BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY

DISTRICT OF NORTH VANCOUVER

LANDSLIDE RISK SUMMARY

FINAL REPORT

PROJECT NO: 0404-035

DATE: November 12, 2010

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November 12, 2010
Project No. 0404-035

Ms. Fiona Dercole
Section Manager – Public Safety
District North Vancouver
355 West Queens Road
North Vancouver, BC
V7N 4N5

Dear Fiona,

Re: District of North Vancouver Landslide Risk Summary

Please find attached 5 copies of our above-referenced final report dated November 12, 2010.

Should you have any questions or comments, please do not hesitate to contact me at the number listed above.

Yours sincerely,

BGC ENGINEERING INC.
per:

Sam Fougère, M.Sc., P.Geo.
Engineering Geologist

EXECUTIVE SUMMARY

Following the landslide along the Berkley Escarpment on January 19, 2005, the District of North Vancouver (DNV) initiated a proactive risk-based approach to the management of natural hazards. BGC Engineering Inc. (BGC) was retained to complete a quantitative risk assessment (QRA) along the entire Berkley Escarpment, and to work with DNV to review and compile an inventory of records pertaining to geotechnical and geohazard issues across the District. On the basis of this review DNV identified priority areas for preliminary landslide hazard assessments (Drawing 1), including:

- Berkley Escarpment;
- Indian Arm Debris Flow Fans;
- Pemberton Heights Escarpment;
- Westlynn Escarpment;
- Deep Cove/Cove Cliff;
- Riverside West;
- Mosquito Creek;
- Capilano River East; and,
- Mount Fromme East.

Between 2006 and 2010, preliminary landslide hazard and quantitative risk assessments were completed for these priority areas and for known debris flow fans along Indian Arm.

This reports presents an overview of the landslide risk-management process and updated summary of all available preliminary and quantitative risk assessments (QRA's) completed within the District since the January 2005 Berkley Escarpment landslide. The intent of this summary document is to collate landslide risk information at each location and provide up-to-date information to assist District planning staff.

The purpose of the landslide assessments completed since 2006 was to determine where additional investigation or mitigation was required and to prioritize DNV's landslide risk reduction efforts. DNV retained BGC to conduct preliminary landslide hazard assessments and risk analyses to prioritize sites for more detailed QRA. In most cases the methodology developed following the January 2005 Berkley Escarpment landslide provided the technical framework for the assessments summarized in this report (BGC 2006a, 2006b and 2007a). Some landslide hazards involved different geological conditions, failure mechanisms, or urban development scenarios than were present along the Berkley Escarpment. These sites required different landslide hazard and risk assessment techniques that used the results of limit equilibrium slope stability analyses, rock fall runout analyses, and professional judgment. The approaches taken to assess landslide safety are consistent with those

recommended in landslide guidelines published by the Association of Professional Engineers and Geoscientists of British Columbia (APEGBC 2008).

Results of the preliminary landslide hazard assessments were intended to support the 'Preliminary Analysis' phase of the risk management decision-making process as outlined in the Canadian Standards Association Risk Management Guidelines for Decision-Makers (CAN/CSA Q850-97). The purpose of the 'Preliminary Analysis' phase was to prioritize areas requiring further investigation. More detailed landslide investigations and risk analyses (QRA's) were carried out at select locations to support the 'Risk Estimation' and 'Risk Evaluation' phases of the risk management decision-making process.

The preliminary landslide screening studies were predominantly desk-based studies supplemented by brief field inspections (BGC 2007b, 2009a, 2009b, 2009c, 2009d, 2009e, and 2009f). Additional data collected as part of the more detailed investigations and analyses included visual observations such as slope angle, the presence of seepage, and evidence of slope deformation (BGC 2006a, 2006b, 2007a, 2008a and 2010a). Shallow hand and mechanical auger holes were completed to assess the thickness of loose fill and colluvial soils.

BGC recommends that DNV continue to provide updated information and education to the public on how to reduce landslide risk when living near steep slopes. For example, alteration of surface drainage and placement of fill and garden waste at the crest of escarpment slopes may increase the potential for slope instability through erosion, raising of the water table, slope oversteepening and by introducing materials with lower strength than the native soils. These practices should be avoided.

Records for sites identified in this study have been added to DNV's natural hazard database, which is currently under development, to help facilitate future geotechnical inspections. Geotechnical inspections should be conducted on approximately 3 to 5 year intervals by professional engineers or geoscientists experienced in slope stability and landslide risk assessment issues.

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LIMITATIONS OF REPORT

BGC Engineering Inc. (BGC) prepared this document for the account of District of North Vancouver (DNV). It presents the results of landslide investigations, factor of safety calculations, and risk estimates, along with recommendations for risk management for landslides triggered by intense rainfall. Other natural hazards, such as flooding, soil erosion and debris flows are not included in this study. Landslides triggered by earthquakes, slope excavation, or other processes are generally not considered in this study.

The material in it reflects the judgment of BGC staff in light of the information available to BGC at the time of document preparation. Any use which a third party makes of this document or any reliance on decisions to be based on it are the responsibility of such third parties. BGC accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this document.

As a mutual protection to our client, the public, and ourselves, all documents and drawings are submitted for the confidential information of our client for a specific project. Authorization for any use and/or publication of this document or any data, statements, conclusions or abstracts from or regarding our documents and drawings, through any form of print or electronic media, including without limitation, posting or reproduction of same on any website, is reserved pending BGC's written approval.

It is understood that the District of North Vancouver might make this report and drawings available to the community for the sole purpose of conveying current information about landslide risk management as limited in paragraph one, above.

Anyone in the community receiving a copy of this report and drawings is urged to recognize that these documents represent one of many steps in the risk management process as defined by Canadian Standards Association Guidelines[1].

If this document is issued in an electronic format, an original paper copy is on file at BGC and that copy is the primary reference with precedence over any electronic copy of the document, or any extracts from our documents published by others.

[1] As referenced on page 1.

1.0 INTRODUCTION

After the landslide along the Berkley Escarpment on January 19, 2005, the District of North Vancouver (DNV) initiated a proactive risk-based approach to the management of natural hazards. BGC Engineering Inc. (BGC) was retained to complete a quantitative risk assessment (QRA) along the entire Berkley Escarpment, and to work with DNV to review and compile an inventory of records pertaining to geotechnical and geohazard issues across the District. On the basis of this review DNV identified priority areas for preliminary landslide hazard assessments (Drawing 1), including:

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- Mosquito Creek;
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- Mount Fromme East.

Between 2006 and 2010, preliminary landslide hazard and quantitative risk assessments were completed for these priority areas and for known debris flow fans along Indian Arm.

An overview of the landslide risk-management process and updated summary of all available preliminary and quantitative risk assessments (QRA's) completed within the District since the January 2005 Berkley Escarpment landslide is presented in this report. The intent of this summary document is to collate landslide risk information at each location and provide up-to-date information to assist District planning staff.

