REGULAR COUNCIL MEETING AGENDA

VILLAGE OF ANMORE

Agenda for the Regular Council Meeting scheduled for
Tuesday, March 29, 2016 at 7:00 p.m. in the portable classroom
at Anmore Elementary School 30 Elementary Road, Anmore, BC

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1. **Call to Order**

2. **Approval of the Agenda**

   Recommendation: That the agenda be approved as circulated.

3. **Public Input**

   Note: The public is permitted to provide comments to Council on any item shown on this meeting agenda.

4. **Delegations**

   Steve Carter to present a poem entitled 'Anmore's Pride'.

5. **Adoption of Minutes**

   (a) Minutes of the Regular Council Meeting held on March 1, 2016

   Recommendation: That the Minutes of the Regular Council Meeting held on March 1, 2016 be adopted as circulated.

6. **Business Arising from Minutes**

7. **Consent Agenda**

   Note: Council may adopt in one motion all recommendations appearing on the Consent Agenda or, prior to the vote, request that an item be removed from the Consent Agenda for debate or discussion, voting in opposition to a recommendation, or declaring a conflict of interest with an item.

8. **Items Removed from the Consent Agenda**

9. **Legislative Reports**

page 9

(a) Water Rates and Regulations Amending Bylaw No. 546-2016

Recommendation: THAT ANMORE WATER RATES AND REGULATIONS AMENDING BYLAW NO. 546-2016 BE RECONSIDERED, FINALLY PASSED AND ADOPTED.

page 12

(b) Anmore Erosion and Sediment Control Bylaw No. 547-2016

Recommendation: THAT ANMORE EROSION AND SEDIMENT CONTROL BYLAW NO. 547-2016 BE RECONSIDERED, FINALLY PASSED AND ADOPTED.

page 26

(c) Anmore Five-Year Financial Plan Bylaw No. 548-2016

Staff to present the Five-Year Financial Plan for public comment and for consideration by Council.

Recommendation: THAT ANMORE FIVE-YEAR FINANCIAL PLAN BYLAW NO. 548-2016 BE READ A FIRST, SECOND AND THIRD TIME.

10. **Unfinished Business**

11. **New Business**

page 31

(a) Ministry of Forests, Lands and Natural Resource Operations – Request for Comment on Proposed Naming of Tim Jones Peak

Letter dated February 29, 2016 from Carla Jack, Provincial Toponymist, is attached.

page 35

(b) Anmore Elementary School – Request for Traffic Control on April 29, 2016

Letter dated March 7, 2016 from Nicole Daneault, Principal, is attached.

page 36

(c) Council Policy No. 43 – In-Camera Council Meeting Rules of Order

Report dated March 17, 2016 from the Manager of Corporate Services is attached.

page 40

(d) Sign Permit – Request for Approval to Exceed Zoning Bylaw Requirement

Letter dated March 22, 2016 from Tony Barone, Bella Terra Developments, is attached.

page 43 **(e) Development Permit Authorization for Bella Terra (Lot 2, Section 20, Township 39, New Westminster District, Plan LMP49409 and PARCEL A, Section 20, Township 39, New Westminster District Plan BCP32330)**

Report dated March 23, 2016 from Kate Lambert, Planning Consultant, is attached.

12. Mayor's Report

13. Councillors Reports

14. Chief Administrative Officer's Report

15. Information Items

(a) Committees, Commissions, and Boards – Minutes

(b) General Correspondence

pages 101-141

- Letter dated February 16, 2016 from Ministry of Jobs, Tourism and Skills Training and Minister Responsible for Labour regarding Canada Starts Here: The BC Jobs Plan
- Letter dated February 25, 2016 from TransLink regarding Local Government Engagement in TransLink's Transit Fare Policy Review
- Letter dated March 14, 2016 from The Corporation of Delta regarding George Massey Tunnel Replacement Project

16. Public Question Period

Note: The public is permitted to ask questions of Council regarding any item pertaining to Village business.

17. Adjournment

VILLAGE OF ANMORE

REGULAR COUNCIL MEETING – MINUTES

Minutes of the Regular Council Meeting held on
Tuesday, March 1, 2016 in the portable classroom at Anmore
Elementary School, 30 Elementary Road, Anmore, BC

ELECTED OFFICIALS PRESENT
Mayor John McEwen
Councillor Ryan Froese
Councillor Ann-Marie Thiele
Councillor Kim Trowbridge
Councillor Paul Weverink

STAFF and OTHERS PRESENT
Juli Kolby, Chief Administrative Officer & Finance Officer
Christine Milloy, Manager of Corporate Services
Kevin Dicken, Director of Operations
Brent Elliott, Planning Consultant
Alan Reggin, Tetra Tech EBA

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1. **Call to Order**

Mayor McEwen called the meeting to order at 7:00 p.m.

It was MOVED and SECONDED:

R62/2016 **"TO RECESS."**

CARRIED UNANIMOUSLY

The meeting recessed at 7:00 p.m.

Councillor Trowbridge joined the meeting at 7:05 p.m.

Mayor McEwen called the meeting reconvened at 7:05 p.m.

2. **Approval of the Agenda**

It was MOVED and SECONDED:

R63/2016 **"THAT THE ADDENDUM AND A LATE ADDITION TO THE AGENDA BE ACCEPTED AS PART OF THE AGENDA, AND THE AGENDA BE APPROVED, AS AMENDED."**

CARRIED UNANIMOUSLY

3. Public Input

Nil

4. Delegations

(a) Marcus Schmieder – Proposal for Old Village Hall

Mr. Schmieder presented his proposal to convert the old village hall for future use as a commercial restaurant. Council asked questions, and agreed to consider discussing this item at their next In-Camera Council Meeting.

(b) RCMP – Update on Recent Activity in Anmore

Constable Colin Kent introduced Justin Abels, who will replace Colin effective March 24.

Further to a staff request for information from the RCMP regarding recent events in the Village, Cst. Kent presented the following information:

- RCMP first received a report of a break and enter on Alpine on February 13. Two days later it was reported that there was a small blue vehicle being involved. Following further investigation the only lead is the report of the vehicle.

- On February 21 the same complainants called to say that there was an attempted break-in and the RCMP and police dog responded, and no evidence of a break-in was found.

- On February 23, RCMP responded to a call on Alpine Drive that resulted in a false alarm.

- Last week there was a call from the store next to the mobile home park, where it was seen on video that kids cut out a hole in gyprock and were reaching inside, for chocolate bars.

- The most recent call received was a report of a suspicious person on a trail at Buntzen, where the person was reported to be shouting "back, back". RCMP arrived to find no evidence of any suspicious activity.

Cst. Kent advised that it is beneficial to have sensor lights on houses and monitored alarms. He added that there are regularly 10-15 break and enters reported in Anmore each year. The public should phone the RCMP if they hear or see anything suspicious. It should be done right away if possible, but residents should not feel too embarrassed to phone if they do not phone right away; a later call is better than no call.

5. Adoption of Minutes

(a) Minutes of the Regular Council Meeting held on February 16, 2016

It was MOVED and SECONDED:

R64/2016 **"THAT THE MINUTES OF THE REGULAR COUNCIL MEETING HELD ON FEBRUARY 16, 2016 BE ADOPTED AS CIRCULATED."**

CARRIED UNANIMOUSLY

6. Business Arising from Minutes

Nil

7. Consent Agenda

It was MOVED, SECONDED:

R65/2016 **"TO APPROVE THE CONSENT AGENDA."**

(a) Parks Committee Resolution for Ratification

That the following recommendation from the Parks Committee Meeting of February 18, 2016 be ratified:

"That the Parks Committee recommends the overage for the Mossom Creek Bridge Project, the maximum amount of $75,000; contingent on there being secured access for eternity from the end of Elementary Road to Bert Flinn Park."

(b) Finance Committee Resolution for Ratification

That the following recommendation from the Finance Committee Meeting of January 25, 2016 be ratified:

"To approve the four projects identified, with funding to be determined by Council, which are the two projects on East Road: Mossom Creek and the narrowing road between Lanson and Charlotte; East Road be completely built from one end to the other; the restructure of Elementary Road; and the sidewalk between Birch Wynde and the bus stops; and that the Finance Committee deems these a priority for 2016."

CARRIED UNANIMOUSLY

8. Items Removed from the Consent Agenda

Nil

9. Legislative Reports

(a) Water Rates and Regulations Amending Bylaw No. 546-2016

It was MOVED and SECONDED:

R66/2016 **"THAT ANMORE WATER RATES AND REGULATIONS AMENDMENT BYLAW NO. 546-2016 BE READ A FIRST, SECOND AND THIRD TIME."**

Juli Kolby presented details regarding the increase to water fees.

CARRIED UNANIMOUSLY

(b) Anmore Erosion and Sediment Control Bylaw No. 547-2016

It was MOVED and SECONDED:

R67/2016 **"THAT ANMORE EROSION AND SEDIMENT CONTROL BYLAW NO. 547-2016 BE READ A FIRST, SECOND AND THIRD TIME."**

Kevin Dicken presented highlighted changes to the updated bylaw.

CARRIED UNANIMOUSLY

(c) Annual Indemnity Bylaw No. 549-2016

It was MOVED and SECONDED:

R68/2016 **"THAT ANMORE ANNUAL INDEMNITY BYLAW NO. 549-2016 BE RECONSIDERED, FINALLY PASSED AND ADOPTED."**

CARRIED UNANIMOUSLY

(d) Anmore Zoning Bylaw Amendment Bylaw No. 543-2015 Comprehensive Development Zone 6 (Bella Terra)

It was MOVED and SECONDED:

R69/2016 **"THAT VILLAGE OF ANMORE ZONING BYLAW NO. 374-2004, AMENDMENT BYLAW NO. 543-2015 (COMPREHENSIVE DEVELOPMENT ZONE 6 (BELLA TERRA)) BE RECONSIDERED, FINALLY PASSED AND ADOPTED."**

Brent Elliott presented highlights from the report dated March 1, 2016.

CARRIED UNANIMOUSLY

Brent Elliott left the meeting at 7:58 p.m.

10. Unfinished Business

(a) Policy No. 43 – In-Camera Council Meeting Rules of Order [Tabled]

It was MOVED and SECONDED:

R70/2016 **"TO PULL THE ITEM OFF THE TABLE."**

CARRIED UNANIMOUSLY

Christine Milloy stated her understanding of Councillor Thiele's concerns regarding the policy. Councillor Thiele advised that her preference would be for the policy to be amended instead of repealed.

It was MOVED and SECONDED:

R71/2016 **"TO DIRECT STAFF TO AMEND POLICY NO. 43 AND BRING IT BACK TO COUNCIL FOR REVIEW AND ADOPTION."**

CARRIED UNANIMOUSLY

11. New Business

(a) Pavement Analysis Project

Alan Reggin presented findings from the pavement analysis project that was conducted to determine the quality of the Village's roadways, which identified road conditions as ranging between very good to very poor.

Alan Reggin left the meeting at 8:20 p.m.

(b) 2015 Annual Water Quality Report

Kevin Dicken presented the annual water quality report.

(c) Mossom Creek Bridge Project

Mayor McEwen presented background information on the project. Kevin Dicken then presented highlights from his memorandum dated February 25, 2016.

It was MOVED and SECONDED:

R72/2016 **"THAT COUNCIL DIRECT STAFF TO CONTACT THE RELEVANT PROPERTY OWNERS REGARDING THE POTENTIAL EASEMENTS ON THEIR LAND TO FACILITATE THE ETERNAL TRAIL LINKAGE AS RECOMMENDED BY THE PARKS COMMITTEE."**

CARRIED
Mayor McEwen opposed
Councillor Thiele opposed

(d) Lower Mainland Local Government Association – 2016 Resolutions - Annual General Meeting

Juli Kolby presented highlights from the memorandum dated February 18, 2016 from Councillor Corisa Bell, LMLGA President.

(e) Appointment of Approving Officer

It was MOVED and SECONDED:

R73/2016 **"THAT JULI KOLBY, CHIEF ADMINISTRATIVE OFFICER, BE APPOINTED AS APPROVING OFFICER FOR THE VILLAGE OF ANMORE."**

CARRIED UNANIMOUSLY

(f) Appointment of Authorized Signatory

It was MOVED and SECONDED:

R74/2016 **"THAT CHRISTINE MILLOY, MANAGER OF CORPORATE SERVICES, BE APPOINTED AS AN AUTHORIZED SIGNATORY FOR THE VILLAGE OF ANMORE."**

CARRIED UNANIMOUSLY

(g) British Columbia Communities in Bloom – Program Participation Request

Juli Kolby presented summary information regarding the request for participation. Council agreed to staff's recommendation for council to decline participation in the program at this time due to budget and resource limitations.

12. Mayor's Report

Mayor McEwen reported that:

- He and Juli Kolby met recently with Diane Strandberg of TriCity News regarding the old village hall, and she wrote an article following that meeting.

- Council authorized staff to take measures to move the Village's records to a better climate.
- The infill task force has been created, and will be comprised of Herb Mueckel, Doug Salberg, Councillor Trowbridge and Councillor Weverink.
- The APC will meet in March, and he will assign a new council liaison for the new APC.
- A Finance Committee meeting was held last Monday, where road safety was agreed to be a priority.
- Easter is fast approaching.
- He thanks Kevin Dicken for his time put into the Village and the challenges he faced in the position, adding that he made a significant mark on the Village.

13. Councillors Reports

Councillor Paul Weverink reported that:

- He attended the grad transitions event at Heritage Woods Secondary School and he was very impressed with how prepared the kids are with their future plans.
- He attended the Sasamat Volunteer Fire Department awards night, and noticed good comradery, and it was the official retirement of Larry Scott.
- He wishes Kevin Dicken well.

14. Chief Administrative Officer's Report

Juli Kolby reported that:

- She and Christine Milloy will meet with BC Hydro regarding the transmission line.
- Rogers Communication is looking at installing a tower. It is in Port Moody, but three properties in Pinnacle Ridge would be affected. She will share the details of the public communication with anyone wishing to receive the information.
- Christine Milloy is arranging the move of village records in the old village hall; the heat has been fixed and is now working.

15. Information Items

(a) Committees, Commissions, and Boards – Minutes

- Advisory Planning Commission Meeting Minutes of December 14, 2015
- Environment Committee Meeting Minutes of December 7, 2015
- Finance Committee Meeting Minutes of January 25, 2016

(b) Correspondence for Information

- Letter dated February 16, 2016 from City of Coquitlam regarding Coquitlam Council Feedback on Draft Regional Affordable Housing Strategy
- Letter dated February 19, 2016 from BC Trucking Association regarding Lower Mainland Tolling & Mobility Pricing

16. Public Question Period

Lynn Burton, Sugar Mountain Way, asked if there was a recent retaining wall failure at Pinnacle Ridge and staff replied that there was a washout about a month ago, but the situation was rectified immediately and there was no damage to public or private properties. Lynn Burton also asked who holds responsibility for a failed retaining wall and staff replied that the property owner is responsible.

Pam Blackman, East Road, asked if there is a time limit on delegations and Mayor McEwen replied that the limit is 15 minutes.

17. Adjournment

It was MOVED and SECONDED:

R75/2016 **"TO ADJOURN."**

CARRIED UNANIMOUSLY

The meeting adjourned at 8:52 p.m.

Certified Correct:

Christine Milloy
Manager of Corporate Services

Approved by:

John McEwen
Mayor

VILLAGE OF ANMORE

BYLAW NO. 546-2016

A bylaw to amend Anmore Water Rates and Regulations Bylaw No. 161-1995

WHEREAS the Municipal Council may, by bylaw, fix the rates and terms under which water may be supplied and used, and may provide for the classification of users and prescribe different rates, terms and conditions for different users;

NOW THEREFORE the Municipal Council of the Village of Anmore, in open meeting assembled, enacts as follows:

1. That this bylaw may be cited for all purposes as "Anmore Water Rates and Regulations Amendment Bylaw No. 546-2016".

2. That Anmore Water Rates and Regulations Bylaw No. 161, 1995, as amended, be further amended as follows:

   (a) That Schedule B be amended by changing the per cubic meter rate from $1.89 to $2.42 in section 1 and section 2.

   (b) That Schedule B be amended by changing the number for Hydrant Use section 4 to 3.

   (c) That Schedule B be amended by removing the words in section 3 "on the 31st day of March and the 31st day of October" and replacing them with "by the 30th day of April and the 31st day of October".

   (d) That Schedule B be amended by removing the words in section 3 "in April and October" and replacing them with "and distributed as soon as possible following the aforementioned readings".

READ a first time the 1st day of March , 2016

READ a second time the 1st day of March , 2016

READ a third time the 1st day of March , 2016

RECONSIDERED, FINALLY PASSED AND ADOPTED this day of , 2016

_____

MAYOR

_____

MANAGER OF CORPORATE SERVICES

Certified as a true and correct copy of "Anmore Water Rates and Regulations Amendment Bylaw No. 546-2016".

DATE

MANAGER OF CORPORATE SERVICES

NOTE – REVISED SCHEDULE IS PENDING ADOPTION OF AMENDING BYLAW NO. 546-2016

SCHEDULE "B"
BYLAW NO. 161-1995

WATER USER FEES

Most Recently Amended by Bylaw No. 546-2016

1. RESIDENTIAL RATE

The residential rate, including manufactured homes, is $2.42 per cubic meter of water for all Specified Areas.

For residents who do not have a water meter, they will be charged 120% of the highest user fee for the period.

Most Recently Amended by Bylaw No. 546-2016

2. BUSINESS AND OTHER NONRESIDENTIAL RATE

For each business or other non-residential user including Schools, the rate shall be $2.42 per cubic meter of water.

The water meters will be read by the 30th day of March and the 31st day of October each year. Invoices will be prepared and distributed as soon as possible following the aforementioned readings and payment will be due and payable 30 days from date of invoice. Where any portion of the charge as set out above remains unpaid 30 days from date of invoice for the period in which it is levied, an amount equal to 10% of such portion of the charge owing shall be added to the said charge and from that date the additional amount shall be part of the charge.

Most Recently Amended by Bylaw No. 546-2016

3. HYDRANT USE

For Developers and Contractors requiring to use the Municipality's hydrants will be charged $100.00 per subdivision or phase of subdivision. For Contractors to fill portable water tanks will be charged $25.00 per fill.

VILLAGE OF ANMORE

BYLAW NO. 547-2016

A bylaw to ensure that adequate protection of the Village of Anmore drainage system is taken during any construction, by implementation of erosion and sediment control measures.

WHEREAS section 8(3)(j) of the *Community Charter,* SBC 2003, c. 26 authorizes Council to regulate, prohibit and impose requirements in relation to the protection of the natural environment;

AND WHEREAS Council deems it in the best interest of the environmental well-being of the community that the streams, creeks, waterways, watercourses, ditches, storm sewers and drains that make up the drainage system are protected from pollution, obstructions, sediment, and sediment-laden water;

NOW THEREFORE Council of the Village of Anmore, in open meeting assembled, enacts as follows:

PART 1 – TITLE AND REGULATION

1.1 That this bylaw may be cited for all purposes as "Anmore Erosion and Sediment Control Bylaw No. 547-2016".

PART 2 – DEFINITIONS

2.1 In this bylaw, unless the context otherwise requires, the following words shall have the meanings as described.

Chief Administrative Officer means the officer appointed by Council, pursuant to the Anmore Officer & Delegation Bylaw No. 398-2005 as amended.

Civil Construction means all works and services as specified in the executed servicing agreement.

Construction means clearing, grubbing, excavating, grading, civil construction, and any activity which might cause sediment or sediment-laden water to discharge into the drainage system, including but not limited to soil deposition or removal, agriculture, land development, construction or repair of any services or utilities, or anything constructed, altered, repaired, in or under land.

Council means the municipal council of the Village of Anmore.

Developer means any person representing the Owner, by designation or contract in writing satisfactory to the Village, if any, of land for which an application for ESC Permit is made.

Discharge means to release.

Drainage System means all rivers, streams, creeks, waterways, watercourses, ditches, channels, drainage works, and drains located in the Village, on private or public property, by which surface or ground water or any other liquids are conveyed.

Erosion and Sediment Control (ESC) Facilities means all erosion and sediment control works, measures, facilities and methods constructed or installed to reduce the likelihood of sediment and sediment-laden water reaching the drainage system during all stages of construction.

Erosion and Sediment Control (ESC) Permit means the erosion and sediment control permit issued by the Village to the owner and/or developer, pursuant to the terms and conditions of this bylaw.

Erosion and Sediment Control (ESC) Plan means the erosion and sediment control plan specified in this bylaw, which is a requirement for an ESC permit.

Erosion and Sediment Control (ESC) Supervisor means an engineer, biologist, geoscientist, applied scientist, or technologist who is registered and in good standing with a professional organization in the province of British Columbia, constituted under an Act, who is acting under that association's code of ethics and would be subject to disciplinary action by that association, and who is trained in designing and implementing an ESC plan, and who is responsible for inspecting, monitoring and reporting on the ESC facilities constructed and installed pursuant to the ESC plan.

Guidelines means the document entitled 'Land Development Guidelines for the Protection of Aquatic Habitat', 1993 edition, as amended, co-published by the Ministry of Environment, Lands and Parks and the Department of Fisheries and Oceans Canada.

Land means land, with or without improvements so affixed to the land as to make them in fact and law a part of it.

Maintenance Stage means the one-year period following the date of issuance of the certificate of completion issued by the Village, in accordance with Anmore Works and Services Bylaw No. 242-1988, as amended where the owner and/or developer is responsible for the maintenance and upkeep of civil construction.

Notice to Comply means a written method of issuing a violation pursuant to the bylaw or ESC Permit

Owner means the individual, company, or organization that is the owner of the property as so recorded on the property's State of Title Certificate held in the Land Title Office.

Person means an individual, association, corporation, firm, body politic, co-partnership, or similar organization, and their heirs, executors, successors and assigns or other legal representatives, whether acting alone or by a servant, agent or employee.

Person Responsible means any person, owner, developer, contractor, occupant, or leaseholder, where construction occurs pursuant to the ESC Permit.

Professional Engineer means a person who is registered or licensed as a professional engineer under the *Engineers and Geoscientists Act*, R.S.B.C. 1996, c. 116, as amended, in the province of British Columbia.

Sediment or Sediment-Laden Water means any sediment, rock, gravel, sand, soil, silt, clay, earth, construction or excavation wastes, or other substances whether or not suspended in water; or any sediment-laden water having a turbidity greater than 25 NTU.

Significant Rainfall Event means any precipitation event which meets or exceeds the intensity of 25 mm of total rainfall depth in a 24-hour period.

Substantial Completion means the stage of construction at which a minimum of 90% of all construction is complete and the land is ready for use, or is being used for the purpose intended.

NTU means Nephelometric Turbidity Unit, and is a standard measurement of water turbidity.

Turbidity means the measurement of the suspended particulate matter in water, which affects the clarity or degree of transparency of the water by interfering with the passage of a beam of light through the water. Turbidity values are generally reported in NTUs.

TSS means total suspended solids, as measured in milligrams per litre, and determined as non-filterable residue (1.5 micron filter) weighed in a dry condition.

Village means the Village of Anmore.

PART 3 – PROHIBITION OF DISCHARGE

3.1 No person shall cause, or permit another person to cause, sediment or sediment-laden water to discharge into the drainage system greater than an amount that is greater than 75 milligrams per litre of TSS or 25 NTU.

3.2 No person responsible pursuant to an ESC permit shall cause sediment or sediment-laden water to be discharged greater than the TSS or NTU amount specified in the approved ESC Plan.

PART 4 – EROSION AND SEDIMENT CONTROL PERMIT

4.1 All construction on land of less than 2,000m^2 shall comply with section 3.1 and utilize the best management practices for erosion and sediment control attached hereto as Schedule "B". However, should a person wish to utilize the TSS limit for a significant rainfall event, as specified in an approved ESC Plan, an ESC permit will be required.

4.2 All applications for proposed construction on land of 2,000m^2 or larger shall be submitted with a complete ESC Permit application to the Village. No construction shall occur until the Village has issued an ESC permit.

4.3 An application for an ESC Permit must:

(a) be made by completing the form set out in Schedule "A" to this bylaw;
(b) be signed by the owner and developer;
(c) have attached an ESC Plan;
(d) name an ESC Supervisor as identified in the Letter of Undertaking, attached hereto as Schedule "D";
(e) include payment of a non-refundable fee as specified in Anmore Fees and Charges Bylaw No. 545-2015; and
(f) include a security deposit in cash, certified cheque, or an irrevocable Letter of Credit drawn on a Canadian Chartered Bank, made payable to the Village for a term of at least one (1) year in the minimum amount of $10,000 or 150% of the estimated cost for the installation, maintenance, monitoring and removal of the ESC Facilities as specified in the approved ESC Plan, whichever is greater, or as determined by the Chief Administrative Officer. An ESC Permit application may be waived by the Chief Administrative Officer, considering but not limiting to the following factors:

(i) construction timing and schedule;
(ii) size of a proposed building or structure;
(iii) soil conditions;
(iv) existing ground cover (i.e. trees, gravel, etc.);
(v) topographical conditions; and
(vi) location of proposed construction with respect to the perimeter of the Land.

4.4 An ESC Permit application that is waived shall still utilize the Best Management Practices For Erosion and Sediment Control, attached as Schedule "B" to this bylaw, and shall meet the requirements in section 2.1 of this bylaw.

4.5 The ESC Permit will be valid for minimum of one (1) year following the date of issuance and will expire upon substantial completion.

4.6 Subject to section 7.7, the security deposit submitted with the ESC Permit application is to secure the full and proper compliance with the provisions of the ESC Permit and of this bylaw. In the event that the Owner, Developer, or Person Responsible, has not complied with the provisions of this bylaw or fulfilled all of the terms and conditions expressed in the ESC Permit, the necessary funds from the security deposit may be drawn down, at the Village's option, and the money used either by the Village or its agents to protect the drainage system from sediment or sediment-laden water, in adherence with the terms and conditions of this bylaw. Notwithstanding, the Village is under no obligation to initiate or complete remedial works in or under the land.

4.7 If the amount of the security deposit is insufficient for the Village to complete the ESC Facilities, the Owner and Developer jointly and severally will pay any deficiency to the Village on demand.

4.8 When the Owner, Developer, and Person Responsible complies with the provisions of this bylaw and fulfill the terms and conditions expressed in the ESC Permit, the Village will return the security deposit at such a time that construction has reached substantial completion and the ESC Facilities have been removed, to the acceptance of the Chief Administrative Officer.

4.9 The security deposit may be reduced, by the Chief Administrative Officer, by a maximum amount of 50% from time to time after the civil construction is complete, provided that the installed ESC Facilities comply with the ESC Plan. It is the responsibility of the Owner and/or Developer to provide satisfactory proof to the Chief Administrative Officer that the ESC Facilities comply with the ESC Plan.

4.10 For construction that does not reach substantial completion at the end of a maintenance stage, the security deposit shall be released provided that the ESC Facilities comply with the ESC Plan and individual land siltation controls are in place to the acceptance of the Chief Administrative Officer.

PART 5 – EROSION AND SEDIMENT CONTROL PLAN

5.1 The ESC Facilities and ESC Plan must be designed in accordance with Schedule "B" and in accordance with section 4.3.

5.2 The ESC Plan must be designed, signed, and sealed by a Professional Engineer, and reviewed and signed by the appointed ESC Supervisor.

5.3 The ESC Plan submitted must conform to the Village's drafting standards and must include, at a minimum, the following:

(a) three-stage silt plan (clearing and grubbing, civil construction, and through to substantial completion) measures for erosion and sediment control during the three stages, and timing of implementation;
(b) the designed sediment discharge limit as specified under section 3.1 of this bylaw.
(c) pond deactivation methodology, (if required);
(d) lot line(s) and other legal designations of the subject Land(s);
(e) location(s) of any existing underground services, as well as any proposed connections to existing services from the Land;
(f) location(s) of any existing drainage infrastructure and the proposed measures to protect it;
(g) location(s) of any existing and proposed watercourses, ditches, swales or any other body of water within 50m of the Land boundaries, along with the proposed protection measures;
(h) location(s) of any existing/proposed buildings, including residential buildings or ancillary buildings or structures;
(i) existing and proposed contours and relevant spot elevations;
(j) proposed access locations to the Land;
(k) wheel wash facilities (if required);
(l) proposed ESC Facilities to be implemented on site, which shall include source controls as the primary method of erosion and sediment control;
(m) proposed methods to restore disturbed areas following the completion of construction;
(n) location of the Village's rain gauge to be used for rainfall intensity monitoring;
(o) any and all other details pertaining to the proposed construction, describing how the ESC Facility will meet the Guidelines;
(p) An ESC Supervisor monitoring, inspecting, and reporting program, in accordance with Schedule "C" of this bylaw; and
(q) a detailed cost estimate for the installation, maintenance, and removal of the ESC Facilities.

5.4 When the Chief Administrative Officer is satisfied with the ESC Plan and all provisions of this bylaw have been complied with, the Chief Administrative Officer may issue an ESC Permit by approving an ESC Permit application with such specific terms and conditions attached thereto as are reasonably necessary to reduce the likelihood of sediment and sediment-laden water reaching the drainage system.

5.5 It is the responsibility of the Owner and/or Developer to ensure that all ESC Facilities described in the ESC Plan are constructed, implemented, installed and maintained for the duration of construction until substantial completion.

PART 6 – MONITORING AND REPORTING

6.1 The ESC Supervisor is responsible for inspecting and monitoring the ESC Facilities including reporting requirements as set out hereto in Schedule "C" and the approved ESC Plan.

6.2 The ESC Supervisor is responsible for immediately notifying the Village of termination or when an infraction occurs pursuant to this bylaw or ESC Permit.

6.3 A waterproof copy of any issued ESC Permit is to be posted in a location visible from outside the construction on the land, and for the duration of construction. In addition, the sign shall clearly state the name and phone number of the appointed ESC Supervisor and the Village's bylaw enforcement officer.

PART 7 – OFFENCES AND ENFORCEMENT

7.1 The Chief Administrative Officer, the Village's bylaw enforcement officer, or their designates, may enter upon any land to carry out field measurements and conduct inspections as are reasonably necessary to ascertain whether there is compliance with the provisions of this bylaw or an ESC Permit issued pursuant to this bylaw.

7.2 Upon field measurements or ESC Facilities inspection where the Owner and/or Developer has failed to maintain the validity of the ESC Permit or meet the provisions of this bylaw, the Chief Administrative Officer, the Village's bylaw enforcement officer, or their designates may serve on the Owner, Developer, or ESC Supervisor a Notice to Comply, which requires the Owner and/or Developer to remedy the non-compliance within 24 hours of issuance. If, in the opinion of the Chief Administrative Officer, special circumstances exist, the non-compliance shall be remedied on a date the Chief Administrative Officer considers reasonable given the circumstances.

7.3 Following issuance of a Notice to Comply, all construction on the land shall cease except for those works necessary to achieve compliance.

7.4 A Notice to Comply must be served on the Owner and/or Developer and/or the named ESC Supervisor by:

(a) personal service; or
(b) return registered mail to the address of the Owner and/or Developer and/or ESC Supervisor of the ESC Permit as it appears on the ESC Permit application. The Notice to Comply is deemed to have been served on the third day after mailing.

7.5 The Village may notify the Department of Fisheries and Oceans Canada and the Ministry of Environment of the issuance of any Notice to Comply.

7.6 If the Owner and/or Developer fails to comply with the Notice to Comply, the Village may, not withstanding section 3.6, utilize all or part of the security deposit to take whatever action the Village deems necessary to protect the drainage system. The Village may concurrently pursue any other legal remedy it may believe is necessary including issuing violation tickets.

7.7 Prosecution of the Owner and/or Developer pursuant to section 5.6 does not exempt the Owner and/or Developer from remedying the non-compliance within 24 hours or as set out in the Notice to Comply.

7.8 A Person who commits an offence against this bylaw shall be subject to a violation ticket for offences prescribed in the Anmore Municipal Ticket Information Utilization Bylaw No. 479-2009, as amended.

7.9 Any Person who violates a provision of their ESC Permit or this bylaw commits an offence punishable on summary conviction and shall be liable to a fine of not less than two thousand ($2,000) dollars and not more than ten thousand ($10,000) dollars for each day on which an offence exists or is continuing, together with such costs as a court of competent jurisdiction may order. For the purposes of enforcing any judgment of a court or collecting any fine levied hereunder, the provisions of the *Offence Act*, R.S.B.C. 1996 c. 338, as amended, shall apply.

7.10 Where an offence is a continuing offence, each day that the offence continues shall constitute a separate and distinct offence with the same minimum and maximum fines applying as set out in section 5.8 and section 5.9 above.

PART 8 – GENERAL PROVISIONS

8.1 In the event that any particular provision or part of a provision of this bylaw is found to be invalid or unenforceable, it shall be severed and the validity of the remaining provisions shall not be affected.

8.2 The Schedules attached to this bylaw shall be deemed to be an integral part of this bylaw and are enforceable as part of this bylaw.

8.3 In this bylaw, wherever the singular or the masculine is used, the same shall be construed as meaning the plural or feminine or body corporate or politic where the context or the parties hereto so require.

PART 9 – REPEALMENT

9.1 That Anmore Sedimentation and Discharge Control Bylaw No. 309-2001 and any amendments thereto be repealed in their entirety.

READ a first time the 1st day of March, 2016
READ a second time the 1st day of March, 2016
READ a third time the 1st day of March, 2016
RECONSIDERED, FINALLY PASSED AND ADOPTED this day of , 2016

MAYOR

MANAGER OF CORPORATE SERVICES

Certified as a true and correct copy of "Anmore Erosion and Sediment Control Bylaw No. 547-2016".

DATE

MANAGER OF CORPORATE SERVICES

APPLICATION FOR EROSION AND SEDIMENT CONTROL PERMIT

In compliance with Anmore Erosion and Sediment Control Bylaw No. 547-2016

Part 1	**LAND OWNER**
Name	
Mailing Address	
E-mail Address	
Telephone	
Part 2	**DEVELOPER**
Name	
Mailing Address	
E-mail Address	
Telephone	
Part 3	**EROSION AND SEDIMENT CONTROL SUPERVISOR**
Name	
Mailing Address	
E-mail Address	
Telephone	
Part 4	**IDENTIFICATION OF LAND WHERE CONSTRUCTION WILL OCCUR**
Civic Address	
Legal Description	
Size of Land Parcel Area (approximate)	
Expected Construction Start Date MM/DD/YYYY	
Expected Construction End Date MM/DD/YYYY	

(boxes must be checked before submission)

☐ ESC Plan is attached, and conforms to the Village's drafting standards and includes the minimum requirements as set out on the reverse of this application.

