1+870	m ²	412.50	\$670	\$670	\$ 276,380
	Left Side - STA 5+920 to 5+950	m ²	112.50	\$670	\$670	\$ 75,380
	Right Side - STA 5+910 to 5+940	m ²	90.00	\$670	\$670	\$ 60,300
	EX. Asphalt and Base Structure Re-Use and Overlay					
	3+270 to 3+415 - 6.0m	m	145.00			
	3+420 to 4+230 - 6.0m	m	810.00			
	4+420 to 6+050 - 6.0m	m	1,630.00			
		m	2,585.00	(\$310)	(\$310)	\$ (801,350)
	SUB-TOTAL ROAD & SITE WORKS					\$ 10,882,880
2.0	STORM SEWERS AND CULVERTS					
	CULVERTS					
	Crossing 7 - Latimer Creek (1+850)	1600mm ID m	30.00	\$3,375	\$3,375	\$ 101,250
	Crossing 8 - Latimer Creek (2+227)	1200mm ID m	60.00	\$1,625	\$1,625	\$ 97,500
	Crossing 15 - Unknown (4+805)	600mm ID m	20.00	\$625	\$625	\$ 12,500
	Crossing 15 - Kanaka Creek (5+928)	2.44 x 1.27 Arch m	30.00	\$5,000	\$5,000	\$ 150,000
	Headwalls <1800mm ID	ea.	8.00	\$27,625	\$27,625	\$ 221,000
	SUB-TOTAL STORM SEWER					\$ 582,250
3.0	SANITARY SEWERS					
					\$0	\$ -
					\$0	\$ -
	SUB-TOTAL SANITARY SEWER					\$ -
4.0	WATERMAIN					
					\$0	\$ -
					\$0	\$ -
	SUB-TOTAL WATERMAIN					\$ -
5.0	BC HYDRO/TEL/GAS					
	BCH Pole Relocation	ea.	27.00	\$30,000	\$30,000	\$ 810,000
					\$0	\$ -
	SUBTOTAL BC HYDRO/TEL					\$ 810,000
6.0	STREET LIGHTING / SIGNALS					
	LIGHTING					
	Streetslighting	ea.		\$9,000	\$9,000	\$ -
	INTERSECTION SIGNALS					
	Abernethy Way and 244 Street	l.s.	1.00		\$0	\$ -
	248 Street and 124 Avenue	l.s.	1.00		\$0	\$ -
	248 Street and 128 Avenue	l.s.	1.00		\$0	\$ -
					\$0	\$ -
					\$0	\$ -
	SUB-TOTAL STREET LIGHTING					\$ -
7.0	SIGNAGE & PAVEMENT MARKINGS					
	Signage/Pavement Markings	l.s.	1.00		\$66,000	\$ 66,000
					\$0	\$ -
	SUBTOTAL SIGNAGE & PAVEMENT MARKINGS					\$ 66,000
8.0	MISCELLANEOUS					
					\$0	\$ -
					\$0	\$ -
	SUB-TOTAL MISCELLANEOUS					\$ -
9.0	EROSION AND SEDIMENT CONTROL					
	Costs of Items 1 through 8	l.s.	1	\$12,341,130	5%	\$ 617,060
	SUB-TOTAL EROSION AND SEDIMENT CONTROL					\$ 617,060
10.0	PROPERTY ACQUISITIONS					
	Land - ALR	m ²	45,433.68	\$84.11	\$84.11	\$ 3,821,430
	Land - NON-ALR	m ²	3,117.41	\$560.94	\$560.94	\$ 1,749,680
	Additional Land - ALR	m ²	79,450.01	\$84.11	\$84.11	\$ 6,682,540
	Additional Land - NON-ALR	m ²	0.00	\$560.94	\$560.94	\$ -
	Improvements - ALR	ea.	3	\$222,412.22	\$222,412.22	\$ 667,240
	Improvements - NON-ALR	ea.		\$248,278.95	\$248,278.95	\$ -
	SUB-TOTAL PROPERTY ACQUISITIONS					\$ 12,919,890
	TOTAL					\$ 25,878,080

DETAILED COST ESTIMATE
ABERNETHY WAY OPTIONS
OPTION 7 - Phase 3
CLASS 'D' CONSTRUCTION COST ESTIMATE

ITEM	DESCRIPTION	UNIT	QUANTITY	INFLATION 0%	UNIT PRICE	AMOUNT	
1.0	ROAD & SITE WORKS	1,715 m					
	Clearing and Grubbing	ha	3.42	\$30,000	\$30,000	\$ 102,480	
	Common Excavation and Removal	m³	16,780.00	\$45	\$45	\$ 755,100	
	Import Embankment Fill (75mm Pitrun Gravel)	tonne	28,816.00	\$22	\$22	\$ 585,550	
	232 STREET TO 240 STREET (2 LANE INTERIM - 24m ROW)	m	1,715.00	\$1,628	\$1,628	\$ 2,785,800	
	INTERSECTIONS						
	Abernethy Way and 232 Street	i.s.	1.00	\$50,000	\$50,000	\$ 50,000	
	Abernethy Way and 240 Street	i.s.	1.00	\$100,000	\$100,000	\$ 100,000	
	WALLS (Lock Block w/ MMCD-C14 Handrail)						
	Right Side - STA 0+250 to 0+280	m²	135.00	\$670	\$670	\$ 90,450	
	Left Side - STA 0+230 to 0+315	m²	382.50	\$670	\$670	\$ 256,280	
	Left Side - STA 0+630 to 0+800	m²	510.00	\$670	\$670	\$ 341,700	
	Left Side - STA 1+050 to 1+160	m²	330.00	\$670	\$670	\$ 221,100	
	Left Side - STA 1+290 to 1+670	m²	1,140.00	\$670	\$670	\$ 763,800	
	EX. Asphalt and Base Structure Re-Use and Overlay						
	0+000 to 0+700 - 6.0m	m	700.00				
		m	700.00	(\$310)	(\$310)	\$ (217,000)	
	SUB-TOTAL ROAD & SITE WORKS					\$ 5,838,260	
2.0	STORM SEWERS AND CULVERTS						
	CULVERTS						
	Crossing 1 - Coho Creek (0+255)	1400mm ID	m	30.00	\$2,125	\$2,125	\$ 63,750
	Crossing 2 - Coho Creek (0+498)	1200mm ID	m	35.00	\$1,625	\$1,625	\$ 56,880
	Crossing 4D - Latimer Creek (1+588)	1000mm ID	m	30.00	\$1,250	\$1,250	\$ 37,500
	Headwalls <1800mm ID	ea.	6.00	\$27,625	\$27,625	\$ 165,750	
	Headwalls - Arch Culvert	ea.	0.00		\$0	\$ -	
					\$0	\$ -	
	SUB-TOTAL STORM SEWER					\$ 323,880	
3.0	SANITARY SEWERS						
					\$0	\$ -	
					\$0	\$ -	
	SUB-TOTAL SANITARY SEWER					\$ -	
4.0	WATERMAIN						
					\$0	\$ -	
					\$0	\$ -	
	SUB-TOTAL WATERMAIN					\$ -	
5.0	BC HYDRO/TEL/GAS						
	BCH Pole Relocation	ea.	2.00	\$30,000	\$30,000	\$ 60,000	
	BCH Pole Relocation - Distribution & Transmission (Southside)	ea.	0.00	\$250,000	\$250,000	\$ -	
	BCH Pole Relocation - Transmission (Northside)	ea.	0.00	\$100,000	\$100,000	\$ -	
					\$0	\$ -	
	SUBTOTAL BC HYDRO/TEL					\$ 60,000	
6.0	STREET LIGHTING / SIGNALS						
	LIGHTING						
	Streetlighting	ea.	49.00	\$9,000	\$9,000	\$ 441,000	
	INTERSECTION SIGNALS						
	Abernethy Way and 232 Street	i.s.	1.00	\$20,000	\$20,000	\$ 20,000	
	Abernethy Way and 240 Street	i.s.	1.00	\$100,000	\$100,000	\$ 100,000	
	240 Street and Dewdney Trunk Road	i.s.	1.00		\$0	\$ -	
	Dewdney Trunk Road and 248 Street	i.s.	1.00		\$0	\$ -	
	Dewdney Trunk Road and 252 Street	i.s.	1.00		\$0	\$ -	
					\$0	\$ -	
	SUB-TOTAL STREET LIGHTING					\$ 581,000	
7.0	SIGNAGE & PAVMENT MARKINGS						
	Signage/Pavement Markings	i.s.	1.00		\$34,000	\$ 34,000	
					\$0	\$ -	
	SUBTOTAL SIGNAGE & PAVEMENT MARKINGS					\$ 34,000	
8.0	MISCELLANEOUS						
					\$0	\$ -	
					\$0	\$ -	
					\$0	\$ -	
	SUB-TOTAL MISCELLANEOUS					\$ -	
9.0	EROSION AND SEDIMENT CONTROL						
	Costs of Items 1 through 8	i.s.	1	\$6,817,140	5%	\$ 340,860	
	SUB-TOTAL EROSION AND SEDIMENT CONTROL					\$ 340,860	
10.0	PROPERTY ACQUISITIONS						
	Land - ALR	m²	23,422.98	\$84.11	\$84.11	\$ 1,970,110	
	Land - NON-ALR	m²	367.81	\$560.94	\$560.94	\$ 206,320	
	Additional Land - ALR	m²	70,246.03	\$84.11	\$84.11	\$ 5,908,390	
	Additional Land - NON-ALR	m²	0.00	\$560.94	\$560.94	\$ -	
	Improvements - ALR	ea.	2	\$222,412.22	\$222,412.22	\$ 444,820	
	Improvements - NON-ALR	ea.	0	\$248,278.95	\$248,278.95	\$ -	
	SUB-TOTAL PROPERTY ACQUISITIONS					\$ 8,529,640	
	TOTAL					\$ 15,687,640	

NOTES:

1 Widening of Dewdney Trunk Road to 4 Lanes ends at 5+100 prior to the Bridge at Kanaka Creek as requested by the City of Maple Ridge.

DETAILED COST ESTIMATE

ABERNETHY WAY OPTIONS
OPTION 7 - Phase 4 (DTR 4 Lining ends prior to Kanaka Creek Bridge; Includes 240 Street widening)
CLASS 'D' CONSTRUCTION COST ESTIMATE

ITEM	DESCRIPTION	UNIT	QUANTITY	INFLATION %	UNIT PRICE	AMOUNT
1.0	ROAD & SITE WORKS	3,385 m				
	Clearing and Grubbing	ha	5.39	\$30,000	\$30,000	\$ 161,820
	Common Excavation and Removal	m ³	36,525.00	\$45	\$45	\$ 1,643,625
	Import Embankment Fill (75mm Pitrun Gravel)	tonne	22,210.00	\$22	\$22	\$ 488,620
	240 STREET TO 256 STREET (4 LANE DEWDNEY - 24m ROW)	m	3,385.00	\$3,535	\$3,535	\$ 11,966,990
	124 AVENUE EXTENSION (2 LANE 7.1)	m	200.00	\$957	\$957	\$ 191,420
	INTERSECTIONS					
	240 Street and Dewdney Trunk Road	ls.	1.00	\$50,000	\$50,000	\$ 50,000
	Dewdney Trunk Road and 248 Street	ls.	1.00	\$50,000	\$50,000	\$ 50,000
	Dewdney Trunk Road and 252 Street	ls.	1.00	\$50,000	\$50,000	\$ 50,000
	WALLS (Lock Block w/ MMCD-C14 Handrail)					
	Left Side - STA 3+340 to 3+730	m ²	877.50	\$670	\$670	\$ 587,930
	Left Side - STA 3+760 to 3+870	m ²	247.50	\$670	\$670	\$ 165,825
	Left Side - STA 4+820 to 5+090	m ²	510.00	\$670	\$670	\$ 341,700
	Right Side - STA 5+000 to 5+090	m ²	270.00	\$670	\$670	\$ 180,900
	EX. Asphalt and Base Structure Re-Use and Overlay					
	2+360 to 5+090 - 6.0m	m	2,730.00			
		m	2,730.00	(\$310)	(\$310)	\$ (846,300)
	SUB-TOTAL ROAD & SITE WORKS					\$ 15,032,540
2.0	STORM SEWERS AND CULVERTS					
	240 STREET TO 256 STREET (4 LANE DEWDNEY - 24m ROW)	m	1,910.00	\$988	\$988	\$ 1,887,080
	Catch Basins and Catch Basin Leads	m	3,385.00	\$111	\$111	\$ 377,190
	CULVERTS					
	Crossing 11 - Unknown Creek (3+685)	1000mm ID	m	25.00	\$1,250	\$ 31,250
	Crossing 12 - Unknown Creek (4+246)	1400mm ID	m	35.00	\$2,125	\$ 74,380
	Headwalls <1800mm ID	ea.	4.00	\$27,625	\$27,625	\$ 110,500
					\$0	\$ -
	SUB-TOTAL STORM SEWER					\$ 2,480,400
3.0	SANITARY SEWERS					
					\$0	\$ -
					\$0	\$ -
	SUB-TOTAL SANITARY SEWER					\$ -
4.0	WATERMAIN					
					\$0	\$ -
					\$0	\$ -
	SUB-TOTAL WATERMAIN					\$ -
5.0	BC HYDRO/TEL/GAS					
	BCH Pole Relocation - Distribution (240 Street)	ea.	8.00	\$30,000	\$30,000	\$ 240,000
	BCH Pole Relocation - Distribution & Transmission (Southside)	ea.	0.00	\$250,000	\$250,000	\$ -
	BCH Pole Relocation - Transmission (Northside)	ea.	8.00	\$100,000	\$100,000	\$ 800,000
					\$0	\$ -
	SUBTOTAL BC HYDRO/TEL					\$ 1,040,000
6.0	STREET LIGHTING / SIGNALS					
	LIGHTING					
	Streetlighting	ea.	97.00	\$9,000	\$9,000	\$ 873,000
	INTERSECTION SIGNALS					
	240 Street and Dewdney Trunk Road	ls.	1.00		\$0	\$ -
	Dewdney Trunk Road and 248 Street	ls.	1.00		\$0	\$ -
	Dewdney Trunk Road and 252 Street	ls.	1.00		\$0	\$ -
					\$0	\$ -
	SUB-TOTAL STREET LIGHTING					\$ 873,000
7.0	SIGNAGE & PAVEMENT MARKINGS					
	Signage/Pavement Markings	ls.	1.00		\$66,000	\$ 66,000
					\$0	\$ -
	SUBTOTAL SIGNAGE & PAVEMENT MARKINGS					\$ 66,000
8.0	MISCELLANEOUS					
					\$0	\$ -
					\$0	\$ -
					\$0	\$ -
	SUB-TOTAL MISCELLANEOUS					\$ -
9.0	EROSION AND SEDIMENT CONTROL					
	Costs of Items 1 through 8	ls.	1	\$19,491,940	5%	\$ 974,600
	SUB-TOTAL EROSION AND SEDIMENT CONTROL					\$ 974,600
10.0	PROPERTY ACQUISITIONS					
	Lend - ALR	m ²	6,750.93	\$84.11	\$84.11	\$ 567,820
	Lend - NON-ALR	m ²	1,953.69	\$560.94	\$560.94	\$ 1,095,900
	Additional Lend - ALR	m ²	0.00	\$84.11	\$84.11	\$ -
	Additional Lend - NON-ALR	m ²	0.00	\$560.94	\$560.94	\$ -
	Improvements - ALR	ea.	0	\$222,412.22	\$222,412.22	\$ -
	Improvements - NON-ALR	ea.	0	\$248,278.95	\$248,278.95	\$ -
	SUB-TOTAL PROPERTY ACQUISITIONS					\$ 1,663,720
	TOTAL					\$ 22,130,260

NOTES:

1 Widening of Dewdney Trunk Road to 4 Lanes ends at 5+100 prior to the Bridge at Kanaka Creek as requested by the City of Maple Ridge.