BGC's scope of work was outlined in a proposal dated April 7, 2010 (BGC 2010b) and was carried out according to terms and conditions outlined in a consulting and professional services agreement dated March 28, 2007.

The purpose of the landslide assessments completed since 2006 was to determine where additional investigation or mitigation was required and to prioritize DNV's landslide risk reduction efforts. DNV retained BGC to conduct preliminary landslide hazard assessments and risk analyses to prioritize sites for more detailed QRA. In most cases the methodology developed following the January 2005 Berkley Escarpment landslide provided the technical framework for the assessments summarized in this report (BGC 2006a, 2006b and 2007a). Some landslide hazards involved different geological conditions, failure mechanisms, or

urban development scenarios than were present along the Berkley Escarpment. These sites required different landslide hazard and risk assessment techniques that used the results of limit equilibrium slope stability analyses, rock fall runout analyses, and professional judgment. The approaches taken to assess landslide safety are consistent with those recommended in landslide guidelines published by the Association of Professional Engineers and Geoscientists of British Columbia (APEGBC 2008).

Results of the preliminary landslide hazard assessments were intended to support the 'Preliminary Analysis' phase of the risk management decision-making process as outlined in the Canadian Standards Association Risk Management Guidelines for Decision-Makers (CAN/CSA Q850-97). The purpose of the 'Preliminary Analysis' phase was to prioritize areas requiring further investigation. More detailed landslide investigations and risk analyses (QRA's) were carried out at select locations to support the 'Risk Estimation' and 'Risk Evaluation' phases of the risk management decision-making process.

The preliminary landslide screening studies were predominantly desk-based studies supplemented by brief field inspections (BGC 2007b, 2009a, 2009b, 2009c, 2009d, 2009e, and 2009f). Additional data collected as part of the more detailed investigations and analyses included visual observations such as slope angle, the presence of seepage, and evidence of slope deformation (BGC 2006a, 2006b, 2007a, 2008a and 2010a). Shallow hand and mechanical auger holes were completed to assess the thickness of loose fill and colluvial soils.

Section 2 of this report describes the landslide risk management process. In Section 3 a brief description of the landslide risk assessment for each study area is outlined and guidance on how to use and interpret the appended summary tables and drawings is provided. Section 4 provides recommendations for the ongoing management of landslide hazards within the District study areas.

Risk control mitigation options and specific recommendations for risk reduction at individual sites were reported in the results from each of the QRA studies and are not reproduced here.

2.0 LANDSLIDE RISK MANAGEMENT

2.1. Background

Following the January 19, 2005 landslide along the Berkley Escarpment, DNV initiated a proactive risk-based approach to the management of natural hazards. The first phase encompassed a detailed quantitative risk assessment (QRA) and mitigation of landslide hazards along the crest of the Berkley Escarpment (BGC 2006a, 2006b, and 2007a). Quantitative risk estimates were also prepared for debris flow hazards throughout the District (BGC 2007b). Subsequent work included a QRA of landslides originating from the Westlynn and Pemberton Heights Escarpments (BGC 2007b, 2008a, 2009f, and 2010a). More recently a QRA of landslides originating from the Capilano River East, Mosquito Creek and Riverside West Escarpments, and the Deep Cove – Cove Cliff and Mount Fromme East areas was undertaken (BGC 2009a, 2009b, 2009c, 2009d, 2009e, and 2010a). In all cases, investigations focused on estimating the potential for loss of life to house occupants exposed to known landslide hazards.

DNV's natural hazard program uses the risk management framework outlined in Figure 1. This framework follows Canadian and international guidelines for risk management (CAN/CSA Q850-97) and is described in more detail in the sections that follow.

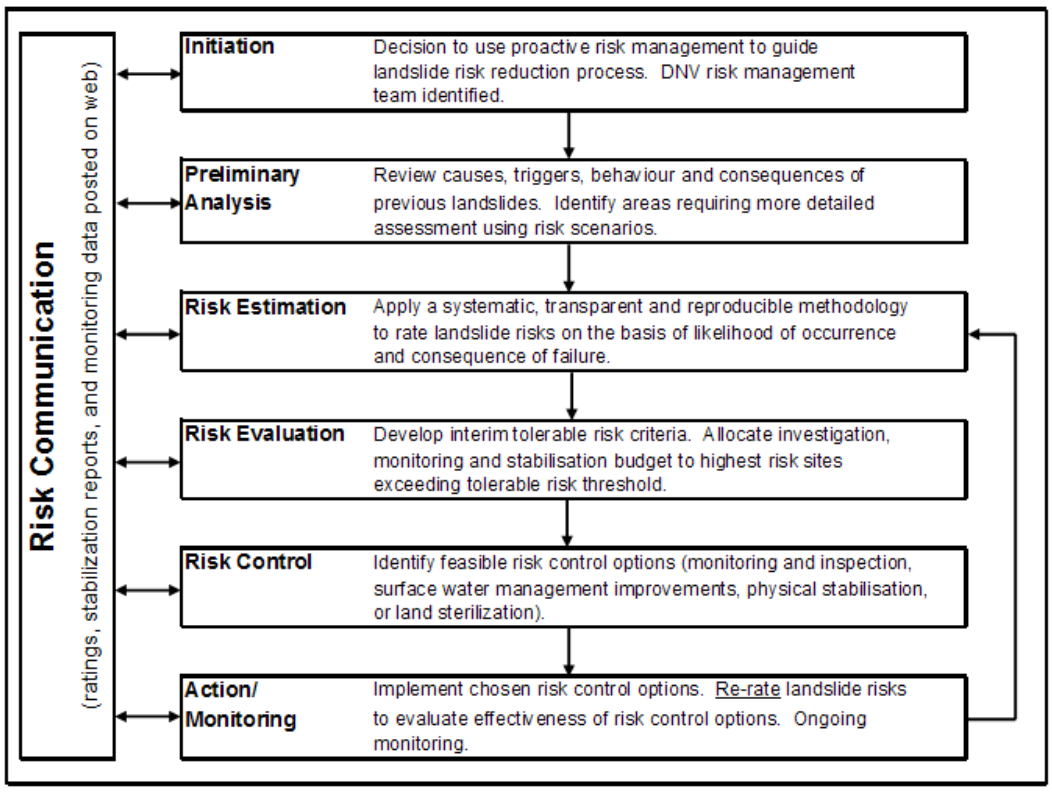

Figure 1 DNV Landslide Risk Management Cycle (after CAN/CSA-Q850-97)

2.2. Preliminary Analysis

The purpose of the Preliminary Analysis phase is to determine the types of hazards that might be present and to identify locations where more detailed analysis is warranted. Preliminary landslide hazard assessment and risk analysis was used to assign a qualitative rating to each study area site using partial risk (BGC 2009a, 2009b, 2009c, 2009d, 2009e and 2009f). A brief summary of the partial risk rating process is outlined below.