☐ Confirmation of Commitment by ESC Supervisor attached and signed by the ESC Supervisor.

☐ Payment of non-refundable fee has been made by ☐ cash or ☐ cheque

☐ Payment of security deposit made by ☐ cash ☐ cheque or ☐ letter of credit

I hereby declare that the above information is correct and true as well as all information provided on the ESC Plan attached and submitted herewith. I guarantee to construct the ESC Facilities in accordance with the ESC Plan. I am aware of the provisions of the Erosion and Sediment Control Bylaw, and I will abide by all applicable provisions of said bylaw and such other terms and conditions as may be imposed under this application for an ESC Permit.

Signature of Land Owner	Date MM/DD/YYYY
Signature of Developer	Date MM/DD/YYYY

Following For Office Use Only

Permit No.	
Issued by the Village on	Date MM/DD/YYYY
Authorized Village Signatory	

The ESC Plan must be prepared, signed, and sealed, by a Professional Engineer, and reviewed and signed by the appointed ESC Supervisor.

The ESC Plan must conform to the Village of Anmore's drafting standards and must include, at a minimum, the following information:

(a) three-stage silt plan (clearing and grubbing, civil construction, and through to substantial completion) measures for erosion and sediment control during the three stages, and timing of implementation;
(b) the designed sediment discharge limit as specified under section 3.1 of Anmore Erosion and Sediment Control Bylaw No. 547-2016;
(c) pond deactivation methodology, (if required);
(d) lot line(s) and other legal designations of the subject Land(s);
(e) location(s) of any existing underground services, as well as any proposed connections to existing services from the Land;
(f) location(s) of any existing drainage infrastructure and the proposed measures to protect it;
(g) location(s) of any existing and proposed watercourses, ditches, swales or any other body of water within 50m of the Land boundaries, along with the proposed protection measures;
(h) location(s) of any existing/proposed buildings, including residential buildings or ancillary buildings or structures;
(i) existing and proposed contours and relevant spot elevations;
(j) Proposed access locations to the Land;
(k) wheel wash facilities (if required);
(l) proposed ESC Facilities to be implemented on site, which shall include source controls as the primary method of erosion and sediment control;
(m) proposed methods to restore disturbed areas following the completion of construction;
(n) location of the Village's rain gauge to be used for rainfall intensity monitoring;
(o) any and all other details pertaining to the proposed construction, describing how the ESC Facility will meet the Guidelines;
(p) An ESC Supervisor monitoring, inspecting, and reporting program, in accordance with Schedule "C" of Anmore Erosion and Sediment Control Bylaw No. 547-2016; and
(q) a detailed cost estimate for the installation, maintenance, and removal of the ESC Facilities.

All ESC Facilities must be designed in accordance with the Land Development Guidelines for the Protection of Aquatic Habitat', 1993 edition, as amended, co-published by the Ministry of Environment, Lands and Parks and the Department of Fisheries and Oceans Canada; and management practices as approved by the Village, to limit the amount of Sediment and Sediment-Laden Water discharged into the Drainage System.

ANMORE BYLAW NO. 547-2016 – SCHEDULE "B"

BEST MANAGEMENT PRACTICES FOR EROSION AND SEDIMENT CONTROL

As part of the Village's effort to control sediment discharge from construction sites, persons responsible will be expected to adhere to best management practices (BMPs) including, but not limited to, the ones outlined below:

(a) Retain existing vegetation and ground cover where possible;
(b) Restrict vehicle access and utilize wheel wash pads at access points;
(c) Install silt fencing around stockpiles and at the toe of disturbed slopes;
(d) Completely cover temporary stockpiles or spoiled material with polyethylene or tarps and surround with silt fence;
(e) Install and maintain filter fabric bags inside any catch basins, lawn basins, exposed manholes or any other open storm sewer access points collecting runoff from the building site;
(f) Divert runoff away from cleared areas by use of low berms;
(g) Convey surface runoff through swales designed to minimize flow velocity and erosion while maximizing settling;
(h) Where possible, collect runoff into suitable sediment settling facility or facilities prior to discharge off-site;
(i) Unless deemed unnecessary, a sediment pond should be designed, installed and maintained according to the Land Development Guidelines for the Protection of Aquatic Habitat;
(j) Keep all sand, gravel, spoiled material and concrete mix off of the paved surfaces;
(k) During excavation, holes requiring dewatering should be pumped to a vegetated area or suitable settling facility which will prevent sediment-laden water from accessing the Drainage System;
(l) Regularly sweep roads; and
(m) Re-vegetate, cover or mulch disturbed areas as soon as practically possible.

ANMORE BYLAW NO. 547-2016 – SCHEDULE "C"

DETAILS OF THE INSPECTING, MONITORING, AND REPORTING REQUIREMENTS OF THE ESC SUPERVISOR

Inspecting, Monitoring, and Reporting

Inspecting, Monitoring and Reporting intervals will be specified in the approved ESC Plan.

Inspecting

The ESC Supervisor shall keep detailed notes for each site visit in a logbook which shall contain the following minimum information:

(a) Water turbidity levels;
(b) TSS concentrations and of NTU concentrations,
(c) Observed ESC Facilities conditions; and
(d) Details of any remedial measures undertaken or recommendations made. The logbook must be made available to the Village upon request.

Monitoring

The ESC Supervisor must monitor and record in the logbook the maintenance of the ESC Facilities. Maintenance may include, but may not be limited to, the removal and proper disposal of accumulated sediment and the replacement of ESC Facilities if they deteriorate or fail to operate efficiently or as designed.

The ESC Supervisor must also visually monitor any receiving waters, including watercourses, ditches, swales or bodies of water up to 50 meters outside of the construction area.

ANMORE BYLAW NO. 547-2016 – SCHEDULE "D"

CONFIRMATION OF COMMITMENT BY ESC SUPERVISOR

[DATE]

Village of Anmore
2697 Sunnyside Road
Anmore, BC V3H 5G9

Dear Sir or Madam:

Re: [CIVIC ADDRESS OF PROJECT]
[LEGAL DESCRIPTION OF PROJECT]

I, [NAME OF ESC SUPERVISOR] confirm that I have been retained by [OWNER/DEVELOPER].

I confirm that I am an engineer, biologist, geoscientist, applied scientist, or technologist who is registered and in good standing in British Columbia with a professional organization constituted under an Act, acting under that association's code of ethics and subject to disciplinary action by that association, and am trained in designing and implementing ESC Plans, and am responsible for inspecting, monitoring and reporting in accordance with the requirements of Anmore Erosion and Sediment Control Bylaw No. 547-2016.

I acknowledge the responsibility to notify the addressee of this letter of the date I cease to be retained by the Owner and/or Developer.

Yours truly,

[NAME OF ESC SUPERVISOR]
[ORGANIZATION NAME OF ESC SUPERVISOR]

Professional Seal *(if applicable)*

Cc: [OWNER AND/OR DEVELOPER]

VILLAGE OF ANMORE

BYLAW NO. 548-2016

A bylaw to approve the Five-Year Financial Plan for the years 2016 through 2020

WHEREAS pursuant to the provisions of the *Community Charter* stating that a municipality must have a Financial Plan adopted annually, by bylaw, before the 15th of May in each year;

AND WHEREAS the Municipal Council has caused to be prepared a Five-Year Financial Plan for the period 2016-2020 inclusive;

NOW THEREFORE the Council of the Village of Anmore enacts as follows:

1. This bylaw may be cited as "Anmore Five-Year Financial Plan Bylaw No. 548-2016".

2. Council hereby adopts the Five-Year Financial Plan for the years 2016-2020 inclusive, for each year of the plan, as set out in Schedules A and B, attached hereto and forming part of this bylaw.

3. If a portion of this bylaw is held invalid by a Court of competent jurisdiction, the invalid portion must be severed and the remainder of this bylaw is deemed to have been adopted without the severed section, subsection, paragraph, subparagraph, clause or phrase.

4. That "Anmore Five-Year Financial Plan Bylaw No. 538-2015" is hereby repealed in its entirety.

READ a first time the day of March, 2016
READ a second time the day of March, 2016
READ a third time the day of March, 2016
RECONSIDERED, FINALLY PASSED AND ADOPTED this day of , 2016

_____
MAYOR

_____
MANAGER OF CORPORATE SERVICES

Certified as a true and correct copy of "Anmore Five-Year Financial Plan Bylaw No. 548-2016".

DATE

MANAGER OF CORPORATE SERVICES

SCHEDULE "A"

2016-2020 FINANCIAL PLAN STATEMENT OF OBJECTIVES AND POLICIES

1. In accordance with the *Community Charter*, the Village of Anmore is required to include in the Five-Year Financial Plan, objectives and policies regarding each of the following:

   (a) The proportion of total revenue that comes from each of the funding sources described in the Community Charter;
   (b) The distribution of property taxes among the property classes; and
   (c) The use of permissive tax exemptions.

2. Funding Sources

   Table 1, below, shows the proportion of total revenue proposed to be raised from each fund source in 2016.

   Property value tax revenues are the largest portion of planned revenues. Property Taxation provides a stable and consistent revenue source for general services that cannot be recovered from user-pay fees. It is simple to administer and easy for residents to understand.

   Fees & charges provide the second largest proportion of revenue and are sourced from the utility fees collected for water and garbage, recycling & organic waste collection, as well as various permit fees.

   Government grants provide for the third largest proportion of revenue and are sourced from the Major Road Network Fund (MRN), the Small Communities Fund, grants in lieu of taxes, as well as from miscellaneous provincial grants.

   Objectives

   - Over the next five years, the Village will increase the portion of revenue received from user fees and charges to reflect service levels and changes in inflation.

   Policies

   - All user-fee levels will be reviewed, on an annual basis, to ensure they are adequately meeting both the respective service delivery and capital costs.
   - Revenues will be recovered from user fees and charges where possible, rather than general taxation, to lessen the burden on the Village's limited property tax base.

Table 1 – Sources of Revenue

REVENUE SOURCE	% OF TOTAL REVENUE	DOLLAR VALUE
Taxation	45	$ 1,659,323
Fees and Charges	25	934,245
Government Grants	20	746,100
Reserve Transfers	8	281,685
Interest and Other	2	105,000
TOTAL	**100**	**$ 3,726,353**

3. Distribution of Property Tax Rates

Table 2 outlines the distribution of property taxes among the property classes. The residential property class provides the largest proportion of property tax revenue. This is appropriate as this class also forms the largest portion of the assessment base and consumes the majority of Village services.

Objectives

- Tax rates set maintain tax stability in accordance with the Village's operational and capital requirements.

Policies

- Supplement, where possible, revenues from user fees and charges to help to offset the burden on the entire property tax base.
- Regularly review and compare the Village's distributions of tax burden relative to other municipalities having similar property class composition.

Table 2 – Distribution of Property Tax Rates

PROPERTY CLASS	% OF TOTAL PROPERTY TAXATION
Residential (1)	97
Utilities (2)	2
Business and Other (6)	1
TOTAL	**100**

4. Permissive Tax Exemptions

No property in the Village of Anmore is permissively exempt. Village properties do not meet the legislated criteria.

SCHEDULE "B"

Village of Anmore
Financial Plan
2016 - 2020

	2016	2017	2018	2019	2020
REVENUES					
Property Tax	$ 1,659,323	$ 1,853,264	$ 2,029,466	$ 2,199,326	$ 2,369,826
Parcel Tax	$ 6,482	$ 6,482	$ -	$ -	$ -
Permits, Fees and Charges	$ 934,245	$ 1,015,690	$ 1,063,350	$ 1,111,560	$ 1,165,210
Grants	$ 746,100	$ 739,600	$ 741,700	$ 743,800	$ 746,000
Interest & Other	$ 105,000	$ 106,700	$ 108,610	$ 110,520	$ 112,430
SUBTOTAL REVENUES	$ 3,451,150	$ 3,721,736	$ 3,943,126	$ 4,165,206	$ 4,393,466
EXPENSES					
General Government	$ 1,829,917	$ 1,289,904	$ 1,305,180	$ 1,310,978	$ 1,341,449
Public Works	$ 1,503,700	$ 520,000	$ 528,000	$ 536,200	$ 544,400
Protective and Inspection Services	$ 121,190	$ 123,960	$ 126,796	$ 129,678	$ 132,636
Planning & Development	$ 160,500	$ 3,531,700	$ 88,700	$ 90,700	$ 92,700
Water Utility	$ 561,345	$ 1,090,140	$ 550,350	$ 681,800	$ 622,980
Capital	$ 137,000	$ 137,000	$ 137,000	$ 137,000	$ 137,000
Interest & Debt Charges	$ 6,482	$ 6,482	$ -	$ -	$ -
Amortization	$ 870,000	$ 870,000	$ 870,000	$ 870,000	$ 870,000
SUBTOTAL EXPENSES	$ 5,190,134	$ 7,569,186	$ 3,606,026	$ 3,756,356	$ 3,741,166
SURPLUS / (DEFICIT)	-$ 1,738,984	-$ 3,847,450	$ 337,100	$ 408,850	$ 652,300
INTERNAL TRANSFERS					
Transfer to (from) Reserves	$ 587,300	$ 2,983,450	-$ 1,225,100	-$ 1,272,850	-$ 1,516,300
Transfer to (from) Surplus	$ 281,685	-$ 6,000	$ 18,000	-$ 6,000	-$ 6,000
Transfer from DCCs	$ -	$ -	$ -	$ -	$ -
Investment in TCA	$ 870,000	$ 870,000	$ 870,000	$ 870,000	$ 870,000
SUBTOTAL INTERNAL EXPENSES	$ 1,738,985	$ 3,847,450	-$ 337,100	-$ 408,850	-$ 652,300
FINANCIAL PLAN BALANCE	$ 0	$ 0	$ 0	-$ 0	$ 0

BRITISH COLUMBIA

29 February 2016

File: 10280-60 (92G/7)

Mayor and Council
Village of Anmore
2697 Sunnyside Road
Anmore BC V3H 5G9

Dear Mayor and Council:

I am writing to follow up on my letter dated 23 October 2015 (enclosed) regarding the proposal to adopt "Tim Jones Peak" as an official place name in British Columbia.

Requesting community comment on geographical naming proposals is to ensure that the proposed name reflects the heritage values of the area and is supported by a broad section of the community; it is a cornerstone of the provincial naming policy.

Before considering adoption of "Tim Jones Peak" for the second of three summits on Mount Seymour near North Vancouver, may I have your advice and comments? In particular, since you represent a user group in the area, is there any reason why the name "Tim Jones Peak" should not be a suitable name for this feature?

For more information about this naming proposal and location of the peak, please refer to the enclosed copy of the 23 October 2015 letter and maps. Adoption of this name would not prejudice legitimate claims to the land.

Thank you in advance for any comments and advice that you, as representatives of your community, would like to share. Your response before 31 March 2016 would be appreciated.

Regards,

Carla Jack
Provincial Toponymist
carla.jack@gov.bc.ca

enclosure

Ministry of Forests, Lands and Natural Resource Operations

Heritage Branch
BC Geographical Names Office

Mailing Address:
PO Box 9818 Stn Prov Govt
Victoria BC V8W 9W3

BRITISH COLUMBIA

23 October 2015

File: 10280-60 (92G/7)

Mayor and Council
Village of Anmore
2697 Sunnyside Road
Anmore BC V3H 5G9

Dear Mayor and Council:

This office has received a proposal to adopt "Tim Jones Peak" as an official place name in British Columbia, referring to the second of three summits that comprise Mount Seymour near North Vancouver, as shown on the attached map.

The namesake is Timothy Jones (1956-2014), team leader and voice of B.C.'s North Shore Rescue, and a long-time paramedic. Mr. Jones is widely regarded for playing a key role in implementing B.C's first Helicopter Flight Rescue System, building a world-class communications system and a state-of-the-art rescue base for North Shore Rescue. He was presented with the Order of British Columbia in 2011.

In addition to its location in Mount Seymour Provincial Park, this peak is within or forms a portion of the boundary of the traditional territory of several First Nations, and is within or near the border of several local governments so it is important to ascertain a) if there is a known traditional name for the feature, and b) the proposed name reflects the heritage values in the area. This peak has a local name of "Second Pump (Peak)" that would be supplanted by the proposed name "Tim Jones Peak."

Before considering adoption of "Tim Jones Peak" for the second of three summits on Mount Seymour, may I have your advice and comments? In particular, is there a reason why the name "Tim Jones Peak" should not be a suitable name for this feature?

Adoption of this name does not prejudice legitimate claims to the land.

Thank you in advance for your comments. Your response before 31 January 2016 would be appreciated.

Regards,

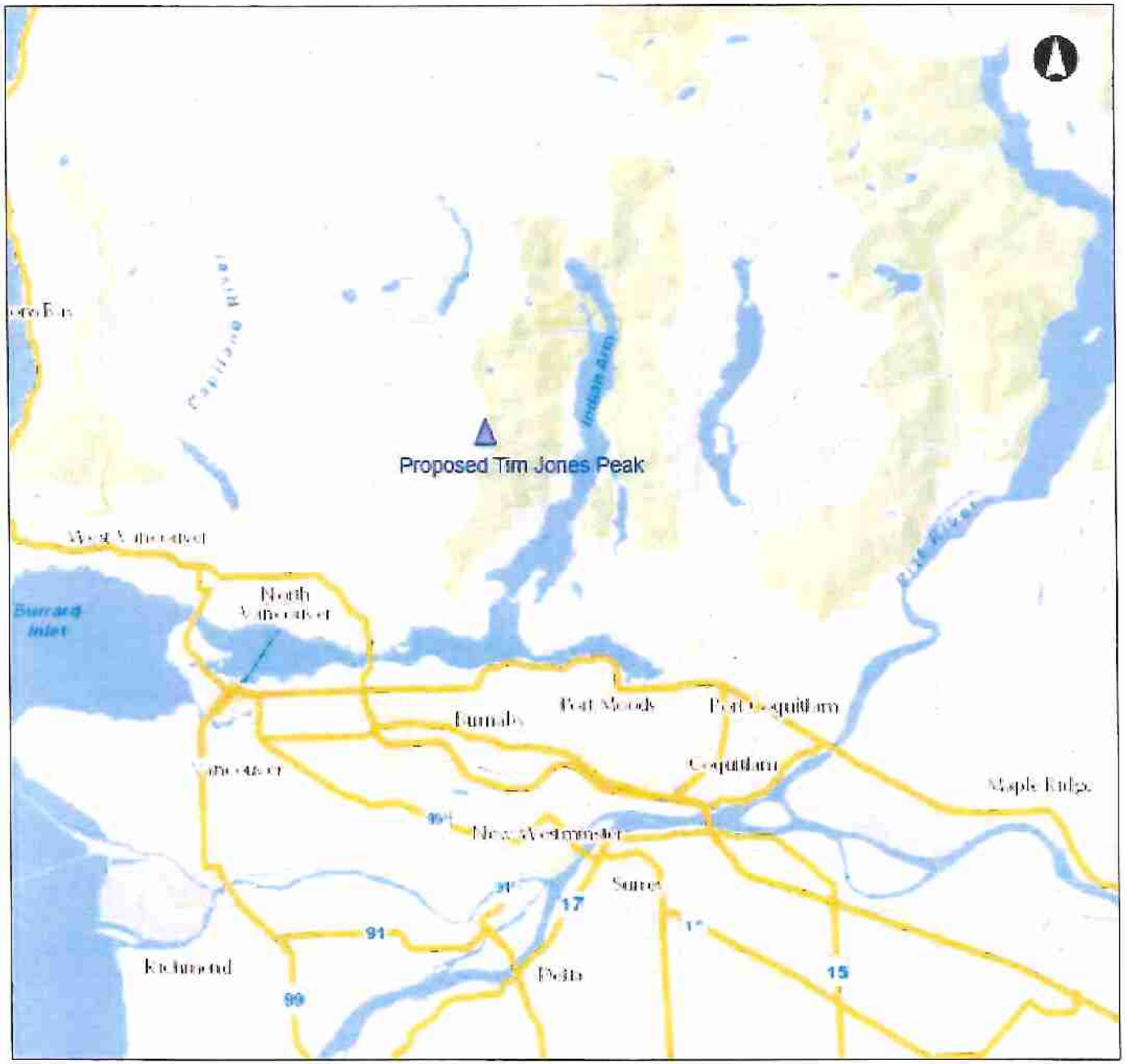
Carla Jack
BC Geographical Names Office
carla.jack@gov.bc.ca

enclosure

Ministry of Forests, Lands and Natural Resource Operations

Heritage Branch
BC Geographical Names Office

Mailing Address:
PO Box 9818 Stn Prov Govt
Victoria BC V8W 9W3



BRITISH COLUMBIA

Legend

Location of proposed Tim Jones Peak

0 5.44 10.87 km

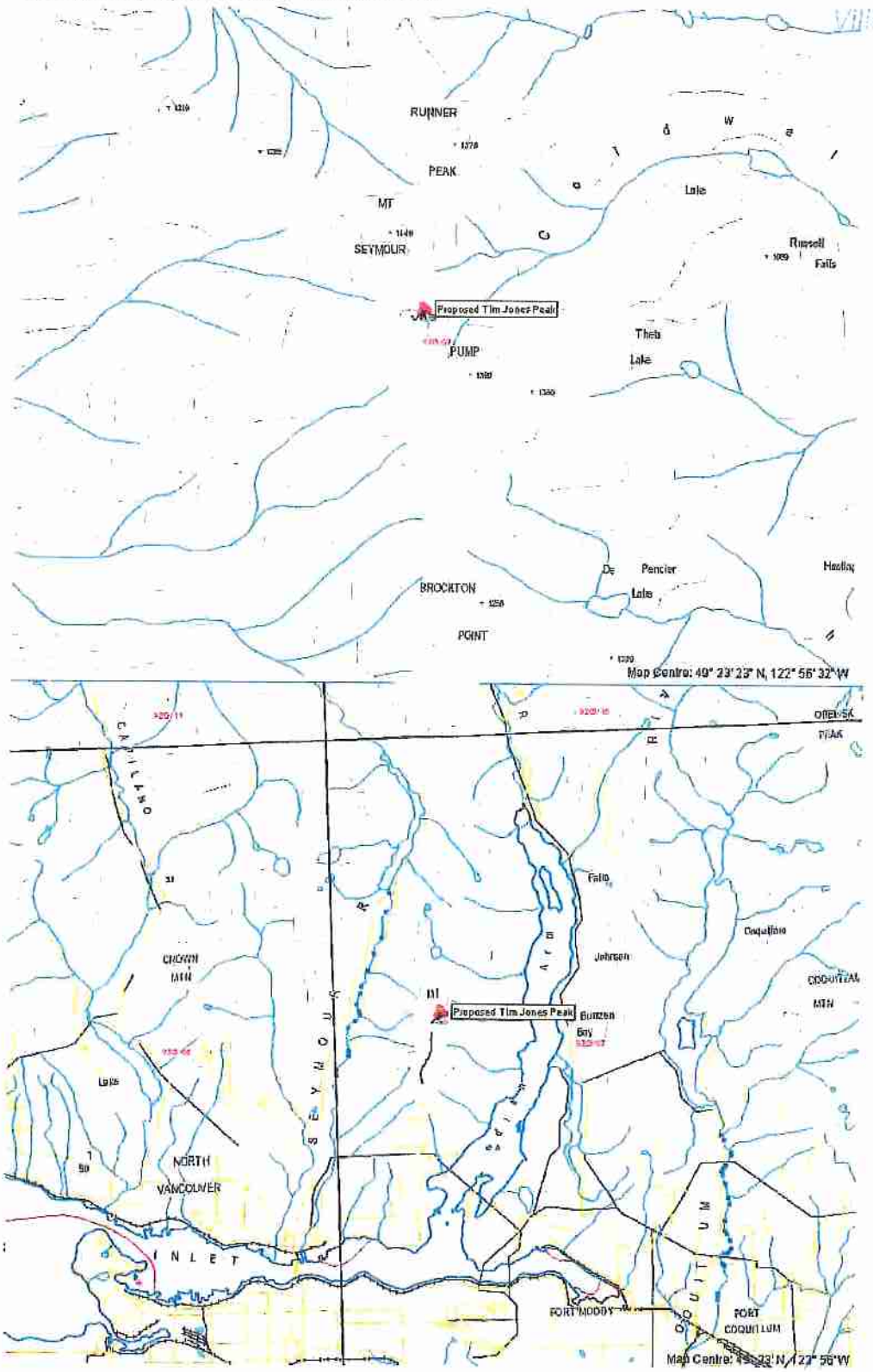
1: 267,573

Datum: NAD83

Projection: NAD_1983_BC_Environment_Albers

Key Map of British Columbia

Location for proposed name "Tim Jones Peak"



ANMORE ELEMENTARY

....a caring community working and learning together...

Village of Anmore,
2697 Sunnyside Road
Anmore BC, V3H 5G9

March 7 2016

To whom it may concern,

The students, staff and parents Anmore Elementary School are hosting a Great Walk event as a ½ day fundraiser. This rain or shine event which we hope to take place within the Village of Anmore, beyond Anmore Elementary School grounds, will focus on physical activity, school spirit and fun. All monies raised will be targeted towards replacing and maintenance aging Smartboards within the school.

Date: Friday April 29th
Time: 1-3 pm
Location: K-Gr3 – to Ice Cream Store and back
Gr3-5 – to Floating Bridge and back
Gr4-5 – to Pump House and back

Although we plan on having parent volunteers with students, we would like to ask for assistance in traffic control for the intersection of Sunnyside/ East Road, and possibly the crosswalk on Sunnyside near the campgrounds.

We will also be contacting Buntzen Lake Warden's Office - BC Hydro, Anmore Store & Recreation Ltd. to notify them of our intent.

Thank you for your time and assistance,

NDaneault

Nicole Daneault,
Principal, Anmore Elementary School
ndaneault@sd43.bc.ca

VILLAGE OF ANMORE

REPORT TO COUNCIL

Date:	March 17, 2016
Submitted by:	Christine Milloy, Manager of Corporate Services
Subject:	Policy 43 – Review and Update

Purpose / Introduction

To present a draft update of the current Policy No. 43 – In-Camera Council Meeting Rules of Order for consideration, as directed by Council.

Recommended Resolutions

1. That Council authorizes the revision to Policy No. 43 as circulated.
   OR
2. That Council authorizes the revision to Policy No. 43 with amendments.
   OR
3. That Council authorizes Policy No. 43 to be rescinded; and that Staff be directed to amend Anmore Procedure Bylaw No. 541-2016 to address the recording of meetings and the release of related documents for In-Camera Council meetings, for future consideration by Council.

Background

At the Regular Council Meeting held on February 2, 2016, Council raised concerns regarding the request of staff to rescind Policy No. 43, citing that information in the Policy would be relevant despite adoption of the updated Procedure Bylaw. This matter was then tabled for discussion at a future meeting where the Corporate Officer would be in attendance to respond to questions from Council.

Report/Recommendation to Council
Policy 43 – Review and Update
March 17, 2016

At the Regular Council Meeting held on March 1, 2016, this matter was lifted from the table for discussion. Following comments and questions from Council to Staff, Staff was directed to amend Policy No. 43 and bring it back to Council for review and adoption.

Discussion

The Policy has been revised with the intention of providing simplicity and addressing concerns raised with respect to the use of recording devices and the release and collection of confidential documentation relative to In-Camera Council meetings.

The Policy shall be considered supplemental to regulations referenced by the *Community Charter*, *Local Government Act* and *Anmore Procedure Bylaw* with respect to In-Camera Council Meetings, which may or must be closed to the public.

Council is requested to consider adopting one of the three recommendation resolutions.

Attachments
1. Policy No. 43 proposed, dated March 29, 2016
2. Policy No. 43 currently in effect, dated November 9, 2010

Prepared by:	
C Milloy Christine Milloy Manager of Corporate Services	
Reviewed for Form and Content / Approved for Submission to Council:	
Chief Administrative Officer's Comment/Concurrence	
JKolby **Chief Administrative Officer**	

Village of Anmore

COUNCIL POLICY

Subject	In-Camera Council Meeting Rules of Order	**Policy No.**	43
Effective Date	March 29, 2016	**Approved by Council Resolution No.**	XX/2016
Date Established	November 9, 2010	**Revisions**	March 29, 2016

POLICY STATEMENT

A policy to address the recording of meetings and release of related documents for In-Camera Council meetings. This policy is intended to supplement regulations previously referenced in the *Community Charter*, *Local Government Act* and *Anmore Procedure Bylaw*, for the handling of In-Camera Council Meetings.

POLICY DETAILS

1. In-Camera Council meetings are not to be recorded, in whole or in part, by any person in attendance at the meeting.

2. Handwritten notes shall be taken by staff during the meeting for creation of meeting minutes.

3. Documents deemed confidential by the Chief Administrative Officer shall be distributed by staff as part of the meeting agenda package.

4. Documents deemed highly confidential by the Chief Administrative Officer shall be distributed by staff at the beginning of the meeting.

5. Following conclusion of an In-Camera Council Meeting, when it has been determined by Council that the documents received would not be required for future discussion or reference, each council member shall be responsible for the appropriate destruction of those documents.

6. As exception to section 5 above, where highly confidential documents were provided pursuant to section 4, all highly confidential documents will be collected by staff following adjournment of the meeting where the documents were provided, and staff shall be responsible for the appropriate destruction of those documents.

ADOPTED by Village of Anmore Council on the day of , 2016

Certified Correct: Approved:

Manager of Corporate Services

Mayor

VILLAGE OF ANMORE

2697 Sunnyside Road
Anmore, B.C.
V3H 5G9

POLICY NO. 43

IN CAMERA COUNCIL MEETING RULES OF ORDER

POLICY STATEMENT

A policy to define the rules of order for In Camera Council meetings.

POLICY DETAILS

1. In Camera Council meetings, for reasons of confidentiality, are to be recorded by the official recorder only. All other recording devices will not be permitted.
2. Documents of a sensitive or confidential nature will be distributed by the supervising staff official at the beginning of the In Camera Council meeting and then retrieved by the supervising staff official at the conclusion of the In Camera meeting.

APPROVED by the Municipal Council on the 9th day of November 2010.

Heather Anderson – Mayor

Howard Carley - CAO

Phone: 604-469-9877 • Fax: 604-469-0537 • Email: village.hall@anmore.com
Web: http://www.anmore.com

Bella Terra
BY THE LAKE

c/o 1028 Ravenswood Drive
Anmore, BC
V3H 5M6

March 22, 2016

Juli Kolby
Chief Administrative Officer/Chief Financial Officer
Village of Anmore
2697 Sunnyside Road
Anmore, BC
V3H 5G9

RE: Request for Approval of Sign Installation - Bella Terra by the Lake Subdivision

Dear Juli,

Please accept this letter as our request to install a sign on Lot 27 at Eaglecrest and Sunnyside Road - Parcel A Section 20 TWP 39 NWD Plan BCP 32330 – PID 027-207-641. This Lot 27 will be the location of our new Presentation Center for the Bella Terra by the Lake subdivision.

The sign will be used for marketing purposes and will provide general information to the public, including contact information. The sign will permit the public to obtain basic information and will help direct them to our Presentation Center where more specific questions can be answered by our onsite sales and marketing staff.

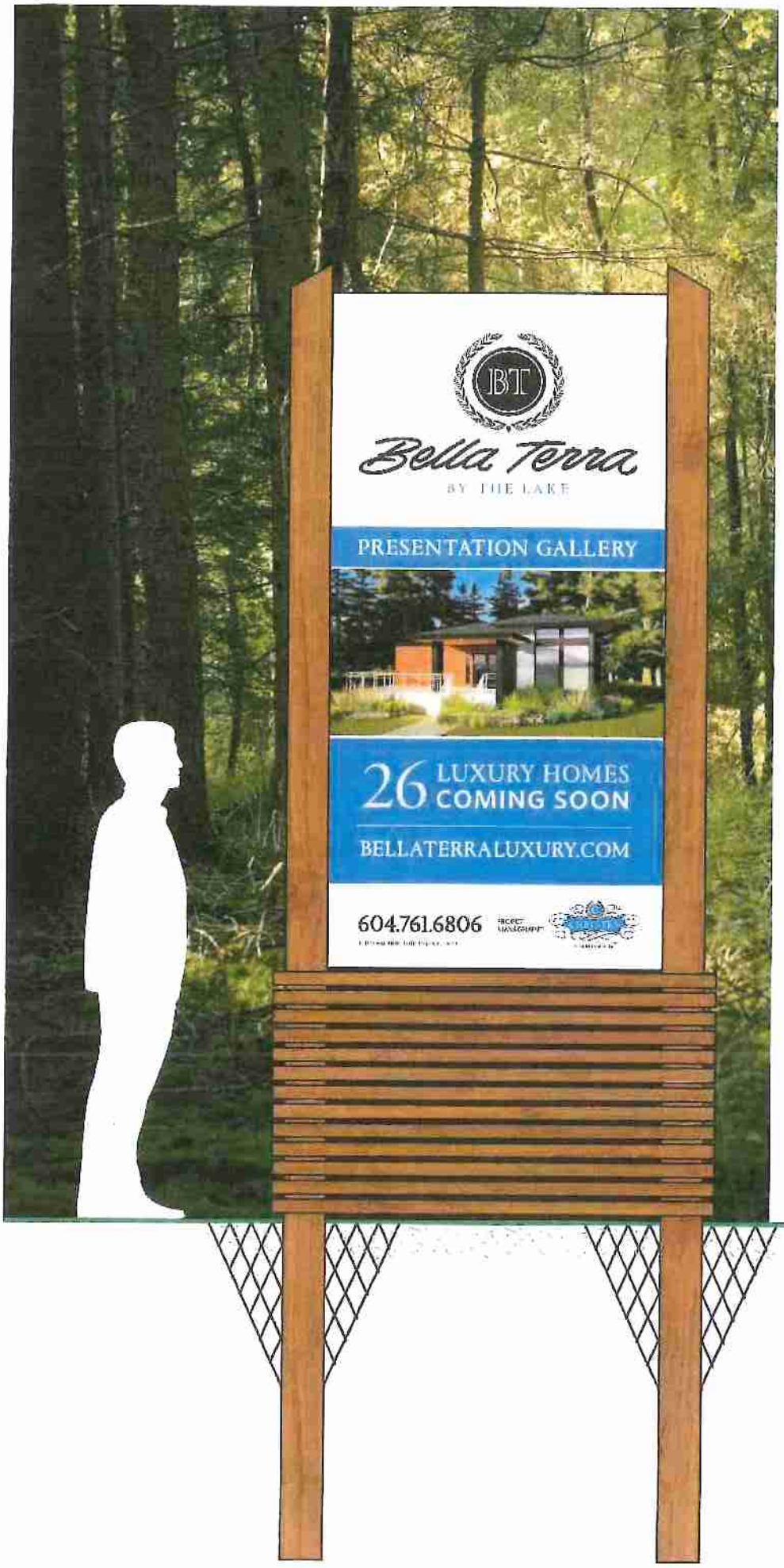
The requested dimensions of the sign are 8 ft by 4 ft. It will be complemented by cedar posts and cedar wrappings. (See attached sign and location of Presentation Center.) This sign will be for temporary use and for marketing and subdivision promotion purposes only. We estimate our Presentation Center to be used for a period of one year starting approximately June 1, 2016.