DETAILED COST ESTIMATE
ABERNETHY WAY OPTIONS
OPTION 10 - Phase 3
CLASS 'D' CONSTRUCTION COST ESTIMATE

ITEM	DESCRIPTION	UNIT	QUANTITY	INFLATION 0%	UNIT PRICE	AMOUNT	
1.0	ROAD & SITE WORKS	1,715 m					
	Clearing and Grubbing	ha	3.42	\$30,000	\$30,000	\$ 102,480	
	Common Excavation and Removal	m³	16,780.00	\$45	\$45	\$ 755,100	
	Import Embankment Fill (75mm Pitrun Gravel)	tonne	26,616.00	\$22	\$22	\$ 585,550	
	232 STREET TO 240 STREET (2 LANE INTERIM - 24m ROW)	m	1,715.00	\$1,626	\$1,626	\$ 2,786,800	
	INTERSECTIONS						
	Abernethy Way and 232 Street	l.s.	1.00	\$50,000	\$50,000	\$ 50,000	
	Abernethy Way and 240 Street	l.s.	1.00	\$100,000	\$100,000	\$ 100,000	
	WALLS (Lock Block w/ MMCD-C14 Handrail)						
	Right Side - STA 0+250 to 0+280	m²	135.00	\$670	\$670	\$ 90,450	
	Left Side - STA 0+230 to 0+315	m²	382.50	\$670	\$670	\$ 256,280	
	Left Side - STA 0+330 to 0+400	m²	510.00	\$670	\$670	\$ 341,700	
	Left Side - STA 1+050 to 1+160	m²	330.00	\$670	\$670	\$ 221,100	
	Left Side - STA 1+290 to 1+670	m²	1,140.00	\$670	\$670	\$ 763,800	
	EX Asphalt and Base Structure Re-Use and Overlay						
	0+000 to 0+700 - 6.0m	m	700.00				
		m	700.00	(\$310)	(\$310)	\$ (217,000)	
	SUB-TOTAL ROAD & SITE WORKS					\$ 5,838,260	
2.0	STORM SEWERS AND CULVERTS						
	CULVERTS						
	Crossing 1 - Coho Creek (0+255)	1400mm ID	m	30.00	\$2,125	\$2,125	\$ 63,750
	Crossing 2 - Coho Creek (0+498)	1200mm ID	m	35.00	\$1,625	\$1,625	\$ 56,880
	Crossing 4D - Lalimer Creek (1+568)	1000mm ID	m	30.00	\$1,250	\$1,250	\$ 37,500
	Headwalls <1800mm ID	ea.	6.00	\$27,625	\$27,625	\$ 165,750	
	Headwalls - Arch Culvert	ea.	0.00		\$0	\$ -	
	SUB-TOTAL STORM SEWER					\$ 323,880	
3.0	SANITARY SEWERS						
					\$0	\$ -	
					\$0	\$ -	
	SUB-TOTAL SANITARY SEWER					\$ -	
4.0	WATERMAIN						
					\$0	\$ -	
					\$0	\$ -	
	SUB-TOTAL WATERMAIN					\$ -	
5.0	BC HYDRO/TEL/GAS						
	BCH Pole Relocation	ea.	2.00	\$30,000	\$30,000	\$ 60,000	
					\$0	\$ -	
	SUBTOTAL BC HYDRO/TEL					\$ 60,000	
6.0	STREET LIGHTING / SIGNALS						
	LIGHTING						
	Streetlighting	ea.	49.00	\$9,000	\$9,000	\$ 441,000	
	INTERSECTION SIGNALS						
	Abernethy Way and 232 Street	l.s.	1.00	\$20,000	\$20,000	\$ 20,000	
	Abernethy Way and 240 Street	l.s.	1.00	\$100,000	\$100,000	\$ 100,000	
	Abernethy Way and 244 Street	l.s.	1.00		\$0	\$ -	
	248 Street and 124 Avenue	l.s.	1.00		\$0	\$ -	
	252 Street and 124 Avenue	l.s.	1.00		\$0	\$ -	
	256 Street and 124 Avenue	l.s.	1.00		\$0	\$ -	
					\$0	\$ -	
					\$0	\$ -	
	SUB-TOTAL STREET LIGHTING					\$ 561,000	
7.0	SIGNAGE & PAVMENT MARKINGS						
	Signage/Pavement Markings	l.s.	1.00		\$34,000	\$ 34,000	
					\$0	\$ -	
	SUBTOTAL SIGNAGE & PAVEMENT MARKINGS					\$ 34,000	
8.0	MISCELLANEOUS						
					\$0	\$ -	
					\$0	\$ -	
	SUB-TOTAL MISCELLANEOUS					\$ -	
9.0	EROSION AND SEDIMENT CONTROL						
	Costs of Items 1 through 8	l.s.	1	\$6,817,140	5%	\$ 340,860	
	SUB-TOTAL EROSION AND SEDIMENT CONTROL					\$ 340,860	
10.0	PROPERTY ACQUISITIONS						
	Land - ALR	m²	23,422.98	\$84.11	\$84.11	\$ 1,970,110	
	Land - NON-ALR	m²	367.81	\$560.94	\$560.94	\$ 206,320	
	Additional Land - ALR	m²	70,246.03	\$84.11	\$84.11	\$ 5,908,390	
	Additional Land - NON-ALR	m²		\$560.94	\$560.94	\$ -	
	Improvements - ALR	ea.	2	\$222,412.22	\$222,412.22	\$ 444,820	
	Improvements - NON-ALR	ea.	0	\$248,278.95	\$248,278.95	\$ -	
	SUB-TOTAL PROPERTY ACQUISITIONS					\$ 8,529,640	
	TOTAL					\$ 15,687,640	

DETAILED COST ESTIMATE
ABERNETHY WAY OPTIONS
OPTION 10 - Phase 4
CLASS 'D' CONSTRUCTION COST ESTIMATE

ITEM	DESCRIPTION	UNIT	QUANTITY	INFLATION 0%	UNIT PRICE	AMOUNT
1.0	ROAD & SITE WORKS	3,350 m				
	Clearing and Grubbing	ha	7.14	\$30,000	\$30,000	\$ 214,050
	Common Excavation and Removal	m ³	37,435.00	\$45	\$45	\$ 1,684,580
	Import Embankment Fill (75mm Pitrun Gravel)	tonne	43,068.00	\$22	\$22	\$ 947,500
	240 STREET TO 256 STREET (2 LANE - 24m ROW)	m	3,350.00	\$1,596	\$1,596	\$ 5,347,000
	INTERSECTIONS					
	Abernethy Way and 244 Street	i.s.	1.00	\$50,000	\$50,000	\$ 50,000
	246 Street and 124 Avenue	i.s.	1.00	\$50,000	\$50,000	\$ 50,000
	252 Street and 124 Avenue	i.s.	1.00	\$50,000	\$50,000	\$ 50,000
	256 Street and 124 Avenue	i.s.	1.00	\$50,000	\$50,000	\$ 50,000
	WALLS (Lock Block w/ MMCD-C14 Handrail)					
	Left Side - STA 1+820 to 1+870	m ²	412.50	\$670	\$670	\$ 276,380
	Right Side - STA 1+820 to 1+870	m ²	412.50	\$670	\$670	\$ 276,380
	Left Side - STA 3+550 to 3+640	m ²	202.50	\$670	\$670	\$ 135,880
	Right Side - STA 3+550 to 3+640	m ²	270.00	\$670	\$670	\$ 180,900
	EX. Asphalt and Base Structure Re-Use and Overlay					
	3+270 to 3+415 - 6.0m	m	145.00			
	3+860 to 4+620 - 6.0m	m	760.00			
		m	905.00	(\$310)	(\$310)	\$ (280,550)
	SUB-TOTAL ROAD & SITE WORKS					\$ 8,981,920
2.0	STORM SEWERS AND CULVERTS					
	CULVERTS					
	Crossing 7 - Latimer Creek (1+850)	1600mm ID m	30.00	\$3,375	\$3,375	\$ 101,250
	Crossing 8 - Latimer Creek (2+227)	1000mm ID m	60.00	\$1,250	\$1,250	\$ 75,000
	Crossing 9 - Kanaka Creek (4+380)	3.35 X 1.75 Arch m	30.00	\$5,750	\$5,750	\$ 172,500
	Headwalls <1800mm ID	ea.	6.00	\$27,625	\$27,625	\$ 165,750
	Headwalls - Arch Culvert	ea.	2.00		\$0	\$ -
	SUB-TOTAL STORM SEWER					\$ 514,500
3.0	SANITARY SEWERS					
					\$0	\$ -
					\$0	\$ -
	SUB-TOTAL SANITARY SEWER					\$ -
4.0	WATERMAIN					
					\$0	\$ -
					\$0	\$ -
	SUB-TOTAL WATERMAIN					\$ -
5.0	BC HYDRO/TEL/GAS					
	BCH Pole Relocation	ea.	0.00	\$30,000	\$30,000	\$ -
					\$0	\$ -
	SUBTOTAL BC HYDRO/TEL					\$ -
6.0	STREET LIGHTING / SIGNALS					
	LIGHTING					
	Streetlighting	ea.	0.00	\$9,000	\$9,000	\$ -
	INTERSECTION SIGNALS					
	Abernethy Way and 244 Street	i.s.	1.00		\$0	\$ -
	246 Street and 124 Avenue	i.s.	1.00		\$0	\$ -
	252 Street and 124 Avenue	i.s.	1.00		\$0	\$ -
	256 Street and 124 Avenue	i.s.	1.00		\$0	\$ -
					\$0	\$ -
					\$0	\$ -
	SUB-TOTAL STREET LIGHTING					\$ -
7.0	SIGNAGE & PAVEMENT MARKINGS					
	Signage/Pavement Markings	i.s.	1.00		\$66,000	\$ 66,000
					\$0	\$ -
	SUBTOTAL SIGNAGE & PAVEMENT MARKINGS					\$ 66,000
8.0	MISCELLANEOUS					
					\$0	\$ -
					\$0	\$ -
	SUB-TOTAL MISCELLANEOUS					\$ -
9.0	EROSION AND SEDIMENT CONTROL					
	Costs of Items 1 through 8	i.s.	1	\$9,562,420	5%	\$ 478,120
	SUB-TOTAL EROSION AND SEDIMENT CONTROL					\$ 478,120
10.0	PROPERTY ACQUISITIONS					
	Land - ALR	m ²	58,589.65	\$84.11	\$84.11	\$ 4,927,980
	Land - NON-ALR	m ²	0.00	\$560.94	\$560.94	\$ -
	Additional Land - ALR	m ²	98,051.71	\$84.11	\$84.11	\$ 8,247,130
	Additional Land - NON-ALR	m ²	0.00	\$560.94	\$560.94	\$ -
	Improvements - ALR	ea.	5	\$222,412.22	\$222,412.22	\$ 1,112,060
	Improvements - NON-ALR	ea.		\$248,278.95	\$248,278.95	\$ -
	SUB-TOTAL PROPERTY ACQUISITIONS					\$ 14,287,170
	TOTAL					\$ 24,327,710

DETAILED COST ESTIMATE
ABERNETHY WAY OPTIONS
240 STREET EXTENSION
CLASS 'D' CONSTRUCTION COST ESTIMATE

ITEM	DESCRIPTION	AMOUNT
1.0	<u>ROAD & SITE WORKS</u>	
	<u>ROADWORKS</u>	
	Clearing and Grubbing	\$ 300,000
	Common Excavation	\$ 2,500,000
	Embankment Fill	\$ 2,000,000
	Retaining Walls	\$ 150,000
	Roadworks	\$ 1,800,000
	<u>BRIDGE WORKS</u>	
	Riprap	\$ 125,000
	Bridge End Fill	\$ 100,000
	Piling	\$ 1,000,000
	Substructure Concrete	\$ 680,000
	Supply and Install Girders	\$ 3,700,000
	Superstructure Concrete	\$ 3,600,000
	Bearings and Deck Joints	\$ 250,000
	Parapet Mounted Railings	\$ 100,000
	Fences	\$ 200,000
	Waterproof Membrane	\$ 150,000
	Asphalt Overlay	\$ 300,000
	SUB-TOTAL ROAD & SITE WORKS	\$ 16,955,000
2.0	<u>STORM SEWERS AND CULVERTS</u>	
	Culvert Replacement at Abernethy / 240 Street	\$ 350,000
	SUB-TOTAL STORM SEWER	\$ 350,000
3.0	<u>SANITARY SEWERS</u>	
		\$ -
	SUB-TOTAL SANITARY SEWER	\$ -
4.0	<u>WATERMAIN</u>	
		\$ -
	SUB-TOTAL WATERMAIN	\$ -
5.0	<u>BC HYDRO/TEL/GAS</u>	
		\$ -
	SUBTOTAL BC HYDRO/TEL	\$ -
6.0	<u>STREET LIGHTING / SIGNALS</u>	
	Streetslighting	\$ 400,000
	SUB-TOTAL STREET LIGHTING	\$ 400,000
7.0	<u>SIGNAGE & PAVMENT MARKINGS</u>	
		\$ -
	SUBTOTAL SIGNAGE & PAVEMENT MARKINGS	\$ -
8.0	<u>MISCELLANEOUS</u>	
	Mobilization	\$ 500,000
	Traffic Management	\$ 250,000
	Quality Management	\$ 250,000
	SUB-TOTAL MISCELLANEOUS	\$ 1,000,000
9.0	<u>EROSION AND SEDIMENT CONTROL</u>	
	Erosion and Sediment Control	\$ 350,000
	SUB-TOTAL EROSION AND SEDIMENT CONTROL	\$ 350,000
10.0	<u>PROPERTY ACQUISITIONS</u>	
	Property Acquisitions	\$ 5,000,000
	SUB-TOTAL PROPERTY ACQUISITIONS	\$ 5,000,000
	TOTAL	\$ 24,055,000

McELHANNEY LTD.

PROJECT No.: 2111-03980-00

REVISION: PA

DATE: 2019-04-03

ROAD: 232 STREET TO 240 STREET (4 LANE ULTIMATE - 24m ROW)

FULL ROAD

ROAD TYPE:

ARTERIAL

		Sides	Width	Depth	Area/Volume	Unit	Unit Rate	Cost/m
Subbase	450mm	2	7.25	0.45	15.66	tonne	\$30.00	\$469.80
Base	100mm	2	7.25	0.10	3.48	tonne	\$35.00	\$121.80
Curb and Gutter	MMCD-C4 Type 'B'	2				lin. m	\$85.00	\$170.00
Base AC	100mm	2	6.50	0.10	3.12	tonne	\$120.00	\$374.40
Tack Coat		2	6.50		13.00	m ²	\$1.00	\$13.00
Surface AC	50mm	2	6.50	0.05	1.56	tonne	\$120.00	\$187.20
Sidewalk								
Base	100mm	1	1.50	0.10	0.36	tonne	\$35.00	\$12.60
Concrete	100mm	1	1.50		1.50	m ²	\$50.00	\$75.00
MUP								
Base	100mm	1	3.00	0.10	0.72	tonne	\$35.00	\$25.20
Asphalt	50mm	1	3.00	0.05	0.36	tonne	\$120.00	\$43.20
Boulevard Topsoil	300mm	2	1.80	0.30	1.08	m ³	\$70.00	\$75.60
Boulevard Sodding		1	1.80		1.80	m ²	\$15.00	\$27.00
HydroSeeding		2	2.00		4.00	m ²	\$2.00	\$8.00
Boulevard Tree		2	1.00		2.00	ea.	\$33.33	\$66.67

SUB-TOTAL

\$1,669.47

Description	Size		Cost/m
Concrete Pipe	0 - 2.0m Depth	600 mm	lin. m
Manhole Base, Frame, Lid and Cover - 150m Spacing		1200 mm	ea.
Manhole Rings		1.5 m	m
Catch Basins - 500m ² Spacing (70m)		600 mm	ea.
Catch Basin Leads (+/-7.5m each side)		200 mm	lin. m

SUB-TOTAL

\$1,099.43

SANITARY

SUB-TOTAL

\$0.00

WATERMAIN

SUB-TOTAL

\$0.00

STREET LIGHTING

SUB-TOTAL

\$0.00

BC HYDRO/TELUS/SHAW/BELL

SUB-TOTAL

\$0.00

ESTIMATED COST PER LIN.M

\$2,768.90

McELHANNEY LTD.