2.2.1. Qualitative Landslide Partial Risk, $P_{H:A}$

For each habitable structure investigated as part of the preliminary analysis a Qualitative Landslide Partial Risk, $P_{H:A}$, was determined by combining an assessment of Landslide Hazard Probability, P_H, and a Spatial Probability of Impact, $P_{S:H}$ (BGC 2009a, 2009b, 2009c, 2009d, 2009e and 2009f). Hazard Probability, P_H, refers to the likelihood of occurrence of a slope failure. Qualitative estimates of hazard probability were provided at each property, based on evidence of past failures or adverse slope conditions, as observed in aerial photographs, documented in other reports, or observed in the field. Spatial Probability of Impact, $P_{S:H}$, refers to the likelihood that a landslide will impact habitable structures at either the crest, ($P_{S:H;\ CREST}$), or base, ($P_{S:H;\ BASE}$), of the escarpment slopes, or a combination of both. Qualitative partial risk criteria are shown in Table 1.

Table 1 Qualitative Partial Risk Matrix

$P_{HA} = P_H \times P_{S:H}$ Probability of a specific landslide impacting the identified elements at risk		P_H (Landslide Likelihood)		
		Low	Moderate	High
$P_{S:H}$ (Spatial Probability of Impact – highest risk of either $P_{S:H;\ CREST\ or\ BASE}$)	Low	Very Low	Low	Moderate
	Moderate	Low	Moderate	High
	High	Moderate	High	Very High

Qualitative partial risk estimates do not systematically account for variations in landslide consequence, such as individuals' temporal probability of impact, vulnerability, or risk of loss of life.

Experience gained from the Berkley Escarpment risk assessment suggested further investigation and risk assessment was warranted for 'Very High' and 'High' rated sites as these sites may pose unacceptable individual or societal risk (BGC 2006a, 2006b, and 2007a). Based on the findings of the preliminary analysis and following consultation with affected stakeholders DNV elected to proceed with the 'Risk Estimation' and 'Risk Evaluation' phases for all 'Very High' and 'High' rated sites.

2.3. Risk Estimation

Landslide risk is estimated by multiplying the annual likelihood of a slide (P_{SLIDE}) by the spatial probability of impact of individuals exposed to the hazard ($P_{S:H}$), the temporal probability of impact of individuals exposed to the hazard ($P_{T:S}$), their vulnerability if impacted (V), and the number of individuals exposed to the hazard (E), where:

- $RISK = P_{SLIDE} \times P_{S:H} \times P_{T:S} \times V \times E$

Two different risk estimation methods were employed to assign values of each parameter listed above: one for sites exhibiting characteristics similar to the Berkley Escarpment, and another for sites potentially exposed to rock fall hazards. A third approach utilizing factors of safety was applied to sites that fit neither of the above criteria.

2.3.1. Individual Versus Societal Risk

Individual and societal risks are two ways of evaluating the potential for loss of life. Individual risk to life is the increment of risk imposed on a particular individual by their exposure to the landslide hazard. This increment is in addition to the background risk to life which the person would live with on a daily basis if not exposed to the hazard. Individual risk is usually expressed as the annual probability of fatality for the individual deemed to be most at risk (Leroi et al. 2005). For the DNV landslide studies the individuals deemed to be most at risk are the ones in each household who spend the most time in their homes (at the base of the escarpment) or in their backyards (at the crest of the escarpment).

Individual risk estimates do not provide an indication of the total number of expected fatalities should a hazard occur. The total number of expected fatalities is illustrated by societal risk, which is based on a consideration of the population exposed to each potential hazard. For the DNV landslide studies the population exposed includes the occupants of the house at the crest of the escarpment nearest to each hypothetical landslide source, as well as the occupants of all houses at the base of the escarpment located within the hypothetical slide path.

2.4. Risk Evaluation

Where houses are built on or near slopes the estimated residual risks from landslides are compared with DNV's risk tolerance criteria. Where risks are unacceptable risk control measures can be designed and implemented to reduce risk to tolerable levels. Risk evaluation involves comparing risk estimates against risk tolerance criteria to determine if the level of risk is Unacceptable, Tolerable, or Broadly Acceptable.

2.4.1. Risk Tolerance

Tolerable risks are risks within a range that society can tolerate so as to secure certain net benefits. It is a range of risk regarded as non-negligible and needing to be kept under review and reduced further if practicable (Leroi et al. 2005). The evaluation criteria for individual

and societal risk are different, but some common general principles can be applied (Leroi et al. 2005):

- The incremental risk from a hazard to an individual should not be significant compared to other risks to which a person is exposed in everyday life;
- The incremental risk from a hazard should be reduced wherever reasonably practicable, i.e. the As Low As Reasonably Practicable (ALARP) principle should apply;
- If the possible number of lives lost from a landslide incident is high, the likelihood that the incident might actually occur should be low. This accounts for society's particular intolerance to many simultaneous casualties, and is embodied in societal tolerable risk criteria;
- Higher risks are likely to be tolerated for existing slopes than for new developments; and,
- Tolerable risks may vary from country to country, and within countries, depending on historic exposure to landslide hazard, and the system of ownership and control of slopes and natural landslide hazards.

2.4.2. Individual Risk

Prior to 2006 tolerable risk or risk acceptance criteria for landslides had not been defined for British Columbia or DNV. The Australian Geomechanics Society guidelines for landslide risk management suggest a tolerable limit of 10^{-4} per annum chance of fatality for individuals most at risk on existing slopes or developments and a limit of 10^{-5} per annum for new developments (AGS 2000). The Hong Kong Special Administrative Regional Government adopted applies the same tolerable limits for landslides from natural slopes (Leroi et al. 2005). The DNV have now formally adopted these same criteria as shown in Table 2 (DNV 2009). Some discussion is required to put these numbers into perspective.

An annual probability of 10^{-4} (or 0.0001) implies that individuals most at risk have a 1 in 10,000 chance of fatality for each year they are exposed to the landslide hazard. This increment of risk is generally less than other risks individuals are exposed to in everyday life. In 1997 the Canadian population as a whole faced a mortality rate of $7x10^{-3}$ (a 1 in 143 chance per year), which is about 70 times greater than the tolerable limit adopted by DNV (Statistics Canada 2005). A Canadian's annual risk of death from motor vehicle accidents in the same year was 10^{-4}, which coincidentally is identical to the tolerable limit for landslides at existing developments.

2.4.3. Societal Risk

Societal risk estimates are presented on F-N graphs showing the frequency of events leading to loss of life (F) and the expected number of lives lost (N) (Figure 2). The graphs are generally subdivided into 4 zones:

- Unacceptable – where risks are generally considered unacceptable by society and require mitigation;
- ALARP – where the incremental risks from a hazard should, wherever reasonably practicable, be reduced;
- Broadly Acceptable – where incremental risks from a hazard are within the range that society can generally tolerate; and,
- Intense Scrutiny Region – for situations where there exists a low potential for a very large number of lives to be lost during a single landslide, which requires careful consideration. No clearly defined risk acceptance criteria have been developed for these situations.