If you have any further questions, please do not hesitate to call me direct at 604-340-7468 or email me at tbarone@telus.net.

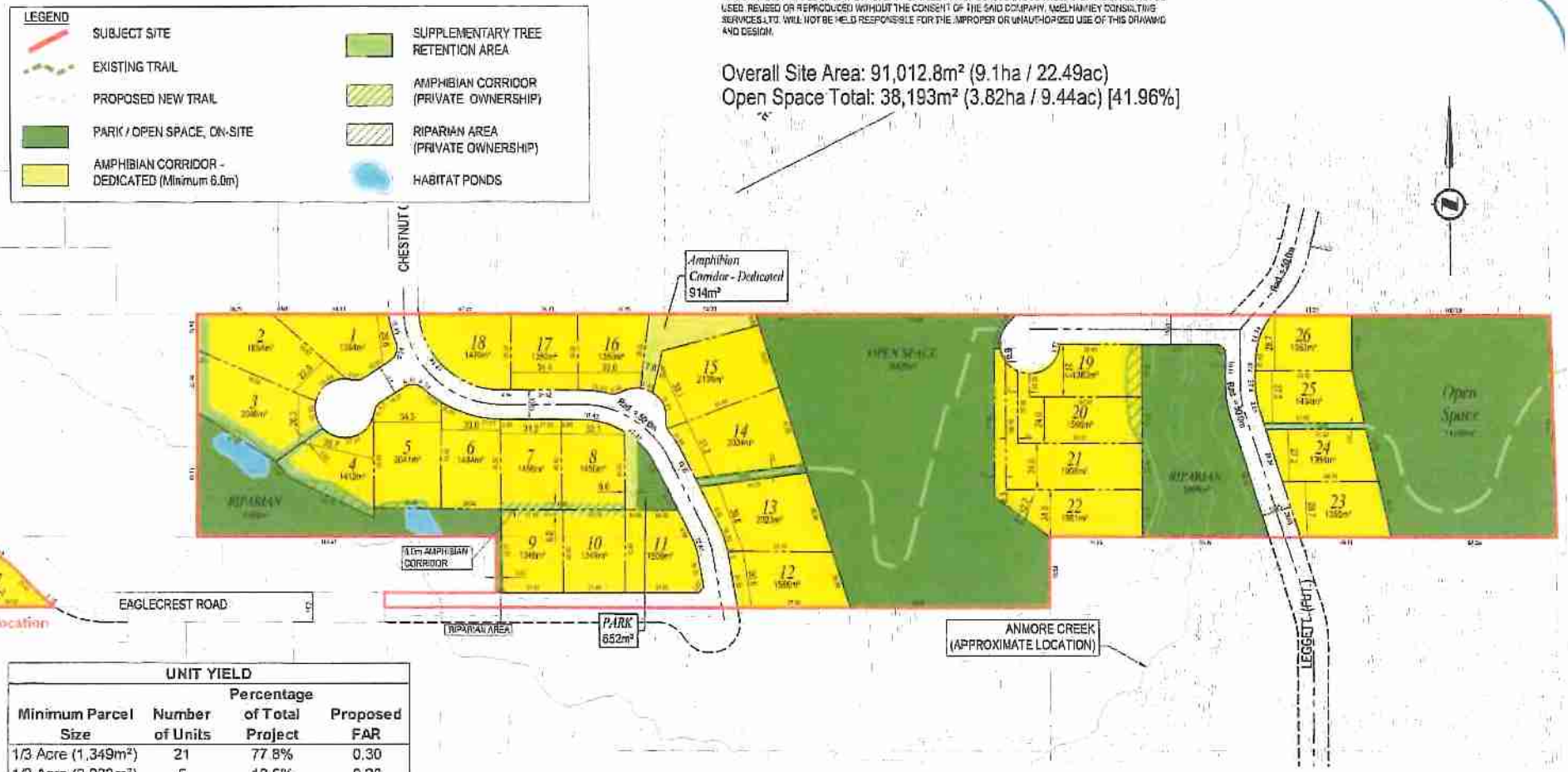
Thank you in advance for your consideration and I look forward to hearing from you.

Best regards,

Tony Barone
Director
Bella Terra Investments Inc.



4ft x 8ft
Sign Concept



UNIT YIELD			
Minimum Parcel Size	Number of Units	Percentage of Total Project	Proposed FAR
1/3 Acre (1,349m²)	21	77.8%	0.30
1/2 Acre (2,023m²)	5	18.5%	0.28
Smaller (840m²)	1	3.7%	0.32
Total	27		

DRAWING 1.3 - Development Concept

LAYOUT SKETCH 1B

McElhanney

McElhanney Consulting Services Ltd.
SUITE 2300 - CENTRAL CITY TOWER
13450 102 AVENUE, SURREY, BC
V3T 5X3
P: 604-596-0391
F: 604-584-5059

NOTES:
- THIS DRAWING IS FOR PRELIMINARY LAYOUT ONLY, AND SUBJECT TO MUNICIPAL APPROVAL.

Scale: 1:2000
Date: September 29, 2015
Job No.: 2111-03104-0

COUNCIL REPORT

TO:	Juli Kolby, Chief Administrative Officer
SUBMITTED BY:	Kate Lambert, Planning Consultant
DATE:	March 23, 2016
RE:	Development Permit Authorization for Bella Terra (LOT 2, SECTION 20, TOWNSHIP 39, NEW WESTMINSTER DISTRICT PLAN LMP49409 and PARCEL A, SECTION 20, TOWNSHIP 39, NEW WESTMINSTER DISTRICT PLAN BCP32330)

INTRODUCTION

The intent of this report is to bring forward the Watercourse Protection Development Permit, sought by Bella Terra Investments, for authorization by Council as part of the development approval process to facilitate a 27 lot subdivision.

RESOLUTIONS

THAT Council approve issuance of a Watercourse Protection Development Permit for Bella Terra for lands legally described as LOT 2, SECTION 20, TOWNSHIP 39, NEW WESTMINSTER DISTRICT PLAN LMP49409 and PARCEL A, SECTION 20, TOWNSHIP 39, NEW WESTMINSTER DISTRICT PLAN BCP32330, on the terms as attached hereto, subject to confirmation of satisfactory receipt from the Ministry of Forests, Lands and Natural Resource Operations that the RAR Assessment report has been submitted and aligns with the RAR methodology.

Other Resolution Options

THAT Council defer the application and consideration of the Watercourse Protection Development Permit for Bella Terra and direct staff to further resolve with the applicant any outstanding issues before issuing the Development Permit.

BACKGROUND

The Village of Anmore Official Community Plan (OCP) approved in 2015, established a Watercourse Protection Development Permit Area (DPA) for the purpose of protecting the natural environment, its ecosystems and biological diversity from development. Schedule F of the OCP identifies those areas of the Village where a Watercourse Protection Development Permit may be required, generally 30 metres from the top-of-bank of a stream or ravine. The

guidelines for the DPA are consistent with the Province's Riparian Areas Regulation (RAR), and are outlined in the Zoning Bylaw. The DPA applies to residential, commercial and industrial land uses, and restricts certain development activities, such as the removal, alteration, disruption or destruction of vegetation, construction of roads, and subdivision (refer to the Village of Anmore Official Community Plan, 2015, Schedule F for details).

In January 2015, a rezoning application was submitted by Mr. James Pernu of McElhanney Consulting Services on behalf of Bella Terra Investments to rezone the properties noted above from a Single-Family Residential (RS-1) to a Comprehensive Development (CD) zone. As the subject properties fall within the Watercourse Protection Area highlighted in Schedule F of the OCP, it was noted that a a Development Permit (DP) would be required as part of the development approval process (refer to appendix i).

Following review by Village staff, its consultants, Council Committees and the Advisory Planning Commission, a Public Hearing, and third reading of Bylaw No. 543-2015 by Village Council on November 17, 2015, a Watercourse Protection Development Permit application was submitted on December 7, 2015. As required by the DPA guidelines, a report prepared in accordance with the detailed methodology of the BC Riparian Areas Regulation (RAR) was received by the Village of Anmore as part of the Development Permit Application. The report was prepared by Mr. Chris Lee, R.P.Bio., a qualified environmental professional (QEP), on behalf Bella Terra Investments.

On March 1, 2016, Council considered Bylaw No. 543-2015 a fourth time, and approved the Bella Terra rezoning. This Comprehensive Development zone permits a mix of 1/2 and 1/3 acre lots generally located in two clusters with an overall residential density of 1.2 lots/acre. Conditions of the rezoning included a restrictive covenant specifically for lots 3 through 6, 9 and 12 that limits the future use, building or subdivision of those lots until the Province's Riparian Area Regulations (RAR) and the Village's Watercourse Development Permit requirements have been satisfied.

Comments on the report from the Village's Environmental Consultant were provided to the applicant and a revised report dated March 14, 2016 was submitted to the Village and filed with the Ministry of Forests, Lands and Natural Resource Operations of British Columbia, as per the RAR process.

Staff and the Village's Environmental, Legal, and Planning Consultants have worked with the applicant to review the Development Permit application and are also working with the applicant to review and process a subdivision application for the subject site, in accordance with the approved CD zoning.

DISCUSSION

Introduction of a Development Permit Area in the updated Anmore OCP was specifically intended to protect riparian areas. Designated in Schedule F of the OCP, the DPA reflects the community's desire to enhance environmental protection and provides the policy context for the Village to implement the Province's Riparian Areas Regulation (RAR).

Environmental protection was a key topic of discussion during the rezoning process for Bella Terra, which includes portions of Anmore Creek, and has been acknowledged through a variety of approaches, including parkland dedications, commitment to construct amphibian corridors, tree management plan, restrictive covenants, and conditions related to approval of the rezoning, development permit, and subdivision.

The purpose of the Development Permit is to ensure the Riparian Areas Regulation is applied consistently throughout the Village and that environmental values, particularly related to watercourses and riparian areas, are protected to the satisfaction of the Village. As such, the Village's Environmental Consultant has been actively involved in the rezoning process, and has reviewed and provided comments to the applicant's environmental consultant throughout the development approval process for the Bella Terra project.

The Development Permit application includes a report prepared by Mr. Chris Lee, R.P.Bio., a qualified environmental professional (QEP), in accordance with the detailed methodology of the RAR. The report includes a description of the site, results of the environmental assessment, a site plan identifying Streamside Protection and Enhancement Area (SPEA) widths and setbacks as part of the development concept, and measures to protect and maintain the riparian setbacks.

The RAR Assessment Report was updated in March 2016 to respond to comments from the Village's Environmental Consultant. The revised report addresses several of these comments, however; a tributary watercourse that is confluent with Anmore Creek at the west side of the proposed development was not accounted for in the RAR report. In order to ensure that all statutory requirements regarding watercourses are adhered to, the Village and the applicant have agreed to impose no-build covenant agreements on all proposed lots that would be affected by the tributary watercourse. Therefore, the Development Permit for the subject site will include clauses that specifically prohibit any alteration of the lots upon which the no-build covenant have been registered.

As such, the Development Permit may be prepared and issued for the site, noting that a no-build covenant on lots 3, 4, 5, 6, 9 and 12 will remain in place until the question of the tributary watercourse has been resolved, to the satisfaction of the Village through one of the following options, or by another means acceptable to the Village:

- The tributary watercourse is surveyed by a BCLS land surveyor and has setbacks as established according to the detailed methodology of the RAR;
- The tributary watercourse is deemed not to be a "stream" in accordance with definitions provided in the RAR and the BC Water Act. Written confirmation must be provided to the Village of Anmore from the Regional Water Manager of the Ministry of Forests, Lands and Natural Resource Operations. Should the tributary or any portion thereof be deemed not to be a "stream" then setbacks will not apply to those sections. Any sections deemed to be a "stream" will require setbacks in accordance with the detailed methodology of the RAR; or
- The tributary watercourse may be altered, realigned or modified in accordance with the terms and conditions of a Water Approval to be issued under the BC Water Act by the Ministry of Forests, Lands and Natural Resource Operations. Setbacks from any altered, realigned or modified sections of the tributary watercourse will be established in accordance with the detailed methodology of the RAR.

Depending on how the applicant addresses the tributary watercourse, the Development Permit may be amended to include any additional setbacks or restrictions on lots 3, 4, 5, 6, 9 and 12, and, the no-build covenant would be removed.

The Province's RAR process requires the Qualified Environmental Professional to submit the RAR Assessment Report to the Ministry of Forests, Lands and Natural Resource Operations. The Ministry then notifies the Village that the report has been submitted and notes whether the report aligns with the RAR methodology. Once this notification has been received, the Village can issue the Development Permit. The RAR Assessment Report has been submitted and the Village is awaiting notification from the Province.

Issuing a DP for the subject site indicates that the Village is satisfied that the applicant has followed the RAR methodology to determine SPEA widths, development setbacks, and measures to protect and maintain the SPEA, and that development activities may proceed, in accordance with all applicable Village bylaws and permits.

As part of this Development Permit, legal agreements will establish: restrictive covenant on any future lots created through subdivision that are implicated by the DP and a no-build covenant on lots 3, 4, 5, 6, 9 and 12.

It should also be noted that the applicant is obliged to comply with the BC *Wildlife Act* when undertaking any activities on the site. Specifically, Section 34 protects the active nests of all birds. Land-clearing may not occur during the general bird-nesting window of March 15 through July 15 unless a QEP certifies that no nests will be harmed. Adherence to this legislation will be monitored by the Village accordingly.

Additional environmental protection measures, such as design and construction of amphibian corridors, will be addressed through the subdivision process.

In summary, the Development Permit for the Bella Terra project

- Aligns with OCP policy to protect watercourses and riparian areas;
- Aligns with the DPA Guidelines in the Zoning Bylaw;
- Follows the RAR detailed assessment methodology (pending confirmation from MFLRO); and
- Includes agreement that a no-build covenant for lots 3, 4, 5, 6, 9 and 12 will be registered on title, until which time as the tributary watercourse is addressed to the satisfaction of the Village.

FINANCIAL IMPLICATIONS

A Development Permit fee of $500.00 is payable to the Village, as per the Anmore Fees and Charges Bylaw. There are no financial implications to the proposed resolution, noting that the staff and Village consultant efforts involved in processing the development permit is recaptured on a cost-recovered basis.

COMMUNICATIONS/CIVIC ENGAGEMENT

There is no public process associated with the Development Permit process.

CORPORATE STRATEGIC PLAN OBJECTIVES

The proposed resolution is consistent with the Village's 2015-2018 environment corporate objective to "foster preservation of the Village's natural environment and enhance awareness of its importance to the character and sense of community found in Anmore."

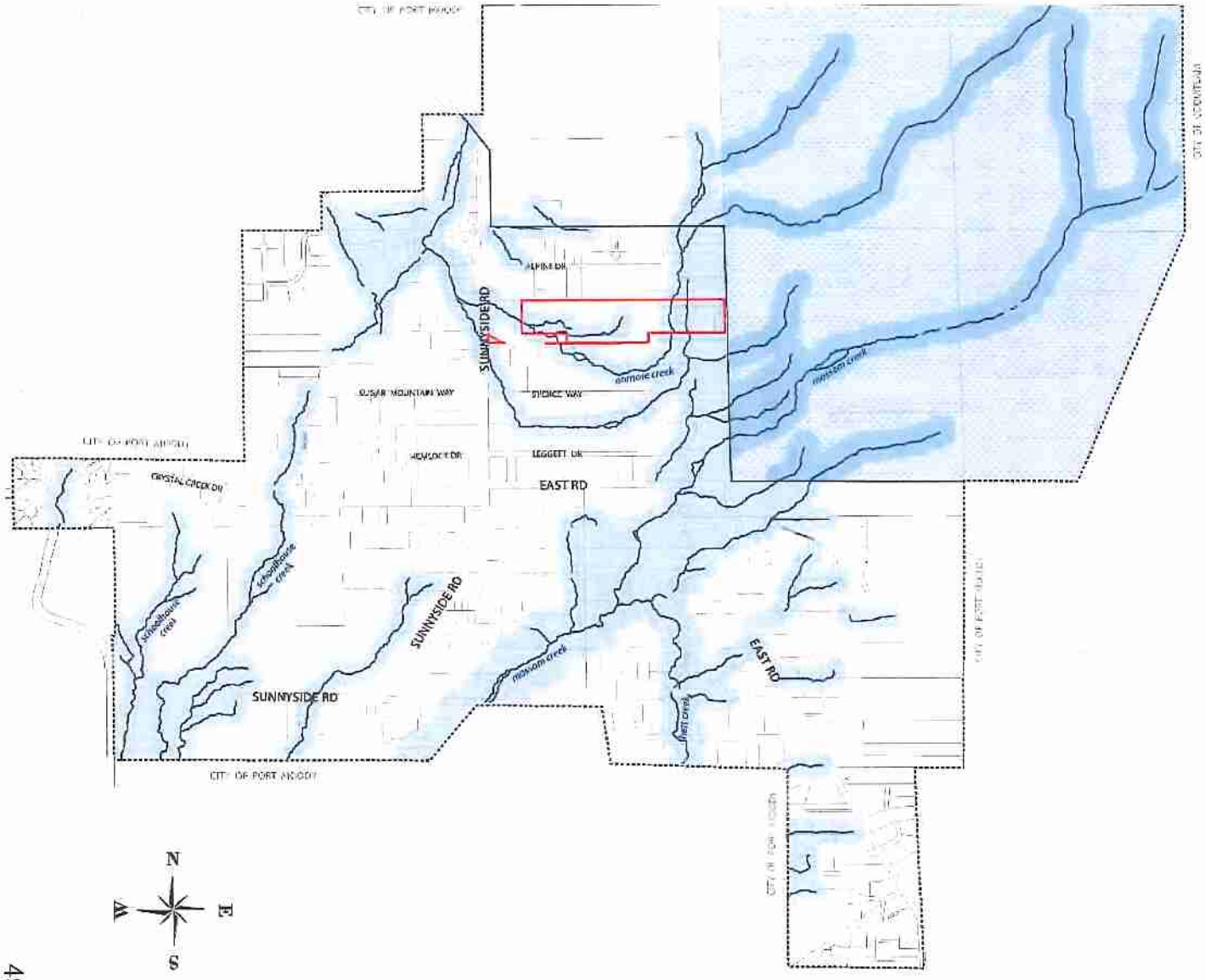
Attachments:

A. *Village of Anmore Official Community Plan Schedule F - Watercourse Protection Development Permit Area Map*
B. *Development Permit No. 1*

Prepared by:
Kate Lambert, Planning Consultant

Reviewed for Form and Content / Approved for Submission to Council:
Chief Administrative Officer's Comment/Concurrence
C Milley per Chief Administrative Officer

SCHEDULE F: WATERCOURSE PROTECTION DEVELOPMENT PERMIT AREA MAP



LEGEND

- Watercourses
- Watercourse Protection Area
- Municipal Boundary
- Right of Way
- Rural Residential
- Conservation & Recreation
- Subject Site

VILLAGE OF ANMORE

2697 Sunnyside Road, Anmore, BC, V3H 5C9 Ph: 604-469-9877

THE VILLAGE OF ANMORE DOES NOT ASSUME RESPONSIBILITY FOR THE CORRECTNESS OF THIS MAP AS IT IS INTENDED FOR GENERAL REFERENCE ONLY. LAST UPDATED MARCH 2014.

THIS MAP HAS BEEN COMPILED WITH DATA FROM VARIOUS SOURCES AND IS NOT WARRANTED AS TO ITS ACCURACY OR SUFFICIENCY BY THE VILLAGE OF ANMORE. THE DATA IS PROVIDED FOR INFORMATION PURPOSED ONLY AND IS NOT TO BE SOLELY RELIED UPON TO PROVIDE A DETAILED DEPICTION OF ALL EXISTING NATURAL FEATURES OR CONDITIONS.

VILLAGE OF ANMORE

2697 Sunnyside Road
Anmore, B.C.
V3H 5G9

The Village of Anmore

Development Permit No. 001

This Permit is issued this _____day of _____ 2016 to:

1. Name: Bella Terra Investments Inc.
   Address: 1028 Ravenswood Drive, Anmore, BC, V3H 5M6

2. This permit applies to and only to those lands within the Municipality described as follows and to any and all buildings, structures and other development thereon:

   LEGAL DESCRIPTION: LOT 2, SECTION 20, TOWNSHIP 39, NEW WESTMINSTER DISTRICT PLAN LMP49409 and PARCEL A, SECTION 20, TOWNSHIP 39, NEW WESTMINSTER DISTRICT PLAN BCP32330

   PID: 025-011-345 and 027-207-641

   CIVIC ADDRESS: No civic address

3. This permit allows for alteration and subdivision of the lands.

4. CONDITIONS:
   As provided for under sections 488(1) and 489 of the *Local Government Act*, the following conditions must be adhered to:
   a. There shall be no disturbance, alteration or destruction of the riparian area within the prescribed Streamside Protection and Enhancement Area (SPEA) as detailed in Schedules A and B;
   b. A no-build covenant shall be registered against the subject lands for the lots identified in Schedule B as lots 3, 4, 5, 6, 9, 12 and 13.
   c. The no-build covenant shall remain in place until which time as a tributary watercourse identified on the above noted lots is addressed to the satisfaction of the Village.
   d. Should further Riparian Areas Regulation assessment be required, this DP may be amended to reflect new information.

5. REGISTRATION:
   Notice of this Permit shall be filed in the Land Title Office of New Westminster under Section 503 of *the Local Government Act,* and upon such filing, the terms of this or any amendment hereto shall be binding upon all persons who acquire an interest in the land affected by this Permit.

6. PERMIT EXPIRY:
   If the Permittee does not substantially start any construction permitted by this Permit within two years of the date of this Permit as established by the authorizing resolution date, this Permit shall lapse.

7. OTHER PERMITS:
This Permit is not a building permit or a development variance permit. While development on the Lands is subject to the conditions and requirements set out in this Permit, the Permit does not authorize development or any construction. Despite issuance of this permit, construction may not start without a Building Permit, Tree Permit or other necessary permits or approvals. It is the owner's responsibility to determine whether such permits or approvals are required.

8. SCHEDULES:
Development of the site must be completed in substantial compliance with the attached drawings and documents:

Schedule A: Riparian Areas Regulation Assessment Report (March 2016)
Schedule B: Draft Subdivision Plan (Layout Sketch 19, March 23, 2016)
Schedule C: Tree Clearing Area (March 16, 2016)

AUTHORIZING RESOLUTION PASSED BY COUNCIL THIS ____ DAY OF _____, 2016.

RIPARIAN AREAS ASSESSMENT
DETAILED ASSESSMENT METHODOLOGY

Bella Terra Development
Sunnyside Road, Anmore, B.C.

Prepared for:
BELLA TERRA INVESTMENTS INC.

Prepared by:

AQUATERRA ENVIRONMENTAL LTD

Project No. 2008010 / 2014313

Originally Submitted January 2013
Updated December 2014
Updated September 2015
Finalized March 2016

FORM 1

Riparian Areas Regulation - Qualified Environmental Professional - Assessment Report

Riparian Areas Regulation: Assessment Report

Please refer to submission instructions and assessment report guidelines when completing this report.

Date: 2016-03-14

I. Primary QEP Information

First Name	Chris	Middle Name		
Last Name	Lee			
Designation	RPBio	Company	AquaTerra Environmental Ltd.	
Registration #	1711	Email	chris@aquaterra.ca	
Address	PO Box 18120			
City	Port Moody	Postal/Zip	V3H0A2	Phone # 604-765-2993
Prov/state	BC	Country	Canada	

II. Secondary QEP Information (use Form 2 for other QEPs)

First Name	Andrew	Middle Name		
Last Name	Booth			
Designation	RPBio / ISA Arborist	Company		
Registration #	2351 / PN 6580A	Email	andrewrbooth@hotmail.com	
Address	60 Morven Drive			
City	West Vancouver	Postal/Zip	V7S 1B2	Phone #
Prov/state	BC	Country	Canada	

III. Developer Information

Names	Tony Barone and Steve Bowie	Middle Name	
Companies	Bella Terra Investments Inc.		
Phone #	604-340-7468	Email	tbarone@telus.net
Address	1028 Ravenwood Drive		
City	Anmore	Postal/Zip	V3B 7M9
Prov/state	BC	Country	Canada

IV. Development Information

Development Type	> 6 Lot - Single Family Residential		
Area of Development (ha)	14.62	Riparian Length (m)	270 m (total for 2 reaches)
Lot Area (ha)	19.62	Nature of Development	new
Proposed Start Date	2016-03-15	Proposed End Date	2018-12-31

V. Location of Proposed Development

Street Address (or nearest town)	Sunnyside Road						
Local Government	Village of Anmore			City	Anmore		
Stream Name	Anmore Creek						
Legal Description (PID)	025-001-345			Region	2		
Stream/River Type	Creek			DFO Area	South Coast		
Watershed Code	900-052400-42700						
Latitude	49	19	11.6	Longitude	122	51	17.2

Completion of Database Information includes the Form 2 for the Additional QEPs, if needed. Insert that form immediately after this page.

Form 2 - Additional QEP Form

Riparian Areas Regulation - Qualified Environmental Professional - Assessment Report

Make duplicates of the complete form fields and paste below each other for additional QEPs

II. Additional QEP Information

First Name	Byron	Middle Name	
Last Name	Richardson		
Designation	P.Eng.	Company GeoPacific	
Registration #	24663	Email byron@geopacific.ca	
Address	1200 W. 73rd Avenue		
City	Vancouver	Postal V6P 6G5	Phone # 604-439-0922
Prov/state	BC	Country Canada	

Table of Contents for Assessment Report

Page Number

Section 1. Description of Fisheries Resources Values and a Description of the Development proposal

(Provide as a minimum: Species present, type of fish habitat present, description of current riparian vegetation condition, connectivity to downstream habitats, nature of development, specific activities proposed, timelines)

UPDATE DETAILS:
2013: ORIGINAL RAR SUBMISSION (INTERNAL). DEVELOPMENT LIMITED TO WESTERN HALF OF THE SITE.

2014 UPDATE: RAR UPDATED TO INCLUDE EASTERN PORTION OF THE SITE, WHICH WAS INCLUDED IN THE OVERALL DEVELOPMENT PLAN.

2015 UPDATE: RAR UPDATED TO REFLECT CHANGES IN LOT LAYOUTS AND REDUCED DENSITY. NO CHANGES TO SPEA OR MEASURES.

2016 UPDATE: SUBMITTED TO RARNS FOLLOWING 4th READING AND APPROVAL AS A COMPONENT OF THE DEVELOPMENT PERMIT.

BACKGROUND & DESCRIPTION OF THE PROPOSED PROJECT

The site is currently vegetated and undeveloped; however existing PVC pipes, which collect groundwater from upslope areas, discharge water into the creek near the southwest corner of the site and an old, overgrown access road including a bridge and degraded concrete, suggesting that some infrastructure had been historically constructed on-site. Additionally, the presence of large Western Redcedar stumps throughout the site are indicative of historical logging activities.

The developer (Bella Terra Investments Inc.) is currently proposing to sub-divide the site into twenty-seven lots comprised largely of 1/3 acre and 1/2 acre lots (ranging from 1349 m^2 to 2138 m^2), and a smaller (840 m^2 lot).

STREAM DESCRIPTION

Anmore Creek bisects the eastern portion of the site, then continues off-site to the south, traversing numerous off-site properties, before re-entering the site along the southwest corner and bisecting the southwestern portion of the site before continuing off-site to the west. Anmore Creek ultimately discharges into Buntzen Lake, to the north of the site.

At the site, the Anmore Creek channel is steeply incised in a ravine. Localized bank armouring has occurred on the western bank and at a clearspan bridge crossing at Eaglecrest Road. Anmore Creek conveys significant flows during sustained, heavy storm events; however, the localized rip-rap bank armouring and slope gradients are anticipated to limit lateral channel movement over time. In unarmoured portions of the channel (lower reach), the stream substrate composition is approximately 5% boulders, 60% cobble, 25% gravel, and 10% fines.

Within the eastern reach, Anmore Creek bisects the site within a localized ravine. The channel has a varying width but has capacity for periodic heavier flows. Localized erosion and bank

failures were observed along the left bank, and are generally attributed to uprooted trees resulting in re-directed flow. The stream substrate in the upper reach consists of 20% boulders, 60% cobble, 15% gravel, and 5% fines.

RIPARIAN VEGETATION

Within the riparian corridor, the tree layer is characterized as 'mature coniferous forest', being dominated by Western Redcedar (*Thuja plicata*) and Western Hemlock (*Tsuga heterophylla*). Minor amounts of Red Alder (*Alnus rubra*) and Douglas-fir (*Pseudotsuga menziesii*) were also observed. The shrub layer is well developed, consisting of Vine Maple (*Acer circinatum*), Hardhack (*Spiraea douglasii*), Salmonberry (*Rubus spectabilis*) and Devil's Club (*Oplopanax horridus*). In contrast, the herbaceous layer is generally absent, consisting primarily of Swordfern (*Polystichum munitum*) and Bracken Fern (*Pteridium aquilinum*). A significant amount of invasive Himalayan Blackberry was observed along the eastern side of the channel particularly within the southern portion of the site. The prevalence of Himalayan Blackberry (*Rubus armeniacus*) diminishes rapidly to the north as the tree canopy becomes increasingly dense. A local cluster of Japanese Knotweed (*Fallopia japonica*) was observed within Lots 2 and 3 near the western portion of the lots.

FISH PRESENCE

In the mid 1950s to the late 1970s, ponds were created by damming the creek. Those ponds were stocked with Cutthroat Trout (*Oncorhynchus clarkii clarkii*) and Rainbow Trout (*O. mykiss*) and these areas were intended to be used as a fish farm for recreational angling. These species still currently reside in the Anmore Creek system. Other species observed include Prickly Sculpin (*Cottus asper*), Threespine Stickleback (*Gasterosteus aculeatus*), and Western Brook Lamprey (*Lamptera richardsoni*).

2. Results of Detailed Riparian Assessment

Refer to Chapter 3 of Assessment Methodology

Date: 2016-03-14

Description of Water bodies involved (number, type): 1 - stream - Anmore Creek

Stream	X
Wetland	
Lake	
Ditch	
Number of reaches	2
Reach #	1

Channel width and slope and Channel Type (use only if water body is a stream or a ditch, and only provide widths if a ditch)

	Channel Width(m)	Gradient (%)
starting point	4.2	
upstream	4.8	
	4.3	4%
	4.8	
	5.3	
downstream	5.2	
	4.9	
	~~3.9~~	
	4.3	
	4.1	5.5%
	~~6.3~~	
Total: minus high /low	41.9	
mean	4.66	

	R/P	C/P	S/P
Channel Type		X	

I, Chris Lee *(name of qualified environmental professional)*, hereby certify that:
a) I am a qualified environmental professional, as defined in the Riparian Areas Regulation made under the *Fish Protection Act*;
b) I am qualified to carry out this part of the assessment of the development proposal made by the developer Bella Terra Investments Inc. *(name of developer)*;
c) I have carried out an assessment of the development proposal and my assessment is set out in this Assessment Report; and
d) In carrying out my assessment of the development proposal, I have followed the assessment methods set out in the Schedule to the Riparian Areas Regulation.

Site Potential Vegetation Type (SPVT)

	Yes	No
SPVT Polygons		X

Tick yes only if multiple polygons, if No then fill in one set of SPVT data boxes

I, Chris Lee *(name of qualified environmental professional)*, hereby certify that:
a) I am a qualified environmental professional, as defined in the Riparian Areas Regulation made under the *Fish Protection Act*;
b) I am qualified to carry out this part of the assessment of the development proposal made by the developer Bella Terra Investments Inc. *(name of developer)*;
c) I have carried out an assessment of the development proposal and my assessment is set out in this Assessment Report; and
d) In carrying out my assessment of the development proposal, I have followed the assessment methods set out in the Schedule to the Riparian Areas Regulation.

Polygon No: 1

	LC	SH	TR
SPVT Type			X

Method employed if other than TR

TR

Zone of Sensitivity (ZOS) and resultant SPEA

Segment No:	1	If two sides of a stream involved, each side is a separate segment. For all water bodies multiple segments occur where there are multiple SPVT polygons
LWD, Bank and Channel Stability ZOS (m)	10 m (minimum)	
Litter fall and insect drop ZOS (m)	14.0 m	

Shade ZOS (m) max	14.0 m	South bank	Yes		No	X

SPEA maximum **14.0 m**

I, Chris Lee *(name of qualified environmental professional)*, hereby certify that:

a) I am a qualified environmental professional, as defined in the Riparian Areas Regulation made under the *Fish Protection Act*;
b) I am qualified to carry out this part of the assessment of the development proposal made by the developer Bella Terra Investments Inc. *(name of developer)*;
c) I have carried out an assessment of the development proposal and my assessment is set out in this Assessment Report; and
d) In carrying out my assessment of the development proposal, I have followed the assessment methods set out in the Schedule to the Riparian Areas Regulation.