PROJECT No.: 2111-03980-00

REVISION: PA

DATE: 2019-04-03

ROAD: 232 STREET TO 240 STREET (2 LANE INTERIM - 24m ROW)

FULL ROAD

ROAD TYPE:

ARTERIAL

		Sides	Width	Depth	Area/Volume	Unit	Unit Rate	Cost/m
Subbase	450mm	2	6.15	0.45	13.28	tonne	\$30.00	\$398.52
Base	100mm	2	5.70	0.10	2.74	tonne	\$35.00	\$95.76
Curb and Gutter	MMCD-C4 Type 'B'					lin. m	\$85.00	\$0.00
No Post Barrier - CRB		2				lin. m	285.00	\$570.00
Base AC	100mm	2	5.10	0.10	2.45	tonne	\$120.00	\$293.76
Tack Coat		2	5.10		10.20	m ²	\$1.00	\$10.20
Surface AC	50mm	2	5.10	0.05	1.22	tonne	\$120.00	\$146.88
Sidewalk								
Base	100mm	1		0.10	0.00	tonne	\$35.00	\$0.00
Concrete	100mm	1		0.10	0.00	m ²	\$50.00	\$0.00
MUP								
Base	100mm	1	3.00	0.10	0.72	tonne	\$35.00	\$25.20
Asphalt	50mm	1	3.00	0.05	0.36	tonne	\$120.00	\$43.20
Boulevard Topsoil	300mm	2	0.30	0.30	0.18	m ³	\$70.00	\$12.60
Boulevard Sodding		2	0.30	1.00	0.60	m ²	\$15.00	\$9.00
HydroSeeding		1	10.50	1.00	10.50	m ²	\$2.00	\$21.00
Boulevard Tree					0.00	ea.	\$1,000.00	\$0.00

SUB-TOTAL

\$1,626.12

Description	Size		Cost/m
STORM			
Ditch Perforated Subdrain	300 mm		\$405.00
Manhole Base, Frame, Lid and Cover - 150m Spacing	1050 mm	ea.	\$3,500.00
Manhole Rings	1.0 m	m	\$650.00

SUB-TOTAL

\$432.67

SANITARY

SUB-TOTAL

\$0.00

WATERMAIN

SUB-TOTAL

\$0.00

STREET LIGHTING

SUB-TOTAL

\$0.00

BC HYDRO/TELUS/SHAW/BELL

SUB-TOTAL

\$0.00

ESTIMATED COST PER LIN.M

\$2,058.79

McELHANNEY LTD.

PROJECT No.:

2111-03980-00

REVISION:

PA

DATE:

2019-04-03

ROAD: 240 STREET TO 256 STREET (2 LANE - 24m ROW)

FULL ROAD

ROAD TYPE:

ARTERIAL

		Sides	Width	Depth	Area/Volume	Unit	Unit Rate	Cost/m
Subbase	450mm	2	6.15	0.45	13.28	tonne	\$30.00	\$398.52
Base	100mm	2	5.70	0.10	2.74	tonne	\$35.00	\$95.76
Curb and Gutter	MMCD-C4 Type 'B'					lin. m	\$85.00	\$0.00
No Post Barrier - CRB		2				lin. m	285.00	\$570.00
Base AC	100mm	2	5.10	0.10	2.45	tonne	\$120.00	\$293.76
Tack Coat		2	5.10		10.20	m ²	\$1.00	\$10.20
Surface AC	50mm	2	5.10	0.05	1.22	tonne	\$120.00	\$146.88
Sidewalk								
Base	100mm	1		0.10	0.00	tonne	\$35.00	\$0.00
Concrete	100mm	1		0.10	0.00	m ²	\$50.00	\$0.00
MUP								
Base	100mm	1	3.00	0.10	0.72	tonne	\$35.00	\$25.20
Asphalt	50mm	1	3.00	0.05	0.36	tonne	\$120.00	\$43.20
Boulevard Topsoil	300mm	2	0.30	0.30	0.18	m ³	\$70.00	\$12.60
Boulevard Sodding		2	0.30		0.00	m ²	\$15.00	\$0.00
HydroSeeding		1	10.20		0.00	m ²	\$2.00	\$0.00
Boulevard Tree					0.00	ea.	\$1,000.00	\$0.00

SUB-TOTAL

\$1,596.12

STORM	Description	Size	Cost/m
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SUB-TOTAL

\$0.00

SANITARY

SUB-TOTAL

\$0.00

WATERMAIN

SUB-TOTAL

\$0.00

STREET LIGHTING

SUB-TOTAL

\$0.00

BC HYDRO/TELUS/SHAW/BELL

SUB-TOTAL

\$0.00

ESTIMATED COST PER LIN.M

\$1,596.12

McELHANNEY LTD.

PROJECT No.: 2111-03980-00

REVISION: PA

DATE: 2019-04-03

ROAD: 240 STREET TO 256 STREET (2 LANE - 24m ROW) - LOCAL CONNECTION (7.1'

FULL ROAD

ROAD TYPE:

ARTERIAL

		Sides	Width	Depth	Area/Volume	Unit	Unit Rate	Cost/m
Subbase	450mm	2	6.15	0.45	13.28	tonne	\$30.00	\$398.52
Base	100mm	2	5.70	0.10	2.74	tonne	\$35.00	\$95.76
Curb and Gutter	MMCD-C4 Type 'B'					lin. m	\$85.00	\$0.00
Base AC	100mm	2	5.10	0.10	2.45	tonne	\$120.00	\$293.76
Tack Coat		2	5.10	1.00	10.20	m ²	\$1.00	\$10.20
Surface AC	50mm	2	5.10	0.05	1.22	tonne	\$120.00	\$146.88
HydroSeeding		2	3.00	1.00	6.00	m ²	\$2.00	\$12.00
Boulevard Tree					0.00	ea.	\$1,000.00	\$0.00

SUB-TOTAL \$957.12

STORM Description Size Cost/m

SUB-TOTAL \$0.00

SANITARY

SUB-TOTAL \$0.00

WATERMAIN

SUB-TOTAL \$0.00

STREET LIGHTING

SUB-TOTAL \$0.00

BC HYDRO/TELUS/SHAW/BELL

SUB-TOTAL \$0.00

ESTIMATED COST PER LIN.M \$957.12

McELHANNEY LTD.

PROJECT No.: 2111-03980-00

REVISION: PA

DATE: 2019-04-03

ROAD: 240 STREET TO 256 STREET (4 LANE DEWDNEY - 24m ROW)

FULL ROAD
ARTERIAL

ROAD TYPE:

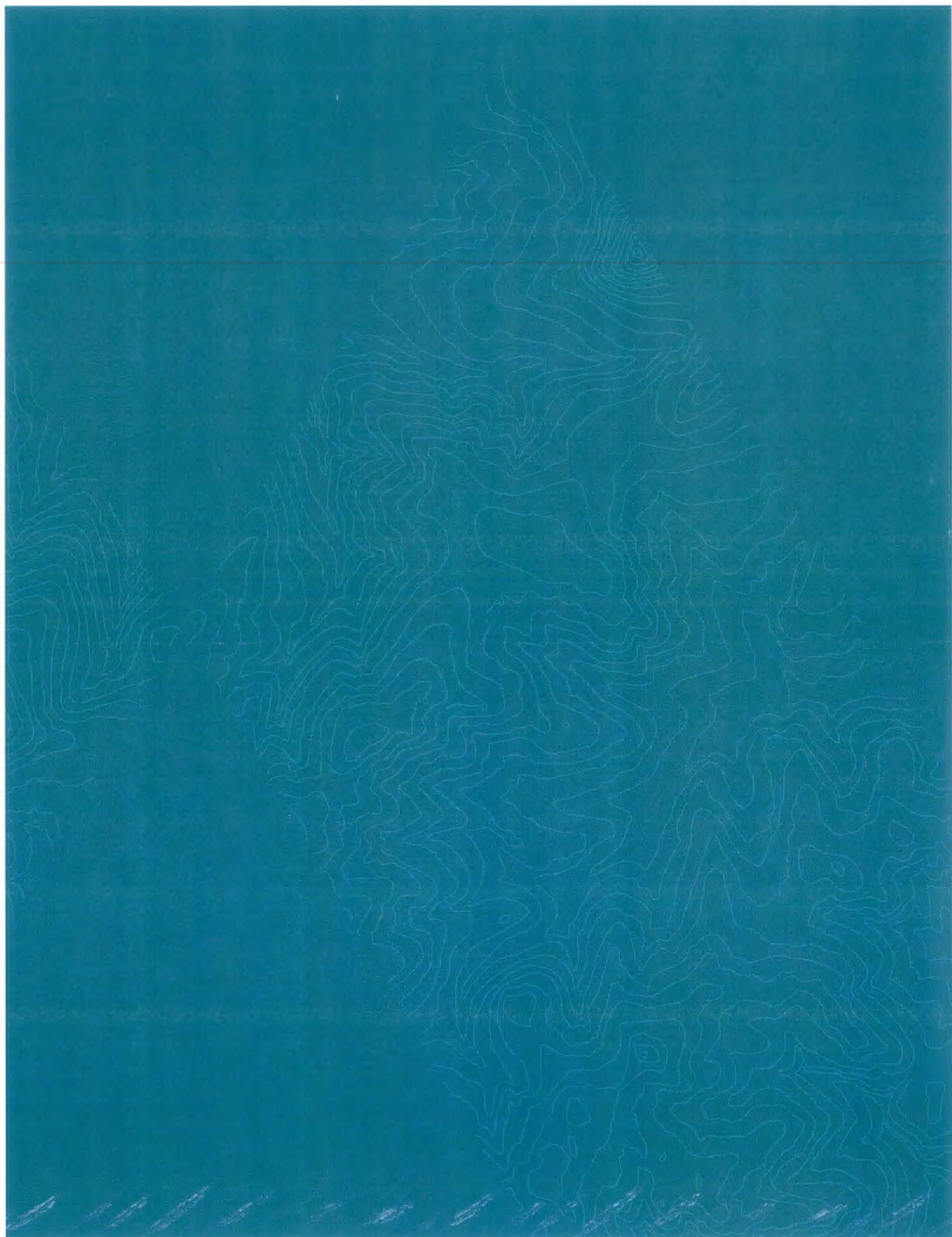
		Sides	Width	Depth	Area/Volume	Unit	Unit Rate	Cost/m
Subbase	450mm	2	7.25	0.45	15.66	tonne	\$30.00	\$469.80
Base	100mm	2	7.25	0.10	3.48	tonne	\$35.00	\$121.80
Curb and Gutter	MMCD-C4 Type 'B'	2				lin. m	\$85.00	\$170.00
Base AC	100mm	2	6.50	0.10	3.12	tonne	\$120.00	\$374.40
Tack Coat		2	6.50		13.00	m ²	\$1.00	\$13.00
Surface AC	50mm	2	6.50	0.05	1.56	tonne	\$120.00	\$187.20
Sidewalk								
Base	100mm	1	1.50	0.10	0.36	tonne	\$35.00	\$12.60
Concrete	100mm	1	1.50	0.10	0.15	m ²	\$50.00	\$7.50
MUP								
Base	100mm	1	3.00	0.10	0.72	tonne	\$35.00	\$25.20
Asphalt	50mm	1	3.00	0.05	0.36	tonne	\$120.00	\$43.20
Boulevard Topsoil	300mm	2	1.80	0.30	1.08	m ³	\$70.00	\$75.60
Boulevard Sodding		1	1.80	1.00	1.80	m ²	\$15.00	\$27.00
HydroSeeding		2	2.00	1.00	4.00	m ²	\$2.00	\$8.00
Boulevard Tree		2	1.00	1.00	2.00	ea.	\$1,000.00	\$2,000.00

SUB-TOTAL **\$3,535.30**

Description	Size		Unit Rate	Cost/m
STORM				
Concrete Pipe	0 - 2.0m Depth	600 mm	lin. m	\$950.00
Manhole Base, Frame, Lid and Cover - 150m Spacing		1200 mm	ea.	\$4,500.00
Manhole Rings		1.5 m	m	\$800.00
Catch Basins - 500m ² Spacing (70m)		600 mm	ea.	\$1,650.00
Catch Basin Leads (+/-7.5m each side)		200 mm	lin. m	\$300.00

SUB-TOTAL **\$1,099.43****SANITARY****SUB-TOTAL** **\$0.00****WATERMAIN****SUB-TOTAL** **\$0.00****STREET LIGHTING****SUB-TOTAL** **\$0.00****BC HYDRO/TELUS/SHAW/BELL****SUB-TOTAL** **\$0.00****ESTIMATED COST PER LIN.M** **\$4,634.73**

ROAD TYPE		Sides	Width	Depth	Area/Volume	Unit	Unit Rate	Cost/m
Subbase	300mm	2	3.00	0.30	4.32	tonne	-\$30.00	-\$129.60
Base	100mm	2	3.00	0.10	1.44	tonne	-\$35.00	-\$50.40
Base AC	50mm	2	3.00	0.05	0.72	tonne	-\$120.00	-\$86.40
Tack Coat		2	3.00		6.00	m ²	-\$1.00	-\$6.00
Mill	50mm	2	3.00		6.00	m ²	-\$20.00	-\$120.00
Overlay	50mm	2	3.00	0.05	0.72	tonne	\$120.00	\$86.40
SUB-TOTAL								-\$310.00





TO: His Worship Mayor Michael Morden
and Members of Council
FROM: Chief Administrative Officer
SUBJECT: **2020 Council Meeting Schedule**

MEETING DATE: November 26, 2019
FILE NO: 01-0530-04/2020
MEETING: Workshop

EXECUTIVE SUMMARY:

The attached calendar of council meetings for 2020 recommends a schedule based on the following general outline:

- Committee of the Whole on the 1st and 3rd Tuesday of the month
- Council Workshop on the 2nd and 4th Tuesday of the month
- Public Hearing on the 3rd Tuesday of the month
- Closed Council scheduled weekly on Tuesdays, to be utilized as necessary
- Adjustments to accommodate Spring, Summer and Winter breaks, a September convention, and 2020 business planning sessions.

With appropriate public notification, the schedule may be altered as needed to either add or remove meetings to accommodate Council's workplan.

RECOMMENDATION:


That the 2020 Council Meeting Schedule attached to the staff report dated November 26, 2019 be adopted.

DISCUSSION:

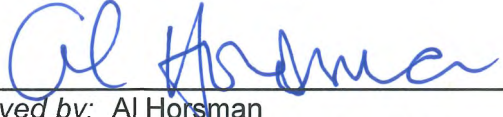
The 2020 calendar generally follows the previous schedule of meetings. Variations are noted below:

1. The Union of British Columbia Municipalities Convention (UBCM) will be held in Victoria from September 21 through to September 25. September 22 is the 4th Tuesday. It is suggested that for the month of September the Council and Workshop Meetings be rescheduled to September 29, 2020.
2. The summer break is scheduled for the first four weeks of August with meetings beginning again on the 1st day of September. It is noted that in some past years, meetings were scheduled for the last week in August to deal with Public Hearing and Committee of the Whole items, however due to scheduling in July, items from these meetings can be dealt with at a regularly scheduled Council Meeting on July 28. Should Council wish to pursue an option of returning on September 8, Committee of the Whole can be added to that date, with items moving forward to the scheduled evening Council meeting. This option will extend Council break for a week.
3. The winter break is scheduled between December 14, 2020 and December 31, 2020. The Public Hearing for this month has been advanced to the first Tuesday.

Staff are proposing a Council media session and a joint Closed Council meeting with the Council of the City of Pitt Meadows to be held on Tuesday, February 4, 2020. These two events are not reflected in the calendar. It is suggested that the media session be held at 11:00 a.m. prior to Committee of the Whole, and the joint Closed Council meeting be held at 7:00 p.m.