2.4.4. Factor of Safety

The Factor of Safety (FOS) against slope instability is another method traditionally used to evaluate the level of safety for 'engineered slopes'. Engineered slopes include retaining walls, excavations, fill slopes, and natural slopes that have been characterized to the extent that allows for a FOS determination using slope stability analyses. The DNV has recently adopted FOS criteria for development on slopes. A static factor of safety of >1.3 is required for slopes and retaining walls within an existing development, while a static FOS >1.5 is required for slope elements in areas of new development. For the purpose of these studies, BGC compared FOS estimates against these criteria which are summarized in Table 2.

Table 2 DNV Landslide Safety Criteria

Type of Application	Risk of Loss of Life (per annum)		Factor of Safety (static)	
	1:10,000 + ALARP	1:100,000	FOS >1.3	FOS >1.5
Building Permit (<25% increase to gross floor area)	X		X	
Building Permit (>25% increase to gross floor area and/or retaining walls >1.2 m)		X		X
Re-zoning		X		X
Sub-division		X		X
New Development		X		X

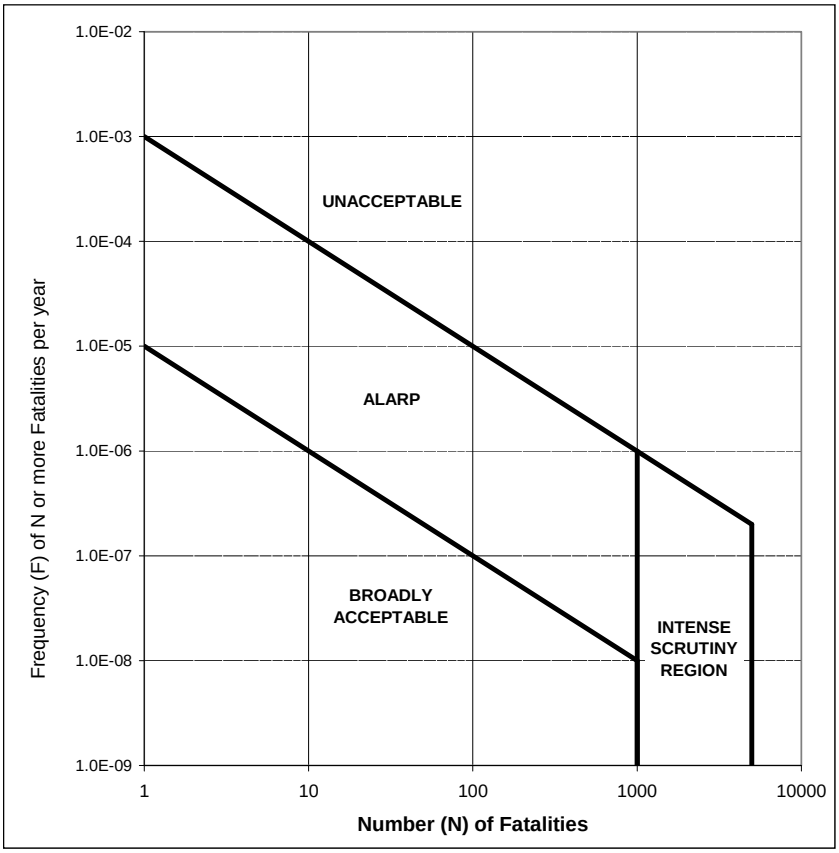

Figure 2 Example F-N Curve For Evaluating Societal Risk

3.0 LANDSLIDE RISK ASSESSMENT SUMMARIES

A brief summary of the landslide risk assessments completed at each study area throughout the District since 2006 is provided in the sections that follow. More detailed information (surficial geology summaries, residential development histories and historical landslide records) is provided in the original reports issued between 2006 and 2010 (BGC 2006a, 2006b, 2007a, 2007b, 2007d, 2008a, 2009a, 2009b, 2009c, 2009d, 2009e, 2009f, and 2010a).

A master list summarizes landslide risk for every site assessed in the District since 2006 (Appendix A). This list is organized alphabetically. It encompasses all the areas studied and includes homes at the crest and base of the escarpment. More detailed risk assessment site information is provided in Appendices B to J.

While field inspections and subsequent risk and factor of safety calculations are referenced to civic addresses to conveniently communicate the results to the public it is important to note that the locations of potential landslide initiation zones are not known precisely and may often cross property boundaries. Also, these studies focused on residential development within the study areas and have not addressed landslide risk to commercial structures or municipal infrastructure.

3.1. Capilano River East Escarpment

3.1.1. Location

The Capilano River East Escarpment study area is located east of the Capilano River and south of the Trans Canada Highway (Drawing 1). All the sites investigated as part of this study are located west of Capilano Road.

3.1.2. Landslide Risk Assessment Summary

A desk-based screening study was completed for the Capilano River East Escarpment study area to focus field inspections at sites most likely to pose elevated landslide risks to the public (BGC 2009a). Thirty-five sites were selected for field inspections and qualitative partial risk ratings ranging from ‘Very High’ to ‘Very Low’ were assigned to each site based on field observations of slope angle, soil type, drainage and evidence of previous instability. One area posing a ‘Very High’ partial risk and three areas posing ‘High’ partial risk were identified. Landslide risk posed at the remaining sites, ranked ‘Moderate’, ‘Low’, or ‘Very Low’, likely fall within the broadly acceptable risk tolerance zone and are considered tolerable.

One of these sites was later split into two segments (posing different levels of risk) resulting in five sites along the Capilano Escarpment being studied in further detail (BGC 2010a). Two of these five sites were assessed using the Berkley Escarpment Method while the remaining

three sites were assessed by limit equilibrium slope stability analyses and compared against DNV's risk tolerance criteria.

A summary of all partial risk assessment results from the preliminary study (BGC 2009a) and the subsequent landslide risk assessment for select areas (BGC 2010a) is provided in Appendix A and B. As mentioned earlier, results from the landslide risk assessment supersede results of the preliminary partial risk assessments. Table B1 (Appendix B) provides the risk assessment results for each property assessed at the preliminary (Phase 1) or QRA (Phase 2) phases of the assessment and compares the results to DNV's risk tolerance criteria. A reference to information from the preliminary and QRA studies for each property is also provided in Table B1 (Appendix B).

At one site along the Capilano River Escarpment DNV's risk tolerance criteria for new or existing development is not satisfied (DNV 2009). At two other sites criteria for existing development within the District is satisfied but is less than would normally be accepted for new development (DNV 2009). Based on the DNV criteria the level of landslide safety is considered tolerable at these two locations. All other properties assessed as part of these studies are considered likely to fall within the 'Broadly Acceptable' risk tolerance level.

3.2. Pemberton Heights Escarpment

3.2.1. Location

The Pemberton Heights Escarpment study area is located south of the Cleveland Dam and north of the Trans Canada Highway (Drawing 1). All the sites investigated as part of this study are located east of Capilano Road south of Graveley Street and West Keith Road.