Comments

lower reach - western portion of site

2. *Results of Detailed Riparian Assessment*

Refer to Chapter 3 of Assessment Methodology

Date: 2016-03-14

Description of Water bodies involved (number, type): 1 - stream - Anmore Creek (Upper Reach)

Stream	X
Wetland	
Lake	
Ditch	
Number of reaches	2
Reach #	2

Channel width and slope and Channel Type (use only if water body is a stream or a ditch, and only provide widths if a ditch)

	Channel Width(m)	Gradient (%)
starting point	6.3	6.5%
upstream	5.8	
	10.2	
	~~4.9~~	
	7.1	
downstream	6.8	
	9.6	
	6.8	
	9.3	
	~~18.9~~	8%
	10.3	
Total: minus high /low	72.2	
mean	8.0	

	R/P	C/P	S/P
Channel Type			X

I, Chris Lee *(name of qualified environmental professional)*, hereby certify that:
a) I am a qualified environmental professional, as defined in the Riparian Areas Regulation made under the *Fish Protection Act*;
b) I am qualified to carry out this part of the assessment of the development proposal made by the developer Bella Terra Investments Inc. *(name of developer)*;
c) I have carried out an assessment of the development proposal and my assessment is set out in this Assessment Report; and
d) In carrying out my assessment of the development proposal, I have followed the assessment methods set out in the Schedule to the Riparian Areas Regulation.

Site Potential Vegetation Type (SPVT)

	Yes	No
SPVT Polygons		X

Tick yes only if multiple polygons, if No then fill in one set of SPVT data boxes

I, Chris Lee *(name of qualified environmental professional)*, hereby certify that:
a) I am a qualified environmental professional, as defined in the Riparian Areas Regulation made under the *Fish Protection Act*;
b) I am qualified to carry out this part of the assessment of the development proposal made by the developer Bella Terra Investments Inc. *(name of developer)*;
c) I have carried out an assessment of the development proposal and my assessment is set out in this Assessment Report; and
d) In carrying out my assessment of the development proposal, I have followed the assessment methods set out in the Schedule to the Riparian Areas Regulation.

Polygon No: 1

	LC	SH	TR
SPVT Type			X

Method employed if other than TR
TR

Zone of Sensitivity (ZOS) and resultant SPEA

Segment No:	1	If two sides of a stream involved, each side is a separate segment. For all water bodies multiple segments occur where there are multiple SPVT polygons
LWD, Bank and Channel Stability ZOS (m)	10 m (minimum)	
Litter fall and insect drop ZOS (m)	15.0 m (maximum)	

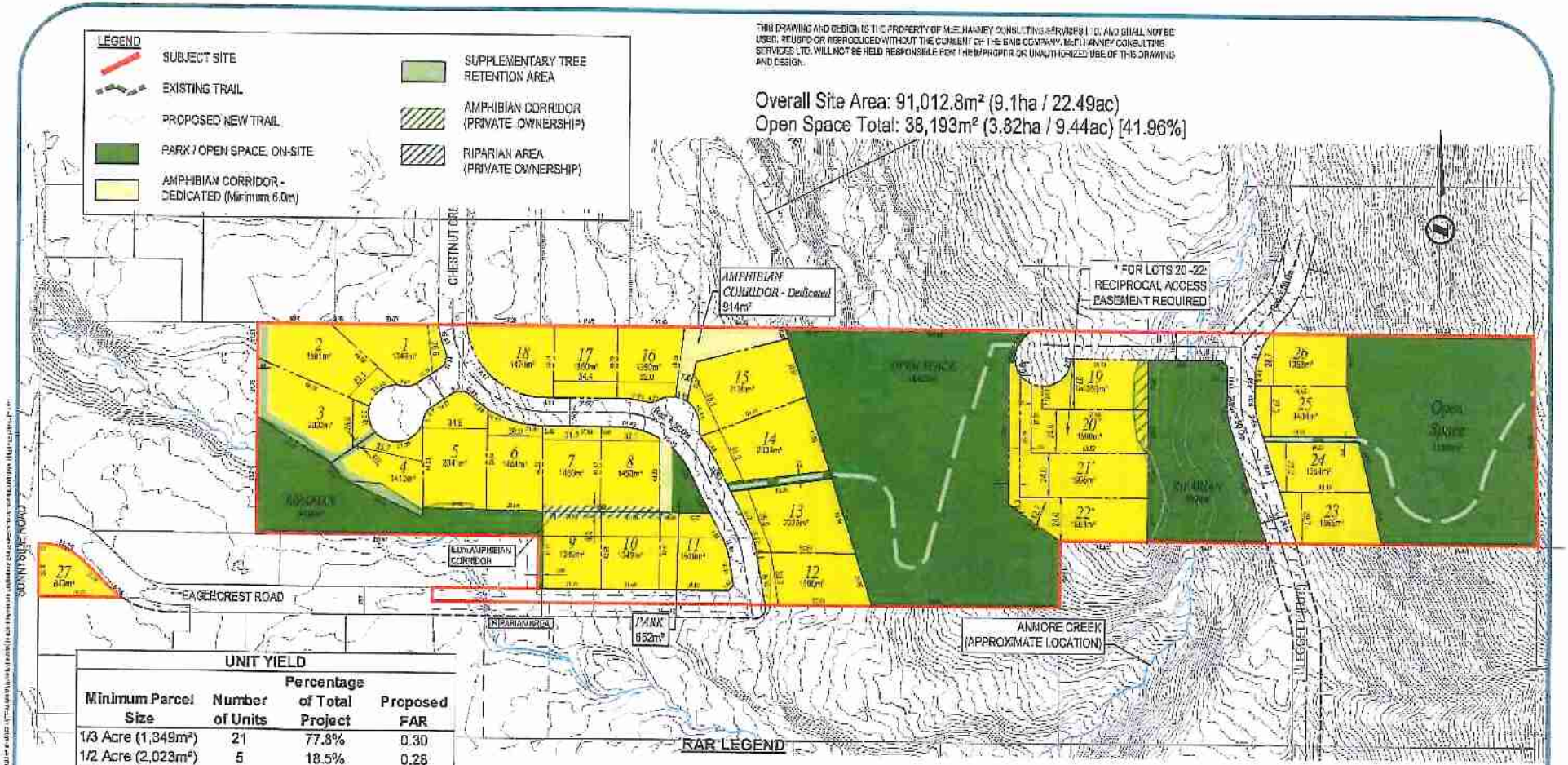
Shade ZOS (m) max	9.5 m	South bank	Yes		No	X

SPEA maximum 15.0 m

I, Chris Lee *(name of qualified environmental professional)*, hereby certify that:
a) I am a qualified environmental professional, as defined in the Riparian Areas Regulation made under the *Fish Protection Act*;
b) I am qualified to carry out this part of the assessment of the development proposal made by the developer Bella Terra Investments Inc. *(name of developer)*;
c) I have carried out an assessment of the development proposal and my assessment is set out in this Assessment Report; and
d) In carrying out my assessment of the development proposal, I have followed the assessment methods set out in the Schedule to the Riparian Areas Regulation.

Comments

Upper Reach - east portion of site. The SPEA has been adjusted to be situated near the top-of-bank to be protective of slope stability (geotechnical) issues and also to prevent encroachment over time (refer to attached RAR figure for details).



UNIT YIELD

Minimum Parcel Size	Number of Units	Percentage of Total Project	Proposed FAR
1/3 Acre (1,349m²)	21	77.8%	0.30
1/2 Acre (2,023m²)	5	18.5%	0.28
Smaller (840m²)	1	3.7%	0.32
Total	27		

RAR LEGEND

High Water Mark (HWM)

Shade Setback

Insect Fall / Litter Drop

Bank Stability / Woody Debris Setback

Streamside Protection and Enhancement Area (SPEA)

McElhanney AQUATERRA

DRAWING 1.3 - Development Concept

LAYOUT SKETCH #9

NOTES:
* THIS DRAWING IS FOR PRELIMINARY LAYOUT ONLY, AND SUBJECT TO MUNICIPAL APPROVAL.

Scale: 1:2000
Date: November 13, 2015
Job No.: 2111-03104-0

Section 4. Measures to Protect and Maintain the SPEA

This section is required for detailed assessments. Attach text or document files, as need, for each element discussed in chapter 1.1.3 of Assessment Methodology. It is suggested that documents be converted to PDF *before* inserting into the assessment report. Use your "return" button on your keyboard after each line. You must address and sign off each measure. If a specific measure is not being recommended a justification must be provided.

1. Danger Trees	***Western Reach of Anmore Creek*** Several standing dead snags have been added to the tree survey map (attached) and these should be topped at 5 m height for wildlife utilization. If tree fallers deem the snags unsafe to climb, they should be felled and the wood left within the SPEA to complex habitat. Additional trees within the SPEA recommended for removal/treatment are listed in the table below. The Ministry of Environment 1996 Tree Replacement Criteria for trees authorized for removal under the *Fisheries Act* was utilized to determine tree replacement types and numbers.

Table: Trees Recommended for Removal / Treatment within the SPEA

Tag	Species	DBH	Height (m)	Defects	Tree replacement
623	Western hemlock	31	32	Dead top at 12 m; breakage hazard. Top at 8 m.	4 trees of minimum height 2 m each. (2 western red cedar, and 2 red alder)
629	Western hemlock	20	32	Dead top; top at 8 m height.	3 trees of minimum height 1.5 m each. (2 western red cedar and 1 red alder).
630	Western hemlock	25	32	Poor condition.	3 trees of minimum height 1.5 m each. (3 red alder)
609	Western hemlock	40	13	Rot at 3 m height. Remove.	4 trees of minimum height 2 m each. (2 black cottonwood, 2 red alder)
536	Western hemlock	60	30	Co-dominant stem, one with rot in bole at 5 m height. Top at 5 m for wildlife utilization.	6 trees each greater than 2 m height. (6 western red cedar)
539	Western hemlock	40	20	Standing dead. Top at 5 m for wildlife	4 trees of minimum height 2 m each. (3 sitka spruce,

				utilization.	1 western red cedar)

Tree IDs are provided on the attached RAR figure.

It is recommended that replacement trees are planted in the stand openings between trees number 653 and 627/610 and 536 to 683. For planting, replacement trees should be spaced a minimum of 2 m from any natural conifer regeneration.

During tree removal, care should be taken to avoid damaging trees which are to be retained, and machinery use should be avoided. Though felled trees should be limbed, and the branches removed, felled stems can be left within the riparian zone as coarse woody debris.

Eastern Reach of Anmore Creek

Danger trees assessed within the eastern reach of Anmore Creek SPEA are summarized in the attached 2015 arborist report.

I, Andrew Booth *(name of qualified environmental professional)*, hereby certify that:

a) I am a qualified environmental professional, as defined in the Riparian Areas Regulation made under the *Fish Protection Act*;

b) I am qualified to carry out this part of the assessment of the development proposal made by the developer Bella Terra Investments Inc. *(name of developer)*;

c) I have carried out an assessment of the development proposal and my assessment is set out in this Assessment Report; and In carrying out my assessment of the development proposal, I have followed the assessment methods set out in the Schedule to the Riparian Areas Regulation

2. Windthrow	***Western Reach of Anmore Creek*** The forest within and adjacent to the lower, western reach of Anmore Creek is comprised of a second growth stand of 60% western hemlock (*Tsuga heterophylla*) and 40% western red cedar (*Thuja plicata*), which are generally tall and thin with low to moderate trunk taper. On average, rooting depth was estimated as moderate. Openings in the forest were dominated by shrub cover and regenerating conifers were common in the area. Most of the western hemlock was infected with dwarf mistle-toe, and an unidentified brown rot fungus was present in a number of standing dead trees near the midpoint of the SPEA. The presence of the pathogens in this local area likely indicates a natural occurring stand replacement event of the western hemlock. As natural thinning has progressed, the remaining trees have been exposed to greater wind forces, and some have adjusted by creating reaction wood and increased trunk taper. Topographically the site is located within a saddle and the new forest edge will be located within the lee of endemic eastward winds. New edge trees will need to adapt to their increased exposure to wind forces and this is expected to occur over a 4-5 year time frame. Seasonal storm winds as reported by local residents originate in the northwest and southeast parallel to the proposed SPEA boundary. Site windthrow hazard was rated as low for exposure, low for soils and moderate for stand dynamics. Overall the windthrow hazard rating was low-to-moderate.

	Tree protection fencing should be erected on the development side of the SPEA (can duplicate as SPEA fencing) to protect tree root systems. The distance of tree protection fencing from each tree stem on the boundary is listed in the table below. The existing treed boundary in the northwest section of the property (adjacent to the SPEA) has been recommended by the arborist (refer to attached figure) for retention with little modification as the boundary trees have grown adjusting to the exposure of the seasonal southeast originating winds. These trees were also situated on a slightly higher topographical elevation than those to the west. The forest behind the boundary trees were tall and thin with little trunk taper, and had shallow rooting in a seasonally wet area. These characteristics could make the forest at this location susceptible to windthrow from southeast originating winds if the boundary trees are removed. Depending on the extent of site clearing, this forest edge may be roughly perpendicular to seasonal southeast originating storms winds and thus could be exposed to higher wind forces after site clearing. Therefore, the retention of the existing boundary trees is important in protecting the forest behind. ***Eastern Reach of Anmore Creek*** Windthrow occurs due to the interaction of a number of factors such as stand characteristics, soil characteristics, topographical characteristics, meteorological conditions, and individual tree characteristics. The hazard rating for exposure of the site was rated as moderate based on prevailing wind directions and topographical features. Because the eastern portion of the site is at a higher elevation, exposure to endemic winds was increased from the lower sections reviewed in 2012. Likewise, being situated on the side of a geographical saddle parallel to seasonal storm winds also begets a rating of moderate exposure hazard. Soils onsite were deep with no impediment to root penetration and as such were rated with low hazard. The site hazard rating (combing exposure and soil in a hazard matrix) was ranked at moderate. When a new forest edge is opened to allow development, edge trees which have grown and adjusted to wind forces will be removed exposing some trees which lack the physical characteristics to withstand wind forces in their current condition. Based on the stand characteristics (tall

	and thin) stem breakage or overturning may occur. Because of this the stand hazard rating was ranked as high and the overall windthrow hazard (combining site hazard and stand hazard in a hazard matrix) was ranked as high

Table: Edge trees with required tree protection fencing distances (western reach).

Tag	Species	DBH (cm)	Ht. (m)	Defects	Tree Protection Fencing Distance from Stem
646	Western red cedar	17	13	Growing on 2m stump	2.0
645	Western hemlock	17	5	Small hemlock in clump	2.0
651	Western red cedar	53	33	Wind firm	5.0
652	Western hemlock	15	5	Small hemlock in clump	2.0
653	Western red cedar	65	33	Wind firm	5.0
627	Western hemlock	27	11	Small hemlock	2.5
628	Western red cedar	61	36	Dominant; co-dominant stem at 12 m. Healthy	5.0
618	Western red cedar	80	36	Dominant; healthy.	5.0
611	Western red cedar	50	30	Fire scarred; moderate taper.	5.0
615	Western hemlock	20	-	-	2.0
683	Western hemlock	45	34	Moderate taper; retain.	4.0
682	Western hemlock	34	34	Moderate taper; retain.	3.5
543	Western red cedar	31	25	Twist in stem; forked top.	3.0
548	Western red cedar	50	33	Low LCR.	5.0

Tree IDs are provided on the attached RAR 2012 figure.

I, Andrew Booth *(name of qualified environmental professional)*, hereby certify that:

a. I am a qualified environmental professional, as defined in the Riparian Areas Regulation made under the *Fish Protection Act*;

b. I am qualified to carry out this part of the assessment of the development proposal made by the developer Bella Terra Investments Inc. *(name of developer)*;

c. I have carried out an assessment of the development proposal and my assessment is set out in this Assessment Report; and in carrying out my assessment of the development proposal, I have followed the assessment methods set out in the Schedule to the Riparian Areas Regulation.

3. Slope Stability	The western portion of the proposed development will be situated well beyond the top of bank on gently sloped

	ground in a non-ravine scenario; therefore risk of slope stability is anticipated to be negligible. In April 2013, Geopacific completed a Landslide Assessment for the site, inclusive of the area east of the upper reach of Anmore Creek. The pre-development static analysis factor of safety was computed to be 2.96 while the post-development grades were expected to minimally impact the factor of safety under pre-development static conditions for the same critical section. The factor of safety under seismic conditions was determined to be 1.35. A safety factor of over 1.0 under seismic conditions (per the Legislated Landslide Assessments [LLA] methodology for proposed residential developments in BC) indicates that less than 15 cm of slope displacement is anticipated. The geotech memo was updated on 14 March 2016, noting that the building setback for steeper lots, namely Lots 19-20, should be a minimum of 8.5 m from the eastern property lines. The SPEA setback mirrors the 8.5 m line off of the rear yard lot lines for Lots 19-20, tapering at or below the watercourse SPEA (outside of the property boundaries) for lots 21 and 22 as illustrated on the attached RAR figure. Refer to Figure SK-1 of the geotechnical report for additional details.
I, Bryon Richardson, P.Eng. *(name of qualified environmental professional)*, hereby certify that: a. I am a qualified environmental professional, as defined in the Riparian Areas Regulation made under the *Fish Protection Act*; b. I am qualified to carry out this part of the assessment of the development proposal made by the developer Bella Terra Investments Inc. *(name of developer)*; c. I have carried out an assessment of the development proposal and my assessment is set out in this Assessment Report; and In carrying out my assessment of the development proposal, I have followed the assessment methods set out in the Schedule to the Riparian Areas Regulation	
4. Protection of Trees	Tree removal between April 1 and July 31 is only to occur after completion of a songbird nesting survey. Tree removal must comply with the Village of Anmore Tree Management By-law (No. 430-2007) and the amendments (No. 469-2009 and No. 478-2009). In order to protect those trees to be retained within the SPEA, a tree protection fence should be established in consultation with the project arborist. The fence may/may not precisely follow the SPEA boundary (contingent on drip-line / root-zone). Within the fenced area, no work should be undertaken except to remove invasive species by hand, mitigate tree hazards or conduct restoration work, if required. Measures that should be taken to protect the trees from construction activity include the following: • Excavation that takes place within 6 meters of the bole of any trees to be protected should be done carefully to ensure that roots are not ripped back toward the trees. As soon as roots that are greater than 5 cm in diameter are encountered, the remaining areas around the roots will be excavated with hand tools and the roots pruned off clean.

	• The excavation and construction activities adjacent to the SPEA can influence the moisture availability to the subject trees. Soil moisture conditions within the tree protection zones should be monitored during hot and dry weather. When soil moisture conditions are dry, supplemental irrigation should be provided. • If there are concerns regarding the clearance required for machinery and workers within the tree protection zone or just outside it, the project arborist should be consulted so that a pruning prescription can be developed or a zone surrounding the crowns can be established. All heavy machinery working adjacent to the trees (excavators, cranes, dump trucks, etc.) operating machinery within five (5) meters of the crowns of these trees should be made aware of the proximity of these trees to their activities. If there is to be a sustained period of machinery working within five meters of the crowns of these trees a line with colored flags should be suspended at the height of the crowns along the length of the protected trees.

I, Andrew Booth and Chris Lee *(name of qualified environmental professional)*, hereby certify that:

a. I am a qualified environmental professional, as defined in the Riparian Areas Regulation made under the *Fish Protection Act*;

b. I am qualified to carry out this part of the assessment of the development proposal made by the developer Bella Terra Investments Inc. *(name of developer)*;

c. I have carried out an assessment of the development proposal and my assessment is set out in this Assessment Report; and In carrying out my assessment of the development proposal, I have followed the assessment methods set out in the Schedule to the Riparian Areas Regulation

5. Encroachment	Encroachment into the SPEA will be prevented during construction via installation of temporary fencing (e.g., silt fencing / snow fencing and wooden posts / steel T-posts combination) prior to the onset of construction. The temporary fencing should be clearly labelled "Environmentally Sensitive Area. No intrusions or disruptions to vegetation within the SPEA are permitted." Silt fencing can also be used to protect the watercourse from erosion and sedimentation concerns (refer to Point #6 below for details). The fence should be erected along the eastern lot boundary / SPEA line and modified Following the completion of construction activities, the temporary fencing along the edge of the SPEA should be replaced with a fence or hedgerow that provides a clear visual barrier. Suitable options include a cedar hedgerow, split rail fence, chain link fence, picket fence, or similar. The SPEA within the eastern portion of the site has been relocated near the top-of-bank to be protective of slope stability concerns but also to prevent encroachment over time.

I, Chris Lee *(name of qualified environmental professional)*, hereby certify that:

a. I am a qualified environmental professional, as defined in the Riparian Areas Regulation made under the *Fish Protection Act*;

b. I am qualified to carry out this part of the assessment of the development proposal made by the developer Bella

Terra Investments Inc. *(name of developer)*; c. I have carried out an assessment of the development proposal and my assessment is set out in this Assessment Report; and in carrying out my assessment of the development proposal, I have followed the assessment methods set out in the Schedule to the Riparian Areas Regulation	
6. Sediment and Erosion Control	The Village of Anmore requires completion of site-specific Erosion and Sediment Control plans, which are to be reviewed, approved and implemented prior to the onset of construction works. AquaTerra has prepared numerous ESC plans for developments within the Village of Anmore and confirm that the developers for this project are amenable to obtaining an ESC Plan and having periodic monitoring conducted during construction.
I, Chris Lee *(name of qualified environmental professional)*, hereby certify that: a. I am a qualified environmental professional, as defined in the Riparian Areas Regulation made under the *Fish Protection Act*; b. I am qualified to carry out this part of the assessment of the development proposal made by the developer Bella Terra Investments Inc. *(name of developer)*, c. I have carried out an assessment of the development proposal and my assessment is set out in this Assessment Report; and in carrying out my assessment of the development proposal, I have followed the assessment methods set out in the Schedule to the Riparian Areas Regulation	
7. Stormwater Management	Development activities generally lead to an increase in the coverage of impermeable surfaces, which equates to an increase in stormwater run-off. In turn, increased stormwater run-off can increase the instantaneous flows within drainage courses, resulting in rapid increases in water levels and periodic, erosional issues, and localized flooding. Prior to the onset of construction, an Erosion and Sediment Control (ESC) plan will be developed (a Village of Anmore requirement) to address potential erosional and sedimentation issues during construction. Periodic monitoring is also required to ensure plan compliance. As part of the development planning process, a stormwater management plan should be considered to address stormwater issues arising from development of the site. The goal of stormwater management is to capture surface run-off from impervious surfaces and return it to natural hydrological pathways. Potential options for stormwater management: a. Constructing a rock-lined drain pit(s) or rock garden(s), which receives surface run off from the roof tops and impermeable areas. Resulting stormwater flow will be encouraged to infiltrate slowly into the ground using this method; b. Storage tanks to capture and slowly release water over time; c. Maximizing permeable ground area and using landscaped areas and permeable areas/pavers; d. Connecting roof rain leaders to perforated underground pipes, which will encourage the infiltration of stormwater; and/or e. Installing rain water collection cisterns or rain

	barrels to collect water flowing off the roof via rain leaders.
I, Chris Lee *(name of qualified environmental professional)*, hereby certify that: a. I am a qualified environmental professional, as defined in the Riparian Areas Regulation made under the *Fish Protection Act*; b. I am qualified to carry out this part of the assessment of the development proposal made by the developer Bella Terra Investments Inc. *(name of developer)*; c. I have carried out an assessment of the development proposal and my assessment is set out in this Assessment Report; and In carrying out my assessment of the development proposal, I have followed the assessment methods set out in the Schedule to the Riparian Areas Regulation	
8. Floodplain Concerns (highly mobile channel)	As noted in the previous section, the western reach of Anmore Creek is generally confined as a result of localized armoured (rip-rapped) sections and slope gradient. The flatter bench areas could be inundated during high flow events, but the setback area (14 m) and potential use of retaining walls along the SPEA boundary are anticipated to mitigate potential flooding issues. Similarly, within the eastern portion of the site, the site is situated a minimum of approximately 170 m Above Sea Level (ASL) and the reach of Anmore Creek is situated within a deeply incised ravine; therefore, floodplain concerns are not applicable.
I, Chris Lee *(name of qualified environmental professional)*, hereby certify that: a. I am a qualified environmental professional, as defined in the Riparian Areas Regulation made under the *Fish Protection Act*, b. I am qualified to carry out this part of the assessment of the development proposal made by the developer Bella Terra Investments Inc. *(name of developer)*; c. I have carried out an assessment of the development proposal and my assessment is set out in this Assessment Report; and In carrying out my assessment of the development proposal, I have followed the assessment methods set out in the Schedule to the Riparian Areas Regulation	

Section 5. Environmental Monitoring

Attach text or document files explaining the monitoring regimen Use your "return" button on your keyboard after each line. It is suggested that all document be converted to PDF *before* inserting into the PDF version of the assessment report.
Include actions required, monitoring schedule, communications plan, and requirement for a post development report.

Prior to the onset of construction, the Village of Anmore requires submission of an Erosion and Sediment Control (ESC) plan, and bird nesting survey results (if clearing is to occur between April 1 and July 31). Periodic ESC monitoring inspections are also required during construction to ensure that no issues relating to erosion and sedimentation are observed. It will be the responsibility of the proponent/developer to retain a Qualified Environmental Professional (QEP) to validate the SPEA areas and re-flag, as needed, prior to the onset of construction. At the onset of construction, ESC works, such as silt fencing, hay-bales, filter socks etc., will be utilized, as needed, to maintain water quality objectives.

Post-construction monitoring is also required per RAR to verify that SPEA functions and features of the creek are maintained. To achieve this requirement, site monitoring events will be summarized in a QEP Post-Development Report, serving to confirm compliance with the conditions set out in the Assessment Method guidelines. The Post-Development Report is to be submitted electronically in PDF format to the RAR Notification website. This requirement has been conveyed to the developer.

Photos

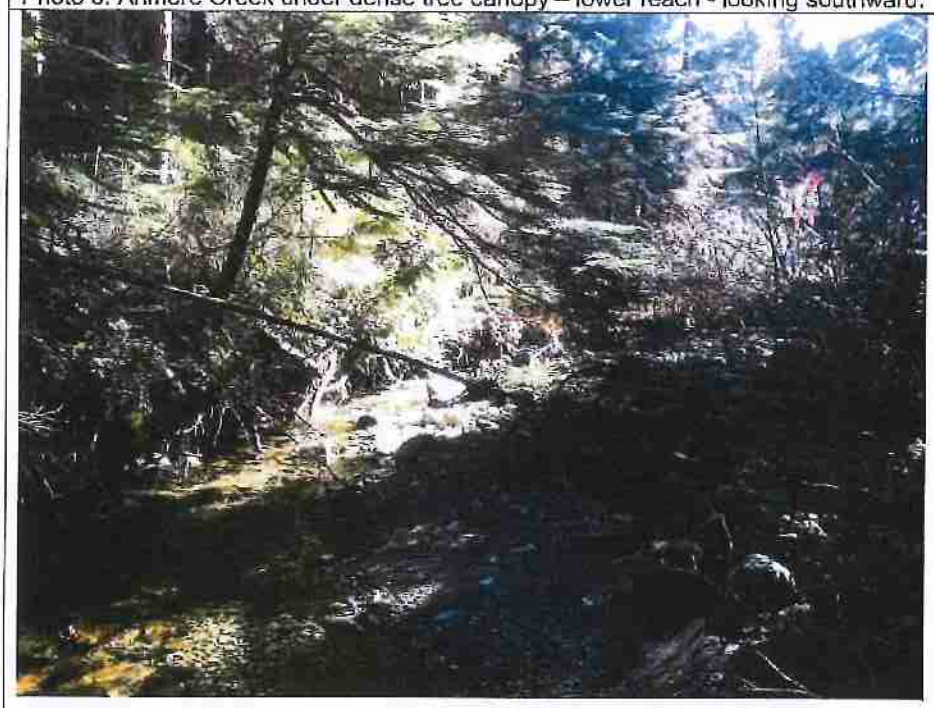
Label	Photo 1: Existing stormwater infrastructure – discharging from beneath old road into Anmore Creek – southwest corner of the site – lower reach.

Label	Photo 2: Anmore Creek looking northward in vicinity of existing clearspan bridge – lower reach.

Label	Photo 3: West (left) bank of Anmore Creek – lower reach - at southwest corner of the site.

Label	Photo 4: Looking downstream from centre of Anmore Creek at the site – lower reach.

Label | Photo 5: Anmore Creek under dense tree canopy – lower reach - looking southward.



Label | Photo 6: Typical Anmore Creek substrate - lower reach.

Photo 7: Anmore Creek – upper reach – near northern site boundary.

Photo 8: Typical Anmore Creek substrate - upper reach - middle of site.

Photo 9: Anmore Creek – upper reach – typical substrate.

Photo 10: Dense Shrub Growth - upper reach near southern site boundary.

Section 7. Professional Opinion

Assessment Report Professional Opinion on the Development Proposal's riparian area.

Date 2016-03-14

1. I/WeChris Lee, Andrew Booth and Bryon Richardson

Please list name(s) of qualified environmental professional(s) and their professional designation that are involved in assessment.)

hereby certify that:

a) I am/We are qualified environmental professional(s), as defined in the Riparian Areas Regulation made under the *Fish Protection Act*;
b) I am/We are qualified to carry out the assessment of the proposal made by the developer Bella Terra Investments Inc. *(name of developer)*, which proposal is described in section 3 of this Assessment Report (the "development proposal"),
c) I have/We have carried out an assessment of the development proposal and my/our assessment is set out in this Assessment Report; and
d) In carrying out my/our assessment of the development proposal, I have/We have followed the assessment methods set out in the Schedule to the Riparian Areas Regulation; AND

2. As qualified environmental professional(s), I/we hereby provide my/our professional opinion that:

a) [ ] if the development is implemented as proposed by the development proposal there will be no harmful alteration, disruption or destruction of natural features, functions and conditions that support fish life processes in the riparian assessment area in which the development is proposed, **OR**
(Note: include local government flex letter, DFO Letter of Advice, or description of how DFO local variance protocol is being addressed)

b) [X] if the streamside protection and enhancement areas identified in this Assessment Report are protected from the development proposed by the development proposal and the measures identified in this Assessment Report as necessary to protect the integrity of those areas from the effects of the development are implemented by the developer, there will be no harmful alteration, disruption or destruction of natural features, functions and conditions that support fish life processes in the riparian assessment area in which the development is proposed.

[NOTE: **"qualified environmental professional"** means an applied scientist or technologist, acting alone or together with another qualified environmental professional, if
(a) the individual is registered and in good standing in British Columbia with an appropriate professional organization constituted under an Act, acting under that association's code of ethics and subject to disciplinary action by that association,
(b) the individual's area of expertise is recognized in the assessment methods as one that is acceptable for the purpose of providing all or part of an assessment report in respect of that development proposal, and
(c) the individual is acting within that individual's area of expertise.]

2012 Stickleback Arborist Memo

Sept 19, 2012

Hazard Trees

Several standing dead snags have been added to the tree survey map and these should be topped at 5 m height for wildlife utilization. If tree fallers deem the snags unsafe to climb, they should be felled and the wood left within the SPEA to complex habitat. Additional trees within the SPEA recommended for removal/treatment are listed in the table below. The Ministry of Environment 1996 Tree Replacement Criteria for trees authorized for removal under the Fisheries Act was utilized to determine tree replacement types and numbers.

Table . Trees recommended for removal/treatment in the SPEA

Tag	Species	DBH	Height (m)	Defects	Tree replacement
623	Western hemlock	31	32	Dead top at 12 m; breakage hazard. Top at 8 m.	4 trees of minimum height 2 m each. (2 western red cedar, and 2 red alder)
629	Western hemlock	20	32	Dead top; top at 8 m height.	3 trees of minimum height 1.5 m each. (2 western red cedar and 1 red alder).
630	Western hemlock	25	32	Poor condition.	3 trees of minimum height 1.5 m each. (3 red alder)
609	Western hemlock	40	13	Rot at 3 m height. Remove.	4 trees of minimum height 2 m each. (2 black cottonwood, 2 red alder)
536	Western hemlock	60	30	Co-dominant stem, one with rot in bole at 5 m height. Top at 5 m for wildlife utilization.	6 trees each greater than 2 m height. (6 western red cedar)
539	Western hemlock	40	20	Standing dead. Top at 5 m for wildlife utilization.	4 trees of minimum height 2 m each. (3 sitka spruce, 1 western red cedar)

It is recommended that replacement trees are planted in the stand openings between trees number 653 and 627/610 and 536 to 683. For planting, replacement trees should be spaced a minimum of 2 m from any natural conifer regeneration.

During tree removal, care should be taken to avoid damaging trees which are to be retained, and machinery use should be avoided. Though felled trees should be limbed, and the branches removed, felled stems can be left within the riparian zone as coarse woody debris.

Windthrow Hazard

The forest was a second growth stand of 60% western hemlock (*Tsuga heterophylla*) and 40% western red cedar (*Thuja plicata*), generally tall and thin with low to moderate trunk taper. On average, rooting depth was estimated as moderate. Openings in the forest were dominated by shrub cover and regenerating conifers were common in the area. Most of the western hemlock was infected with dwarf mistle toe, and an unidentified brown rot fungus was present in a number of standing dead trees near the midpoint of the SPEA. The presence of the pathogens in this local area likely indicates a natural occurring stand replacement event of the western hemlock. As natural thinning has progressed, the remaining trees have been exposed to greater wind forces, and some have adjusted by creating reaction wood and increased trunk taper. Topographically the site is located within a saddle and the new forest edge will be located within the lee of endemic eastward winds. New edge trees will need to adapt to their increased exposure to wind forces and this is expected to occur over a 4-5 year time frame. Seasonal storm winds as reported by local residents originate in the northwest and southeast parallel to the proposed SPEA boundary. Site windthrow hazard was rated as low for exposure, low for soils and moderate for stand dynamics. Overall the windthrow hazard rating was low to moderate.

Tree protection fencing should be erected on the development side of the SPEA to protect tree root systems. The distance of tree protection fencing from each tree stem on the boundary is listed in the table below.