Prepared by: Laura Benson
Director of Corporate Support



Approved by: Al Horsman
Chief Administration Officer

Attachments: Proposed 2020 Council Meeting Calendar



MAPLE RIDGE BRITISH COLUMBIA

City of Maple Ridge 2020 Council Meeting Calendar

PROPOSED

January						
Su	Mo	Tu	We	Th	Fr	Sa
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

February						
Su	Mo	Tu	We	Th	Fr	Sa
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29

March						
Su	Mo	Tu	We	Th	Fr	Sa
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

April						
Su	Mo	Tu	We	Th	Fr	Sa
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30		

May						
Su	Mo	Tu	We	Th	Fr	Sa
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31						

June						
Su	Mo	Tu	We	Th	Fr	Sa
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29					

July						
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			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

August						
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						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31					

September						
Su	Mo	Tu	We	Th	Fr	Sa
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30			

October						
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				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

November						
Su	Mo	Tu	We	Th	Fr	Sa
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30					

December						
Su	Mo	Tu	We	Th	Fr	Sa
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

Meeting Types:

	Closed Council (not public)
	Committee of the Whole
	Council Meeting - Workshop
	Council Meeting - Regular
	Public Hearing

Meeting Times:

	Times vary
	1:30 pm - 3:30 pm
	10:00 am - 4:00 pm
	7pm
	7pm

Location:

	Blaney Room
	Council Chambers
	Blaney Room
	Council Chambers
	Council Chambers

Other:

	Council Conference
	Statutory Holiday
	Council Break - No Meetings
	Business Planning

TO: His Worship Mayor Michael Morden
and Members of Council
FROM: Chief Administrative Officer
SUBJECT: 2019 Town Centre Business Walk Report

MEETING DATE: November 26, 2019
FILE NO: 2320522
MEETING: Workshop

EXECUTIVE SUMMARY:

The Economic Development and Civic Property Department (EDCP) partnered with the Maple Ridge-Pitt Meadows Chamber of Commerce (Chamber) and the Downtown Maple Ridge Business Improvement Association (DMRBIA) to complete a Business Walk in the Town Centre over an 11-day period from September 3 to 17, 2019.

During the Business Walk, 560 questionnaires were distributed to businesses in the Town Centre of which 254 completed questionnaires were returned for a 45.4% return rate. Based on this overall response rate, the data collected should have an overall margin of error of +/- 5% with a 95% confidence level.

Businesses generally rated the Town Centre as a good place to do business; the most common positive responses were that the Town Centre is walkable, has a good mix of businesses, has available parking and there is a good amount of customer traffic. Sixty-eight percent of respondents have been in business at their current location for 10 or more years and 93% of respondents rated their business as either "*Fair/Steady*" or "*Good/Increasing*."

While a majority of respondents gave good marks to the Town Centre overall, a significant number of respondents expressed their concerns that crime, safety, security and social issues in the Town Centre are negatively impacting their businesses. Eighty-nine percent of respondents believe that "*Improving public safety*" should be a high priority for the City. There was strong interest in having the City, Chamber and DMRBIA develop programs, courses and/or workshops to help businesses with crime and security issues as well to help them improve their marketing and social media strategies. Forty two businesses requested follow-up visits.

RECOMMENDATION: Receive for information only. No Council resolution required.

DISCUSSION:

a) Background Context:

Business Walks are a widely used business retention and expansion tool designed to quickly gauge the economic climate of businesses in a specified area. Research from the Provincial government indicates that about 80% of employment and investment growth in urban and suburban markets comes from existing businesses, pointing to the importance business retention and expansion activities in driving economic growth.

Business Walks focus on creating face-to-face engagement opportunities with the business community, allowing businesses the opportunity to share their ideas, opinions and concerns on how to make the community a better place to locate a business. They are a flexible tool that can be used to collect initial baseline data from businesses, and can be used as the basis for developing a longitudinal study that compares and contrasts changes in the market over time.

The overarching goal of the 2019 Town Centre Business Walk was to gain a baseline understanding of the business climate in the Town Centre. To do this, City staff worked with the Chamber and DMRBIA to develop and administer a questionnaire to collect information from business on the general business environment in the Town Centre, the opportunities and challenges they are facing, and on how safety and security concerns are impacting their businesses.

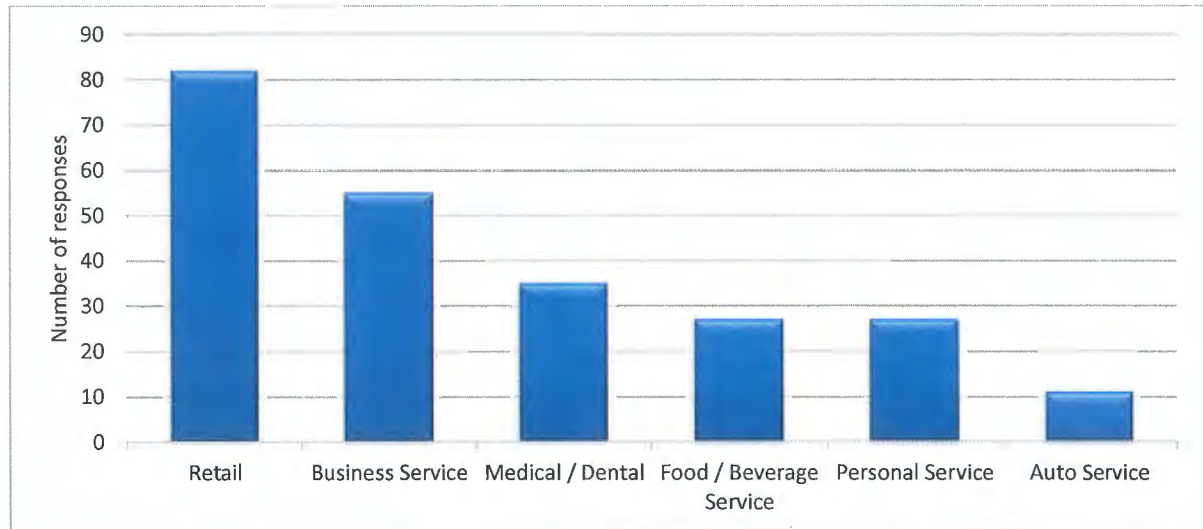
The Business Walk was conducted in two distinct phases. During the first phase from September 2 to 10, City staff delivered the Business Walk questionnaires to approximately 560 business addresses in the Town Centre. Businesses were informed that a Business Walk team would return in a few days to collect the completed questionnaires.

During the second phase from September 11 to 17, Business Walk teams from the City, Chamber and DMRBIA returned to pick-up the completed questionnaires from one of 12 pre-assigned zones within the Town Centre. In total, the Business Walk resulted in approximately 1,170 visits to business (560 initial visits + 560 Business Walk visits + 150 return visits = 1,170 total business visits.) There were 254 questionnaires returned (240 paper-based and 14 online) for a 45.4% return rate giving this survey a high level of statistical validity.

Summary of results

Retail business was the single largest single category of respondents accounting for 1/3 of total responses (**Figure 1**) with the various types of service businesses accounting for the remaining 2/3 of respondents. Some business categories such as a **“Personal Service”**, **“Auto Service”**, and **“Food/Beverage Service”** may also have a retail component to their business. It should also be noted that two “non-market” categories—**“Government/Social Service”** and **“Medical/Dental Service”** together accounted for 18% of the total respondents.

Figure 1: Respondents’ Types of Business



The vast majority of respondents (93%) rated their current state of business as either **“Fair/Steady”** or **“Good/Increasing”** (**Figure 2**), a very positive sign for the overall economic climate in the Town Centre, and most (83%) have been in business at their current location for more than six years (**Figure 3.**)

Figure 2: State of Business

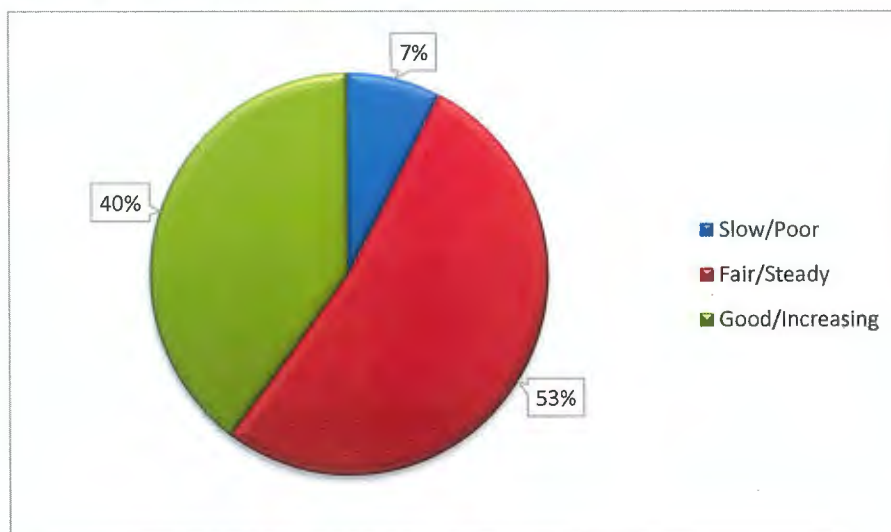
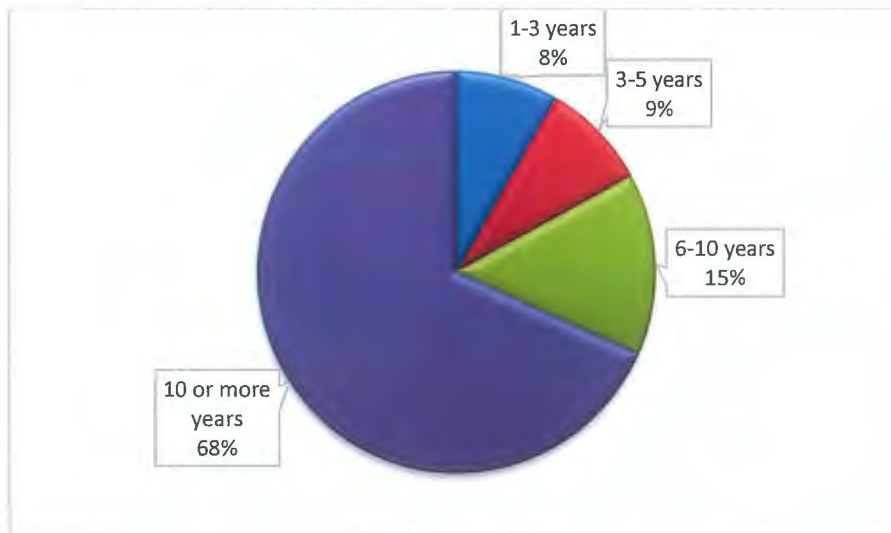
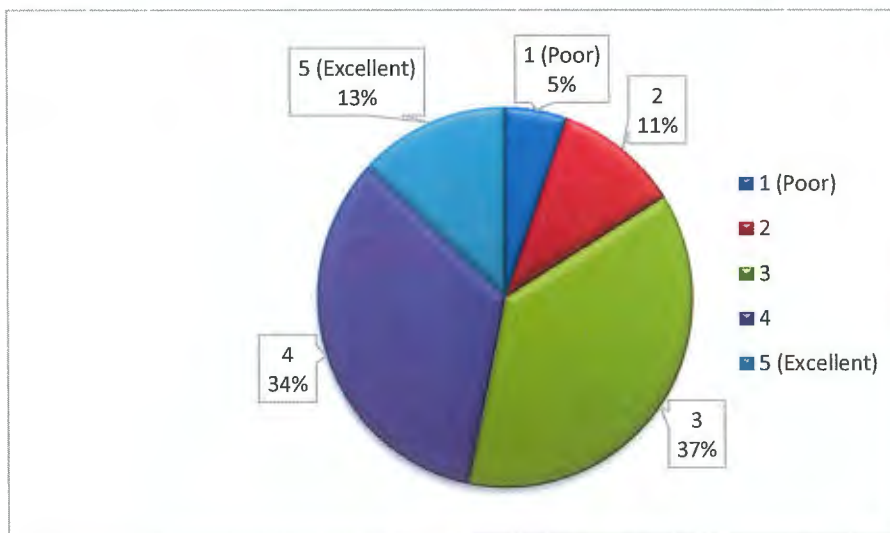


Figure 3: Time in business at current location



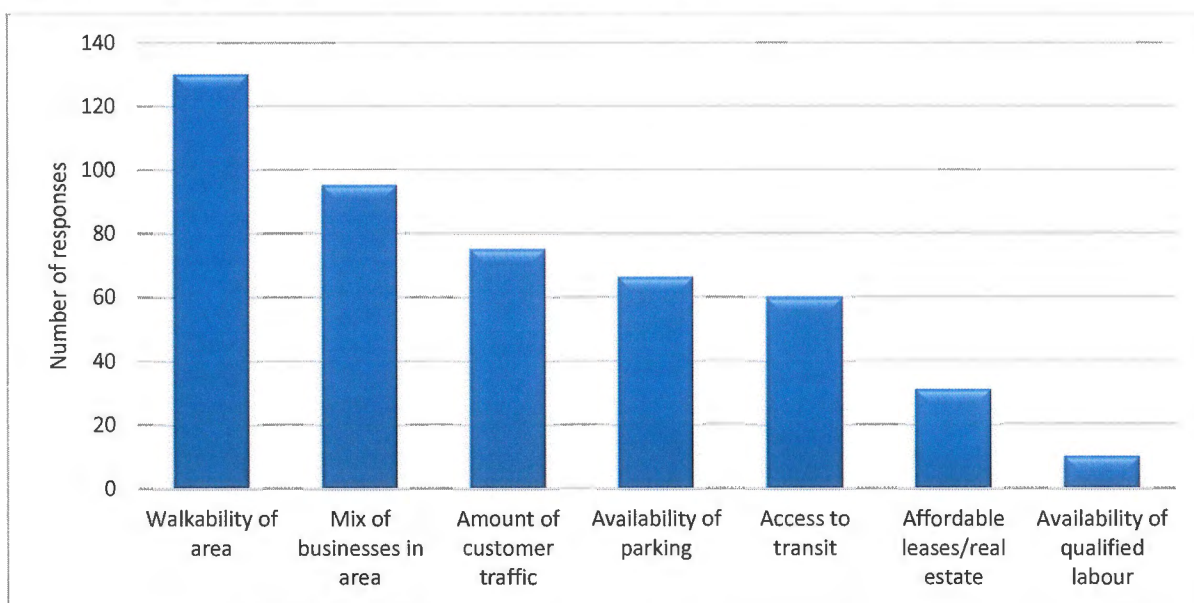
Respondents generally rated the Town Centre as a good place to do business. The average respondent score was 3.4 with almost half of the total respondents (47%) giving the Town Centre a score of 4 or 5 (**Figure 4**). Conversely, only 16% of respondents gave the Town Centre an overall poor grade (1 or 2) as a place to locate a business (**Figure 4**.)

Figure 4: What overall grade would you give the Town Centre as a place to locate a business?



The most common positive responses about locating a business in the Town Centre were that the Town Centre is walkable, has a good mix of businesses, there is available parking and there is a good amount of customer traffic in the area (**Figure 5**.)

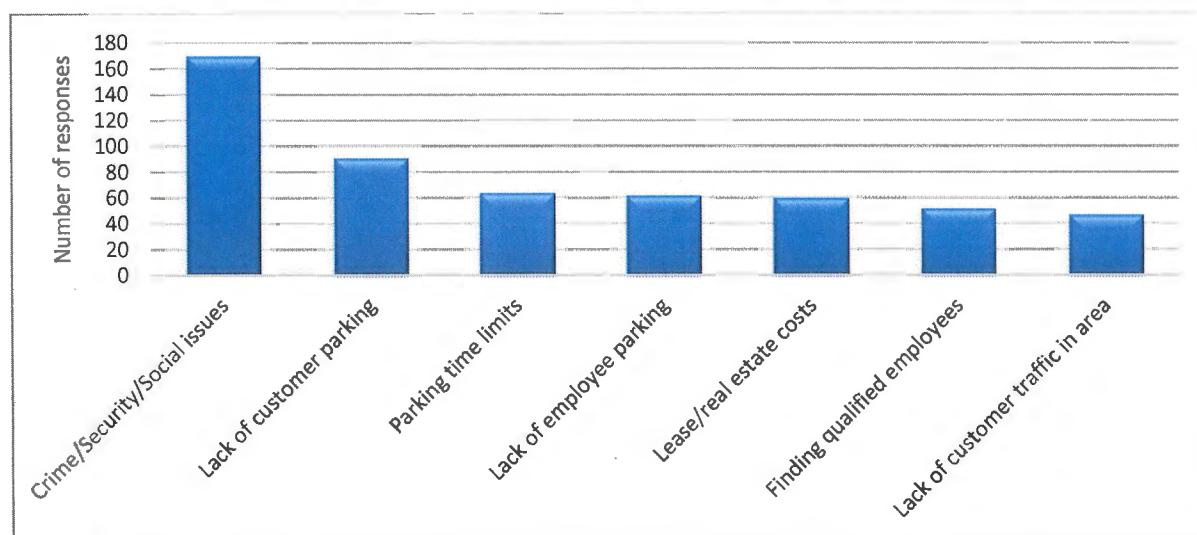
Figure 5: What do you like most about doing business in the Town Centre?