3.2.2. Landslide Risk Assessment Summary

A preliminary landslide hazard assessment for the Pemberton Heights Escarpment was completed in 2007 (BGC 2007b). In this earlier preliminary assessment four landslide risk scenarios, namely 'A' through 'D' (Table 3), were defined based on either the presence or absence of evidence of slope instability and either the presence or absence of homes at the base of the escarpments (BGC 2007b).

Based on comparisons with the results of the Berkley Escarpment quantitative landslide risk assessment Scenarios 'A', 'B' and 'C' were considered unlikely to pose unacceptable individual or societal risks unless previously unidentified adverse conditions existed (BGC 2006a, 2006b). A Scenario 'D' site was defined as having residential development at the base of the slope and the presence of historical landslide activity and/or potentially hazardous conditions at the slope crest (BGC 2007b). Similar scenarios along the Berkley Escarpment suggested these sites might pose unacceptable individual or societal risks and further investigations were recommended.

Table 3 Risk Scenario Matrix from the Pemberton Heights and Westlynn Escarpments

RISK SCENARIO	RESIDENTIAL DEVELOPMENT AT THE BASE OF THE SLOPE	HISTORIC LANDSLIDE ACTIVITY OR POTENTIALLY HAZARDOUS CONDITION IDENTIFIED
A	NO	NO
B	YES	NO
C	NO	YES
D	YES	YES

DNV continued the risk management process and conducted site specific investigations of Scenario 'D' locations to determine whether they posed unacceptable individual or societal risks. Two Scenario 'D' sites were identified along the Pemberton Heights Escarpment (BGC 2007c) and QRA's were completed for these sites approximately 30 m either side of the Scenario 'D' location. One of these sites was later split into two segments (posing different levels of risk) resulting in six sites along the Pemberton Heights Escarpment being studied in further detail (BGC 2008a). All of these sites were assessed using the Berkley Escarpment Method.

Along the Pemberton Heights Escarpment four landslide source areas continue to pose risks that are estimated to fall within the ALARP risk zone (BGC 2008a). Based on the risk tolerance criteria adopted by DNV in 2009 these risks are considered tolerable, however risk reduction conforming to the ALARP principle, to reduce risks to as low as reasonably practicable may be considered. Remedial options to further reduce risk levels are provided in BGC (2008a).

For completeness the refined preliminary risk assessment method adopted in 2009 was applied to all twenty-nine Scenario 'C' sites identified along the Pemberton Heights and Westlynn Escarpments (BGC 2009f). Approximately fifty-three properties are associated with the twenty-nine Scenario 'C' sites. Of these none were assigned a 'Very High' partial risk and only four properties were assigned a 'High' partial risk. All of these 'High' rated sites fall within the Westlynn Escarpment study area. Landslide risk posed at the remaining sites, ranked 'Moderate', 'Low', or 'Very Low' and landslide risk Scenario 'A' and 'B' sites identified earlier, likely fall within the broadly acceptable risk tolerance zone and are considered tolerable.

A summary of all partial risk assessment results from the refined preliminary risk assessment (BGC 2009f) and QRA results (BGC 2008a, 2010a) is provided in Appendix A and C. As mentioned earlier, results from the landslide risk assessment supersede results of the preliminary partial risk assessments. Table C1 (Appendix C) provides the risk assessment results for each property assessed at the preliminary (Phase 1) or QRA (Phase 2) phases of the assessment and compares the results to DNV's risk tolerance criteria. A reference to

information from the preliminary and QRA studies for each property is also provided in Table C1 (Appendix C). Table C2 (Appendix C) provides the risk assessment results posed to individuals at the base of the escarpment from properties at the crest of the slope (referenced by address at the base of the escarpment).

3.3. Mosquito Creek Escarpment

3.3.1. Location

The Mosquito Creek Escarpment study area is located east of Capilano River, south of Grouse Mountain and north of the Trans Canada Highway (Drawing 1). All the sites investigated as part of this study are adjacent to Mosquito Creek, and are bounded to the north by Skyline Drive and Prospect Road, and by Evergreen Place to the south.

3.3.2. Landslide Risk Assessment Summary

A desk-based screening study was completed for the Mosquito Creek Escarpment study area to focus field inspections at sites most likely to pose elevated landslide risks to the public (BGC 2009b). Thirty-one sites were selected for field inspections and qualitative partial risk ratings were assigned to each site based on field observations of slope angle, soil type, drainage and evidence of previous instability. Two areas posing 'very high' partial risk and six areas posing 'high' partial risk were identified. Landslide risk posed at the remaining sites, ranked 'Moderate', 'Low', or 'Very Low', likely fall within the broadly acceptable risk tolerance zone and are considered tolerable.

One of these sites was later split into two segments (posing different levels of risk) resulting in nine sites along the Capilano Escarpment being studied in further detail (BGC 2010a). All of these sites were assessed using the Berkley Escarpment Method.

A summary of all partial risk assessment results from the preliminary study (BGC 2009b) and the subsequent landslide risk assessment for select areas (BGC 2010a) is provided in Appendix A and D. As mentioned earlier, results from the landslide risk assessment supersede results of the preliminary partial risk assessments. Table D1 (Appendix D) provides the risk assessment results for each property assessed at the crest of the escarpment at the preliminary (Phase 1) or QRA (Phase 2) phases of the assessment and compares the results to DNV's risk tolerance criteria. A reference to information from the preliminary and QRA studies for each property is also provided in Table D1 (Appendix D). Table D2 (Appendix D) provides the risk assessment results posed to individuals at the base of the escarpment from properties at the crest of the slope (referenced by address at the base of the escarpment).

Four properties along the Mosquito Creek Escarpment pose risk to individuals at the base of the escarpment that satisfy DNV's risk tolerance criteria for existing development but are less than would normally be accepted for new development (DNV 2009). Based on the DNV criteria the level of landslide safety posed by these properties is considered 'Tolerable'.

These four properties pose tolerable risks to six homes at the base of the escarpment. All other properties assessed as part of these studies are considered likely to fall within the 'Broadly Acceptable' risk tolerance level.

3.4. Mount Fromme East

3.4.1. Location

The Mount Fromme East study area is located west of Mountain Highway, south of Borthwick Road and north of Mill Street (Drawing 1).

3.4.2. Landslide Risk Assessment Summary

A desk-based screening study was completed for the Mount Fromme East study area to focus field inspections at sites most likely to pose elevated landslide risks to the public (BGC 2009c). Qualitative partial risk ratings ranging from 'Very High' to 'Very Low' were estimated for approximately thirty properties located near the base of the escarpment. No areas posing 'Very High' partial risk were identified. Three areas posing 'high' partial risk were identified and landslide risks posed at the remaining sites, ranked 'Moderate', 'Low', or 'Very Low', likely fall within the broadly acceptable risk category and are considered tolerable.

Three sites were studied in further detail within the Mount Fromme East study area and landslide risk estimates were assessed by the rock fall method (BGC 2010a).