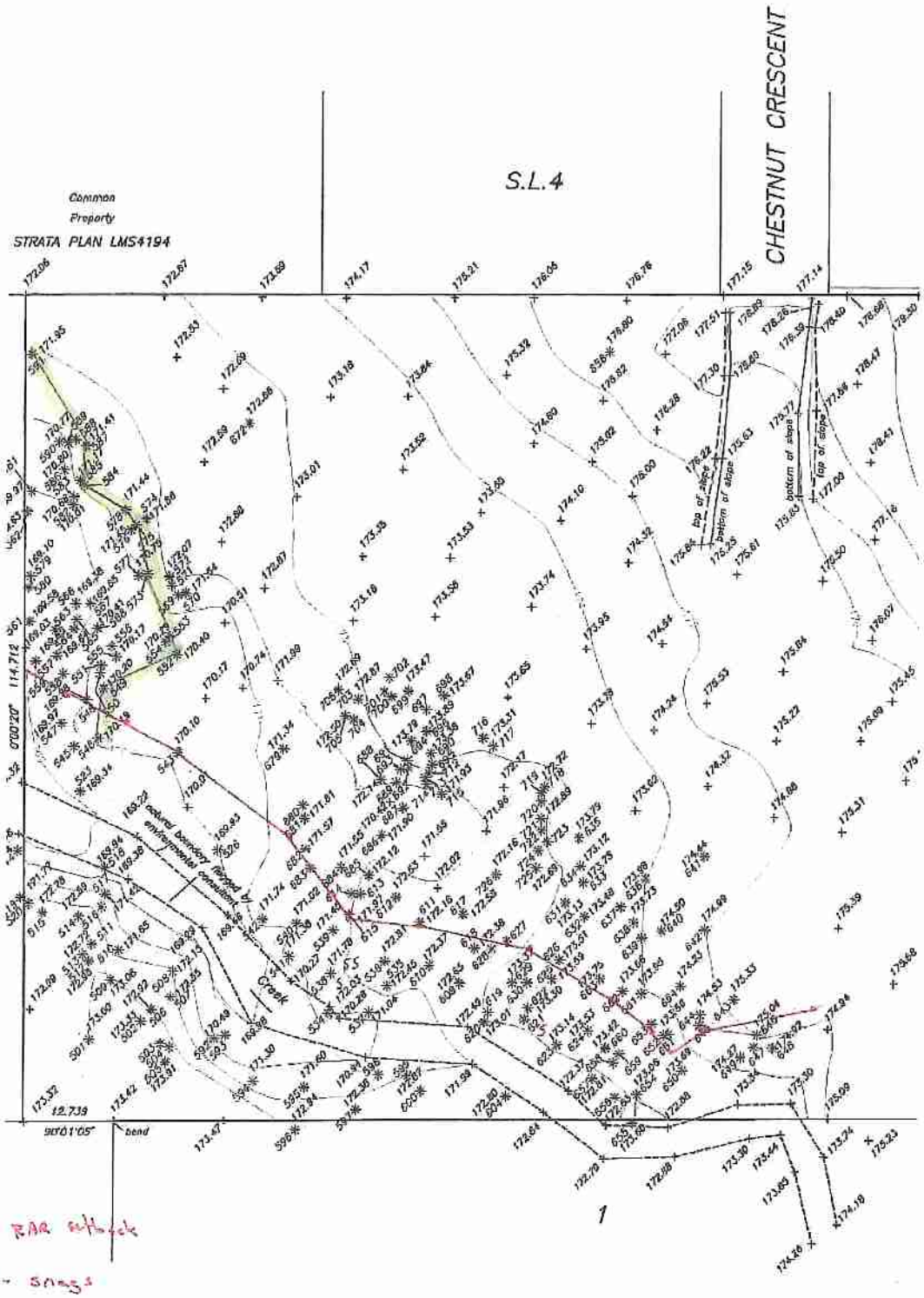
Table . Edge trees with required tree protection fencing distances.

Tag	Species	DBH (cm)	Ht. (m)	Defects	Tree Protection Fencing Distance from Stem
646	Western red cedar	17	13	Growing on 2m stump	2
645	Western hemlock	17	5	Small hemlock in clump	2
651	Western red cedar	53	33	Wind firm	5
652	Western hemlock	15	5	Small hemlock in clump	2
653	Western red cedar	65	33	Wind firm	5
627	Western hemlock	27	11	Small hemlock	2.7
628	Western red cedar	61	36	Dominant; co-dominant stem at 12 m. Healthy	5
618	Western red cedar	80	36	Dominant; healthy.	5
611	Western red cedar	50	30	Firescarred; moderate taper.	5
615	Western hemlock	20	-	-	2
683	Western hemlock	45	34	Moderate taper; retain.	4.5

682	Western hemlock	34	34	Moderate taper; retain.	3.4
543	Western red cedar	31	25	Twist in stem; forked top.	3.1
548	Western red cedar	50	33	Low LCR.	5

The existing treed boundary in the northwest section of the property (outside of the SPEA) was recommended for retention with little modification as the boundary trees have grown adjusting to the exposure of the seasonal southeast originating winds. These trees were also situated on a slightly higher topographical elevation than those to the west. The forest behind the boundary trees were tall and thin with little trunk taper, and had shallow rooting in a seasonally wet area. These characteristics could make the forest at this location susceptible to windthrow from southeast originating winds if the boundary trees are removed. Depending on the extent of site clearing, this forest edge may be roughly perpendicular to seasonal southeast originating storms winds and thus could be exposed to higher wind forces after site clearing. Therefore, the retention of the existing boundary trees is important in protecting the forest behind.

It is never possible to completely eliminate all risks associated with trees Consequently, while findings and conclusions documented in this report have been prepared in a manner consistent with that level of care and skill normally exercised by other members of the arborist profession practicing under similar circumstances in the area at the time of the performance of the work, this report is not intended nor is it able to provide a totally comprehensive review of past, present, or future tree and forest conditions. Approval and implementation of recommendations within this report are the responsibility of the owner of the trees and in no way implies any inspection or supervisory role on the part of Andrew Booth unless agreed upon in writing by both parties.



– RAR setback

S – snags

– recommended limit for boundary

STICKLEBACK ENVIRONMENTAL

CHESTNUT CRESCENT EAST WATERCOURSE RAR ARBORIST REPORT, ANMORE, B.C

PREPARED BY: STICKLEBACK ENVIRONMENTAL FEBRUARY 2015

1.0 Introduction

Stickleback Environmental was retained by AquaTerra Inc. to provide the arborist component of the Riparian Areas Regulation assessment for the east watercourse of the property designated as Lot 2 Section 20, Township 39, New Westminster District, Plan LMP49409 (Chestnut Crescent) in Anmore BC. The objective of the assessment was to comment on the health and wind resistance of trees within the riparian assessment area. An assessment of the watercourse in the western portion of the property was conducted in 2012.

2.0 Methodology

On January 3, 4, and 27, 2015 the project area was traversed on foot and trees in the property boundary were tagged and visually assessed for defects. Approximate tree height, diameter at breast height (DBH), general condition and defects were recorded. At the time of the site review weather conditions were overcast with rain.

3.0 Findings

The riparian assessment area was bounded to the north, west, and east by forest of similar characteristics to the site and to the south by a regenerating forest after harvest. Some clearing to the northwest had occurred previously for home construction. The watercourse flowed in a north to south direction through the eastern portion of the property contained between steep banks on both sides of the creek.

Stand Characteristics

The riparian forest consisted of a second growth forest dominated by veteran Douglas fir (*Pseudotsuga menziesii*) with a subdominant canopy consisting of 75% Douglas-fir, 15% western hemlock (*Tsuga heterophylla*), and 5% western red cedar (*Thuja plicata*) with minor components of red alder (*Alnus rubra*). The shrub understory consisted of a thick mat of salal (*Gaultheria shallon*) covering 60% of the riparian zone, with lesser amounts of sword fern (*Polystichum munitum*) and huckleberry (*Vaccinium parvifolium*). The site was logged at the turn of the century as implied by several decaying stumps observed with notches for spring boards cut into the wood and the forest age was estimated at 90 to 120 years old. Fire had also been part of the sites evolution as evidenced by burn marks on some of the old cedar stumps. Though the veteran trees which have expressed dominance and are taller than the subdominant canopy have grown such that they are exposed to prevailing winds and are likely wind firm, the subdominant canopy is tall and thin as the trees grew in competition for sunlight. The trees of the subdominant canopy are reliant on the proximity of each other to dampen and dissipate wind forces via branch and stem clash, and though are stable as a group, lack the individual physical characteristics to be wind firm as individuals. From soil test pits dug at the site, the rooting medium consisted of a greyish brown gravelly sandy soil with less than 15% coarse particles with good drainage and no observed impediment to root penetration to a depth of 0.8 m. Root anchorage potential was considered good. In the riparian assessment area on the west bank several small openings were developing created by the death of suppressed western hemlock by an unidentified root pathogen. During the site review several hazard trees were identified and these are listed in Table 1.

Prevailing Wind Directions

Meteorological data on endemic wind direction from the Environment Canada Vancouver International Airport weather station was reviewed. From 1971-2000 the most frequent direction of maximum hourly wind speeds were in an eastward direction for each month (Table 2).

Table 2. Most Frequent Direction of Winds and Maximum Hourly Speeds from 1971-2000.

Month	Most Frequent Wind Direction	Maximum Hourly Wind Speed (km/hr)
January	East	69
February	East	89
March	East	77
April	East	72
May	East	61
June	East	52
July	East	48
August	East	50
September	East	64
October	East	76
November	East	89
December	East	82

Though endemic winds are eastward, the most damaging storm winds in BC generally blow in a southeast or northwest direction[1]. This direction concurs with the direction of seasonal storm winds as accounted for by local residents. No windthrow was observed in the stand at the time of the site review.

Topography

Topographically the site was located mid-slope on the southwest of Eagle Mountain at approximately 255 m of elevation. This area is at the opening of a geographical saddle entrained to the west by the mountainous area west of Buntzen Lake.

4.0 Windthrow Synopsis

Windthrow occurs due to the interaction of a number of factors such as stand characteristics, soil characteristics, topographical characteristics, meteorological conditions, and individual tree characteristics.

The hazard rating for exposure of the site was rated as moderate based on prevailing wind directions and topographical features. Because the eastern portion of the site is at a higher elevation, exposure to endemic winds was increased from the lower sections reviewed in 2012. Likewise, being situated

[1] 1994 BC Ministry of Forests Publication *Windthrow Handbook for British Columbia Forests.*

on the side of a geographical saddle parallel to seasonal storm winds also begets a rating of moderate exposure hazard. Soils onsite were deep with no impediment to root penetration and as such were rated with low hazard. The site hazard rating (combing exposure and soil in a hazard matrix) was ranked at moderate.

When a new forest edge is opened to allow development, edge trees which have grown and adjusted to wind forces will be removed exposing some trees which lack the physical characteristics to withstand wind forces in their current condition. Based on the stand characteristics (tall and thin) stem breakage or overturning may occur. Because of this the stand hazard rating was ranked as high and the overall windthrow hazard (combining site hazard and stand hazard in a hazard matrix) was ranked as high.

5.0 Treatment Recommendations

It is recommended that veteran trees and copses outside of the Stream Protection and Enhancement Area are selectively retained as anchors to protect the forest behind. In addition, feathering of the boundary should be undertaken to remove trees which area at a higher risk of wind damage due to their physical characteristics. At the time this report was written, the specifics of the prescription for the site were still under development; however, treatments when prescribed will be presented in an attempt to reduce the potential for endemic windthrow on the remaining forest following development but will not eliminate the risk of windthrow. A risk of tree failure will remain regardless of treatment and Stickleback Environmental accepts no responsibility for any damages that may be incurred to the development from future tree failure. Catastrophic windthrow, associated with extreme storm events may occur in any stand. Any trees identified for preservation, will be given this recommendation on a preliminary basis and will be based on the condition of the tree at the time of the site review. Final recommendations shall be based on clearing, grading, targets, and construction details. Treatments and root protection zones will be listed in a subsequent report.

6.0 Tree Protection

Tree protection should be erected around retained trees to protect the critical root zones of retained trees during construction. Tree protection should be installed prior to construction and maintained throughout construction. No excavation, grade alterations or materials storage should occur within the tree protection zones.

7.0 Disclaimer

This Arboricultural field review is based on site observations on the dates noted. It is never possible to completely eliminate all risk associated with trees, and high to medium risk trees may develop rapidly during adverse conditions. Consequently, while findings and conclusions documented in this report have been prepared in a manner consistent with that level of care and skill normally exercised by other members of the arborist profession practicing under similar circumstances in the area at the time of the performance of the work, this report is not intended nor is it able to provide a totally comprehensive review of past, present or future tree conditions. The findings and opinions expressed in this report are representative of the conditions found on the day of the review only. Tree conditions may deteriorate rapidly and the condition of trees assessed in this report may change over time. Any trees retained should be reviewed on a regular basis. The root crowns and overall structure of all of the trees to be retained must be reviewed immediately following land clearing, grade disturbance, significant weather events and prior to site usage changes. Approval and implementation of recommendations within this report are the responsibility of the owner of the trees and in no way implies any inspection or supervisory role on the part of Stickleback Environmental unless agreed upon in writing by both parties. Development of the site is at the risk of the owner.

We trust this is sufficient for your needs. If you have any questions or require clarification of the materials presented in this report please contact Stickleback Environmental at 778-896-9046.

Sincerely,

Andrew Booth, BSc, RPBio, QEP,
ISA Certified Arborist (PN6580-A), CTRA (537)

Table 1: Identified Hazard Trees

Tag	Species	DBH (cm)	Height (m)	LCR (%)	Health	Observations	Recommendations/tree protection zone radii
834	*Hw*	30	31		G	Suppressed; unreasonable breakage potential.	*Top at 5 m*
940	*Fd*	28	30	20	P	Mistletoe on stem. Needle loss in canopy; unreasonable breakage potential..	*Top at 5 m*
883	*Cw*	54	29	-	D	Standing dead	*Top at 5 m*
801	*Fd*	15	30	30	P	Tall and thin; unreasonable breakage potential..	*Top at 5 m*
809	*Dr*	-	-		D	Standing dead.	*Top at 5 m*
985	*Fd*	27	26	30	G	Tall and thin; unreasonable breakage potential.	*Top at 5 m*
835	*Fd*	29	26	45	G	Tall and thin; unreasonable breakage potential.	*Top at 5 m*
946	*Fd*	38	40	-	-	unreasonable breakage potential.	*Top at 5 m*
881	*Cw*	-	7	-	D	Large diameter snag.	*Reassess target. Top at 5 m*
903	*Fd*	34	36	30	F	Tall and thin. Spongy bark. Lions tail top.	*Top at 5 m*
865	*Fd*	26	27	50	F	Poor form. Tall and thin.	*Top at 5 m*
821	*Dr*	45	29	-	-	Cavity at 5 m.	*Reassess target. Top at 5 m*
943	*Dr*	35	25	-	P	Lean to South West (11%). Fungal agent present.	*Top at 5 m*
1367	*Dr*	25	36		-	Cavity at base. Phototrophic lean. unreasonable breakage potential.	*Top at 5 m*
928	*Dr*	-	10	-	D	Rotten with lean.	*Top at 5 m*
7	*Fd*	37	35	-	F	Tall and thin; unreasonable breakage potential. Dwarf mistle-toe infection.	*Top at 5 m*
15	*Dr*	-	26	-	P	Rotten with 150 lean.	*Remove*
77	-	-	27	-	D	Standing dead	*Top at 5m*
1002	-	54	25	-	D	Standing dead.	*Top at 5m*

Tag	Species	DBH (cm)	Height (m)	LCR (%)	Health	Observations	Recommendations/tree protection zone radii
61	*Hw*	32	11	-	D	Standing dead.	*Remove*

* Fd -Douglas-fir; Cw-western red cedar; Hw-western hemlock; Dr-red alder

**G-good; F-fair; P-poor; D-dead

GEOPACIFIC
VANCOUVER KAMLOOPS CALGARY

P (604) 439 0922
F (604) 439 9189
www.geopacific.ca
#215-1200 West 73rd Ave.
Vancouver, B.C. Canada V6P 6G5

Bella Terra Investments Inc.
1028 Ravenswood Drive
Anmore, B.C.
V6Z 2K5

March 15, 2016
File:11216

Attention: Tony Barone

Re: Slope Stability Assessment - Proposed Residential Development
Lot 2, Sec 20, IWP 39, NWD LMP49409 , Anmore, B.C.

We understand the you require confirmation that the proposed development grades are acceptable under static and seismic loading based on the 2012 BC Building Code (BCBC) design earthquake. We have undertaken a review of the revised site lot layout plan and survey prepared by McElhanney Consulting Services Ltd., dated November 13, 2015.

The proposed grading includes residential buildings and roads constructed at or near the existing grades of the site. The overall land for development consists of 22.49 Acres located east of Sunnyside Road and south of Alpine Drive, Anmore, BC. The proposed residential subdivision is to include 27 lots having setbacks from creeks and waterways as per the municipal and environmental standards in addition to the recommended geotechnical allowances.

Our slope stability analysis was undertaken in accordance with Revision 7 of the 2012 BCBC, which became effective February 1, 2010. Revision 7 was addressed using the "Guidelines for Legislated Landslide Assessments for Proposed Residential Developments in BC" (Revised May 2010). A critical cross-section was established through the eastern end of the overall site through Lot 25 where the gradient is the steepest and can be used as representative for all of the other lots. The location of our critical cross section can be found on the McElhanney Consulting Services Ltd. drawing attached following the text of this letter.

Our slope stability analysis indicates that the post-development grades are acceptable under static and seismic conditions, as required by the 2012 BCBC. The results of our slope stability analysis are provided in Appendix A of this letter. The Lots 19 to 22 are located at roughly the peak of a hill with steep down slopes to the east where Anmore Creek gully is located, moderate down slopes to the west and minor slopes to the south. It is recommended that the building offset from the eastern property lines of these four lots to maintain slope stability based on allowable geotechnical parameters is a minimum of 8.5 metres. For the purpose of establishing the Streamside Protection & Enhancement Area (SPEA) setback the recommended geotechnical setback line is indicated on the attached sketch SK-1. Coupled with the recommended building setback line and SPEA/ 'geotechnical setback' line for Lots 19 to 22, the described area within these lots represents rear yard and/or covenant protected riparian area.

We confirm that the property may be used safely for the use intended as defined in Section 86 (1) d of the Land Title Act provided that any and all recommendations provided by Geopacific Consultants Ltd. during the planning and construction phases of the project are incorporated into the various designs. Our confirmation of the safe intended use of the property is null and void in the event that any third parties undertake any geotechnical related works or actions on the development property which are not reviewed and approved by GeoPacific Consultants Ltd. We also accept no responsibility for future actions or works on

neighbouring properties which impact the development property.

If you would like further details or would like clarification of any of the above, please do not hesitate to call.

For:
GeoPacific Consultants L

MAR 15 2016

Bryon Richardson, B.A.Sc., P.Eng.
Senior Project Engineer

Reviewed by:

Matt Kokan, M.A.Sc., P. Eng.
Principal

APPENDIX A – SLOPE STABILITY ASSESSMENT

We have undertaken a seismic slope stability assessment of the pre-development with results acceptable to the post-development grades based on the 2012 BC Building Code. The 2012 BCBC requires slopes to be analysed under a design earthquake equivalent to a 2 percent in 50 year probability of exceedance. Our assessment is based on the critical cross-section 'A', as sketched on the McElhanney Consulting Services Ltd. site plan attached.

GeoPacific undertook a seismic assessment of the critical slopes based on the recommendations outlined in the Association of Professional Engineers & GeoScientists (APEGBC) "Guidelines for Legislated Landslide Assessments (LLA) for Proposed Residential Developments in BC", revised in May 2010. The Guidelines propose a displacement based method for seismic slope assessments as the relatively high peak ground accelerations associated with the 2012 BC Building Code design earthquake typically result in low factors of safety for conventional pseudo-static limit equilibrium slope stability assessments. The displacement method employed was developed by Bray to estimate the seismic coefficient, k_{15}, compatible with a slope displacement of 15 centimetres. The Bray equation for calculating the seismic coefficient is as follows:

$$k_{15} = (0.006 + 0.038\ M) * S(0.5) - 0.026$$

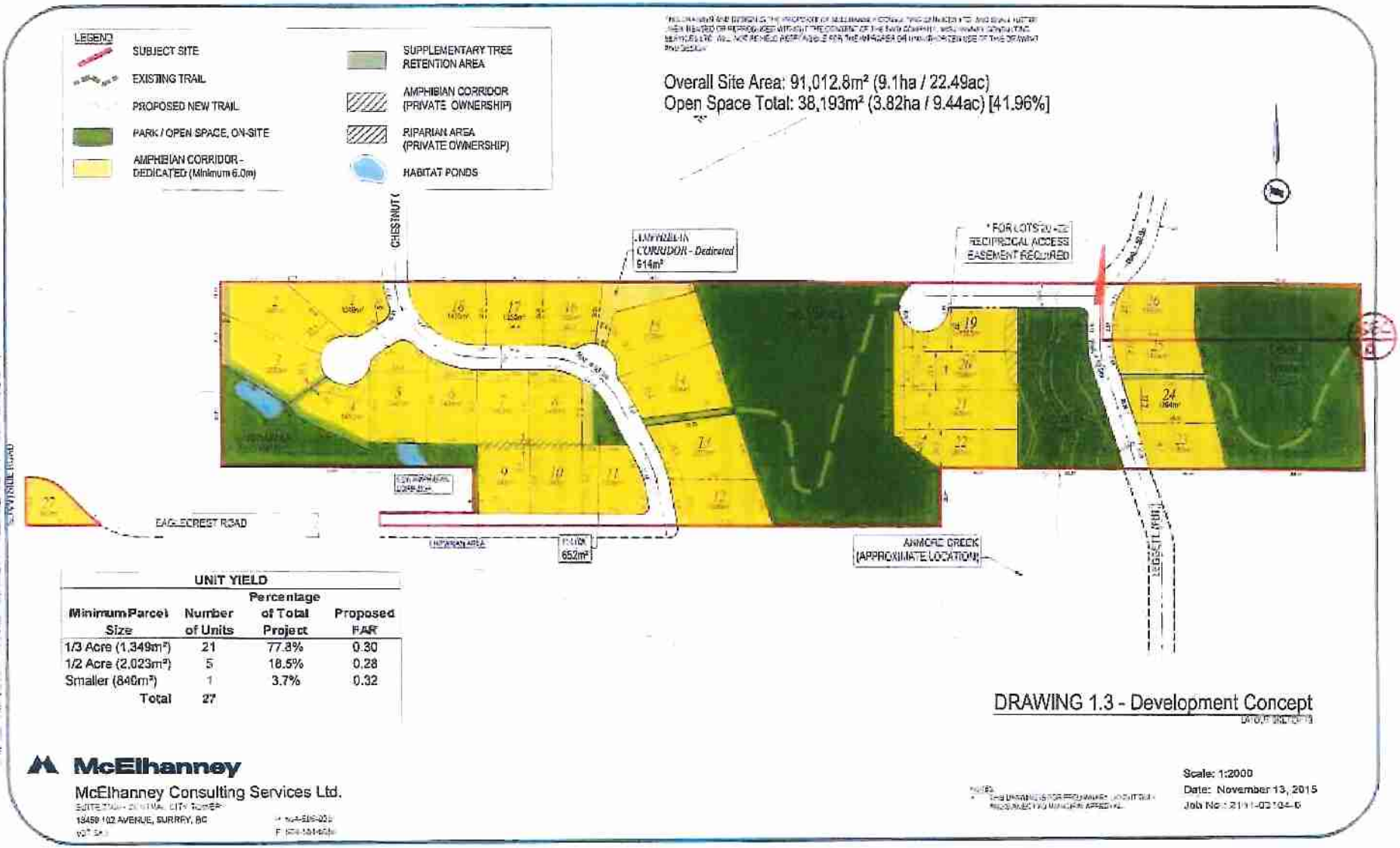
k_{15} = Seismic coefficient
M = Moment magnitude of the design earthquake
S(0.5) = 2012 BCBC spectral design acceleration (2% in 50 years) at a natural period of 0.5 seconds

The seismic coefficient, k_{15}, of 0.151 was employed in our pseudo-static slope stability analysis as an input for horizontal acceleration.

The pre-development static analysis factor of safety at the critical Section A was computed to be 2.96. The post-development grades are expected to minimally impact the factor of safety under pre-development static conditions for the same critical section. The factor of safety under seismic conditions was determined to be 1.35.

In accordance with the LLA, a factor of safety equal to or greater than 1.0 under seismic conditions indicates that less than 15 cm of slope displacement is anticipated.

The Task Force on Seismic Slope Stability (TFSSS) suggests that a slope displacement of 15 cm or less is tolerable using the above method. Thus, under on the current 2012 BCBC design earthquake, the calculated slope displacement is tolerable for the proposed post-development grades.



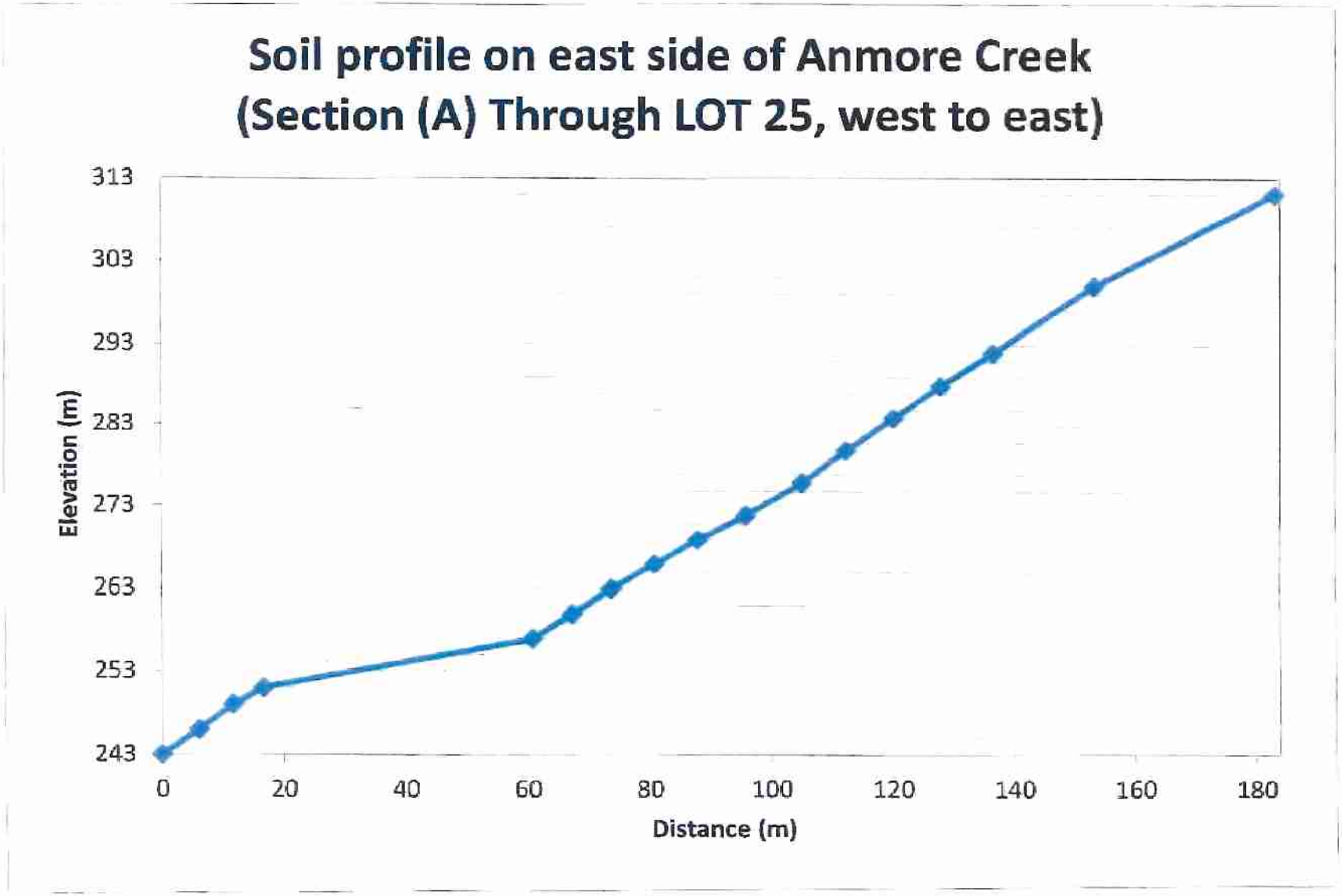
UNIT YIELD

Minimum Parcel Size	Number of Units	Percentage of Total Project	Proposed FAR
1/3 Acre (1,349m²)	21	77.8%	0.30
1/2 Acre (2,023m²)	5	18.5%	0.28
Smaller (840m²)	1	3.7%	0.32
Total	27		

DRAWING 1.3 - Development Concept

McElhanney
McElhanney Consulting Services Ltd.
13450 102 AVENUE, SURREY, BC

Scale: 1:2000
Date: November 13, 2015
Job No.: 2111-02104-0


Soil profile on east side of Anmore Creek
(Section (A) Through LOT 25, west to east)
313
303
293
283
273
263
253
243
Elevation (m)
0
20
40
60
80
100
120
140
160
180
Distance (m)

Distance increment (m)	Height increment (m)	Vertical/horizontal	X (m)	Y (m)
	0		0	243
6.07	3	0.494233937	6.07	246
5.61	3	0.534759358	11.68	249
5.02	2	0.398406375	16.7	251
44.09	6	0.13608528	60.79	257
6.59	3	0.455235205	67.38	260
6.39	3	0.469483568	73.77	263
7.13	3	0.420757363	80.9	266
7.12	3	0.421348315	88.02	269
7.93	3	0.378310214	95.95	272
9.27	4	0.431499461	105.22	276
7.24	4	0.552486188	112.46	280
7.83	4	0.510855683	120.29	284
7.76	4	0.515463918	128.05	288
8.64	4	0.462962963	136.69	292
16.66	8	0.480192077	153.35	300
29.83	11	0.368756286	183.18	311

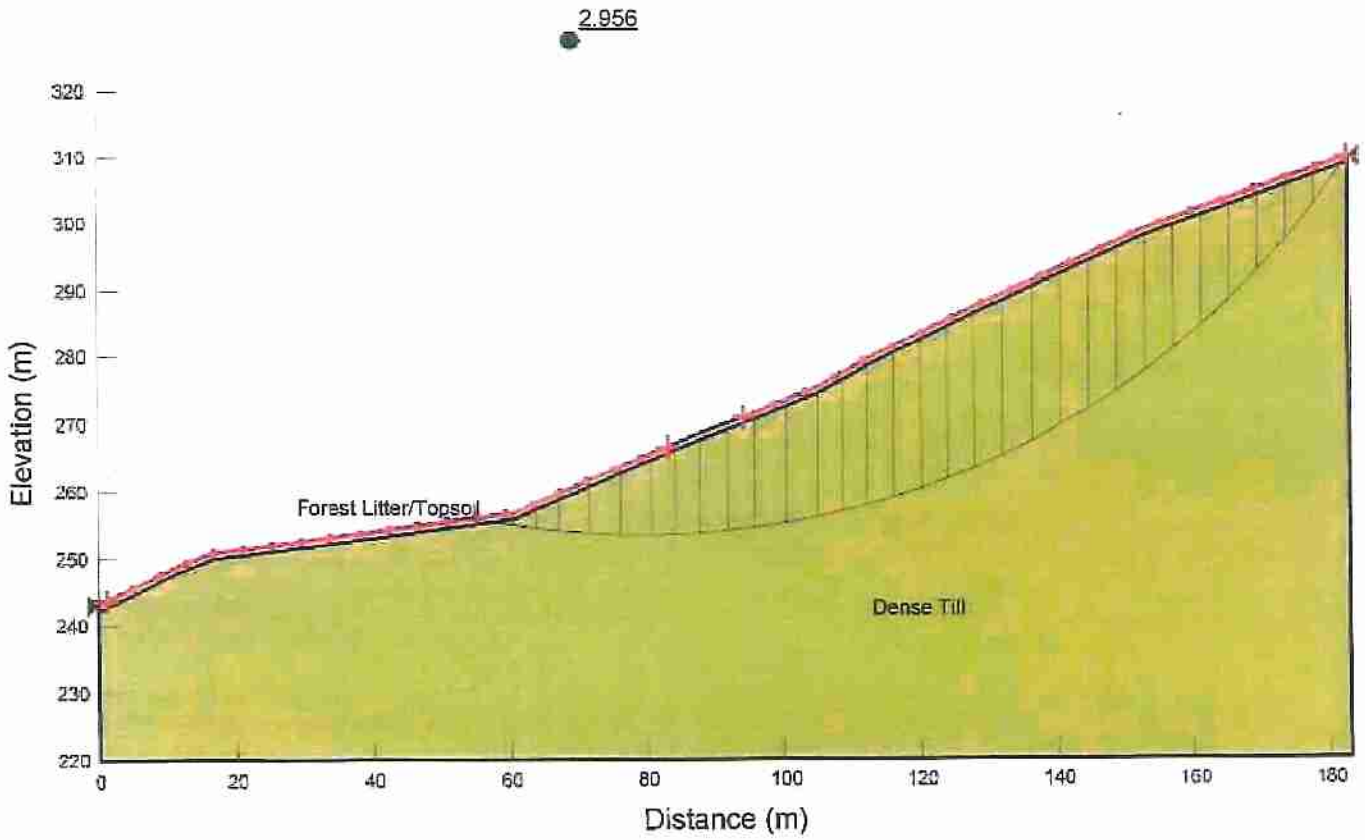
GeoPacific Consultants Ltd.
#215 - 1200 W 73rd Avenue
Vancouver, B.C. V6P 6G5

File: 11216
Project: Residential Subdivision
Site Address: Sunnyside Road, Anmore

Section A - Static Analysis
Pre-development Condition

Soil Parameters

Name	Unit Weight (kN/cu.m.)	Friction Angle (deg.)	Cohesion (kPa)
Forest Litter/Topsoil	12	29	0
Dense Till	21	38	100