While “walkability” does not have a standard definition, it can be thought of as a combination of factors that encourage pedestrian activity in shops, restaurants, sidewalks and other public spaces. This can include an environment with a good mix of shopping and entertainment options that are close together and easily accessible, active and animated public spaces, and a general sense of safety for pedestrians.

When respondents were asked about the biggest challenges they face doing business in the Town Centre, 67% cited “**Crime/Security/Social Issues**” as one of their biggest challenges, almost twice as many who cited “**Lack of customer parking**” as a major challenge (Figure 6.)

Figure 6: What are the biggest challenges facing your business in the Town Centre?



Respondents were then further asked a series of questions to rank what they felt the City's priorities should be in making the Town Centre a more inviting place to locate a business using a five-point scale, with 1 as a "**Low Priority**" and 5 as a "**High Priority**".

The potential priorities included:

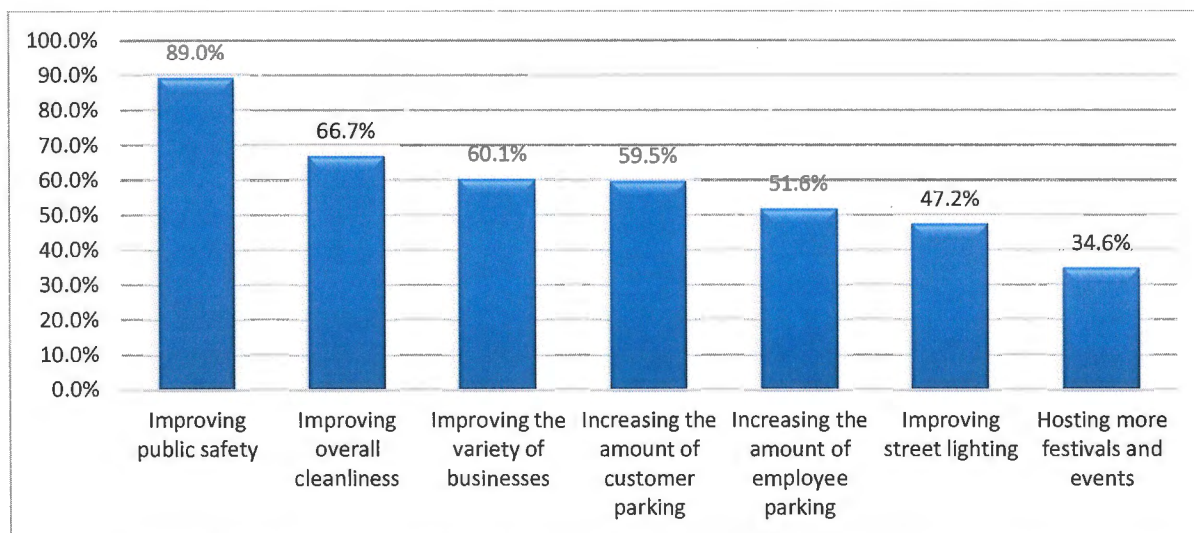
- Hosting more events and festivals
- Improving the overall cleanliness
- Improving public safety
- Improving the variety of businesses
- Increasing the amount of customer parking
- Increasing the amount of employee parking

For the purpose of this report, responses to these questions have been further grouped into "**Low priority**" (1 and 2), "**Medium Priority**" (3), and "**High Priority**" (4 and 5.)

Using this newly compressed scale, 89% (**Figure 7**) of respondents identified "**Improving public safety**" as a High Priority for the City with an average score of 4.78 out of 5 (**Figure 8**.) In both conversations with businesses and in their comments on the questionnaires, respondents expressed concerns that criminal activity and related "social issues" are negatively impacting their businesses and customers. The issues cited included theft, shoplifting, open drug use and drug sales, discarded drug paraphernalia, loitering and disruptive behaviours that were negatively impacting their businesses, staff and customers on a regular basis.

The Business Walk questionnaire was meant to gather an initial reading of the impact that crime, security and social issues are having on businesses. The questionnaire did not ask in-depth questions on the severity, frequency and recency of these issues and should be followed up with more in-depth research and analysis on the impact of crime and related social issues.

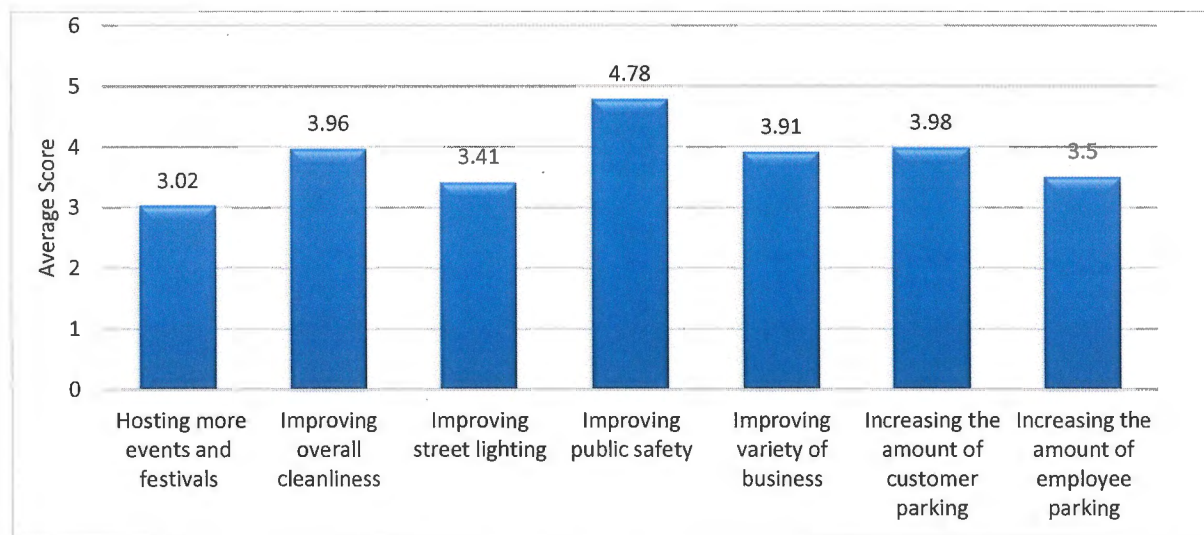
Figure 7: What should the City's priorities be to make the Town Centre a more inviting place to locate a business? (Percent of respondents choosing 4 or 5)



A grouping of three items—*“Increasing the amount of customer parking”*, *“Improving overall cleanliness”* and *“Improving the variety of business”*—were all given a similar but lower High Priority rating, while *“Increasing the amount of employee parking”*, *“Improving street lighting”* and *“Hosting more events and festivals”* were given a Medium Priority rating by respondents (Figure 8.)

Parking concerns, both with the respect to the amount of parking available and time limits, were a recurrent issue with respondents and should be explored in more depth with a dedicated parking study. Concerns with parking time limits included both those looking for longer time limits as well as those looking for a limited number of short term (e.g. 15-minute) on-street parking spots. Interestingly, a number of respondents in locations with off-street parking also expressed concerns about both the amount of customer and employee parking available and time limits.

Figure 8: City's priorities to make the Town Centre a more inviting place to locate a business? (Average score)



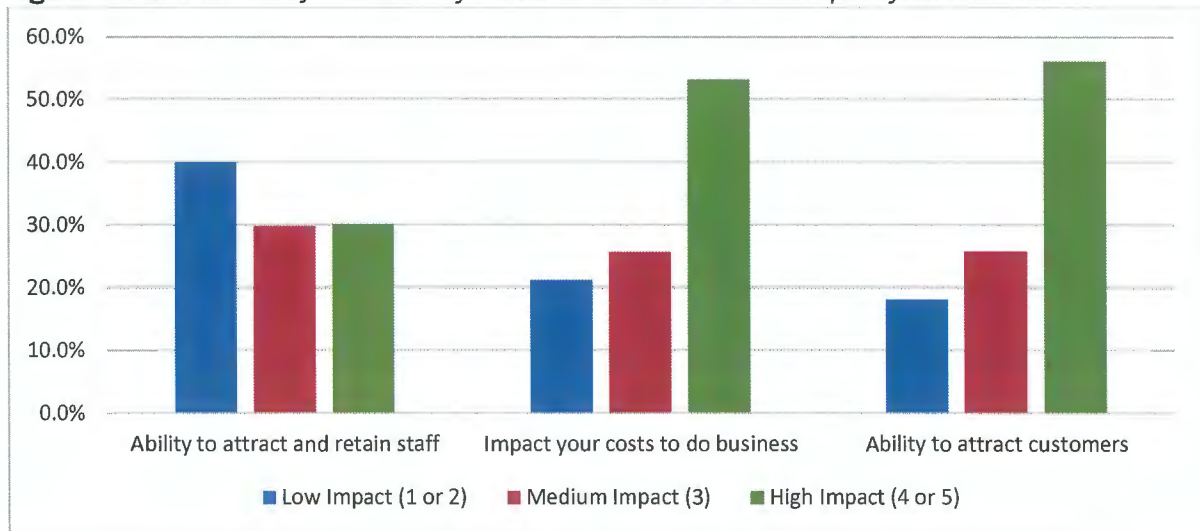
Respondents were also asked a series of questions about the impact that safety and security issues in the Town Centre have on their ability to attract and retain staff, their costs to do business, and on their ability to attract customers.

While the aggregate data indicates that safety and security issues have a “medium impact” (Figure 9), further analysis indicates that respondents believe that these issues have a greater impact on their costs to do business and their ability to attract customers, than on their ability to attract and retain staff (Figure 10.)

Figure 9: How do safety and security issues in the Town Centre impact your business?
(Average scores)



Figure 10: How do safety and security issues in the Town Centre impact your business

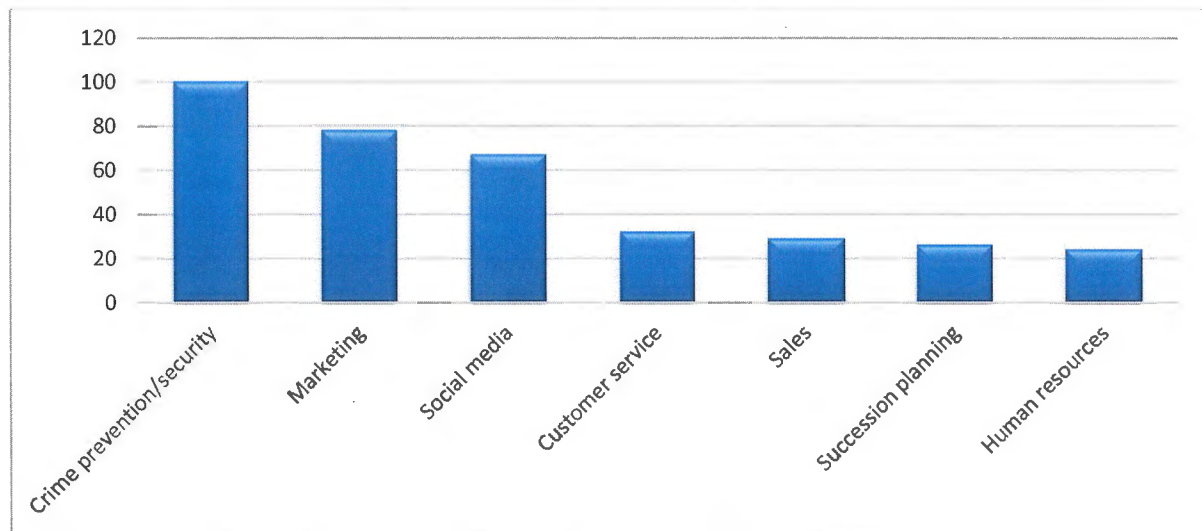


Respondents were also asked which types of business support programs, courses and workshops they would be most interested in if offered by the City, Chamber and/or DMRBIA. The most popular choice was “**Crime prevention/security**” closely followed by “**Marketing**” and “**Social media**”, with the remaining choices having significantly lower levels of interest (Figure 11.)

The City, Chamber and DMRBIA can work together to develop information and workshops to help address respondents’ interest in addressing crime/security issues; the Chamber and DMRBIA can also look at options to host workshops and presentations focusing on marketing and social media for local businesses.

Finally, staff in the Economic Development and Civic Property Department have begun contacting the 42 businesses that requested follow-up visits and will work with City staff, the Chamber and DMRBIA to address any concerns raised by businesses during these follow-up visits.

Figure 11: Respondents’ interest level in business support programs, courses and workshops



b) Desired Outcomes:

The City, Chamber and DMRBIA share a common goal of creating and maintaining an active, attractive and vibrant Town Centre that attracts new businesses, encourages existing businesses to grow and thrive, and is a welcoming destination for residents and visitors. Over the past few years, the City has undertaken a number of initiatives aimed at improving public safety and increasing visitation to the Town Centre that should be continued and built on. Staff recommend the City continues to focus on the activation of public spaces and enhanced safety patrols in the Town Centre, support the Chamber and DMRBIA to offer safety and security programs and marketing workshops, and undertake a comprehensive parking study of the Town Centre.

1. Continue coordinated safety and security activities

Safety and security issues were identified as a significant, ongoing issue for businesses during the Business Walk. The City, RCMP, Westridge Security and DMRBIA are continuing to work together on enhancing safety and security in the Town Centre through the DMRBIA Safety and Security Committee. The addition of two Community Safety Officers in the Town Centre has helped address safety and security concerns, and respondents commented favourably on the recent heightened police/security presence in the Town Centre.

The RCMP are continuing to offer Crime Prevention through Environmental Design (CPTED), a free crime prevention evaluation for businesses, as part of their overall crime prevention strategy.

2. Continue Town Centre activation strategies

The City, Chamber and DMRBIA continue to collaborate on a number of new initiatives designed to support local businesses by attracting residents and visitors to the Town Centre. ***Car Free Day***, ***Celebrate the Night***, and ***Glow Maple Ridge*** are excellent examples of family-friendly events that create a safe, welcoming environment and showcase the variety and vibrancy of businesses in the Town Centre. These events also demonstrate that when the Town Centre is filled with people and family-friendly events, there is a natural and positive reduction in negative behaviours.

3. Support the development and implementation of the Community Safety Plan

The EDCP, Chamber and DMRBIA will play an important role in supporting the development of the Community Safety Plan and acting as a liaison to the business community.

4. Support the Chamber and DMRBIA with specific workshop and training options

The City will continue to support the Chamber and DMBIA in the development and planning of a series of workshops for businesses on crime prevention, marketing and social media. The City will support these efforts by offering training space, access to subject matter experts, and marketing and promotional assistance.

5. Undertake a comprehensive parking study

A large number of businesses raised concerns about the availability of both customer and employee parking, and with the current parking time limits in the Town Centre. This will be further explored through the implementation of a comprehensive parking study that explores the current parking inventory in the Town Centre, trends and future needs in parking, and best practices for managing the parking supply.

6. Ongoing meetings with Town Centre property owners and developers

City staff continue to engage in ongoing dialogue with a number of Town Centre property and business owners about potential commercial and mixed-use development and re-development projects in the Town Centre. These efforts include providing information to developers and property owners on the types and nature of commercial space inquiries the City is receiving. Staff will also schedule a series of meetings with property and business owners where the Business Walk identified specific concerns.

7. 2020 Business Walk

The 2019 Town Centre Business Walk was a successful collaboration between the City, Chamber and DMRBIA that can be repeated on a regular basis to track changes in the business environment in the Town Centre. The partners will schedule a meeting in early 2020 to review the 2019 Business Walk processes and begin planning for 2020.

c) Strategic Alignment:

The goals of the Business Walk align with a number of Council's Strategic Priorities, specifically related to Growth, Community Safety, and Community Pride and Spirit.

d) Citizen/Customer Implications:

The recommended actions contained in this report will help the City, Chamber and DMRBIA achieve their shared goal of creating a safe, vibrant Town Centre that benefits businesses and residents alike.

e) Inter-departmental Implications:

The Economic Development and Civic Property Department will coordinate with Planning, Engineering, Bylaws and Licences, and RCMP to implement the recommendations in this report.

f) Business Plan/Financial Implications:

The 2019 Town Centre Business Walk is a good example of how the City, Chamber and DMRBIA can work together on their common goal of supporting businesses in the Town Centre. Staff recommend that Business Walks become a regular element of the EDCP's annual business retention and expansion activities.