A summary of all partial risk assessment results from the preliminary study (BGC 2009c) and the subsequent landslide risk assessment for select areas (BGC 2010a) is provided in Appendix A and E. As mentioned earlier, results from the landslide risk assessment supersede results of the preliminary partial risk assessments. Table E1 (Appendix E) provides the risk assessment results for each property assessed at the crest of the escarpment at the preliminary (Phase 1) or QRA (Phase 2) phases of the assessment and compares the results to DNV's risk tolerance criteria. A reference to information from the preliminary and QRA studies for each property is also provided in Table E1 (Appendix E).

Risks to individuals above three properties within the Mount Fromme East study areas satisfy DNV's risk tolerance criteria for existing development but are less than would normally be accepted for new development (DNV 2009). Based on the DNV criteria the level of landslide safety posed to these properties is considered 'Tolerable'. All other properties assessed as part of these studies are considered likely to fall within the 'Broadly Acceptable' risk tolerance level.

3.5. Westlynn Escarpment

3.5.1. Location

The Westlynn Escarpment study area is west of Lynn Creek and included the slopes above the lower reaches of Hastings Creek and Hoskins Creek, south of Underwood Avenue and north of the Trans Canada Highway (Drawing 1).

3.5.2. Landslide Risk Assessment Summary

A preliminary landslide hazard assessment for the Westlynn Escarpment was completed in 2007 (BGC 2007b). In this earlier preliminary assessment four landslide risk scenarios, namely 'A' through 'D' (Table 3), were defined based on either the presence or absence of evidence of slope instability and either the presence or absence of homes at the base of the escarpments (BGC 2007b) as previously discussed in Section 3.2.2.

A Scenario 'D' site was defined as having residential development at the base of the slope and the presence of historical landslide activity and/or potentially hazardous conditions at the slope crest (BGC 2007b). DNV continued the risk management process and conducted site specific investigations of Scenario 'D' locations to determine whether they posed unacceptable individual or societal risks. Nine Scenario 'D' sites identified along the Westlynn Escarpment (BGC 2007b) and QRA's were completed for these sites approximately 30 m either side of the Scenario 'D' location. Eighteen sites along the Westlynn Escarpment were studied in further detail (BGC 2008a). All of these sites were assessed using the Berkley Escarpment Method.

Along the Westlynn Escarpment eight landslide source areas continue to pose risks that are estimated to fall within the ALARP risk zone (BGC 2008a). Based on the risk tolerance criteria adopted by DNV in 2009 these risk are considered tolerable, however risk reduction conforming to the ALARP principle, to reduce risks to as low as reasonably practicable may be considered. Remedial options to further reduce risk levels are provided in BGC (2008a).

For completeness the refined preliminary risk assessment method adopted in 2009 was applied to all twenty-nine Scenario 'C' sites identified along the Pemberton Heights and Westlynn Escarpments (BGC 2009f). Approximately fifty-three properties are associated with the twenty-nine Scenario 'C' sites. Of these none were assigned a 'Very High' partial risk and only four properties were assigned a 'High' partial risk. All of these 'High' rated sites fall within the Westlynn Escarpment study area and were assessed in more detail (BGC 2010a). Landslide risk posed at the remaining sites, ranked 'Moderate', 'Low', or 'Very Low' and landslide risk Scenario 'A' and 'B' sites identified earlier, likely fall within the broadly acceptable risk tolerance zone and are considered tolerable.

A summary of all partial risk assessment results from the refined preliminary risk assessment (BGC 2009f) and QRA results (BGC 2008a, 2010a) is provided in Appendix A and F. As mentioned earlier, results from the landslide risk assessment supersede results of the

preliminary partial risk assessments. Table F1 (Appendix F) provides the risk assessment results for each property assessed at the preliminary (Phase 1) or QRA (Phase 2) phases of the assessment and compares the results to DNV's risk tolerance criteria. A reference to information from the preliminary and QRA studies for each property is also provided in Table F1 (Appendix F). Table F2 (Appendix F) provides the risk assessment results posed to individuals at the base of the escarpment from properties at the crest of the slope (referenced by address at the base of the escarpment).

Eight properties along the Westlynn Escarpment pose risk to individuals at the crest or base of the escarpment that satisfy DNV's risk tolerance criteria for existing development but are less than would normally be accepted for new development (DNV 2009). Based on the DNV criteria the level of landslide safety posed by these properties is considered 'Tolerable'. These eight properties pose tolerable risks to nine homes at the base of the escarpment and two properties at the crest of the escarpment. All other properties assessed as part of these studies are considered likely to fall within the 'Broadly Acceptable' risk tolerance zone.

3.6. Riverside West Escarpment

3.6.1. Location

The Riverside West Escarpment study area is located north of Mount Seymour Parkway, east of Capilano College and west of Seymour River (Drawing 1). All the sites investigated as part of this study are located west of Seymour Boulevard and Heritage Boulevard.

3.6.2. Landslide Risk Assessment Summary

A desk-based screening study was completed for the Riverside West Escarpment to focus field inspections at sites most likely to pose elevated landslide risks to the public (BGC 2009d). Qualitative partial risk ratings were estimated for approximately fifty properties located near the base of the escarpment. Eight areas posing 'very high' partial risk and eighteen areas posing 'high' partial risk were identified. Landslide risk posed at the remaining sites, ranked 'Moderate', 'Low', or 'Very Low', likely fall within the broadly acceptable risk tolerance zone and are considered tolerable.

Twenty-six sites were studied in further detail within the Riverside West Escarpment study area and all of these sites were assessed using the Berkley Escarpment Method (BGC 2010a).

A summary of all partial risk assessment results from the preliminary study (BGC 2009d) and the subsequent landslide risk assessment for select areas (BGC 2010a) is provided in Appendix A and G. As mentioned earlier, results from the landslide risk assessment supersede results of the preliminary partial risk assessments. Table G1 (Appendix G) provides the risk assessment results for each property assessed at the preliminary (Phase 1) or QRA (Phase 2) phases of the assessment and compares the results to DNV's risk

tolerance criteria. A reference to information from the preliminary and QRA studies for each property is also provided in Table G1 (Appendix G).

At twenty-six sites along the Riverside West Escarpment risk posed to individuals at the base of the escarpment satisfy DNV's risk tolerance criteria for existing development but are less than would normally be accepted for new development (DNV 2009). Based on the DNV's risk tolerance criteria the level of landslide safety posed by these properties is considered 'Tolerable'. Twenty-six sites at the crest of the slope pose tolerable risks to twenty-six homes at the base of the escarpment. All other properties assessed as part of these studies are considered likely to fall within the 'Broadly Acceptable' risk tolerance zone.

3.7. Berkley Escarpment

3.7.1. Location

The Berkley Escarpment study area is located north of Mount Seymour Parkway and east of the Seymour River (Drawing 1). All the sites investigated as part of this study are located west of Berkley Avenue.