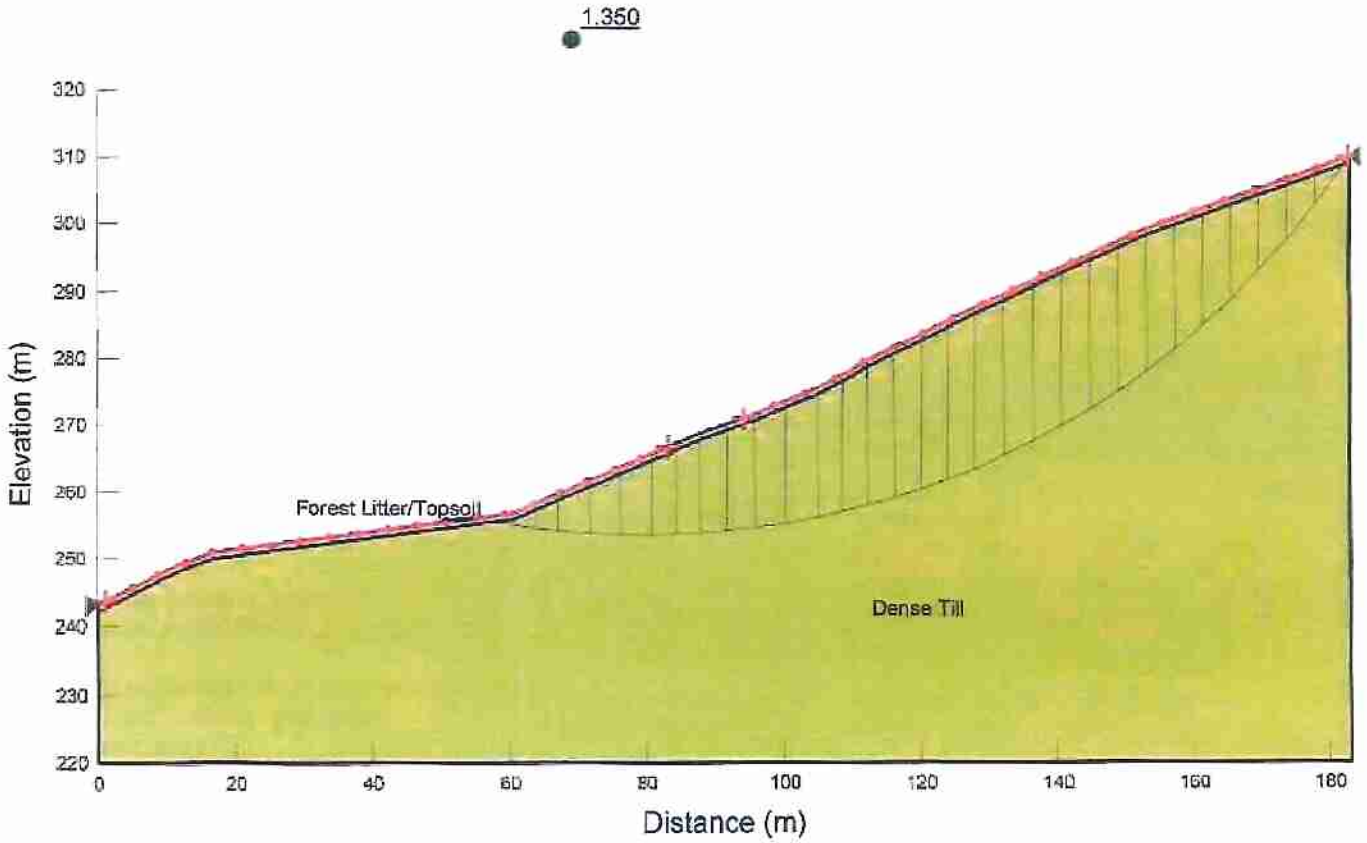
GeoPacific Consultants Ltd.
#215 - 1200 W 73rd Avenue
Vancouver, B.C. V6P 6G5

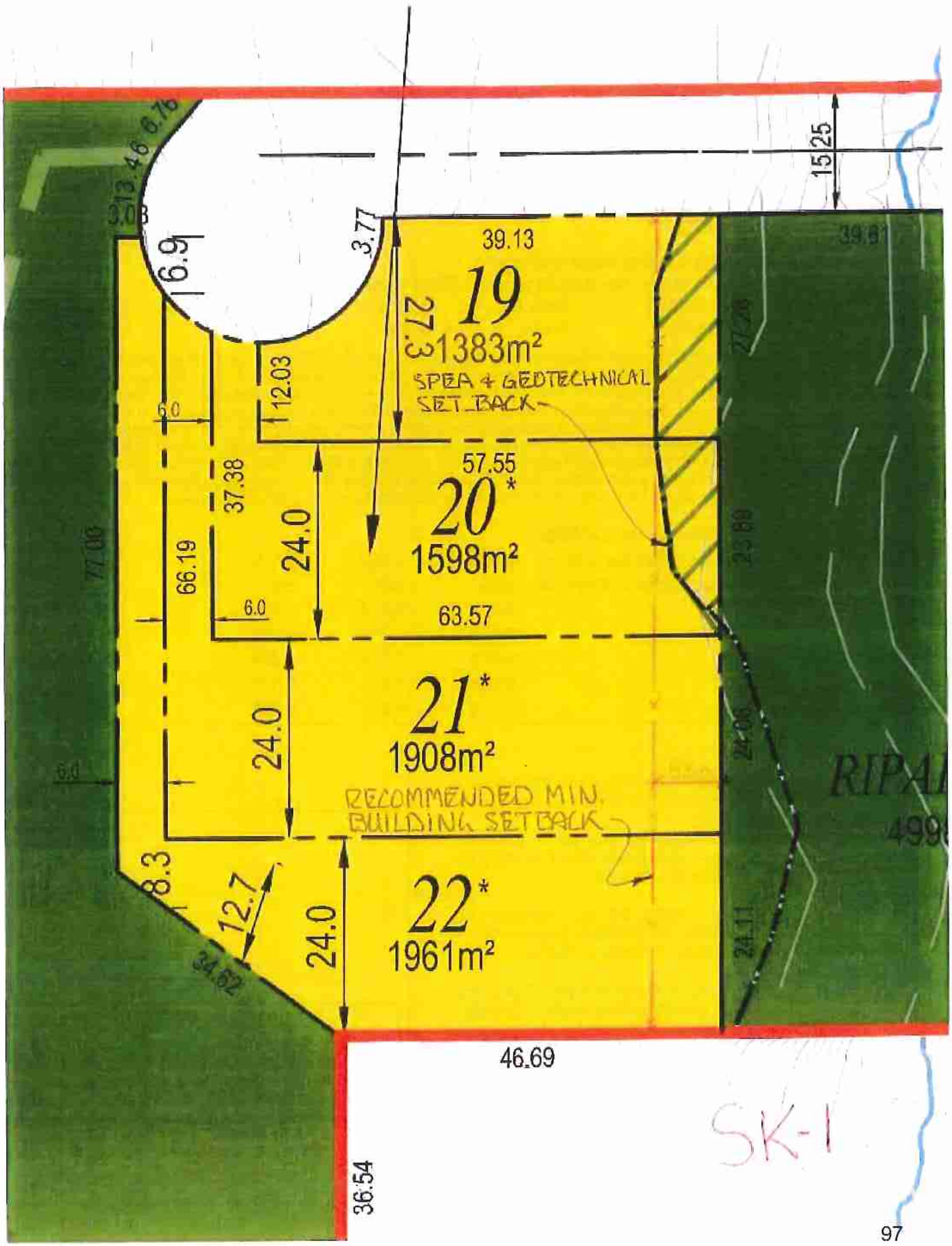
File: 11216
Project: Residential Subdivision
Site Address: Sunnyside Road, Anmore

Section A - Seismic Analysis - PHA=0.45g
Pre-development Condition

Soil Parameters

Name	Unit Weight (kN/cu.m.)	Friction Angle (deg.)	Cohesion (kPa)
Forest Litter/Topsoil	12	29	0
Dense Till	21	38	100





15.25
39.13
19
1383m²
27.3
3.77
16.9
12.03
SPEA & GEOTECHNICAL SET BACK
57.55
20*
1598m²
37.38
24.0
66.19
6.0
63.57
21*
1908m²
24.0
77.00
RECOMMENDED MIN. BUILDING SETBACK
22*
1961m²
8.3
12.7
24.0
34.62
46.69
36.54
SK-1

2010 National Building Code Seismic Hazard Calculation

INFORMATION: Eastern Canada English (613) 995-5548 français (613) 995-0600 Facsimile (613) 992-8836
Western Canada English (250) 363-6500 Facsimile (250) 363-6565

Requested by: ,

April 11, 2013

Site Coordinates: 49.32 North 122.851 West

User File Reference:

National Building Code ground motions:
2% probability of exceedance in 50 years (0.000404 per annum)

Sa(0.2)	Sa(0.5)	Sa(1.0)	Sa(2.0)	PGA (g)
0.905	0.610	0.319	0.168	0.449

Notes. Spectral and peak hazard values are determined for firm ground (NBCC 2010 soil class C - average shear wave velocity 360-750 m/s). Median (50th percentile) values are given in units of g. 5% damped spectral acceleration (Sa(T), where T is the period in seconds) and peak ground acceleration (PGA) values are tabulated. Only 2 significant figures are to be used. ***These values have been interpolated from a 10 km spaced grid of points. Depending on the gradient of the nearby points, values at this location calculated directly from the hazard program may vary. More than 95 percent of interpolated values are within 2 percent of the calculated values.*** Warning: You are in a region which considers the hazard from a deterministic Cascadia subduction event for the National Building Code. Values determined for high probabilities (0.01 per annum) in this region do not consider the hazard from this type of earthquake.

Ground motions for other probabilities:

Probability of exceedance per annum	0.010	0.0021	0.001
Probability of exceedance in 50 years	40%	10%	5%
Sa(0.2)	0.214	0.471	0.646
Sa(0.5)	0.146	0.315	0.432
Sa(1.0)	0.076	0.164	0.224
Sa(2.0)	0.039	0.085	0.117
PGA	0.110	0.237	0.322

References

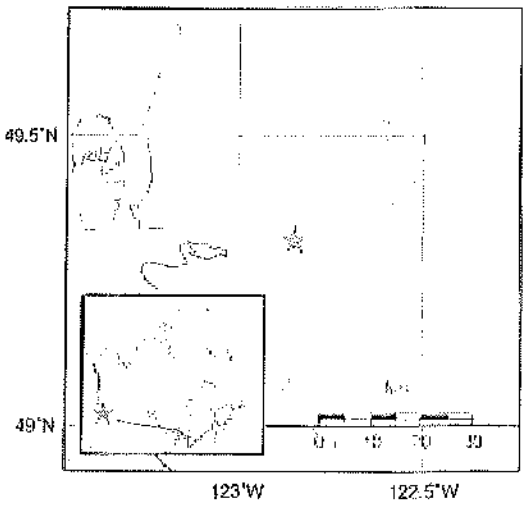
National Building Code of Canada 2010 NRCC no. 53301; sections 4.1.8, 9.20.1.2, 9.23.10.2, 9.31.6.2, and 6.2.1.3
Appendix C: Climatic Information for Building Design in Canada - table in Appendix C starting on page C-11 of Division B, volume 2

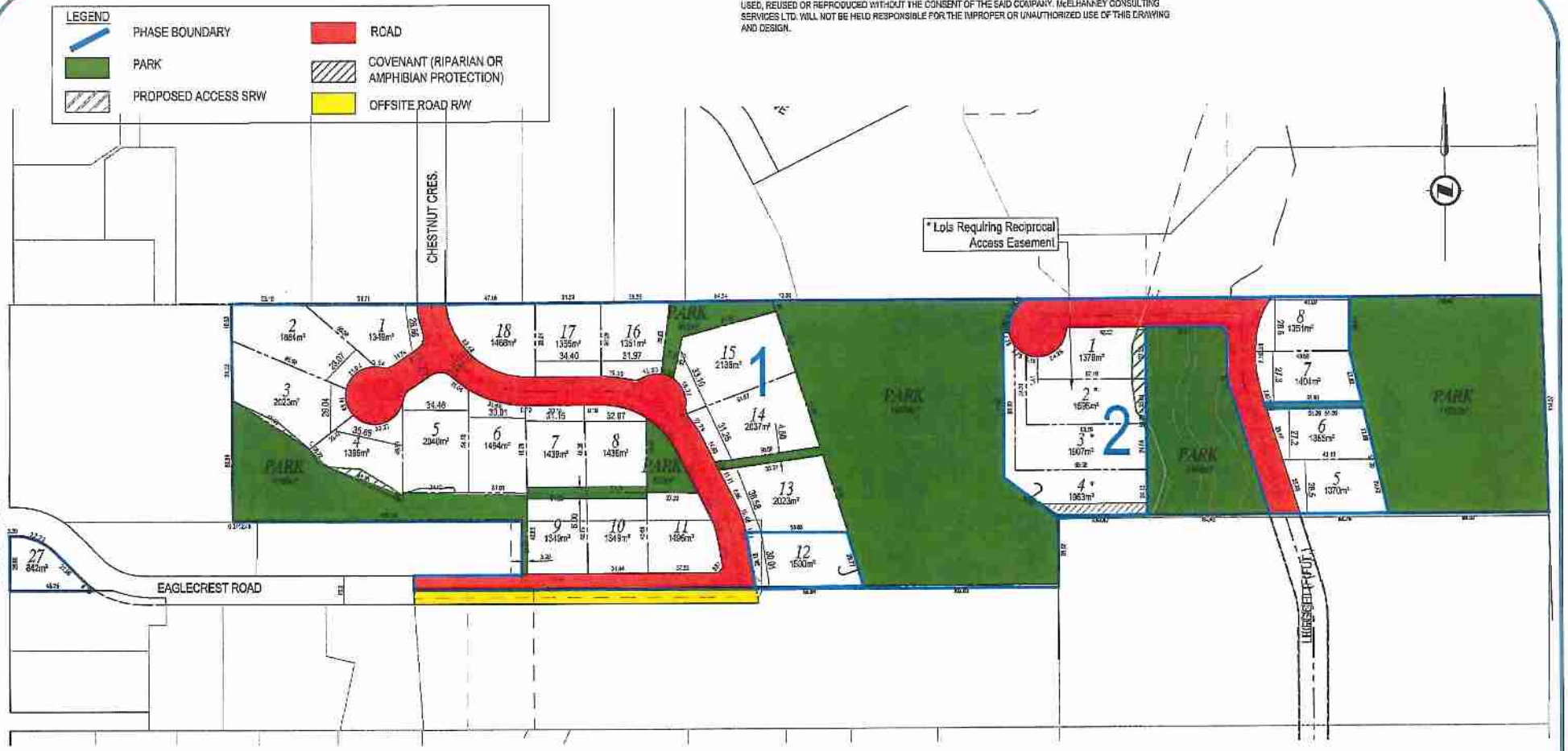
User's Guide - NBC 2010, Structural Commentaries NRCC no. 53543 (in preparation)
Commentary J: Design for Seismic Effects

Geological Survey of Canada Open File xxxx
Fourth generation seismic hazard maps of Canada: Maps and grid values to be used with the 2010 National Building Code of Canada (in preparation)

See the websites *www.EarthquakesCanada.ca* and *www.nationalcodes.ca* for more information

Aussi disponible en français





COMBINED PHASING

LAYOUT SKETCH 1B

McElhanney

McElhanney Consulting Services Ltd.
SUITE 2300 - CENTRAL CITY TOWER
13450 102 AVENUE, SURREY, BC
V3T 5X3
P: 604-596-0391
F: 604-584-5050

NOTES:
- THIS DRAWING IS FOR PRELIMINARY LAYOUT ONLY, AND SUBJECT TO MUNICIPAL APPROVAL.

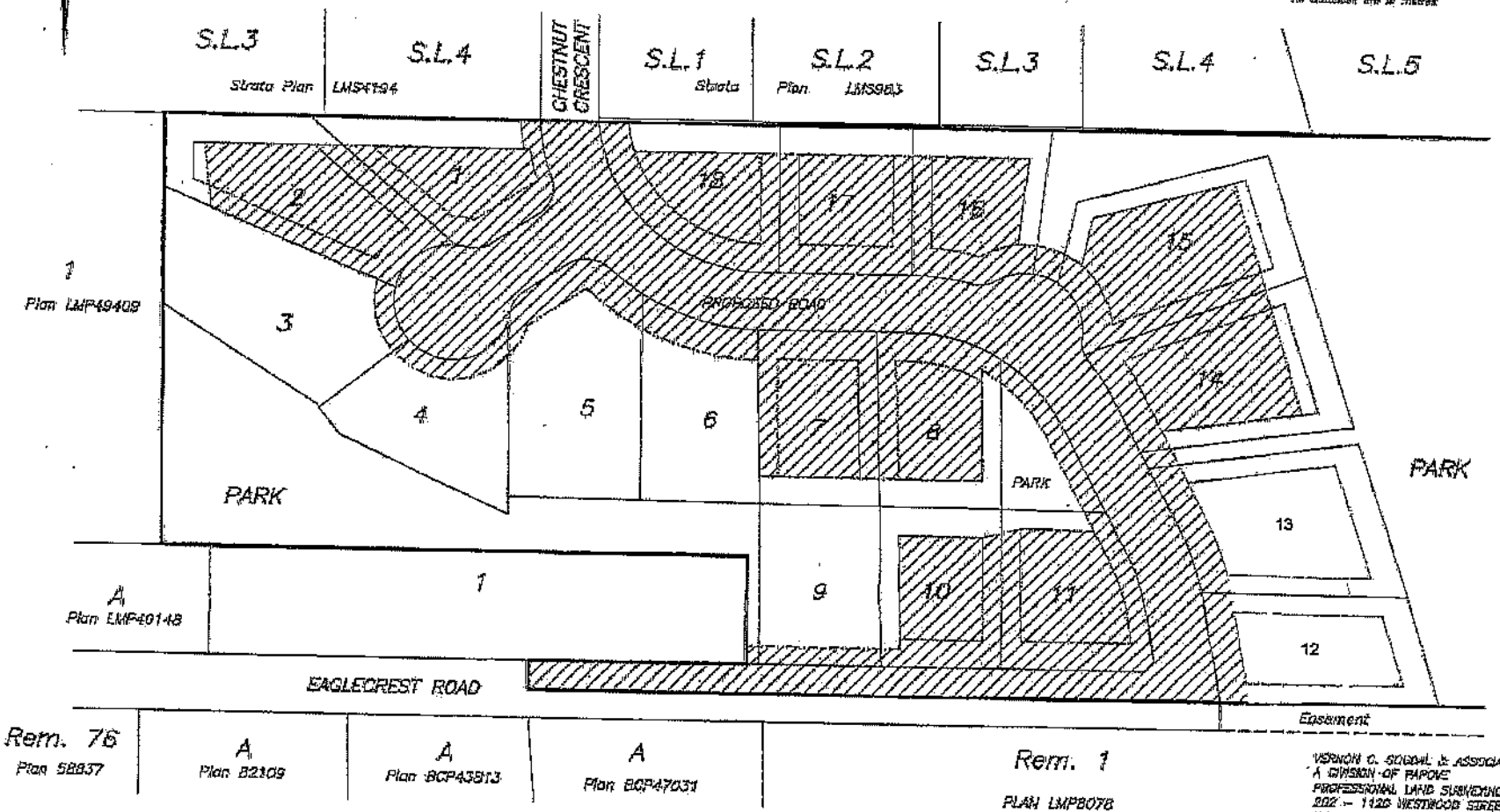
Scale: 1:2000
Date: March 23, 2016
Job No.: 2111-03104-0

SCHEDULE "A"

SKETCH SHOWING TREE CLEARING AREA ON A PORTION OF LOT 2, SECTION 20, TOWNSHIP 39, NEW WESTMINSTER DISTRICT, PLAN LMP49409

SCALE: 1:1000

All distances are in metres



Plan prepared March 16, 2016.

Denotes area to be cleared

VERNON O. SOOOML & ASSOCIATES
A DIVISION OF PAPOVE
PROFESSIONAL LAND SURVEYING INC.
202 – 1125 WESTWOOD STREET
COQUITLAM, B.C., V3B 7X8
TEL: (604) 942-5816
FAX: (604) 464-6509

FILE NUMBER: 66537AK-1

BRITISH COLUMBIA

February 16, 2016

Ref: 111867

Her Worship Mayor John McEwen
Mayor
Village of Anmore
2697 Sunnyside Road
Anmore, BC V3H 5G9

Dear Mayor McEwen:

As a province, we have a responsibility to create an environment that is welcoming to investment and business. "Canada Starts Here: The BC Jobs Plan" (BC Jobs Plan) was launched four years ago to do just that: diversify and grow our economy and support long-term job creation in the province.

We are now seeing the benefits of this effort: BC's economy is diverse, strong and growing. Today, more British Columbians are working than ever before, and our economic performance is reaching record levels. While growth has slowed in much of the rest of Canada, BC is expected to lead the country in economic growth over the next two years. The prosperity we are seeing is a product of the actions and commitments that were initiated in the BC Jobs Plan.

Together with municipalities like yours, as well as industry, our government has actioned numerous commitments to enable job creation, strengthen BC's infrastructure to facilitate the movement of goods to market and expand markets for BC's goods and services while at the same time reducing red tape and other barriers for our key sectors. As the BC Jobs Plan has evolved over the past four years, the eight key sectors have grown together and yielded new opportunities to fuel significant growth of BC's economy.

As a leader of your community, you are also a partner in our province's economic development. As Mayor, you are a major stakeholder in the future of our economy, which is why I am sending you the "BC Jobs Plan 4-Year Progress Update" (4-Year Progress Update).

The 4-Year Progress Update highlights significant achievements we have made over the past four years and allows us to proudly reflect on our accomplishments and the momentum that we have generated by working together to diversify, strengthen and grow our economy.

.../2

Ministry of Jobs, Tourism and Skills Training and Minister Responsible for Labour

Parliamentary Secretary for the BC Jobs Plan

Mailing Address:
East Annex
Parliament Buildings
Victoria, BC V8V 1X4
Phone: 250 953-0964
Fax: 250 952-7263

I hope, as you read through the 4-Year Progress Update, you feel confident that our partnership – municipalities, the Province and the private sector – is working to build on BC's economic successes as we look ahead to how we can continue to drive diversity and growth in the province for years to come.

Work is already underway for the Jobs Plan update in 2016 and we welcome your ideas.

Best wishes for you and your municipality in 2016.

Sincerely,

Greg Kyllo
Parliamentary Secretary

Enclosure

TransLink
400 - 287 Nelson's Court
New Westminster, BC V3L 0E7
Canada
Tel 778-375-7500
www.translink.ca

South Coast British Columbia
Transportation Authority

February 25, 2016

Juli Kolby
Chief Administrative Officer
Village of Anmore
2697 Sunnyside Road
Anmore, BC V3H 5G9

Dear Ms. Kolby:

Re: Local Government Engagement in TransLink's Transit Fare Policy Review

As outlined at the December Regional Administrator's Advisory Committee (RAAC) meeting, TransLink has initiated the review and update of our transit fare policy – including fare structure, products and programs. This is a major public policy initiative that will extend over the next two years. As local governments are key partners in delivering effective transit service in this region and your residents will likely have a keen interest in any changes to the way we price transit, we want to ensure that there is ample opportunity for involvement from your staff and Council in this process.

Over the past thirty years our region has undergone significant growth and development; travel patterns have shifted and the transportation needs of residents have changed. The introduction of the Compass card provides customers with a completely new way to pay; however, the transit fare structure and the core transit fare products have remained largely unchanged since 1984. We are conducting this Transit Fare Policy Review to assess whether there are things that we can do differently to take advantage of Compass and better meet the needs of today's customers and region.

This initiative is being divided into three key phases: Discover, Define, and Develop. We are just starting the Discover phase which will run through Spring-Summer 2016. It will focus primarily on listening to the public to learn about their current issues and wishes for fares in the future. The Define phase will run through the latter half of 2016 and focus on clarifying scope and objectives. The Develop phase will run through 2017 and focus on developing, testing, and consulting on options for ways to price transit.

We are planning for active involvement from municipal staff throughout this process via a partner advisory group – drawn primarily from members of the Major Roads & Transportation Advisory Committee (MRTAC). We also expect that your Council will want to be engaged. This engagement process could potentially take place in late spring once we have some preliminary public consultation findings to share.

The recent introduction of Compass provides a new and exciting opportunity to deliver a transit fare system that was inconceivable thirty years ago – one that could work better for our customers and that could better achieve our shared regional sustainability objectives. We are committed to putting everything on the table in this review and to have an open and genuine dialogue about possible solutions without prejudging the outcome. I am excited about the potential of this review and believe it can only be strengthened through the active involvement of our local government partners.

Please do not hesitate to contact me with any questions or concerns regarding the Fare Policy Review.

Sincerely,

Tim Savoie, MCIP, RPP
Vice President, Transportation Planning & Policy

cc: Geoff Cross, Director, Strategic Planning & Policy, TransLink

THE CORPORATION OF DELTA
Office of The Mayor, Lois E. Jackson

March 14, 2016

Mayor John McEwen
Village of Anmore
2697 Sunnyside Road
Anmore, BC V3H 5G9

Dear Mayor McEwen,

Re: George Massey Tunnel Replacement Project

Please be advised that at the March 7, 2016 Regular Meeting, Delta Council considered a staff report regarding the George Massey Tunnel Replacement Project and unanimously resolved:

> *"THAT a copy of this report be provided to the Minister of Transportation and Infrastructure and all Metro Vancouver Directors."*
>
> *"THAT the Ministry of Transportation and Infrastructure be requested to retain the current timeline for conducting the Project Definition Report review while continuing to receive input from key stakeholders."*

Accordingly, this letter and the enclosed staff report dated February 26, 2016 are provided for your information.

Yours truly,

Lois E. Jackson
Mayor

Enclosure

cc: Carol Mason, Chief Administrative Officer, Metro Vancouver
Delta Council
George V. Harvie, Chief Administrative Officer
Steven Lan, Director of Engineering

4500 Clarence Taylor Crescent, Delta, British Columbia, Canada V4K 3E2
T 604 946-3210 | F 604 946-6055 | E mayor@delta.ca

The Corporation of Delta
COUNCIL REPORT
Regular Meeting

F.23

To: **Mayor and Council** File No.: **5220-30/GMTR**

From: **Engineering Department**

Date: **February 26, 2016**

George Massey Tunnel Replacement Project

The following report has been reviewed and endorsed by the Chief Administrative Officer.

- **RECOMMENDATIONS:**

A. THAT a copy of this report be provided to the Minister of Transportation and Infrastructure and all Metro Vancouver Directors.

B. THAT the Ministry of Transportation and Infrastructure be requested to retain the current timeline for conducting the Project Definition Report review while continuing to receive input from key stakeholders.

- **PURPOSE:**

The purpose of this report is to provide information to Council on the Metro Vancouver staff report that was submitted to the Intergovernment and Finance Committee on the George Massey Tunnel Replacement Project ("Project").

- **BACKGROUND:**

The Ministry of Transportation and Infrastructure ("Ministry") is working on replacing the George Massey Tunnel with a new 10 lane bridge and improving Highway 99 between Bridgeport Road and Highway 91. The proposed bridge will provide a dedicated transit/HOV lane and a separated multi-use path for pedestrians and cyclists. The estimated capital cost for the overall project is $3.5 billion.

Consultations have been ongoing since 2012 on the project. Most recently, consultations and public information sessions were held in conjunction with the release of the Project Definition Report in December 2015. As well, the BC Environmental Assessment Office also sought public comments as part of the pre-application Environmental Assessment process up until February 15, 2016.

- **DISCUSSION:**

In response to the release of the Project Definition Report, Metro Vancouver staff provided written comments to the Ministry and subsequently provided a report to the

Intergovernment and Finance Committee on February 17 (Attachment A) requesting an additional two months to evaluate the impacts of the proposed Project on regional planning and growth management; air quality and climate change; environment; regional parks; and, regional utilities. This report was also presented to the Metro Vancouver Board on February 26, 2016.

There are a number of reasons that this project needs to move ahead within the Ministry's current time frame:

- The Ministry has undertaken numerous detailed studies for the project and has shared the results with key stakeholders including Metro Vancouver staff.
- Consultation with stakeholders has been ongoing over the past three years and to date Metro Vancouver has met with the Ministry more than 20 times. The Corporation of Delta and the City of Richmond have also been consulted with more than 60 times since the project was initiated.
- The submission of the Environmental Assessment Application to the BC Environmental Assessment Office will trigger a further public comment period for a minimum of 45 days. As well, it is anticipated that there will also be at least six months of time for additional discussion and comment between the Ministry and key stakeholders, including Metro Vancouver.
- Metro Vancouver staff reported on the Regional Planning and Transportation impacts in 2014 (Attachment B) to allow the region to respond in a timely and knowledgeable manner upon the release of the Project Definition Report.
- The Province intends to fund the Project through user tolls. As the new bridge may divert traffic to other routes, the Province is committed to receiving feedback to review it's current tolling policy. For reference, a recent summary of major bridge traffic volumes is provided in Attachment C, along with toll revenues from the Port Mann and Golden Ears Bridges.
- The existing tunnel is already beyond required vehicular capacity and reaching the end of its useful life. As such, replacement of the tunnel should not be delayed. Some key facts are as follows:
    - Queues can extend from 1.5 to 5 km during the rush hours.
    - The existing tunnel has about 10 years of useful life remaining before major components will need to be completely replaced.
    - The existing tunnel does not meet modern seismic standards.
    - The existing traffic congestion and delays are impacting the air quality on either side of the tunnel and the Project is expected to help reduce greenhouse gas emissions as a result of reduced idling. As well, the new bridge will provide much needed transit, cycling, and pedestrian improvements

In addition, Delta staff requested clarification from the George Massey Tunnel Replacement Project Team on the comments made by Metro Vancouver to the local

media following their request for additional time. The Project Team provided Delta staff with a response (Attachment D) summarizing the extent to which Metro Vancouver has been involved in the project consultation process as well as providing clarification on the comments made by Metro Vancouver.

Implications:
Financial Implications – There are no financial implications to Delta.

Community Implications – It is essential to maintain project timelines to ensure the bridge will be delivered on schedule to meet the needs of the community.

- **CONCLUSION:**

Rather than incurring further delays and costs to this Project, Metro Vancouver should continue to send comments to the Ministry and work collaboratively with the George Massey Tunnel Replacement Project Team to review and address the regional issues within the existing timelines.

Steven Lan, P.Eng.
Director of Engineering

Department submission prepared by: Hugh G Fraser, P.Eng.
HGF/ll/lf/sl

This report has been prepared in consultation with the following listed departments.

Concurring Departments		
Department	Name	Signature
Human Resources & Corporate Planning	Sean McGill	

- **ATTACHMENTS:**
  A. Intergovernment and Finance Committee Meeting Report dated January 30, 2016
  B. Transportation Committee Meeting Report dated March 5, 2014
  C. Extract from TransLink 2011 Metro Vancouver Regional Screenline Survey
  D. Memorandum February 29, 2016 George Massey Tunnel Replacement Project

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SERVICES AND SOLUTIONS FOR A LIVABLE REGION

To: Intergovernment and Finance Committee

From: Elisa Campbell, Director, Regional Planning
Marcin Pachcinski, Division Manager, Electoral Area & Environment
Planning, Policy and Environment Department

Date: January 30, 2016 Meeting Date: February 17, 2016

Subject: **Update on the George Massey Tunnel Replacement Project**

RECOMMENDATION
That the GVRD Board send a letter to the Minister of Transportation and Infrastructure requesting that an additional two months be granted to review the Project Definition Report for the George Massey Tunnel Replacement Project and to assess the impacts of the proposed Project on Metro Vancouver infrastructure and services.

PURPOSE
This report provides the Intergovernment and Finance Committee with an update on the George Massey Tunnel Replacement Project, including the recent release of the Project Definition Report and the environmental assessment review process that the George Massey Tunnel Replacement Project will undergo and proposes that more time be requested to properly review the report.

BACKGROUND
On December 16, 2015, the Ministry of Transportation and Infrastructure released its Project Definition Report for the George Massey Tunnel Replacement Project (Attachment 1), and requested that comments on the Project Definition Report be submitted by January 28, 2016. On December 16, 2015, the BC Environmental Assessment Office determined that the George Massey Tunnel Replacement Project is subject to provincial environmental assessment review, and requires an environmental assessment certificate prior to proceeding. The Environmental Assessment Office has requested that comments on the draft Application Information Requirements be submitted by February 10, 2016.

This staff report provides the Intergovernment and Finance Committee with a short description of both the Project Definition Report and the environmental assessment review process, briefly outlines Metro Vancouver's broad interests as they relate to the George Massey Tunnel Replacement Project, and requests that additional time be granted to conduct a more detailed assessment of impacts of the proposed Project on Metro Vancouver services and infrastructure.

GEORGE MASSEY TUNNEL REPLACEMENT PROJECT
Project Definition Report
The Project Definition Report outlines the Ministry of Transportation and Infrastructure's proposal to construct a 10-lane tolled bridge (eight motorized vehicle lanes plus two dedicated transit/high-occupancy vehicle lanes) to replace the existing George Massey Tunnel. The George Massey Tunnel Replacement Project as described also entails improvements to Highway 99 from Bridgeport Road in Richmond to Highway 91 in Delta, including dedicated transit/high-occupancy lanes, on- and off-

ramps, and interchanges. A multi-use cycling and pedestrian pathway will be included in the bridge design. The existing George Massey Tunnel will be decommissioned once the new bridge opens to traffic. The estimated capital cost of the George Massey Tunnel Replacement Project is $3.5 billion.

The Ministry of Transportation and Infrastructure has sought public comments on its Project Definition Report in support of making final decisions. The deadline for comments on the Project Definition Report was January 28, 2016. Given the compressed timeline for making submissions, Metro Vancouver staff provided comments to the Ministry of Transportation and Infrastructure to meet the January 28, 2016, deadline. A copy of these comments is provided to the Intergovernment and Finance Committee for information (Attachment 2). These comments have not been reviewed or endorsed by the Metro Vancouver Board.

Provincial Environmental Assessment Review

Under Section 10 of the *Environmental Assessment Act*, the Environmental Assessment Office may determine that an environmental assessment certificate is required for a project, and that the proponent may not proceed with the project without an assessment, where "a reviewable project may have a significant adverse environmental, economic, social, heritage or health effect, taking into account practical means of preventing or reducing to an acceptable level any potential adverse effects of the project."