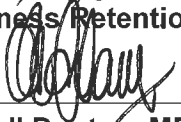
CONCLUSION:

The 2019 Town Centre Business Walk was a successful collaboration between the City, Chamber and DMRBIA. Businesses were generally very receptive to the Business Walk process and were pleased that the City, Chamber and DMRBIA reached out to hear their concerns and suggestions on how to make the Town Centre a more safe, vibrant and attractive place to locate a business.

The responses revealed that a majority of businesses in the Town Centre are successful and see the area as a good place to locate a business. They believe the Town Centre's strengths are its walkability, the mix of businesses in the area, and the amount of customer traffic present.

Respondents also expressed serious concerns about the impact that crime and related social issues are having on their ability to attract customers and on their costs to do business in the Town Centre. Information gathered from businesses during the Business Walk will be useful to inform the development of new Community Safety Plan and to help the City, Chamber and DMRBIA design information and presentations that help businesses address these issues. The Business Walk also revealed the need to conduct a comprehensive parking study on the availability of customer and employee parking and to address parking time limits in the Town Centre.


Prepared by: **Bruce Livingstone, BBA**
Business Retention and Expansion Officer


Reviewed by: **Darrell Denton, MBA**
Acting Director, Economic Development and Civic Property


Approved by: **Christine Carter, M.PL, MCIP, RPP**
GM Planning & Development Services


Concurrence: **Al Horsman**
Chief Administrative Officer

Attachments:

- (A) 2019 Town Centre Business Walk Questionnaire
- (B) Summary of Questionnaire Responses
- (C) Comments from 2019 Town Centre Business Walk Questionnaire

2019 Town Centre Business Walk Questionnaire

1. Type of business

Please select the option that best describes the business

- | | | |
|---|---|--------------------------------------|
| <input type="radio"/> Auto Service | <input type="radio"/> Government Agency | <input type="radio"/> Retail |
| <input type="radio"/> Business Service | <input type="radio"/> Medical / Dental | <input type="radio"/> Social Service |
| <input type="radio"/> Food / Beverage Service | <input type="radio"/> Personal Service | |

Other (please specify): _____

2. Please rate the current state of your business:

- ☐ Slow/Poor ☐ Fair/Steady ☐ Good/Increasing

3. How long have you been in business?

- | | | |
|--|--|-----------------------------------|
| <input type="radio"/> Less than one year | <input type="radio"/> 1 – 3 Years | <input type="radio"/> 3 – 5 years |
| <input type="radio"/> 6 – 10 years | <input type="radio"/> 10 or more years | |

4. How many years at this location?

- | | | |
|--|--|-----------------------------------|
| <input type="radio"/> Less than one year | <input type="radio"/> 1 – 3 Years | <input type="radio"/> 3 – 5 years |
| <input type="radio"/> 6 – 10 years | <input type="radio"/> 10 or more years | |

5. Total number of employees including yourself (or owner)?

F/T Employees: _____ P/T Employees: _____ Temporary/Seasonal: _____

6. Do you plan on hiring additional employees due to business growth in the next 6 to 12 months?

F/T Employees: _____ P/T Employees: _____ Temporary/Seasonal: _____

7. What do you like MOST about doing business in the Town Centre?

Please select all that apply

- ☐ Access to transit ☐ Availability of qualified labour ☐ Mix of businesses in area
- ☐ Amount of customer traffic ☐ Availability of parking ☐ Walkability of area
- ☐ Affordable leases/real estate

Other: _____

8. What overall grade would you give the Town Centre as a place to locate a business?

Circle the number that best describes your opinion of the Town centre as a place to locate a business

A poor location 1 2 3 4 5 An excellent location

9. What are the biggest challenges facing your business in the Town Centre?

Please select all that apply:

- ☐ Crime/security/social issues ☐ Lack of customer parking ☐ Lack of employee parking
- ☐ Finding qualified employees ☐ Lease/real estate costs ☐ Parking time limits
- ☐ Lack of customer traffic in area ☐ Lack of available commercial real estate ☐ Zoning/business licencing regulations

Other: _____

10. What do you think the City's priorities should be to make the Town Centre a more inviting place to locate a business?

Circle the number that best describes what you believe should be the priority level for each item

Hosting more events and festivals	Not a priority	1	2	3	4	5	High Priority
Improving the overall cleanliness	Not a priority	1	2	3	4	5	High Priority
Improving the street lighting	Not a priority	1	2	3	4	5	High Priority
Improving public safety	Not a priority	1	2	3	4	5	High Priority
Improving the variety of businesses	Not a priority	1	2	3	4	5	High Priority
Increasing the amount of customer parking	Not a priority	1	2	3	4	5	High Priority
Increasing the amount of employee parking	Not a priority	1	2	3	4	5	High Priority

Other (please specify): _____

11. How do safety and security issues in the Town Centre impact your business?

Circle the number that best describes the impact on your business

Impact your ability to attract customers	No impact	1	2	3	4	5	Strongly Impact
Impact your ability to attract and retain staff	No impact	1	2	3	4	5	Strongly Impact
Impact your costs to do business	No impact	1	2	3	4	5	Strongly Impact

12. If offered, what business support programs, courses and workshops would best support your business growth?

- | | | |
|--|---------------------------------------|---|
| <input type="radio"/> Crime prevention/security | <input type="radio"/> Human resources | <input type="radio"/> Social media |
| <input type="radio"/> Customer service | <input type="radio"/> Marketing | <input type="radio"/> Succession planning |
| <input type="radio"/> Finance/cash flow management | <input type="radio"/> Sales | |

Other (please specify): _____

13. What can the City, Chamber and BIA do to help your business succeed?

14. Would this business like a follow-up visit?

- ☐ Yes ☐ No

Business Name: _____

Contact Name: _____

Contact Information: _____

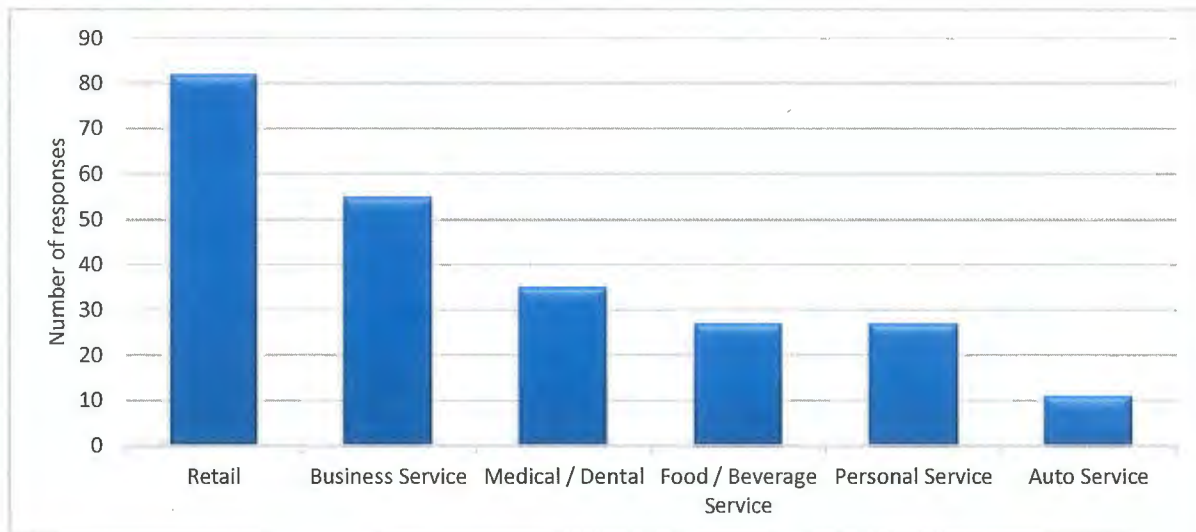
For Office Use Only

Questionnaire #:

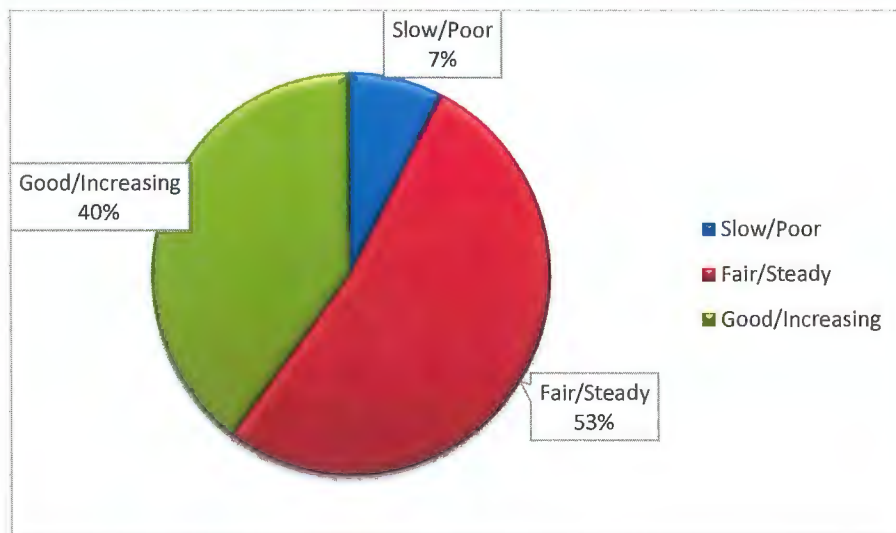
Zone:

Attachment B: Summary of Questionnaire Responses

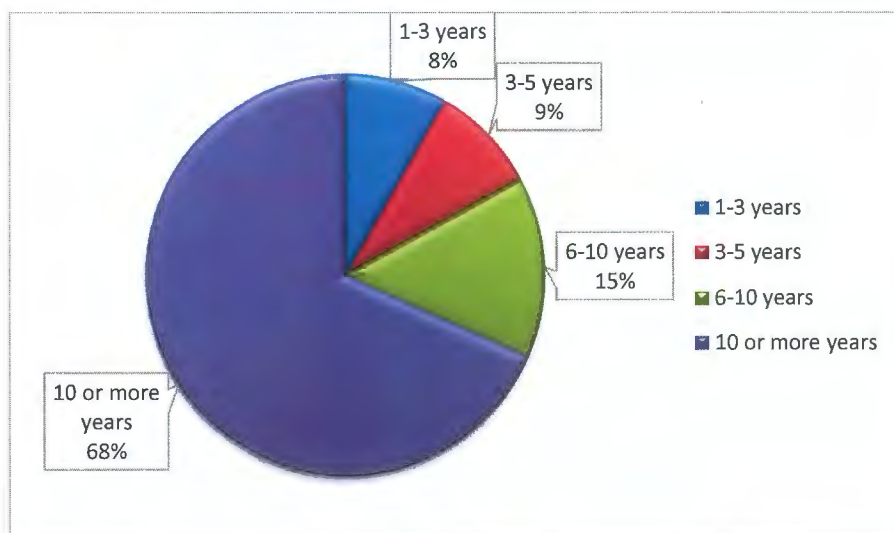
Q1. Type of Business



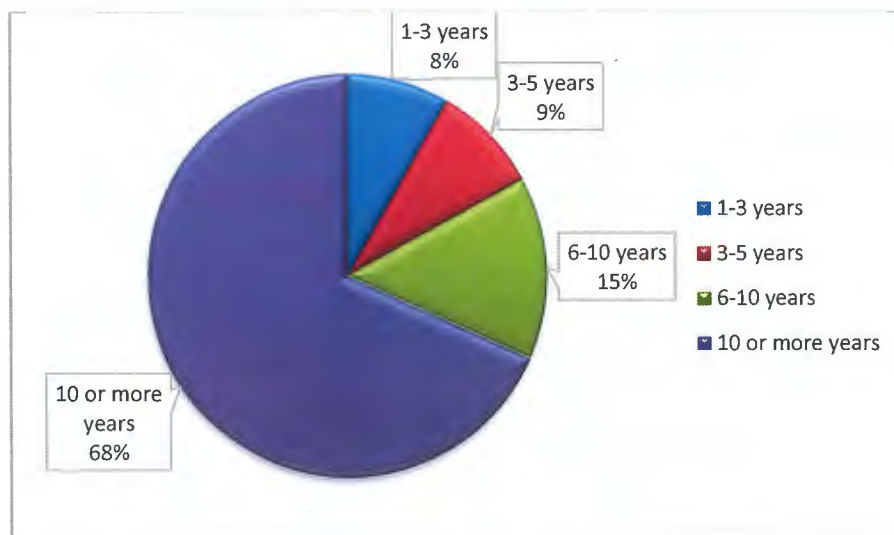
Q2. Please rate the state of your business.



Q3. How long have you been in business?



Q4. How long have you been in business at this location?



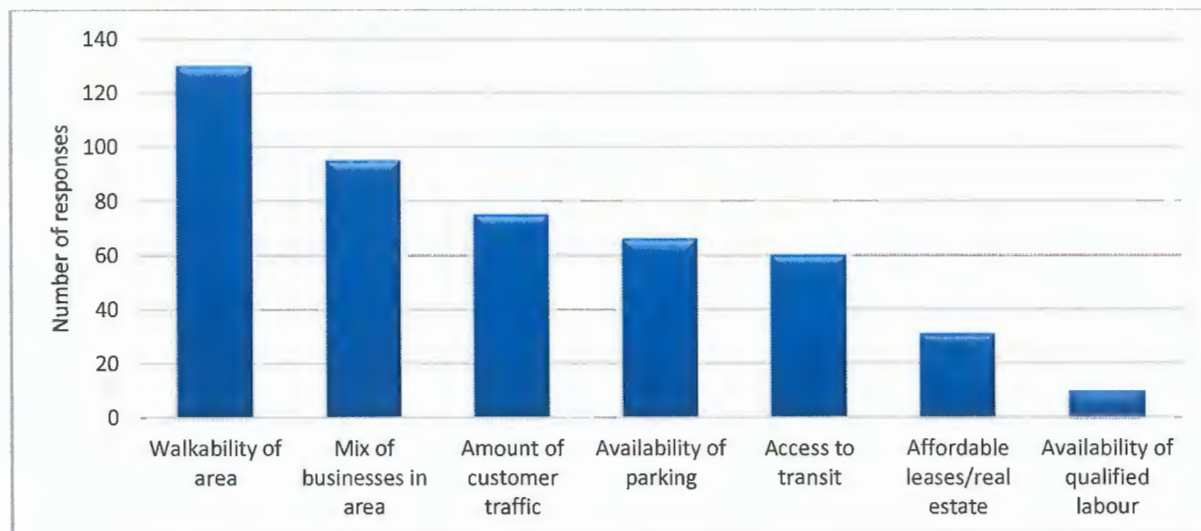
Q5. Total number of employees including yourself (or Owner)?

Number of Employees	Full-time		Part-time	
1 - 5	137	54%	95	37%
6 - 10	35	14%	18	7%
11 - 25	26	10%	12	5%
26 - 100	10	4%	3	1%
100+	1	0%	0	0%
No Response	45	18%	126	50%
Total	254	100%	254	100%

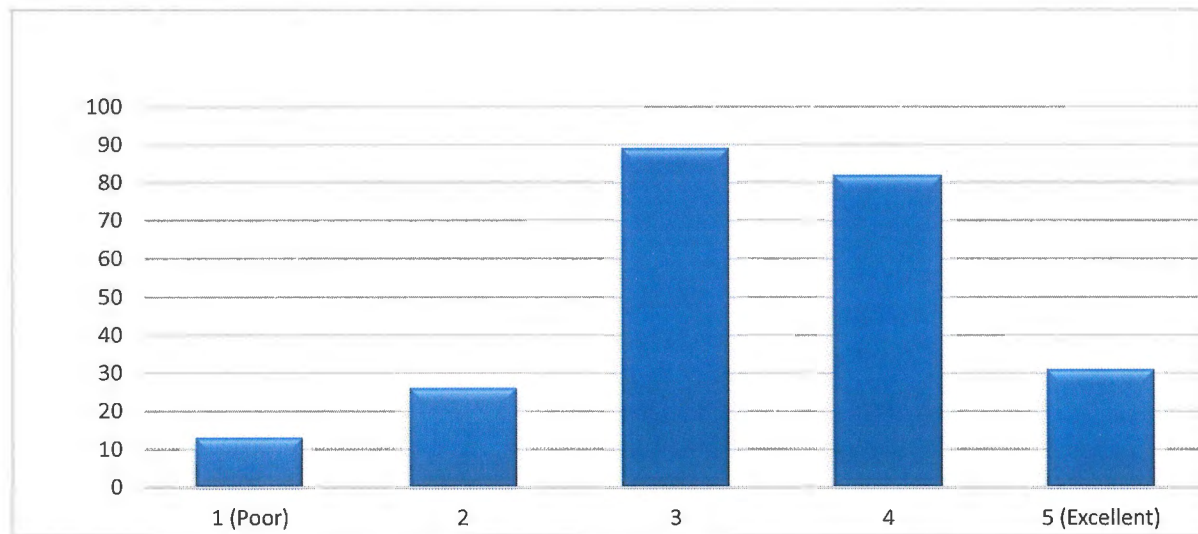
Q6. Do you plan on hiring additional employees due to business growth in the next 6 to 12 months?