3.7.2. Landslide Risk Assessment Summary

Following the January 2005 landslide along the Berkley Escarpment DNV elected to complete a QRA along the entire Berkley Escarpment (BGC 2006a). Seventy-five potential landslide source areas were investigated and preliminary results were provided based on unmitigated slope conditions. Additional more detailed investigations and analyses refined estimates of unmitigated landslide risk and allowed the unmitigated risk, or 'base-case' conditions, to be compared against the benefits of potential mitigation strategies (BGC 2006b). Demolition of houses on six properties and slope reshaping to remove fill and reduce slope angles, storm sewer connections for all the properties on the escarpment crest, and storm water drainage improvements completed by the DNV were included in this assessment (BGC 2006b).

On the basis of these refined risk estimates six remaining potential landslide source areas that posed unacceptable individual risks to residents at the base of the Berkley Escarpment were identified (BGC 2006b). In May 2006, the DNV Council decided that risk control measures must be implemented at the six properties identified on the escarpment crest as posing unacceptable landslide risks prior to the oncoming rainy season. Risk reductions as a result of the remediation work were documented in January 2007 (BGC 2007a).

All of these seventy-five sites were assessed using the Berkley Escarpment Method developed in 2006 (BGC 2006a).

A summary of landslide risk assessments for the Berkley Escarpment (BGC 2006a, 2006b and 2007a) is provided in Appendix A and H. Risk estimates from the BGC (2007a) report supersede risk estimates from the earlier reports. Table H1 (Appendix H) provides the QRA

results and compares the results to DNV's risk tolerance criteria for individual risk at the crest of the escarpment and risk posed by these properties to individual at the base of the escarpment. A reference to information from the preliminary and QRA studies relevant for each property is also provided in Table H1 (Appendix H). Table H2 (Appendix H) provides the risk assessment results to posed to individuals at the base of the escarpment from properties at the crest of the slope (referenced by address at the base of the escarpment).

Thirty-four properties along the Berkley Escarpment pose risk to individuals at the base of the escarpment that satisfy DNV's risk tolerance criteria for existing development but are less than would normally be accepted for new development (DNV 2009). Based on the DNV criteria the level of landslide safety posed by these properties is considered 'Tolerable'. These thirty-eight properties pose tolerable risks to fifty-eight homes at the base of the escarpment. All other properties assessed as part of these studies are considered likely to fall within the 'Broadly Acceptable' risk tolerance zone.

3.8. Deep Cove – Cove Cliff

3.8.1. Location

The Deep Cove – Cove Cliff study area is located in eastern North Vancouver bounded by Burrard Inlet at the entrance to Indian Arm (Drawing 1).

3.8.2. Landslide Risk Assessment Summary

A desk-based screening study was completed for the Riverside West Escarpment to focus field inspections at sites most likely to pose elevated landslide risks to the public (BGC 2009e). Seventy-one sites were selected for field inspections and qualitative partial risk ratings ranging from 'Very High' to 'Very Low' were assigned to each site based on field observations of slope angle, soil type, drainage and evidence of previous instability. No areas posing 'very high' partial risk and only one area posing 'high' partial risk was identified. Landslide risk posed at the remaining sites, ranked 'Moderate', 'Low', or 'Very Low', likely fall within the broadly acceptable risk tolerance zone and are considered tolerable.

One site was studied in further detail within the Deep Cove – Cove Cliff study area. The stability of the driveway fill slope was assessed by limit equilibrium slope stability analyses by Levelton (2009), the engineer of record for that property development, and compared against DNV's risk tolerance criteria.

A summary of all partial risk assessment results from the preliminary study (BGC 2009e) and the subsequent landslide risk assessment for select areas (BGC 2010a) is provided in Appendix A and J. As mentioned earlier, results from the landslide risk assessment supersede results of the preliminary partial risk assessments. Table J1 (Appendix J) provides the risk assessment results for each property assessed at the preliminary (Phase 1) or QRA (Phase 2) phases of the assessment and compares the results to DNV's risk

tolerance criteria. A reference to information from the preliminary and QRA studies relevant for each property is also provided in Table J1 (Appendix J).

One property within the Deep Cove – Cove Cliff study area poses risk to individuals in one property at the base of the escarpment that satisfy DNV's risk tolerance criteria for existing development but are less than would normally be accepted for new development (DNV 2009). Based on the DNV criteria the level of landslide safety posed by this property is considered 'Tolerable'. All other properties assessed as part of these studies are considered likely to fall within the 'Broadly Acceptable' risk tolerance zone.

4.0 RECOMMENDATIONS

4.1. General Recommendations

We suggest DNV ensure properties along the crest of the escarpments within the study areas have access to the storm water system, where practical, and encourage property owners to connect their drainage downpipes to it. If connecting to the storm water system is not practical we suggest DNV encourage property owners to utilize alternative storm water management systems approved by the Municipal Engineer that direct storm water away from the slopes. Also, we suggest DNV encourages property owners living at the crest of the escarpment slopes maintain their storm water drainage system to ensure they function effectively.

At several locations along the within the study area lawn cuttings and garden debris have been placed at the escarpment crest. We suggest DNV encourage property owners to remove these materials and discourage further placement of garden waste along the escarpment.

If the removal of any retaining walls or fills or the construction of new retaining walls is being contemplated, BGC recommends that the remediation designs be reviewed by a qualified professional to ensure the designs will achieve the required level of risk reduction or the appropriate factor of safety levels. Construction should be inspected regularly to ensure ground conditions are as anticipated and to allow for modification of the designs if necessary. Final ‘as built’ drawings and a completion report should be provided to the property owner and DNV and recorded in the DNV natural hazard database.

Ongoing visual monitoring of the slopes should be conducted to ensure that drainage systems remain functional, to confirm that observed slope movements abate, and to prevent new surface erosion or landslide hazards from developing and going undetected.

Finally, we suggest DNV continue to provide information educating and updating the public on how to reduce landslide risk when living near steep slopes.

5.0 CLOSURE

This report presents a summary of results of preliminary landslide hazard and quantitative landslide risk assessments for select properties completed within the District of North Vancouver since 2006. Landslide risks and levels of safety were estimated using methods developed at the Berkley Escarpment, a rock fall risk estimate method, or by comparing factors of safety against DNV acceptance criteria. The methods employed were consistent with Canadian Standards Association (1997) guidelines for risk management and APEGBC (2008) guidelines for landslide safety assessments for residential development.

We trust the above satisfies your requirements at this time. Should you have any questions or comments, please do not hesitate to contact us.