On December 16, 2015, the Environmental Assessment Office determined that the George Massey Tunnel Replacement Project is subject to the provincial environmental assessment review process and requires an environmental assessment certificate prior to proceeding. The determination was based on the Ministry of Transportation and Infrastructure's Project Description and Key Areas of Study (Attachment 3).

The Project Description and Key Areas of Study includes *valued components*. The Environmental Assessment Office's User Guide (June 2015) describes valued components as follows:

> *Valued components provide the foundation of environmental assessments in BC. Valued components are aspects of the natural and human environment that have scientific, ecological, economic, social, cultural, archaeological, historical or other importance. Examples of valued components included in environmental assessments are fish and fish habitat, water quality, species at risk, communities and infrastructure, archaeological resources, and noise. The valued components selected for a proposed project guide the focus of the environmental assessment.*

For the George Massey Tunnel Replacement Project, the Ministry of Transportation and Infrastructure has identified the following valued components:

- River hydraulics and morphology
- Sediment quality and water quality
- Underwater noise
- Fish and fish habitat
- Marine mammals
- Vegetation
- Amphibians
- Terrestrial wildlife
- Land and Water Use
  - Marine use
  - Land use
  - Agricultural use
- Visual quality
- Air quality
- Atmospheric noise
- Human health
- Heritage resources

The Environmental Assessment Office has established an advisory working group of federal, provincial, local government and Aboriginal Group representatives to assist the Environmental Assessment Office with the assessment process. Metro Vancouver staff are participating in the process as part of the working group (Attachment 4). In the current pre-application phase of the environmental assessment review process, the focus of input from working group members is to ensure that the application contains the necessary information to allow the Environmental Assessment Office to undertake its assessment and make recommendations to the Ministers making the decision. This effort includes, for example, determining whether all applicable valued components have been identified. Metro Vancouver staff attended the first meeting of a stakeholder Working Group on January 21, 2016, to discuss the Project Description and Key Areas of Study.

The Environmental Assessment Office has requested comments on the draft Application Information Requirements by February 10, 2016. In order to meet this deadline, Metro Vancouver staff have submitted comments to the Environmental Assessment Office, focusing on the completeness of the environmental assessment application materials, including valued components. These comments have not been reviewed or endorsed by the Metro Vancouver Board.

Proposed BC Hydro Transmission Line Relocation

The existing Tunnel will be decommissioned once the new bridge opens to traffic. The decommissioning of the Tunnel will require BC Hydro to relocate a 230 kilovolt transmission line which currently spans the length of the Tunnel. The transmission line connects to overhead cable on either side of the Tunnel, with single pole configuration running adjacent to Highway 99. The transmission line must be relocated from the Tunnel and on both sides of the crossing to allow for construction of the new bridge and prior to the decommissioning of the Tunnel. BC Hydro staff began consulting with Metro Vancouver staff about this issue in 2015. In fall 2015, BC Hydro undertook public consultation on conceptual designs for three alternatives:

- An overhead transmission line crossing the Fraser River supported by towers;
- An underground transmission line running under the Fraser River; and
- A transmission line located on the new bridge.

The BC Hydro Board is anticipated to select a preferred alternative in early 2016. Metro Vancouver staff will continue to engage with BC Hydro and will keep the Intergovernment and Finance Committee and other committees apprised of new information.

Metro Vancouver's Interests

Metro Vancouver's broad interests around the George Massey Tunnel Replacement Project are related to:

- **Regional Planning and Growth Management** – The proposed bridge will have implications for regional growth management, including related effects on the distribution and growth of traffic across the Fraser River, as well as localized effects on communities, industrial development, population and employment growth distribution, and agricultural lands. Metro Vancouver staff convened an agency/municipal/industry meeting on February 5, 2016, to discuss these issues, and to identify and prioritize further analysis to be undertaken either by Metro Vancouver in conjunction with other interested partners including the proponent, or as part of the Environmental Assessment process. Staff received updates from municipalities, health authorities, consultants and the Province as to how potential land use implications are being assessed and addressed. Possible research needs were identified, and staff will continue to work with agency representatives to advance these efforts.

- **Air Quality and Climate Change** – The proposed bridge will result in changes in the levels of emissions of common air pollutants, toxic air pollutants and greenhouse gases. The changes in emission levels may lead to impacts in the vicinity of the George Massey Tunnel Replacement Project, including exposure to harmful pollutants, as well as impacts in the regional airshed such as smog and reduced visual air quality.

- **Environment** – The proposed bridge may have impacts on land and marine environments with ecological importance. These environments include agricultural lands that serve not only a food-production role, but also provide habitat and other ecological health values. Plans to divert Green Slough underneath the future bridge are of particular interest. Consideration of how to reduce, mitigate, and compensate for impacts will be an important part of the environmental assessment review process.

- **Regional Parks** – The new bridge is expected to follow the alignment of the Tunnel, bisecting Deas Island Regional Park through the existing Ministry of Transportation and Infrastructure right-of-way. Ongoing discussions between Regional Park Staff and the Ministry of Transportation and Infrastructure have focused on noise, debris and visual impacts of the proposed new bridge and the associated BC Hydro project, post construction ecological and trail connectivity through the Ministry of Transportation and Infrastructure right-of-way, habitat impacts and restoration opportunities, and trail connectivity from the bridge to the Deas Island Regional Park and broader regional greenway network including the Experience the Fraser Canyon to Coast Trail. The Ministry of Transportation and Infrastructure has indicated they will not require access through the Deas Island Regional Park for construction but may request limited post-construction access for maintenance purposes.

- **Regional Utilities** – Water Services staff have identified that the River Road West Main in Delta and the Lulu Island-Delta Main crossing under the Fraser River, between Richmond and Delta, may be affected by the George Massey Tunnel Replacement Project. The River Road West Main may need protection from ground improvements or changes in loads imparted by

both Ministry of Transportation and Infrastructure bridge work and by BC Hydro tower installation. The Ministry of Transportation and Infrastructure is also relocating Green Slough to return the slough back to its original pre-Tunnel alignment. Depending on the final channel alignment, the River Road West Main may require relocation. The specific impacts and costs are difficult to predict at this early stage of project definition. The Ministry of Transportation and Infrastructure is reviewing options for removing sections of the Tunnel from the Fraser River once it is decommissioned. Tunnel removal will alter the river hydraulics, which may result in scour at the Lulu Island-Delta Main crossing. This effect has been demonstrated in modelling undertaken by the Ministry of Transportation and Infrastructure's river hydraulics consultant. Any future dredging of the Fraser River channel to facilitate the movement of larger vessels, following decommissioning of the Tunnel, could have significant implications to Metro Vancouver water and sewer infrastructure within the Fraser River.

Detailed comments will be provided by staff at various points in the process. Staff will continue to provide information to and seek direction as relevant from the Intergovernment and Finance Committee, the Utilities Committee, the Climate Action Committee, the Regional Parks Committee, and the Regional Planning Committee as the George Massey Tunnel Replacement Project proceeds.

PROJECT TIMELINE AND KEY PROCESS DATES

The information in this section of the report provides a timeline for the George Massey Tunnel Replacement Project, as well as key dates in the consultative and approval processes.

September 2012	The Government of BC announces its intention to seek a replacement for the George Massey Tunnel.
September 2013	The Government of BC announces a new bridge is the preferred alternative for the replacement of the George Massey Tunnel.
September 2013 – November 2015	The Ministry of Transportation and Infrastructure undertakes traffic studies, technical and financial analysis, geotechnical investigations, and consultation to support development of its Project Definition Report.
December 15, 2015	The Ministry of Transportation and Infrastructure submits its Project Description and Key Areas of Study to the Environmental Assessment Office to determine if the George Massey Tunnel Replacement Project requires a review under the *Environmental Assessment Act*.
December 16, 2015	The Environmental Assessment Office issues an order under Section 10 of the *Environmental Assessment Act*, determining the George Massey Tunnel Replacement Project requires an environmental assessment review.
December 16, 2015	The Ministry of Transportation and Infrastructure releases its Project Definition Report and seeks public comments.
January 7, 2016	The Environmental Assessment Office issues an order under Section 11 of the *Environmental Assessment Act*, setting out the requirements for the first

	public comment period (beginning January 15, 2016) on the Project Description and Key Areas of Study document.
January 15, 2016	The Environmental Assessment Office starts a public comment period on the Project Description and Key Areas of Study. Comments at this stage will be used to inform the development of the application information requirements.
January 21, 2016	The Environmental Assessment Office hosts the first Working Group meeting with stakeholders (including Metro Vancouver staff) to discuss the Project Description and Key Areas of Study.
January 28, 2016	Deadline for public comments on the Project Definition Report to Ministry of Transportation and Infrastructure.
February 10, 2016	Deadline for Working Group (including Metro Vancouver) comments on the Ministry of Transportation and Infrastructure's draft Application Information Requirements submission to the Environmental Assessment Office.
February 15, 2016	Deadline for public comments on the Project Description and Key Areas of Study to the Environmental Assessment Office.
Early & mid-2016	Environmental Assessment Review Process, including Working Group meetings with stakeholders (involving Metro Vancouver staff) and a public comment period during the application review stage. Metro Vancouver will have a formal opportunity to comment during the application review stage (date to be determined).
2017 – 2022	Construction of new bridge
≥ 2022	Bridge opens to traffic
≥ 2022	George Massey Tunnel decommissioned

ALTERNATIVES

1. That the GVRD Board send a letter to the Minister of Transportation and Infrastructure requesting that an additional two months be granted to review the Project Definition Report for the George Massey Tunnel Replacement Project and to assess the impacts of the proposed Project on Metro Vancouver infrastructure and services.
2. That the Intergovernment and Finance Committee receive for information the report titled "Update on the George Massey Tunnel Replacement Project", dated January 30, 2016, and provide alternate direction to staff.

FINANCIAL IMPLICATIONS

The George Massey Tunnel Replacement Project, including the accompanying BC Hydro transmission line relocation and decommissioning of the existing Tunnel, may have financial implications for water utilities and the Deas Island Regional Park. If the GVRD Board supports Alternative 1, a letter will be sent to the Minister of Transportation and Infrastructure requesting that an additional two months be granted to undertake a more detailed review of the George Massey Tunnel Replacement Project Definition Report and the potential impacts on Metro Vancouver infrastructure and services.

Given the lack of detail in the current Project Definition Report, the specific implications for Metro Vancouver as a result of the new bridge and BC Hydro infrastructure are unknown and difficult to estimate at this time. Metro Vancouver staff will continue to liaise with the Ministry of Transportation and Infrastructure and with Port Metro Vancouver to protect the interests of Metro Vancouver with respect to its assets and operations.

It should also be noted that significant Metro Vancouver staff time has been dedicated to the George Massey Tunnel Replacement Project. The need for staff time is anticipated to continue at variable intensity until the completion of the George Massey Tunnel Replacement Project, including decommissioning of the Tunnel.

SUMMARY / CONCLUSION

This report provides the Intergovernment and Finance Committee with an update on the George Massey Tunnel Replacement Project and responds to the Committee's request to report on the costs and implications of the George Massey Tunnel Replacement Project on Metro Vancouver infrastructure.

The George Massey Tunnel Replacement Project, outlined in the Ministry of Transportation and Infrastructure's Project Definition Report released December 16, 2015, proposes to replace the George Massey Tunnel with a new 10-lane bridge, replace the Westminster Highway, Steveston Highway and Highway 17A interchanges, and widen Highway 99 to accommodate dedicated transit/HOV lanes between Bridgeport Road in Richmond and Highway 91 in Delta.

On December 16, 2015, the BC Environmental Assessment Office determined that the George Massey Tunnel Replacement Project is subject to the provincial environmental assessment review process, and requires an environmental assessment certificate prior to proceeding. The determination was based on the Ministry of Transportation and Infrastructure's Project Description and Key Areas of Study. The George Massey Tunnel Replacement Project is in the pre-application stage of the

provincial environmental assessment review process. Metro Vancouver staff are participating in a stakeholder Working Group organized by the Environmental Assessment Office.

Metro Vancouver's broad interests around the George Massey Tunnel Replacement Project are related to regional growth management and planning, air quality and climate change, environment, regional parks, and regional utilities. Deas Island Regional Park, the River Road West Main, and the Lulu Island-Delta Water Main have been identified as Metro Vancouver assets being potentially impacted by the George Massey Tunnel Replacement Project.

This report contains timelines for the George Massey Tunnel Replacement Project and known key dates in consultative and approval processes. Staff will continue to provide information to and seek direction as relevant from the Intergovernment and Finance Committee.

The Ministry of Transportation and Infrastructure requested that comments on the Project Definition Report be received by January 28, 2016. Similarly, the Environmental Assessment Office requested that comments from stakeholders on the draft Application Information Requirements be received by February 10, 2016. Given these compressed schedules, and in order to meet the deadlines, Metro Vancouver staff submitted comments, and have provided them to the Intergovernment and Finance Committee for information. These comments have not been reviewed or endorsed by the Metro Vancouver Board. Staff recommend Alternative 1, that the GVRD Board send a letter to the Minister of Transportation and Infrastructure requesting that an additional two months be provided for Metro Vancouver Board review and assessment.

Attachments *(Orbit # 17222736)*:
1. Project Definition Report
2. Staff comments on Project Definition Report
3. Project Description and Key Areas of Study
4. Environmental Assessment Process
5. Staff comments on draft Application Information Requirements
6. Proposed Bridge Rendering and Metro Vancouver Assets

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SERVICES AND SOLUTIONS FOR A LIVABLE REGION

To: Transportation Committee

From: Ray Kan, Senior Regional Planner
Planning, Policy and Environment Department

Date: March 5, 2014 Meeting Date: March 12, 2014

Subject: **Preliminary Regional Analysis of the New Delta-Richmond Bridge and Existing George Massey Tunnel**

RECOMMENDATION

That the Transportation Committee receive for information the report dated March 5, 2014, titled "Preliminary Regional Analysis of the New Delta-Richmond Bridge and Existing George Massey Tunnel".

PURPOSE

This report provides an update on the George Massey Tunnel Replacement Project and the preliminary results of an analysis undertaken by TransLink for Metro Vancouver.

BACKGROUND

Staff presented a progress update on the regional analysis of the new Delta-Richmond Bridge to the Transportation Committee at its meeting on December 3, 2013. At the time, TransLink, as requested by the GVRD Board in October, was still conducting the technical analysis and could only share the broad assumptions and methodology. TransLink has now completed a preliminary analysis of the new bridge. The results are discussed in this report.

DISCUSSION

Project Context

The George Massey Tunnel Replacement Project is one of the final pieces of the Provincial Gateway Program. It is important to monitor the development of this project and the potential effects of adding vehicular capacity on the implementation of *Metro Vancouver 2040: Shaping Our Region (Metro 2040)*. This will allow the region to respond in a timely and knowledgeable manner when the Province releases the Project Definition Report in the spring of 2014.

In September 2013, the Premier of British Columbia announced a preferred solution to replace the George Massey Tunnel with a new bridge on the same corridor. At its meeting on October 25, 2013, the GVRD Board approved the following resolution (excerpted):

> "a) *request the Minister of Transportation and Infrastructure to demonstrate how the project scope, design, and performance of the proposed bridge to replace the George Massey Tunnel takes into careful consideration the effects on the implementation of the Regional Growth Strategy, Integrated Air Quality and Greenhouse Gas Management Plan, and Regional Transportation Strategy, and that measures be included to support, and not detract from, regional objectives.*

b) request the TransLink Board provide Metro Vancouver with technical analysis and commentary on the potential transportation and emissions implications of expanding transportation capacity on the George Massey Tunnel corridor and effects with proximate Fraser River watercrossings, including tolling and non-tolling scenarios, and the degree of consistency and support the proposed bridge would have on the Regional Growth Strategy, Integrated Air Quality and Greenhouse Gas Management Plan, the Regional Transportation Strategy, and Regional Goods Movement Strategy.

c) direct staff to investigate in relation to the George Massey Tunnel replacement project the following:

i. the business plan;

ii. the role of the port; and

iii. the balance of phase 2 of the Gateway Program;

iv. the potential for an LRT."

The Board's request to TransLink is consistent with TransLink's requirement, under the *South Coast British Columbia Transportation Authority Act*, to:

> *"review, and advise the Greater Vancouver Regional District, the municipalities and the government regarding the implications to the regional transportation system of (iii) major development proposals and provincial highway infrastructure plans in the transportation service region" (SCBCTA, Section 4(1)(f)).*"

In January 2014, staff met with the provincial George Massey Tunnel Replacement team. At this meeting, the provincial project team advised staff of the following:

- A Project Definition Report will be released for consultation in the spring, and will contain details such as the number of lanes on the new bridge.
- A formal environmental assessment process will be undertaken after a project description is submitted to the provincial environmental assessment office.
- The geographic scope of the project extends along the Highway 99 corridor from the Canadian/U.S. border to Bridgeport Road in Richmond. Modifications and upgrades to highway interchanges are within scope.
- All financing options are on the table.
- Geotechnical fieldwork is underway to examine soil conditions.
- Computer modelling analysis is underway on alternative lane capacity and arrangements.
- The project team has initiated dialogue with TransLink on potential bus service improvements along the corridor.

The provincial team and Metro Vancouver staff will schedule a follow-up meeting in early spring.

TransLink's Preliminary Analysis

The Ministry of Transportation and Infrastructure will release a Project Definition Report in the spring to articulate the precise scope, benefits, and costs of the project. For Metro Vancouver to be in a position to respond in a timely and knowledgeable manner, it is important that an independent analysis of this project be undertaken. TransLink has provided Metro Vancouver with a memorandum reporting out on the preliminary analysis of the new Delta-Richmond bridge and the implications for the corridor and the regional network (Attachment 1).

The scope of the analysis and major assumptions are shown below:

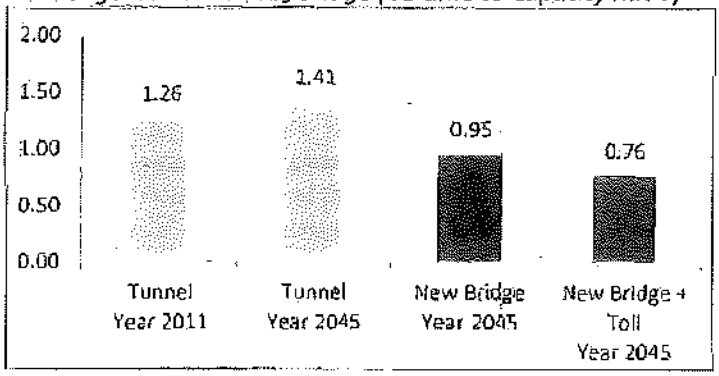
Scope of TransLink Analysis	• Transportation impacts of the new bridge on travel behavior (traffic diversion, modal shift, etc.) • Growth impacts of the new bridge on population and job distribution
Analysis Years	• Base Year: 2011 • Future Year: 2045
Analysis Time Period	• AM peak hour (approximately 7:30AM-8:30AM)
Demographics and Population/ Employment Distribution	• Base assumptions prepared by Metro Vancouver for infrastructure planning • Sensitivity test prepared by Coriolis
Tunnel/Bridge Lane Capacity	• George Massey Tunnel: 3 lanes northbound in the AM peak hour; 1 lane southbound • New Bridge: 3 general purpose lanes in each direction; 1 HOV/transit lane in each direction (total of 8 lanes)
Toll	• Consistent with rates assumed for the Golden Ears Bridge and Port Mann Bridge.
Transit Supply	• Base Year 2011: 39 buses/hour • Future Year: 48 buses/hour

The primary tool used by TransLink is the Regional Travel Demand Model, which is a computer model calibrated to 2011 conditions and used for forecasting purposes up to the year 2045. The model has been the primary tool used to evaluate transportation projects for over the past three decades. It must be cautioned that forecasts from any computer model will contain uncertainty and potential errors. When reviewing these model outputs, it is generally more useful to assess the relative change compared to baseline conditions rather than the precision of any one number.

Transportation Effects on the Highway 99/Fraser River Crossing Corridor

Three common transportation performance measures used in evaluating transportation projects are congestion, mode share, and vehicle kilometres travelled (VKT). Congestion and mode share are measured at the tunnel/bridge section only. VKT is aggregated from all road links that feed traffic to the tunnel/bridge in both directions – Highway 99 is the largest component of the corridor. Additional information can be found in the attached document.

#1. Congestion in Tunnel/Bridge (Volume to Capacity Ratio)

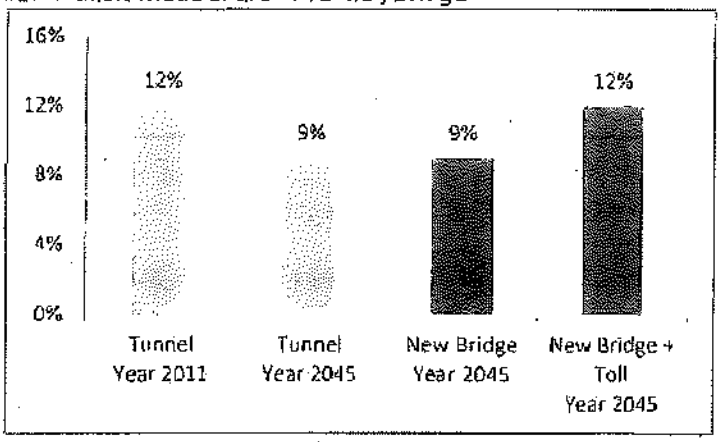


An indicator of congestion is the ratio between volume (demand) and capacity (supply). A ratio above 1 generally means there is more traffic than the roadway can handle efficiently, resulting in slow moving traffic and long queues.

With no new capacity, 2-way congestion continues to rise in the tunnel due to growth in population, employment, and economic activity.

A new bridge in 2045 experiences reduced congestion, but the demand approaches capacity. The addition of tolls helps to manage the growth in demand and prolong the capacity of the bridge beyond 2045.

#2. Transit Mode Share in Tunnel/Bridge

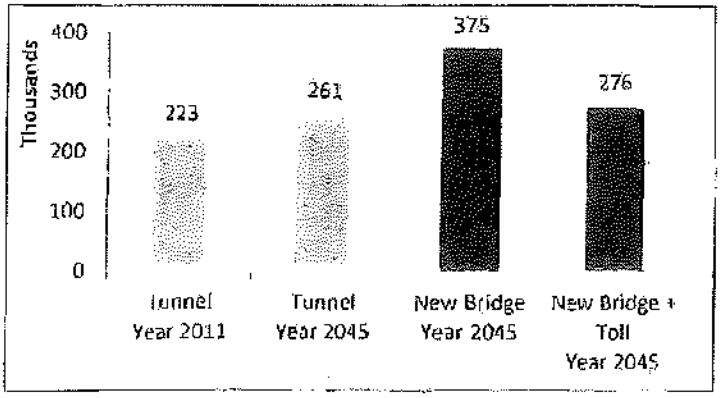


Transit mode share declines over time, whether the tunnel remains or a new untolled bridge is built. With the tunnel, travel speed deteriorates for buses, which makes transit a less desirable choice. Transit mode share falls to 9 percent in 2045.

With an untolled bridge, the expanded capacity allows for more people to drive and take transit, but transit mode share remains stuck at 9 percent in 2045.

When tolls are added to the bridge, a transit mode share of 12 percent is achieved due entirely to a decline in people driving or carpooling.

#3. Vehicle Kilometres Travelled in Corridor



Vehicle kilometres travelled (VKT) is a proxy for greenhouse gas emissions.

VKT in the corridor will be higher with a new bridge (no tolls) as compared to the tunnel in 2045. This is because more traffic is drawn to the expanded capacity.

The addition of tolls on the new bridge will help to moderate the growth in VKT in the corridor by nearly 25 percent.

Auto and Truck Patterns on Other Fraser River Crossings
TransLink's analysis also provides a preliminary view of the implications for auto and truck traffic on other water crossings. In 2045, relative to the existing tunnel, a new 8-lane tolled bridge could potentially draw down some auto traffic on the Alex Fraser Bridge, Pattullo Bridge, and Port Mann Bridge and contribute to an increase in traffic on the Oak Street Bridge and Queensborough Bridge. Truck traffic could decrease on the Alex Fraser Bridge and Queensborough Bridge, and increase on the Oak Street Bridge. As noted in the attachment, TransLink is reviewing the "truck component" of the Regional Travel Demand Model to ensure truck traffic is fully captured.

Growth Distribution Effects (Land Use)
TransLink commissioned Coriolis to study the potential redistribution of growth in 2045 as a result of the new bridge, as well as changes in access and travel time. In terms of population, Coriolis notes that about 1% of single family and townhouse growth may shift from West Richmond and Steveston to South Delta and South Surrey (on the order of 4,000 people).

In terms of employment, Coriolis notes that South Delta and South Surrey may receive a slightly higher share of population-serving employment at the expense of West Richmond and Steveston. In the short term, the pace of light industrial development may occur faster in Richmond and Delta and parts of South Surrey. This growth may come at the expense of South Burnaby and North Surrey. Over the long-term to 2045, with the constraint on industrial lands, there is no significant difference in the total amount of light industrial employment at these locations.

TransLink re-evaluated the transportation effects using Coriolis' population and employment analysis and found only nominal differences for traffic levels across the new bridge.

It should be noted that the scope of the Coriolis analysis did not account for potential increases in marine-based goods movement. The removal of the tunnel may remove a marine bottleneck and allow for more ship traffic along the Fraser River to Fraser Surrey Docks. This element could represent a material shift in the region's capacity to move goods. Further, the direct impact on the land acquired or expropriated for the new bridge, approaches, and associated works are out of the scope of the TransLink analysis. Further investigation is warranted on these issues.

Moreover, changes in accessibility may put development pressures on the Agricultural Land Reserve and the *Metro 2040* Urban Containment Boundary. Any relaxation of these policies would render the current analysis obsolete.

Other Effects
TransLink also tested an expanded regional transit system, including improved bus frequencies on the Highway 99 corridor. Generally, along the Highway 99 corridor, there are slightly fewer auto trips and slightly more transit trips. Further investigation is warranted on the optimal level of transit service on this corridor given an expanded facility, and the associated costs and benefits.

ALTERNATIVES
This is an information report. No alternatives are presented.

FINANCIAL AND REGIONAL GROWTH STRATEGY IMPLICATIONS

Due to the implications of expanding the capacity of the current watercrossing between Delta and Richmond on the implementation of *Metro 2040: Shaping Our Region*, it is important for Metro Vancouver to play an ongoing role in assessing the broad dynamics of the options and the potential effects on travel patterns and land use.

SUMMARY / CONCLUSION

The preliminary analysis undertaken by TransLink, as requested by the Metro Vancouver Board, provides a common base from which the Transportation Committee can continue to monitor and query the development of the bridge proposal. This work demonstrates that TransLink and Metro Vancouver are cooperating on issues of regional significance. The region benefits greatly from the mutual sharing of technical information and the exchange of evidence-based policy dialogues.

While still preliminary, the analysis is already improving the collective understanding about the regional transportation system and the Highway 99 corridor. For instance, three major observations can be made for the 2045 morning rush hour study period:

- An **8-lane untolled bridge** appears to provide measurable travel time benefits for travelers and sufficient capacity for the projected demand to 2045, but the demand on the bridge does approach capacity in 2045.
- An **8-lane tolled bridge** appears to manage the growth in auto traffic demand and may actually prolong the useful capacity of the bridge beyond 2045.
- A new 8-lane bridge appears to have only minor effects on the redistribution of population and employment growth (assuming the Agricultural Lane Reserve and Urban Containment Boundary remain vigilantly protected).

Staff will continue to bring forward updates to this analysis and the analysis of the forthcoming Project Definition Report to be released by the Province in spring 2014. In particular, some outstanding questions that remain to be answered, including those posed by the GVRD Board, and will require additional investigation are:

1. The incremental benefits and costs of lane capacity above and beyond 8 lanes.
2. The effects on truck trips along Highway 99 and in relation to the other watercrossings.
3. The effects on morning and afternoon rush hour traffic through Richmond and Vancouver.
4. The effects on marine-based goods movement and the associated industrial development and employment growth distribution within the region.
5. The direct land impacts (regional parks and agricultural lands) of the bridge, approaches, interchanges, and other works.
6. The direct air emissions impacts of increased vehicular traffic on the Highway 99 corridor.
7. Opportunities for improved transit service on the Highway 99 corridor.

Staff will continue to work with TransLink on better understanding the role and effects of the new bridge, and to better answer the broader questions about implications to land use, air emissions, and goods movement.

Attachment:
'George Massey Tunnel Replacement: Impacts on Regional Transportation Demand' – Memo dated February 25, 2014 from TransLink addressed to Ms. Elisa Campbell, Director of Regional and Strategic Planning, Metro Vancouver.

8477025

5.2 Attachment

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February 25th, 2014

Ms. Elisa Campbell
Director, Regional and Strategic Planning
Planning, Policy and Environment
Metro Vancouver
4330 Kingsway, Burnaby, BC
V5H 4G8

Dear Ms. Campbell,

Re: George Massey Tunnel Replacement: Impacts on Regional Transportation Demand

Attached is a technical memo that provides preliminary modeling analysis on the potential effects of the replacement of the George Massey Tunnel on the regional network. TransLink has recently updated our regional modeling network assumptions to support the development of the new long range Regional Transportation Strategy, which includes the examination of different future investment and management alternatives. TransLink conducted a number of illustrative model runs using the Regional Travel Demand Model. These consider how the additional capacity of a tunnel replacement and resultant changes in the network may affect travel behaviour and how they may impact the distribution of population and jobs over the long term. The exact scope of the new bridge has not yet been confirmed but general expectations and early indications are that the bridge will have more lanes than the existing tunnel.

Preliminary Observations for 2045 Forecasts
The figures here and in the attached report are order-of-magnitude illustrations and are appropriate for relative comparisons between model scenarios. They should not be interpreted as precise predictions of future traffic or passenger volumes, especially on specific road sections or transit route segments. The results are for the AM peak hour only. The technical memo provides some more details around the following observations:

Vehicle Kilometres Travelled

- A new tolled crossing (with 8-lanes) may experience about 5% more demand and traffic crossing the bridge, but decreases in congestion levels at the bridge, compared to the existing untolled crossing in 2045.

- A new untolled crossing (with 8 lanes) may experience in excess of 40% more demand and traffic crossing the bridge, decreases in current congestion levels at the bridge, relative to the existing untolled tunnel.

Mode Choice

- A new tolled crossing (with 8 lanes) in 2045 may result in similar transit mode share (12%) as in 2011, whereas both an untolled 8-lane crossing new crossing and an untolled existing tunnel, may result in a 25% reductions in transit mode share (9%).

Travel Times

- A new tolled crossing (with 8 lanes) in 2045 may result in a trip time between 8th Ave in Surrey and the Oak Street Bridge decreasing by about 10% (3 minutes) relative to 2011, whereas both a new untolled crossing and the existing untolled tunnel may result in trips increasing by about 10% (3 minutes) relative to 2011.

The preceding observations and findings assume that current regional and local land use policies, and protection of the Agricultural Land Reserve remain.

Land Use Implications

Assuming current provincial, regional and local land use policies remain:

- The changes in transportation accessibility for land uses in the corridor are likely to shift some residential and employment growth patterns relative to the Metro Vancouver's current MGS projections, including:
    - Shifts in the growth of single family residential units to South Surrey and South Delta from West Richmond and Steveston;
    - More rapid development in light industrial land uses in Richmond, Delta and South Surrey, shifting from South Burnaby and North Surrey.
- These land use changes may shift travel demand but because of the resulting redistribution of employment trips, this factor does not appear to affect crossing volumes or mode share.
- Changes in accessibility may put additional development pressure on Agricultural Land Reserve and Urban Containment Boundaries.

The attached technical memo delves into the methodology, sensitivity tests and results in more detail. Please feel free to contact me with any questions.

Best regards,

Tamim Raad
Director, Strategic Planning and Policy, TransLink

CC Bob Paddon, EVP, Strategic Planning & Public Affairs, TransLink

TRANSLINK

BRIEFING MEMO

DATE: February 25, 2014

FROM: Strategic Planning and Policy

SUBJECT: George Massey Tunnel Replacement: Preliminary Modelling of Potential Impacts

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PURPOSE

To provide a preliminary assessment of the potential impacts of replacing the George Massey Tunnel on the regional transportation system.

BACKGROUND

The Province of BC has announced its intent to replace the George Massey Tunnel with a new bridge. The exact scope of the new bridge has not yet been confirmed but general expectations and early indications are that the bridge will have more lanes than the existing tunnel. TransLink has undertaken an analysis to understand how the additional capacity and resultant changes in the network would affect travel behaviour; and how they may impact the distribution of population and jobs over the long term. In order to gain some initial understanding of these potential impacts, TransLink staff conducted a number of illustrative model runs using the Regional Travel Demand Model. The purpose of this memo is to document the preliminary results of these simulations.

DISCUSSION

Methodology

The analysis relies on TransLink's latest regional transportation model, also used to develop TransLink's Regional Transportation Strategy (RTS). The Provincial team working on this project is also applying the same model for its own analysis. The model, calibrated for 2011 conditions, reflects the current system of 682 regional transportation zones. The future model runs were completed for horizon year 2045. This preliminary evaluation focuses only on AM peak hour (7:30 to 8:30 am) conditions; however these results come from full 24-hour model assignments. The AM peak conditions appear to be representative of peak volumes for the crossing, although the PM peak in the outbound direction lasts longer and could lead to longer queuing.

Scope of Modelling Work

The analysis consists of comparing the following five model scenarios:

- *Base Case (run 1)* which reflects the transportation network, land use and Massey tunnel conditions as they existed in 2011. The current tunnel configuration consists of a 4-lane cross section, operating as a counter-flow system in the peak hours with three general

purpose lanes in the peak direction and one general purpose lane in the off-peak direction. This 2011 scenario serves as a benchmark against which conditions of future scenarios are compared.

- *Keeping the current tunnel* in the year 2045, *with tolls (run2) and without tolls (run3).*
- *A new bridge* in the current location in the year 2045, *with tolls (run 4) and without tolls (run 5).* These scenarios assumed an 8-lane cross section on the bridge span, including three general purpose lanes and one HOV/transit lane in each direction.

Two additional model runs were also performed as sensitivity testing to identify the impacts of different land use and background transportation network assumptions, as discussed later in this memo. The following table shows the specific modelling input assumptions applied to the five scenarios tested.