Insufficient data was collected for analysis of this question.

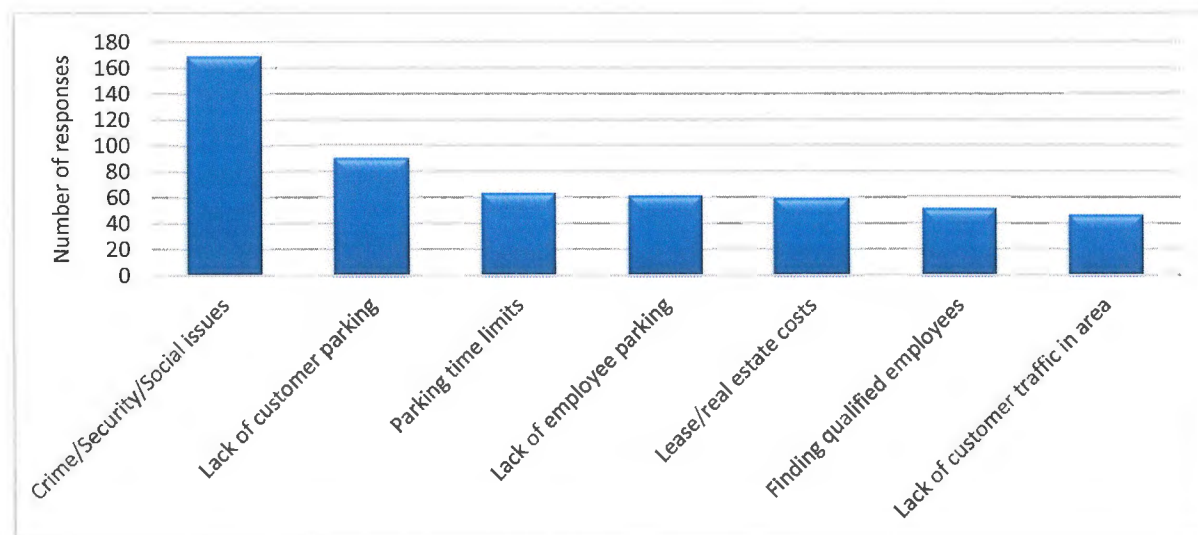
Q7. What do you like most about doing business in the Town Centre?



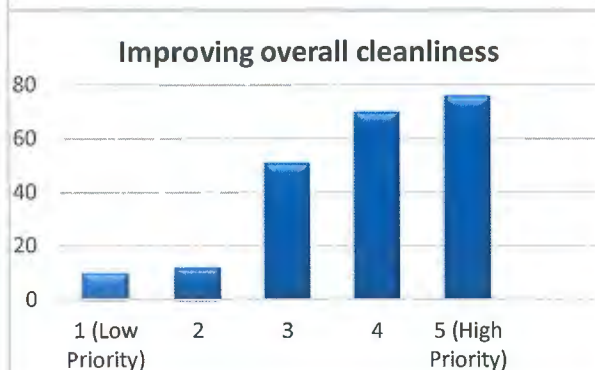
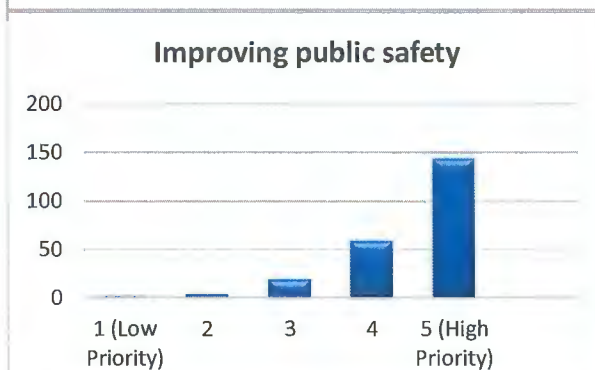
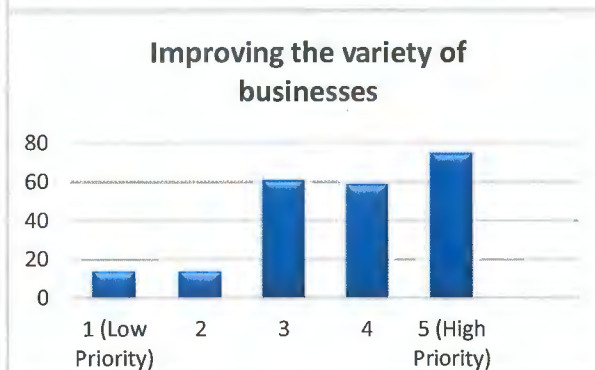
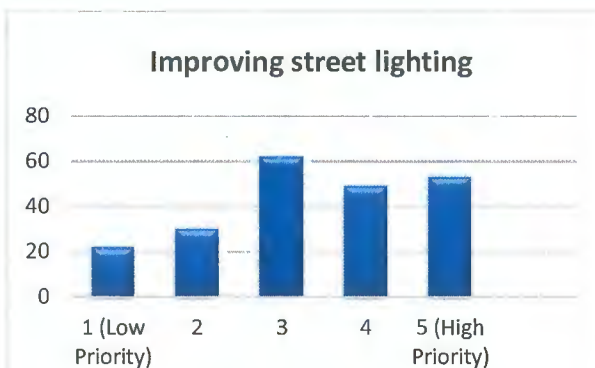
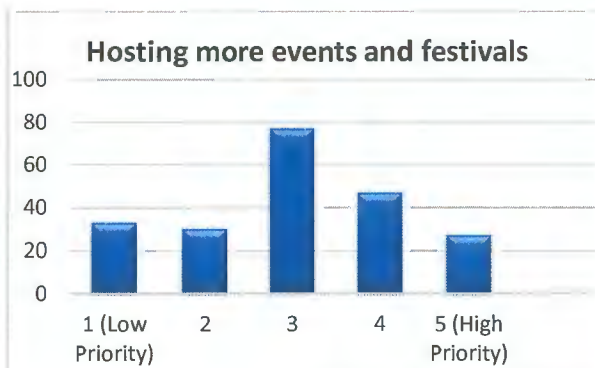
Q8. What overall grade would you give the Town Centre as a place to locate a business?



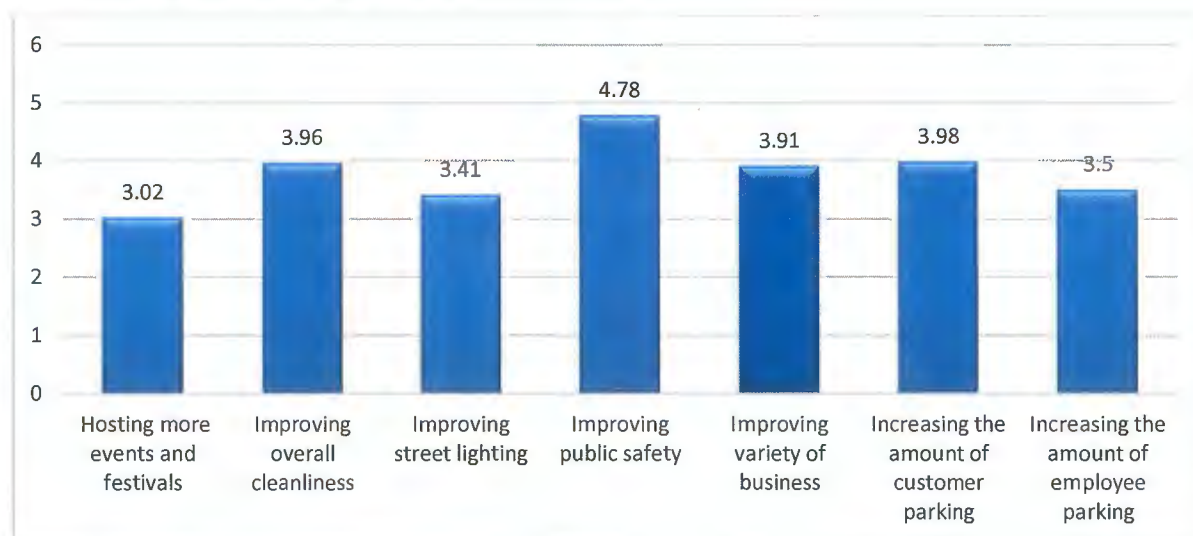
Q9. What are the biggest challenges facing your business in the Town Centre?



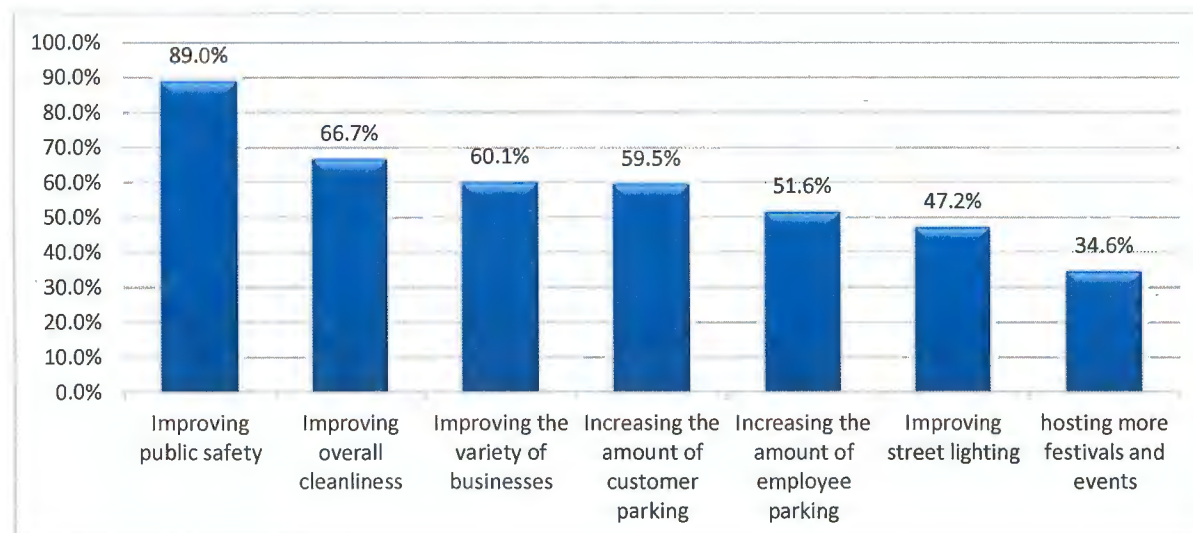
Q10. What do you think the City's priorities should be to make the Town Centre a more inviting place to locate a business?



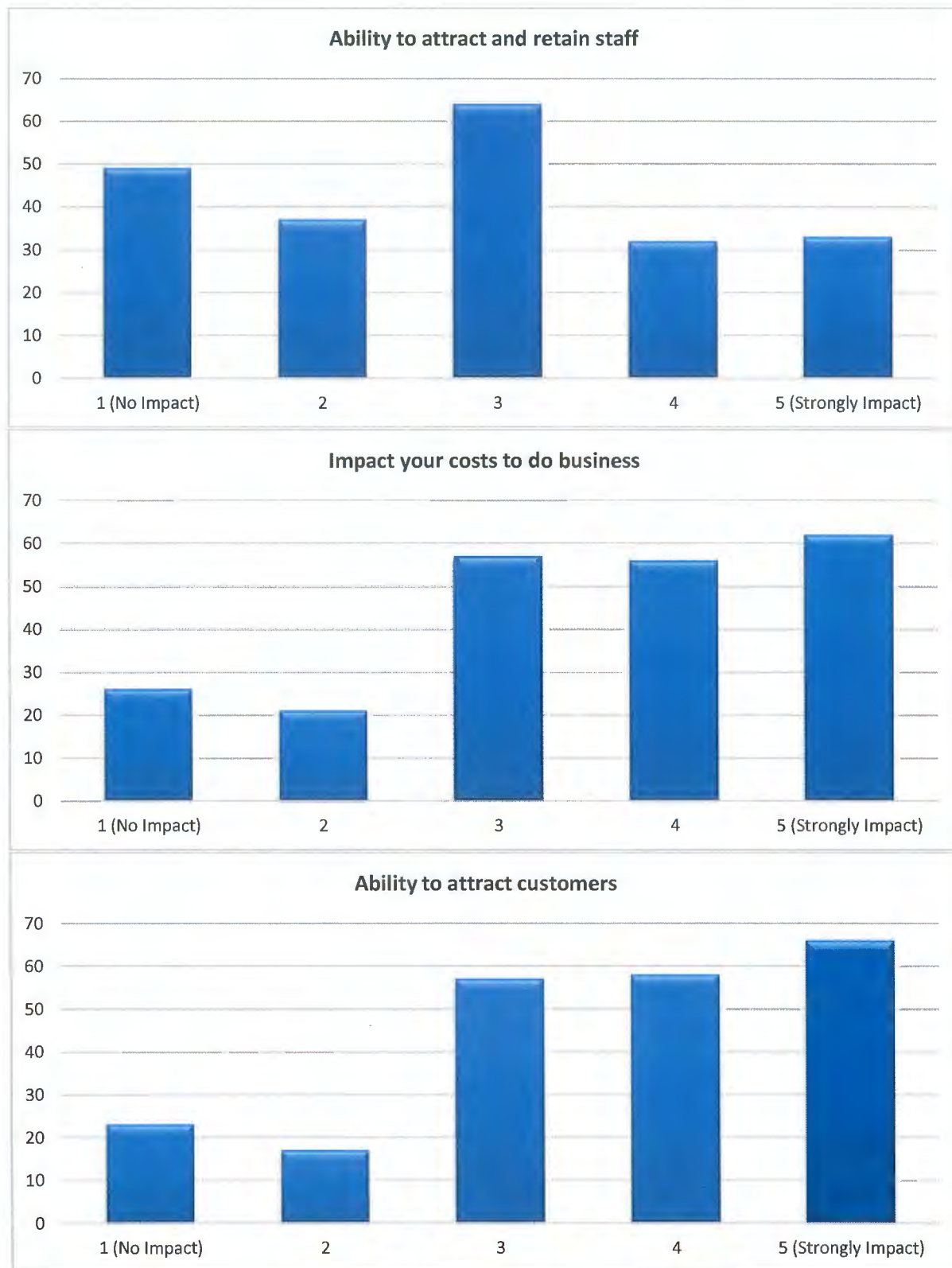
Q10 – Average Respondent Scores for City Priorities