Summary of Key Modelling Assumptions (Year 2045, AM Peak Hour):

Land Use Assumptions:

The land use data for all scenarios come from the Metropolitan Growth Scenario (MGS) forecasts of employment and population for the year 2045 as provided by Metro Vancouver.

Road Network Assumptions:

The 2045 road network modelled in this analysis is the same as the Year 2045 RTS Base Case road network, which includes about 10,500 lane-kilometers within the GVRD. This represents an increase of about 10% over the 2011 road network. Most of the additional lane-kilometers are assumed to occur in Surrey, White Rock, Richmond and Delta, and to a lesser extent in the Tri-cities and Langley. Pattullo Bridge is assumed to be a rehabilitated 3-lane bridge.

Apart from the 8-lane bridge section itself, assumption about potential related improvements in the corridor had to be made in order to conduct the analysis (the Province has not announced a concept); the following changes were used:

- HOV lanes extending between the King George Boulevard interchange and the Oak Street Bridge
- Highway 99 corridor consisting of two general purpose lanes in each direction between the US Border and the Oak Street Bridge
- An additional general purpose lane extending in each direction between the SFPR interchange and the Westminster Highway interchange
- Highway 99 interchange ramps were modified at SFPR, H17A, Steveston, and Sea Island Way
- Highway 17A NB narrowed down to 1 lane from Deltaport Way to Ladner Truck Rd
- Improved Bridgeport and South Delta P&R connectivity

Summary of Key Modelling Assumptions (Year 2045, AM Peak Hour):

Transit Network Assumptions:

The modelling work assumes the Year 2045 RTS Base Case transit network which does not include any significant upgrades or expansion of transit service. The RTS 2045 Base Case includes about 24,000 daily bus kilometers and 4,000 daily train kilometers (SkyTrain and Canada Line) within the GVRD. This represents an increase of about 16% and 51% respectively relative to 2011. The additional train kilometers are mostly due to implementation of the Evergreen Line. Most of the additional bus kilometers are assumed to occur in Surrey, White Rock, Tri-cities, Richmond and Delta.

Within the Massey corridor, and the working assumption is that transit service would increase from 39 buses/hour under 2011 conditions to 48 buses/hour in the 2045 base case (+24%).

Tolling Assumptions:

The tolling scenarios, for either a tunnel or a bridge, assume that the Port Mann and Golden Ears Bridges remain tolled in 2045 but that a rehabilitated 3-lane Pattullo Bridge, included in TransLink's current Base Plan, would not be tolled facility. The tolled tunnel and bridge alternatives assume tolls consistent with those for the Port Mann and Golden Ears Bridges.

Preliminary Modelling Results

The following tables summarize the key general network and corridor-specific model outputs for the five scenarios tested. All statistics are for the 2045 AM Peak hour. The Network results reflect Origin-Destination demand (matrix data) while the Corridor results reflect actual volumes on specific road sections or transit route segments (assignment data).

Total vehicle demand from south of the Fraser river splits as follows:

Demand	From south of the Fraser river	Crosses to north of the Fraser river	Remains on the south side of river	To destinations east of Langley
AUTO	227,600 trips	21,600 (10%)	201,800 (88%)	4,200 (2%)
TRUCKS	8,600 trips	1,960 (23%)	5,970 (69%)	670 (8%)

The truck component of TransLink's regional model is currently under review and in the process of being upgraded to improve all aspects of truck traffic. The regional figures reflect the observed volumes. Figures 1 and 2 illustrate the distribution of trips originating south of the Fraser River for Auto and Trucks respectively.

Figure 1. Distribution of Auto Demand – 2045 AM Peak Hr

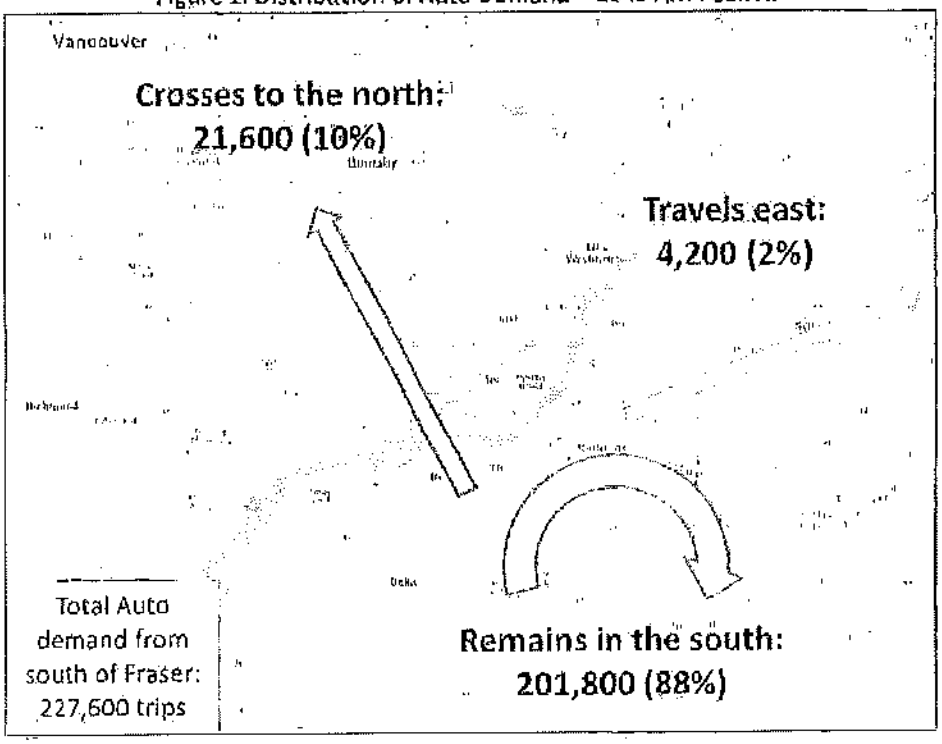
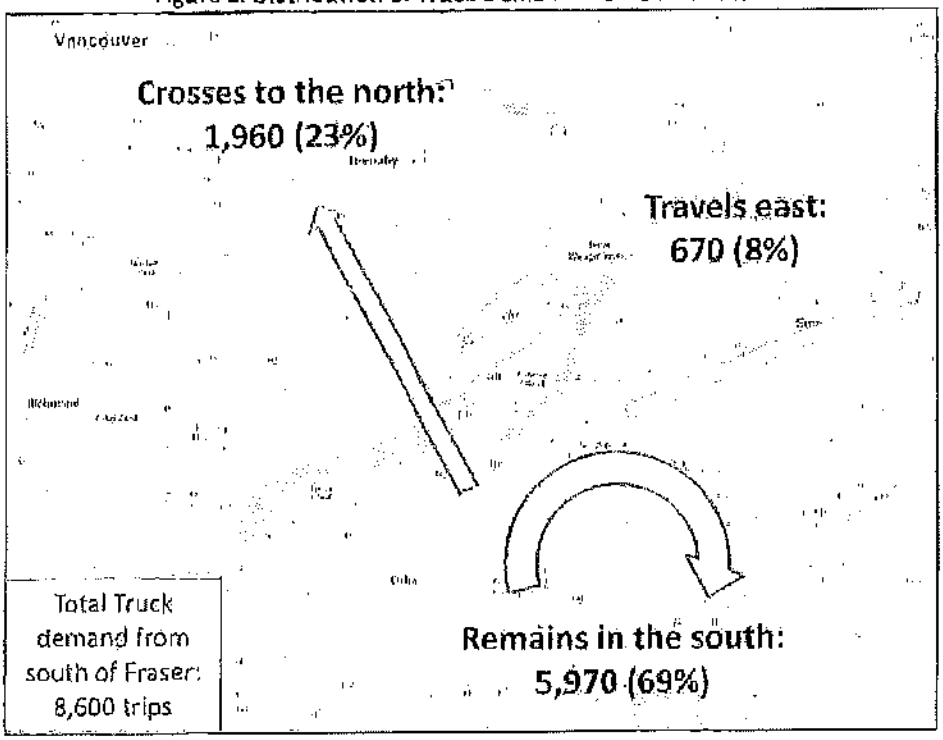


Figure 2. Distribution of Truck Demand – 2045 AM Peak Hr



REGIONAL NETWORK Results - Tunnel and Bridge Options.

Key REGIONAL NETWORK Indicators		Year 2011	Year 2045							
		Base Case - Tunnel	Future - 4-Lane Tunnel. MGS Land Use				Future - 8-Lane Bridge. MGS Land Use			
		WITHOUT Toll	WITHOUT Toll		WITH Toll		WITHOUT Toll		WITH Toll	
Total Regional Person-Trips	- by AUTO	434,300	619,800	(43%)	619,600	(43%)	619,800	(43%)	619,500	(43%)
	- by TRANSIT	91,300	146,500	(60%)	146,700	(61%)	146,600	(61%)	146,600	(61%)
Modal Split (Auto/Transit)		83 / 17	81 / 19	(-2% / 12%)	81 / 19	(-2% / 12%)	81 / 19	(-2% / 12%)	81 / 19	(-2% / 12%)
Vehicle Km Travelled (veh-km)		3,712,700	5,263,700	(42%)	5,248,600	(41%)	5,296,700	(43%)	5,255,800	(42%)
% of Auto Links V/C >1:		13%	20%	(46%)	19%	(46%)	20%	(47%)	19%	(45%)
2-way Volumes at N-S Crossings:	Traffic	32,700	40,300	(23%)	39,300	(20%)	42,200	(28%)	39,200	(20%)
	Transit Trips	1,700	2,300	(35%)	2,300	(35%)	2,800	(65%)	2,600	(53%)

* This is the total 2-way volumes at relevant water crossings across the Fraser River that could reasonably be used to get from south of the Fraser into Richmond and the Burrard Peninsula. Traffic volumes include the Massey Tunnel, Alex Fraser, Pattullo and Port Mann bridges; transit trips are limited to the Massey Tunnel, Alex Fraser and Port Mann bridges.

MASSEY CORRIDOR Results - Tunnel and Bridge Options.

Key MASSEY CORRIDOR Indicators	Year 2011	Year 2045							
	Base Case - Tunnel	Future - 4-Lane Tunnel. MGS Land Use				Future - 8-Lane Bridge. MGS Land Use			
	WITHOUT Toll	WITHOUT Toll		WITH Toll		WITHOUT Toll		WITH Toll	
2-way Person-Trips at Massey crossing - by AUTO	8,200	9,100	(11%)	7,800	(-5%)	14,100	(72%)	10,400	(27%)
- by TRANSIT	1,150	840	(-27%)	970	(-16%)	1,450	(26%)	1,400	(22%)
Modal Split (Auto/Transit)	88 / 12	91/9	(3% / -25%)	89 / 11	(1% / -8%)	91/9	(3% / -25%)	88 / 12	(0% / 0%)
Total 2-way Traffic Volume at Massey crossing:	7,040	7,870	(12%)	6,730	(-4%)	11,010	(56%)	8,210	(17%)
VKT (veh-km)	223,200	260,800	(17%)	220,300	(-1%)	374,600	(68%)	275,600	(23%)
V/C Ratio (2-way weighted avg.)	1.26	1.41	(12%)	1.21	(-4%)	0.93	(-25%)	0.76	(-39%)
V/C Ratio (inbound peak)	1.27	1.41	(11%)	1.24	(-2%)	1.14	(-10%)	0.91	(-28%)
Avg. Speed (km/hr)	29	22	(-26%)	32	(9%)	54	(83%)	70	(138%)
AUTO travel performance: 8 Ave to Oak St Bridge:									
Time (min)	35	38	(9%)	32	(-9%)	38	(8%)	31	(-10%)
Avg. Speed (km/hr)	68	61	(-9%)	73	(9%)	62	(-8%)	75	(10%)

Figure 3 (passenger vehicles) and Figure 4 (trucks) on the following page compare the 2045 forecasts for a new 8-lane, tolled crossing compared to the current 4-lane tunnel without tolls.

Figure 3. Difference in Auto trips 8-lane bridge (tolled) vs. 4-lane tunnel (untolled) – 2045 AM Peak Hr

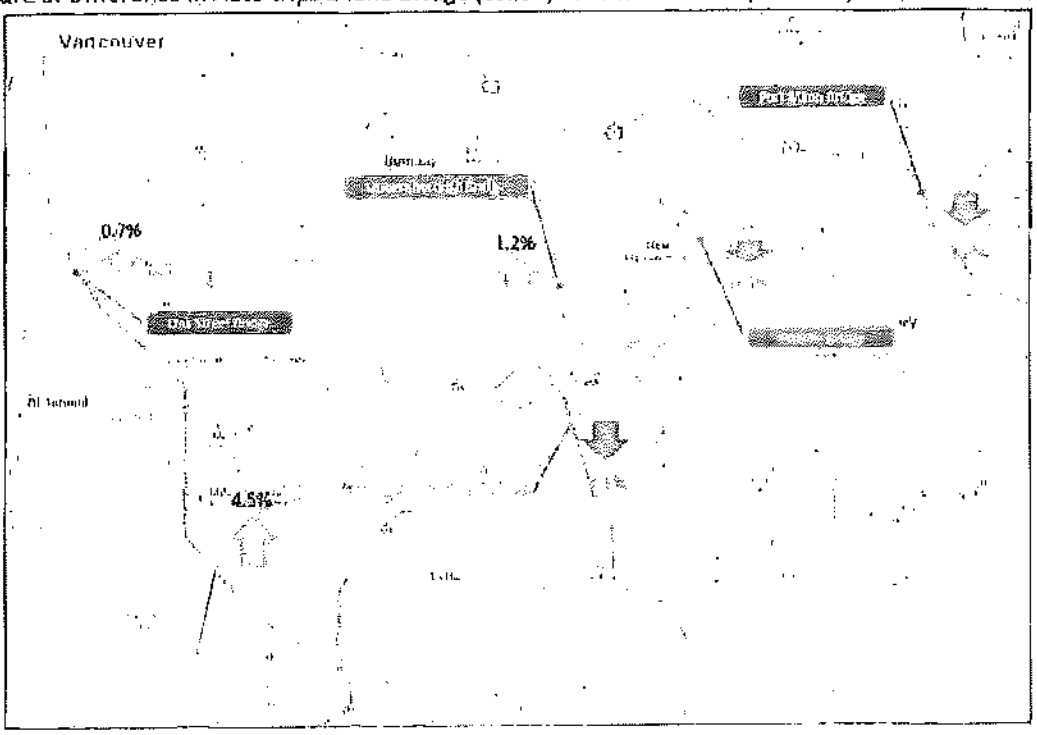
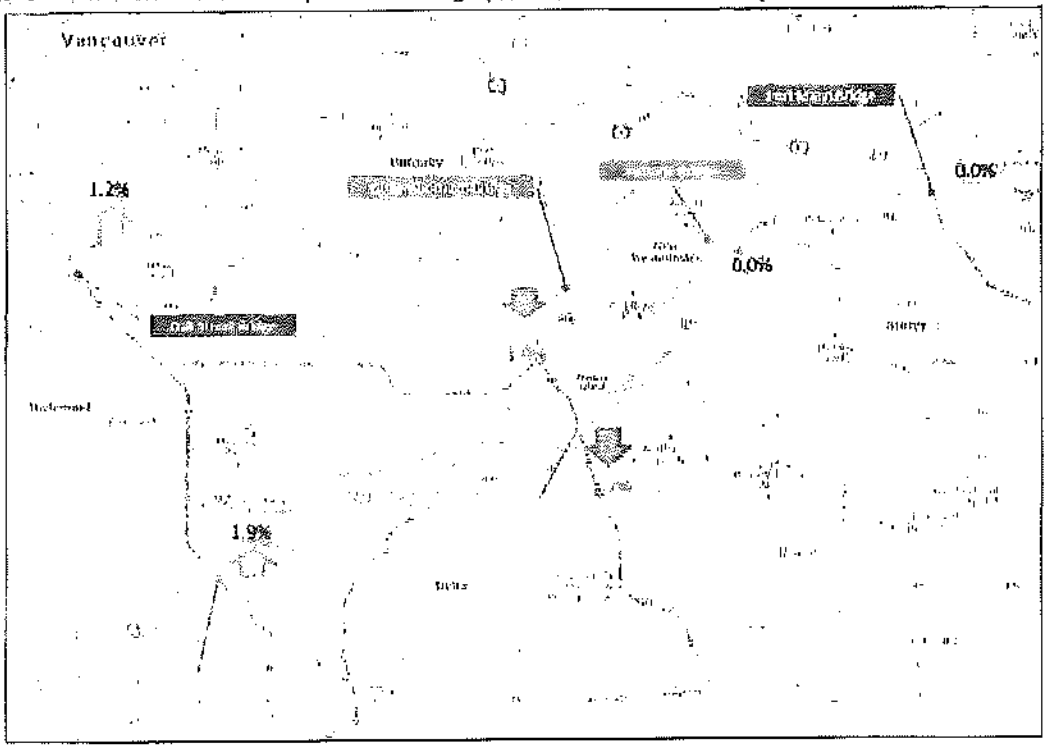


Figure 4. Difference in Truck trips 8-lane bridge (tolled) vs. 4-lane tunnel (untolled) – 2045 AM Peak Hr



Sensitivity Tests

In addition to the five base model runs, this analysis tested the sensitivity of the system to alternative land use assumptions and background network and service conditions. The objective of these tests is to provide a high level assessment of the potential transportation impacts.

Sensitivity Test 1: Alternative Land Use - Methodology and Assumptions

TransLink commissioned Coriolis Consulting Corp, to develop a set of 2045 land use forecasts which illustrate the potential land use impacts of a new 8-lane bridge replacing the Massey tunnel. Coriolis developed these land use forecasts in coordination with TransLink staff and reviewed the findings with Metro Vancouver staff. The future land use was assigned to each transportation zone based on the following observations from the assessment.

The bridge and associated road works could impact the distribution of population and households, due to increased accessibility, as follows:

- About 1% of the suburban population growth that will be accommodated in single family and townhouse development (about 4,400 people) would likely shift from West Richmond and Steveston to South Delta (Ladner and Tsawwassen) and South Surrey.
- There may also be a small shift in population growth from high density nodes (e.g. Yaletown, Lonsdale, Metrotown) to South Delta and South Surrey, but this shift would be small and therefore is not modeled.

The bridge and associated road works could impact the distribution of employment, due to increased accessibility, as follows:

- South Delta and South Surrey would likely receive a slightly higher shares of population-serving employment there (e.g. retail and service employment) and corresponding less in West Richmond and Steveston.
- The pace of light industrial development would likely occur faster in Richmond, Delta (e.g. Tilbury, Tsawwassen First Nation), and parts of South Surrey in the short term and correspondingly slower in South Burnaby and North Surrey. However, the industrial land supply in these areas (and the entire region) is likely to be constrained by 2045, resulting in no significant differences in the total amount of light industrial employment at these locations. [1]

[1] The removal of the tunnel could open up the south arm of the Fraser to deep draught (or higher capacity) vessels. However, Port Metro Vancouver has indicated that the ability to dredge this arm of the Fraser to facilitate deeper or more fully loaded vessels is limited by width of the river. Therefore the Consultant did not assume that these higher capacity vessels would not be going upstream and therefore do not impact employment distribution. Subsequent to the analysis by Coriolis, Metro Vancouver indicated that the potential to open up the south arm of the Fraser River to access Fraser Surrey Docks, either for short-sea shipping or expanded container throughput, could represent a material shift in the region's ability to move goods, which may impact employment distribution- this potential effect was not included in the sensitivity test.

This set of land use forecasts was run through the model for the future bridge, with and without toll, in order to examine how changes in land use may impact travel demand and travel patterns.

Results

The following table summarizes the differences between applying the base and the alternative land use scenarios form Coriolis in the case of a bridge in 2045.

REGIONAL NETWORK Results 2045 - Difference between CORIOLIS Base and Alternative Land Use

Key REGIONAL NETWORK Indicators		Future - 8-Lane Bridge. Coriolis Alternative - Base Land Use	
		Bridge WITHOUT Toll	Bridge WITH Toll
Total Regional Person-Trips	- by AUTO	-2,900	-3,000
	- by TRANSIT	0	-100
Transit Mode Share (%)		0%	0%
Vehicle Km Travelled (veh km)		600	1,400
% of Auto Links V/C >1:		0%	0%
2-way Volumes at N-S Crossings:	Traffic	100	200
	Transit Trips	0	0

MASSEY CORRIDOR Results 2045 - Difference between CORIOLIS Base and Alternative Land Use

Key MASSEY CORRIDOR Indicators	Future - 8-Lane Bridge. Coriolis Alternative - Base Land Use	
	Bridge WITHOUT Toll	Bridge WITH Toll
2-way Person-Trips at Massey crossing - by AUTO	0	100
- by TRANSIT	20	10
Transit Mode Share (%)	0%	0%
Total 2-way Traffic Volume at Massey crossing:	40	70
VKT (veh-km)	1,200	2,200
V/C Ratio	1%	1%
Avg. Speed (km/hr)	0	0

Sensitivity Test 2: Alternative Transportation Network- Network Assumptions

As part of the Regional Transportation Strategy planning process, TransLink developed a number of alternative future transportation network scenarios. These scenarios reflect different levels of investment in the regional transportation network and demand management measures. For the purpose of this sensitivity test, TransLink assumed RTS Alternative 3 regional network background conditions. In terms of network infrastructure and services, RTS Alternative 3 assumes a major expansion of transit, cycling and walking:

- Rapid Transit expansion on key corridors
- Transit priority on high capacity, congested transit corridors
- Expanded Frequent Transit Network and extended supportive transit network to new areas
- Significant investment in cycling and walking
- Minor incremental road expansion
- New, tolled Patullo Bridge

Alternative 3 assumes that general increases in bus service would result in much higher frequency of bus service on most routes within the Massey corridor. This level of planning has not yet occurred, but for working purposes an expansion allocation of 90 buses/hour compared to 39 buses/hour in 2011 was used for modelling.

Results

The following table summarizes the differences between RTS Alternative 3 and RTS Base Case with a new 8-lane tolled bridge in 2045.

REGIONAL NETWORK 2045 - Difference Alt. 3 - Base Network with Tolled

Key REGIONAL NETWORK Indicators		Future 8-Lane Tolled Bridge with RTS ALT3 - RTS Base Network Bridge WITH Toll
Total Regional Person-Trips	- by AUTO	-11,200
	- by TRANSIT	13,700
Transit Mode Share (%)		9%
Vehicle Km Travelled (veh-km)		-93,800
% of Auto Links V/C >1:		0%
2-way Volumes at N-S Crossings:	Traffic	-300
	Transit trips	500

MASSEY CORRIDOR 2045 - Difference Alt. 3 - Base Network with Tolled Br

Key MASSEY CORRIDOR Indicators		Future 8-Lane Tolled Bridge with RTS ALT3 - RTS Base Network Bridge WITH Toll
2 way Person-Trips at Massey crossing	- by AUTO	-100
	- by TRANSIT	120
Transit Mode Share (%)		8%
Total 2-way Traffic Volume at Massey crossing:		-130
	VKT (veh-km)	-4,900
	V/C Ratio	-1%
	Avg. Speed (km/hr)	4

Summary of Preliminary Observations

In interpreting the model outputs, it is important to keep in mind that they are intended to provide a high level approximation of what transportation behaviour may be like in the future given the current set of land use and network assumptions. The figures are order-of-magnitude illustrations and are appropriate for relative comparisons between scenarios. They should not be interpreted as precise predictions of future traffic or passenger volumes, especially on specific road sections or transit route segments. As noted earlier, the modelled results are for the AM peak hour only.

Summary of Current Conditions (Base Case 2011):

- The tunnel shows high levels of congestion and a demand that significantly exceeding capacity, with a volume-to-capacity (v/c) ratio > 1.3 leading to queuing on the approaches to the tunnel.
- The tunnel's two way traffic volume is approximately 7,000 vehicles/hour. This represents 22% of total Fraser River crossings (as defined in the previous Network Regional table).

- Transit mode share at the tunnel (12%) is lower than the network average (17%).

Summary of System Wide Conditions 2045 (all base scenarios):

- At the regional level, there would be over 45% more trips (all modes) compared to 2011.
- The future regional network level travel demand is expected to be similar for all five base model crossing scenarios with only marginal variations.
- The model forecasts the total number of daily regional trips will be about 766,000; total regional transit demand will be about 146,000 trips.
- The regional transit mode share should thus be stable (at about 19% across all scenarios).

George Massey Corridor Level 2045

- Background growth in population and employment alone should result in 11% more person-vehicle trips and 12% more traffic volume through the tunnel in 2045, compared to today.
- Without any changes to the existing tunnel,
    - Congestion would increase, with a volume-to-capacity ratio of over 1.4
    - Transit mode share on the corridor would drop from 12% in 2011 to 9% in 2045.

At the corridor level, the model shows potentially significant differences in transportation behaviour for the four future crossing scenarios. Comparing an 8-lane bridge to a 4-lane untolled tunnel in 2045:

- A new 8-lane bridge without tolls would have:
    - 40% more traffic;
    - a v/c ratio improvement from 1.4 to 0.95 for the 2-way weighted average and to 1.14 for the inbound peak direction;
    - An increase in total two-way transit trips of 73%, but, due to higher vehicle travel, no change in transit mode share (stable at 9%).
- If tolled, a new 8-lane bridge in 2045 could potentially have:
    - 4% more traffic than the existing tunnel;
    - Lower congestion levels than untolled (a v/c ratio of 0.76 for the 2-way weighted average and 0.91 for the inbound peak direction);
- An increase in total two-way transit trips of 67%, and an increase in transit mode share from 9% to 12% due to the lower number of vehicle trips in this scenario. These volumes and mode shares appear reasonable given the Year 2045 RTS Base Case does not assume significant levels of transit investment.

Alternative Land Use Sensitivity Test
At the regional level, the alternative land use tested generates marginal impacts on network level travel demand in 2045; slightly less vehicles trips (0.5% fewer) and about the same number of transit trips. Regional transit mode share forecasts remain stable.

At the corridor level, this alternative land use forecast does not generate statistically more traffic for the new bridge (or the north-south crossings collectively) compared to the Base Case land use. This is likely due to the fact that most of the changes of population relocation are accompanied by similar reallocations of employment.

In 2045, within the corridor, the alternative land use scenario is expected to have similar trends in transportation behaviour as the other bridge crossing scenarios with base land use.

Alternative Transportation Network Sensitivity Test
As described previously, the alternative background transportation network assumptions tested include transit expansion (RTS Alternative 3). At the regional level, this scenario forecasts higher transit trips and transit mode share in 2045 compared to Base Case scenario. The variation in mode share is expected to be slightly less noticeable at the corridor level but it would increase from 19% to 21% region-wide for the AM peak hour.

At the corridor level, the alternative transportation network tested resulted in marginally lower vehicle traffic at the Massey crossing in 2045. Similarly, this reduction in vehicle traffic would translate directly into more transit ridership, though the increase however remains small. The stability of the forecast is likely due to the fact that the transit, cycling and road upgrades envisioned for this corridor do not significantly alter the relative attractiveness of the different modes.

In 2045, within the corridor, the alternative background transportation network scenario is expected to have similar trends in transportation behaviour as the other bridge crossing scenarios with base case transportation network.

This 2045 transportation network sensitivity test includes completion of a practical, comfortable and safe cycling network. These facilities, along with convenient crossing on a new bridge, would provide better options for people to bicycle, likely resulting in large percentage increases. However, the land use and travel patterns around the bridge mean the number of absolute trips that would be conducive for shifting to cycling is unlikely to be large enough to alter the preliminary vehicle and transit travel demand forecasts previously discussed.

Source: TransLink 2011 Metro Vancouver Regional Screenline Survey

Crossing	Daily Traffic Volumes (2011)*	Estimated Annual Trips (Daily x 365 days)	Estimated Annual Weekday Trips (Daily x260 days)
Arthur Laing Bridge	79,000	*28,835,000*	*20,540,000*
Oak Street Bridge	88,000	*32,120,000*	*22,880,000*
Knight Street Bridge	96,000	*35,040,000*	*24,960,000*
George Massey Tunnel	89,000	*32,485,000*	*23,140,000*
Queensborough Bridge	88,000	*32,120,000*	*22,880,000*
Alex Fraser Bridge	117,000	*42,705,000*	*30,420,000*
Pattullo Bridge	68,000	*24,820,000*	*17,680,000*
Port Mann Bridge	112,000	*40,880,000*	*29,120,000*
Pitt River Bridge	79,000	*28,835,000*	*20,540,000*
Golden Ears Bridge	30,000	*10,950,000*	*7,800,000*
Lion's Gate Bridge	63,000	*22,995,000*	*16,380,000*
Iron Workers Memorial Bridge	127,000	*46,355,000*	*33,020,000*
Subtotal	**1,036,000**	***378,140,000***	***269,360,000***

**Daily traffic volumes are based on an average fall weekday in 2011.*

Crossing	Actual Toll Revenue	Year	Document Source
Port Mann Bridge	$122 Million	2014	Transportation Investment Corporation 2014/2015 Annual Service Plan Report
Golden Ears Bridge	$41.6 Million	2014	TransLink 2014 Year-End Financial and Performance Report Appendix A

The Corporation of Delta
Engineering

MEMORANDUM

To: **Mayor Lois E. Jackson**

From: **Steven Lan, P.Eng., Director of Engineering**

Date: **February 29, 2016**

Subject: **George Massey Tunnel Replacement Project: Comments made by Metro Vancouver in relation to their request for additional review time of the Project Definition Report**

File No.: **5220-30/GMTR**

CC: **George V. Harvie, Chief Administrative Officer**

Provided below is additional information from the George Massey Tunnel Project Team in response to the recent Metro Vancouver staff report on the project.

1. **Delay Request**

- Ministry staff have met with Metro Vancouver more than 20 times over the past three years.
- Metro Vancouver staff participate in the technical working group for the Project's environmental assessment review.
- Metro Vancouver staff have already provided written comments on the PDR and the Environmental Assessment Project Definition and Key Areas of Study document.
- The Project Team has met with Delta and Richmond staff more than 60 times each in the past three years and both municipalities have also sent comments.
- Once the EA application is submitted, there will be another 45 to 60 day public comment period and at least six more months of time for discussion and comment from Metro Vancouver staff and directors.

2. **Federal Environmental Review**

- Currently there is no federal trigger for the environmental review.
- Changing federal legislation will take some time.

3. Other Items

Building more roadway lanes encourages more car trips, most of which are made in single-occupant vehicles, ultimately leading to more congestion.

- The Project includes measures to promote transit, carpooling, cycling and walking and to help manage growth in vehicle demand over time.
- With or without the new bridge to replace the George Massey Tunnel, traffic on Highway 99 will continue to grow as more people move to Richmond and Delta and more jobs are created.
- Building an 8-lane bridge will result in congestion on opening day.

Investment in the George Massey Tunnel Replacement Project means that the Province no longer supports the Regional Growth Strategy (RGS).

The RGS calls for measures to reduce greenhouse gases, use land efficiently, build an efficient transportation system and a stable economy, protect natural areas, develop complete communities that support walking and transit, and support sustainable transportation choices. All of these were considered in developing the project scope. For example:

- The Project is expected to help reduce greenhouse gas emissions as a result of reduced congestion-related idling.
- Municipal population and employment targets and existing land use designations were used as the basis for traffic forecasting.
- The Project will reduce congestion, improve travel time and reliability, improve transit service, provide new alternatives for cycling and walking, provide safe alternatives for slower moving traffic, and accommodate future rapid transit. Most of these would not be possible if the Tunnel is not replaced.
- Additionally, the Project provides the opportunity to return Green Slough to its original alignment and reconnect portions of Deas Island Regional Park that are currently bisected by Highway 99.

Most people were unaware of planning for the Project before the Premier announced plans to proceed.

- There have been three phases of public consultation in 2012, 2013, and 2015/16.
- More than 1,000 people participated in each of the three phases of consultation, including 550 people at the Delta open house a few weeks ago.
- Participation levels during this Project's consultation have far exceeded many other recent consultations in this region and hundreds of meetings have been held with First Nations, regional and local government staff, and interested stakeholders.
- The Province's EA communication plan notes that more than 90 presentations have been made to date, in addition to hundreds of meetings with government and agency staff.

Port Metro Vancouver is driving the Project

- The new bridge will have the same vertical clearance as the Alex Fraser Bridge.
- There are no plans to dredge the river to a deeper depth once the Tunnel is removed.
- All current proposals for expansion on the Fraser River can be accommodated with the Tunnel in place.

The Project will take away much needed funding ($4 billion) that should be spent on carbon mitigation, especially in transport for the province.

- The Project will be tolled, ensuring that construction can begin now without taking away from funding for other important initiatives like health care, education, rapid transit and other transportation projects.
- The Province has committed to funding the province's share of the Broadway Line extension and the Surrey-Langley Rapid Transit lines.

The Tunnel should be left for use as a mass transit rail and as a means to prevent proposed LNG and coal expansion on the South Fraser.

- The new bridge will be built to accommodate future rail-based transit, and in the meantime will support improved Rapid Bus service, with dedicated transit lanes, dedicated transit ramps to

connect to Bridgeport SkyTrain Station and integrated transit stops at Steveston Highway and Highway 17A.
- Currently proposed coal and LNG developments can proceed without removing the Tunnel; in fact, LNG vessels have shallower draft requirements than the container vessels using the Fraser River today.

The Project will negatively impact farmland in Delta and Richmond, compromising regional food security and putting pressure to remove land from the Agricultural Land Reserve.

- The Province has committed to no net loss of agricultural land and is working with farmers to achieve a net gain in quality farmland in Delta and in Richmond.
- Like the South Fraser Perimeter Road, this Project also offers potential agricultural benefits like improved cross-highway access and travel time reliability for getting perishables to market.
- The Project Team is working with the Delta Farmers' Institute, the Richmond Farmers' Institute and individual farmers.
- The Agricultural Land Reserve is protected by provincial legislation.

The Project will result in more idling or about the same for vehicles at the other bottlenecks resulting from the construction as well as increased traffic encouraged by the bridge.

- The Project is expected to reduce congestion related idling – both as compared with today and to a future without a new bridge. This will contribute to reduced greenhouse gas emissions.
- Bridge tolls will serve to help manage growth in traffic over time.

Steven Lan, P.Eng., Director of Engineering

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