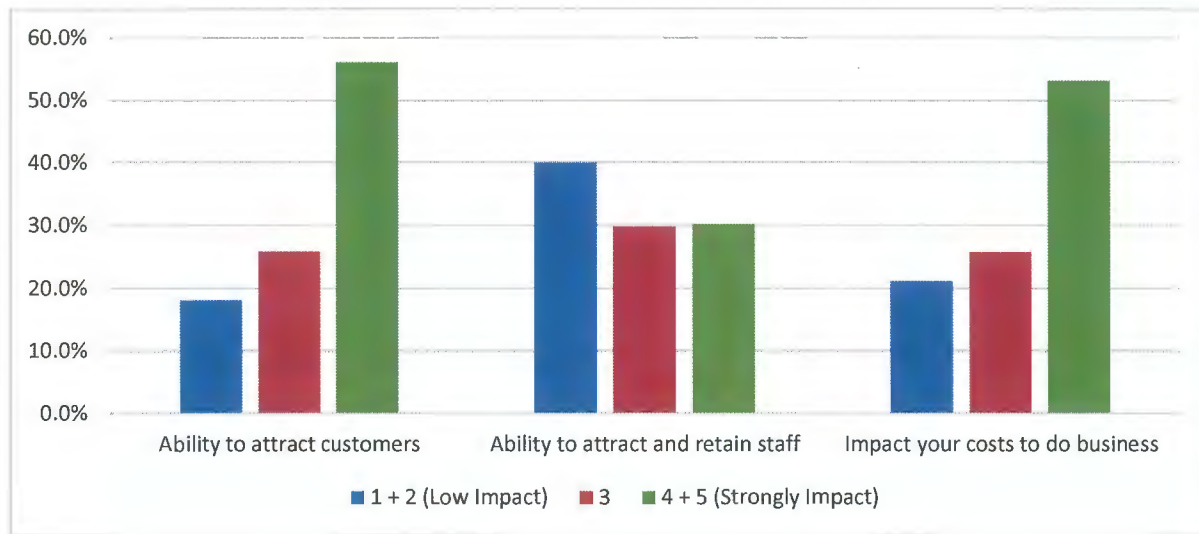
Q10. What should the City's priorities be to make the Town Centre a more inviting place to locate a business? (Percent of respondents choosing 4 or 5)



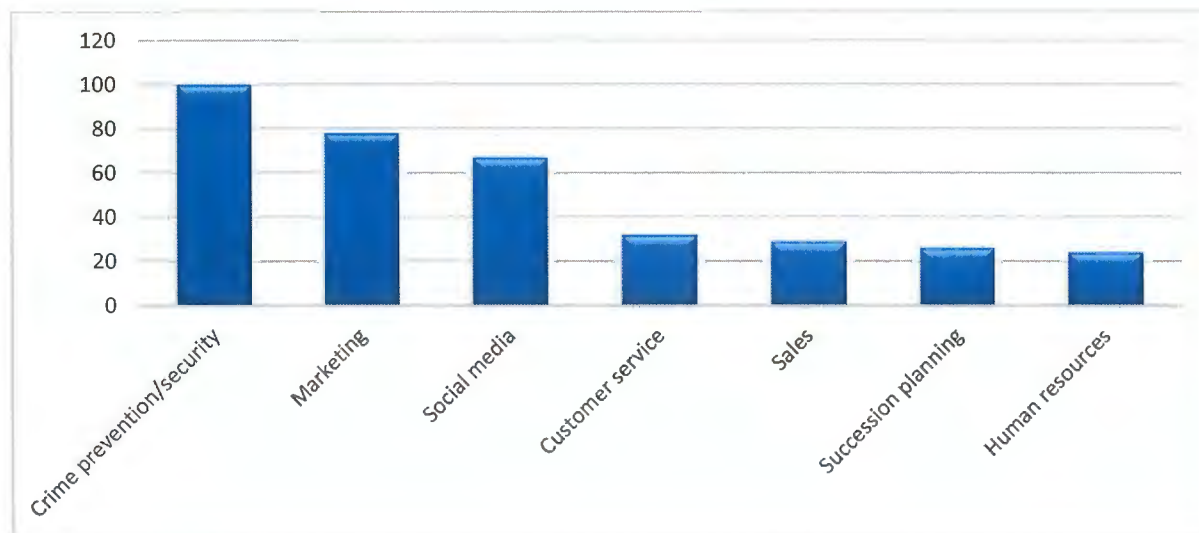
Q11. How do safety and security issues in the Town Centre impact your business?



Q11. How do safety and security issues in the Town Centre impact your business?



Q12. If offered, what business support programs, courses and workshops would best support your business growth?



Attachment C: Comments from 2019 Town Centre Business Walk Questionnaire

Please note that all comments are reported verbatim.

Q7. What do you like MOST about doing business in the Town Centre?

- many excellent events
- 224 is very pretty. downtown lovely in the winter
- A lot of one story buildings: you can see the sky
- Central location for clients
- Close to home
- Growing area
- Known location to customers
- membership driven association geographical area 222-230th St
- near RCMP
- Nice Community
- Not happy w/ recent addition of Garibaldi Ridge Shelter
- Our location - drive by traffic

Q9. What are the biggest challenges facing your business in the Town Centre?

- homeless people
- no moving violation police in area. Events /festivals ineffective in long term
- poor cleaning of pathways - condoms and needles every day
- too many vape shops and dispensaries
- Being unable to put up signs for advertising
- Easy for customers to find us
- Gridlock on 224th St - need four way stops between Lougheed and DTR (also on 227 and 228) or close 224th to pedestrian traffic only.
- Haney Mall has a lot of empty spaces
- homeless people
- Homeless people + theft
- Junky man 4 pm
- needs few signs with 15 minute parking
- New developments without adequate parking
- No fibre internet - customers don't want to come in due to parking limits. This is ridiculous the way the metre lady sits on everyone's tires and constantly tickets.
- One way street
- parking when movie crew is in town
- People don't feel safe walking the streets.
- Poor parking
- Rental costs increasing
- Side street businesses on 224th need directional signs on 224th.
- Signage not allowed on street front (Dewdney). Extremely difficult to find entrance (on Fraser Street) even though our address says Dewdney Trunk Road. Location is not easily visible to access from Dewdney Trunk.
- The city has changed very much in the downtown core. Many people with heavy addictions making it a sometimes dangerous place to be.
- Transportation routes

- Very Concerned Re Crime
- We now have prostitutes around the corner& lack of parking is a big issue

Q10. What do you think the City's priorities should be to make the Town Centre a more inviting place to locate a business?

- Affordable housing
- bike infrastructure and safe in-city routes
- Bring Big box like best buy
- Centralization of businesses
- City should keep sidewalks in better condition
- Clean up addictions
- Cleaning up after the homeless/drug addicts
- Create a setting for business that attract locals to stay local
- Fewer pawn shops and weed stores.
- Flashing pedestrian light on 119th Ave & 227th Street
- Get rid of (not creating free homes) for the homeless people
- I like the mall
- Improving signage (parking, where to find it) Downtown map to find way around. Public Washrooms
- increase allotments for customer parking
- increase signage usage for businesses to be able to promote services/customer incentives
- lots of drug and bad womens around
- lowering taxes for small business to keep them in the city
- more small town shops (gifts/vintage etc. high priority)
- Need to get mall (Haney) to get more tenants
- Remove the drug addicts
- We should not have to deal with the crime/opioid epidemic brought in to our town from other cities.
- with no one hour limits

Q13. What can the City, Chamber and BIA do to help your business succeed?

- 119th Ave 224, 223 1hr parking south side - north side 2hr parking should be the same
- Advertise, Coop events (Bring businesses together for events and increase customer bases
- However since the Big Box has closed the city has not implement what was supposed to...
 - proper sign to show we are open
 - garbage clean up
 - removal of graffiti
 - Parking spots for complex only not all surrounding businesses-parking on sidewalks
- All internal programs for us.
- Allow a sign on the front of the building to direct customers to Fraser Street entrance.
- Assist w/ store front visibility
- Attract or Bring Big Retail and Restaurants to the City
- Better Online presence. Tax rebates for updated signage.

- Better rules to be implemented to control the issues above + police need to take calls more seriously from business owners.
- Bring more business
- Build more and approve more housing and businesses
- Clean town / lot of drugs and steeling (sic) - no support from RCMP
- Clean up d/t core re cash loans, tattoo parlours etc.
- Clean up the downtown area. I have had to pick up needles, garbage, human feces in my parking stall. Remove homeless people from my parking lot. They are coming into my store high, and can't walk straight, stealing right in front of me. Asking my customers for change. Dropping drug bags in my store.
- Clean up the drug addicts smoking and shooting up everywhere!!!!!!Homelessness!!!
- Clean up the homeless problem. Many of our customers choose other locations because they do not feel safe in this area.
- Clean up the streets
- Clean up the streets! Make it a safe environment for families to walk around & shop local.
- Communicate better with businesses. Make easier process for permits/licences too Long
- Continue including us in community events
- Continue the path you have been taking for the past couple years building the BIA and support for Town Centre businesses and continue to have Westridge Security conduct their walks/drives for security.
- It's really nice to do business in the downtown Maple Ridge :) Thank you for everything!!
- Continue with downtown revitalization and address crime/homelessness.
- Cost
- Crime prevention
- Deal with safety, security, crime. Our patients advise us they don't feel safe. They don't want children coming into this area with people doing drugs deals outside our sidewalk, people walking, yelling to themselves. People destroying property on your business, falling asleep outside your doors. Being aggressive. Attacking people just walking down the street.
- Develop a strategy to make locals shop local!!!
- Directional signs (like Whistler) on 224th My business is on a one way street going the wrong way
- Ensure new developments have adequate parking
- Facelift some of the stores
- Faster approvals for businesses trying to upgrade their premises.
- Finding employees
- Focus on crime reduction - homeless issue. Continued residential development & densification (carry out OCP) Continued upgrades to infrastructure to support new growth (roadways, etc.) I am very pleased and satisfied with the effects our city is putting forth to address these items, and appreciate the time & contribution of staff & volunteers. Life & business in Maple Ridge downtown is only getting better. Thank you.
- Get high speed fibre to downtown and commercial properties for small business to purchase.
- Get patrols out more regularly
- Get rid of homeless people, mental health care
- Get rid of tent city
- Get tattoos!

- Get the RCMP to actually enforce the law. Drug addicts are stopping people from shopping local. Town Core needs to have police force remove the drug addicts & problem homeless. Period!
- Group advertising on City billboards. City owns it and affordably lets Maple Ridge businesses use it!
- Have the City stand up to the Province and not allow our city to be destroyed by taking in surrounding cities problems. If someone is in need of housing or treatment and they are from Surrey, PoCo, Vancouver, etc. that is where they should be. There wasn't this issue until people were brought here by professional protesters.
- Help in ensuring safety and security
- Help the homeless crisis
- Help to clean up after homeless. Daily I must pick up garbage, needles, even feces. Not sure how to help this problem but I re-plant my office gardens 2-3 times due to theft.
- Help with promotion, awareness of programs & services
- High rise proposed behind us (noise)
- House homeless people—stop chasing them around. Encourage larger builders to build commercial for larger businesses so a growth company doesn't have to leave town. Densify the downtown and not the periphery. Continue with BIA initiatives.
- I have heard countless local residents say "I don't shop in Maple Ridge anymore because I don't feel safe downtown" Too many local people would rather go to neighbouring cities than spend money in our own economy. I realize this is a fight with provincial and federal governments, however the street people are having an enormous impact on local business. Anything at all to help with this situation will help businesses
- I need my own parking spot in front of my restaurant for food delivery
- Improve curb appeal from 222 to 224 on Dewdney.
- Improve employee safety - night time. What is happening to the mall?
- Improve homelessness - bring more businesses in to the Mall
- Improve sustainable social programs to reduce crime and educate the homeless.
- Follow up visit is only necessary if there is new progress made to address concerns. Thank you
- Improve the look of the downtown core. Think Fort Langley. Yeah, I know, easier said than done.
- Improve traffic on Dewdney and Lougheed.
- Increase public safety & security. Increase police presence in problem areas (south side Lougheed, downtown core at night).
- Increase security in the downtown core and host more family events
- Increase the amount of time for customer parking
- Increase traffic to my store. Unfortunately residents still have mindset to leave Maple Ridge to shop
- Keep doing what you are doing. MR is thriving, regardless of what the whiners are complaining about. No town is perfect, I think we are lucky to call MR home.
- Keep the streets clean. Surveillance cameras on the street. Patrol cars often go down street.
- Keep trees, sidewalks & roads in good condition. Better control of vandalism and vagrancy issues. More police patrol. Better garbage & litter p/u on streets
- Less tax (property tax)
- Let businesses use signage to promote or offer incentive to customers.
- Lower crime, theft, and make downtown Maple Ridge more inviting.

- Lower prop taxes
- Lower rent and lease costs-property tax
- Lower the home tax to bring more people to Maple Ridge
- Make Maple Ridge safe again. Police on bikes or walking and enforcing laws to all.
- Make sure the movie crew isn't taking up our front parking to parents as well as more frequent security checks through out the day. We find we have people linger outside sometimes and parents of the children bring it to our attention. West Gate security will be called and they do come right away.
- Make the area more comfortable and attractive (make benches, parking spaces, street decorations, etc.)
- Maybe help to provide marketing and social media program. Also, a way to give incentives for new employees and/or apprentices to help with the business cost.
- More customer and employee parking
- More parking
- More parking and monthly parking permits.
- More security in daytime, accessible parking to the area esp for seniors
- Move the homeless shelters and halfway houses out of the downtown area.
- My business will probably succeed regardless of what the City does as long as it does not start impeding my business in ways it hasn't to date. The down town core as a whole could be vastly improved as a place to do business if rampant crime/poverty/social issues in the downtown core could be cleaned up and dealt with. Further the City need to attract and prioritize commercial and industrial development. As it is, there is too little commercial and industrial services in the area. This results in many residents, including myself, often visiting neighbouring communities to use businesses not available here, such as Poco and Langley. This hurts our municipality in terms of keeping spending local as well as the City's tax base.
- No more homeless
- Not sure
- Parking issues
- Permits/licencing, new business access
- Please ask Smart Leasing Company & Haney Mall landlord & staff to please think of the children & make sure they set up a fabulous Santa Claus Village attraction for the children. Make it first class
- Please! We need longer time limits on parking! and safer streets for our staff and customers
- Protect the elderly from beggar and I don't mean locking them at home and deliver their med & food.
- Provide more parking in a "suitable area" for employees and patrons
- Reduce crime - we've had 5 attempted break ins in two years that has cost us several thousand dollars in repairs. We're located in the Selkirk Town Plaza and the place looks old, worn down and in need of revitalization. The drug population nearby is off-putting to customers. Garbage on the sidewalks in our plaza needs to be removed regularly. More lighting at night to deter criminals.
- reduce homelessness / crime
- Reduce the homeless and have more police presents in the Mall and around the down town core; theft is very high! Pan handling is also very high and needs to be addressed.
- Remove parking limits. Clean alleys and walkways. Remove prostitute and Johns. Better security. Remove panhandlers. Better lighting. Develop waterfront, stop worrying about (224th) downtown and utilize waterfront - like Fort Langley. Stop building residential and prioritize about businesses.

- Re-organize business locations into centralized areas and help rebuild older areas Dewdney 222-226 (not just that development One large development will be fabulous for all of those who get in, and can afford the huge rental costs, but it will further hurt smaller businesses not located there.
- Service businesses all over Maple Ridge
- Somehow reduce the number of sketchy people in the area. Help with camera placement.
- Stop Homeless shelters
- Street appeal
- Street Lighting
- Take out the sidewalks that took away customer parking. Tried to make it look good but went backwards and rather than spending money cleaning up.
- The City is a huge impediment to new businesses
- They have been a great support. Thank you.
- The homeless issue is our main concern at this time
- The theft in our store and community is immensely increasing.
- They are extremely specific with which side the parking cement block is and would refuse if not on pedestrian side be nice if they can community kindness and straighten it up
- They can give business owner like salon owner extra parking time (+cost) parking permit for client extra
- This building is in shady location so if people get to know more about this place and business can grow more.
- Too many homeless people
- Unsure at this point
- We are experiencing intrusion of the private space by the drug addicts from time to time.
- We expect 222/223 streets be patrolled more frequently,
- Please make the street brighter/cleaner, especially during fall/winter,
- Please respond to calls regarding needle-cleaning/intruders - whether it is strata or detached. Thank you for your attention.
- We are very grateful to the BIA and the support, creativity and networking they offer. Love all their ideas, events and promotions.
- We believe the Chamber and DMRBIA are doing a strong job. Continued initiatives to raise public awareness of businesses and showing people we have that in Maple Ridge will translate to renewed support of shopping locally.
- We face a problem in customer parking and the parking hours should be increased. Whenever someone shoots a movie in the street, our business gets affected and the parking is blocked by shooting crew.
- Without prejudice: remove all of the undesirables from downtown core. This will keep the city clean & safe & customers can shop w/o fear of being harassed or accosted and not come across needles
- Work on crime prevention and cleaning streets
- Work with the City to reduce the amount of homeless + prostitutes + thieves + drug dealers/users. Provide ongoing support programs, courses and workshops.