Yours sincerely,

BGC ENGINEERING INC.
per:

Sam Fougère, M.Sc., P.Geo.
Engineering Geologist

Reviewed by:

Michael Porter, M.Eng., P.Eng.
Senior Geological Engineer

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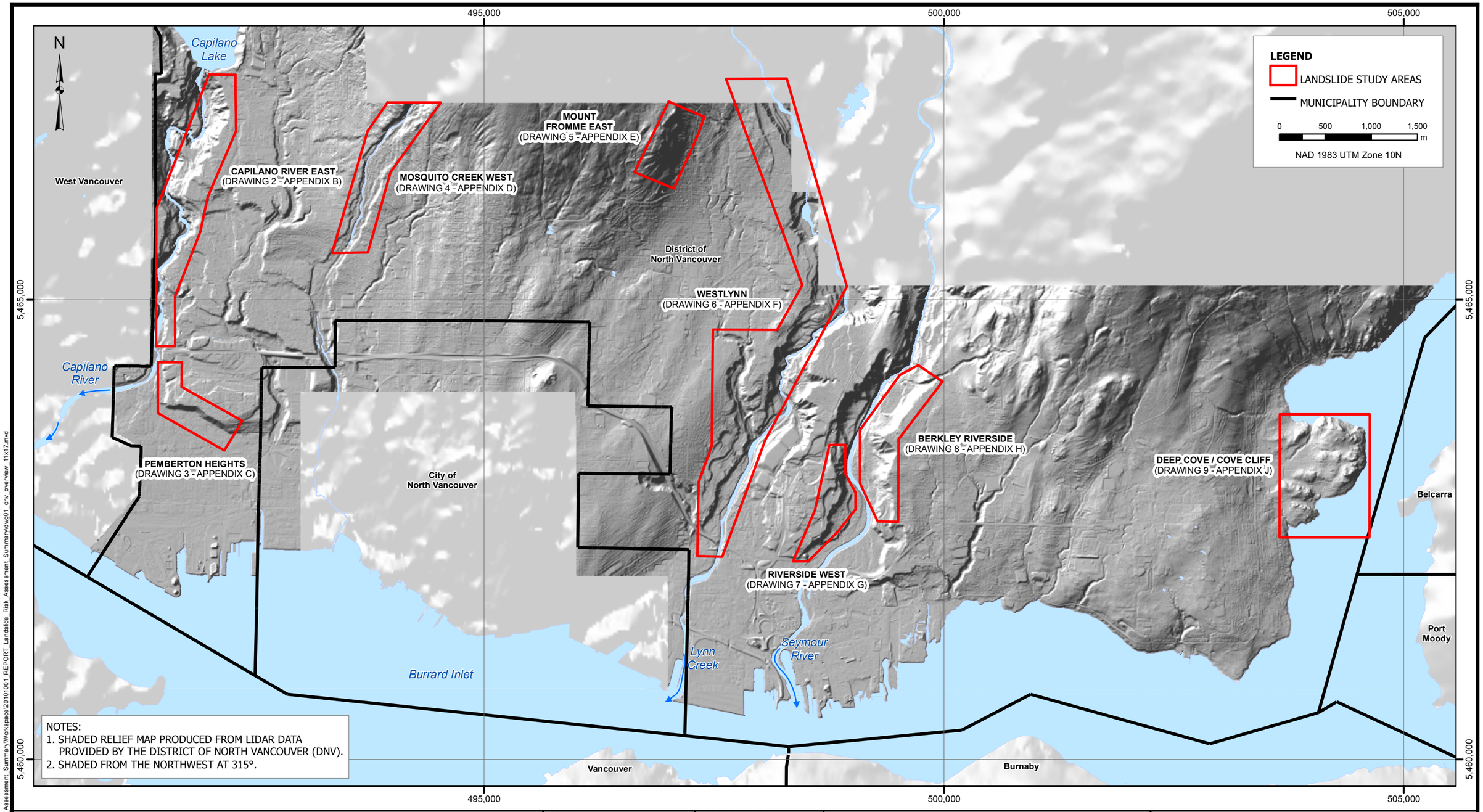
DRAWINGS



NOTES:
1. SHADED RELIEF MAP PRODUCED FROM LIDAR DATA PROVIDED BY THE DISTRICT OF NORTH VANCOUVER (DNV).
2. SHADED FROM THE NORTHWEST AT 315°.

REV.	DATE	REVISION NOTES	DRAWN	CHECK	APPR.

SCALE:	1:40,000
DATE:	NOV 2010
DRAWN:	LL
DESIGNED:	SF
CHECKED:	SF
APPROVED:	MJP

PROFESSIONAL SEAL:

BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY

CLIENT: DISTRICT OF NORTH VANCOUVER

PROJECT: LANDSLIDE RISK SUMMARY

TITLE: STUDY AREA LOCATIONS

PROJECT No.:	DWG No.:	REV.:
0404-035	1	

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DWG TO BE READ WITH BGC REPORT TITLED "LANDSLIDE RISK SUMMARY" DATED NOV 2010

APPENDIX A

DNV LANDSLIDE RISK SUMMARY - MASTER LIST

DNV LANDSLIDE RISK SUMMARY - MASTER LIST

ADDRESS	ESCARPMENT	DNV's RISK TOLERANCE LEVEL (1)	REFERENCE LOCATION (2)
532 Alpine Court	Mosquito Creek	Broadly Acceptable	Appendix D
528 Alpine Court	Mosquito Creek	Broadly Acceptable	Appendix D
520 Alpine Court	Mosquito Creek	Broadly Acceptable	Appendix D
515 Alpine Court	Mosquito Creek	Broadly Acceptable	Appendix D
518 Alpine Court - East	Mosquito Creek	Broadly Acceptable	Appendix D
518 Alpine Court - West	Mosquito Creek	Broadly Acceptable	Appendix D
1282 Arborlynn Drive	Westlynn	Broadly Acceptable	Appendix F
1264 Arborlynn Drive	Westlynn	Broadly Acceptable	Appendix F
1246 Arborlynn Drive	Westlynn	Broadly Acceptable	Appendix F
1210 Arborlynn Drive	Westlynn	Broadly Acceptable	Appendix F
1198 Arborlynn Drive	Westlynn	Broadly Acceptable	Appendix F
1864 Beaulynn Place	Westlynn	Broadly Acceptable	Appendix F
1858 Beaulynn Place	Westlynn	Broadly Acceptable	Appendix F
1761 Bellelynn Place	Westlynn	Broadly Acceptable	Appendix F
1747 Bellelynn Place	Westlynn	Tolerable	Appendix F
2125 Berkley Avenue	Berkley	Broadly Acceptable	Appendix H
2141 Berkley Avenue	Berkley	Broadly Acceptable	Appendix H
2157 Berkley Avenue	Berkley	Broadly Acceptable	Appendix H
2175 Berkley Avenue	Berkley	Broadly Acceptable	Appendix H
2191 Berkley Avenue	Berkley	Broadly Acceptable	Appendix H
2205 Berkley Avenue	Berkley	Broadly Acceptable	Appendix H
2217 Berkley Avenue	Berkley	Broadly Acceptable	Appendix H
2223 Berkley Avenue	Berkley	Broadly Acceptable	Appendix H
2249 Berkley Avenue	Berkley	Broadly Acceptable	Appendix H
2251 Berkley Avenue	Berkley	Broadly Acceptable	Appendix H
2265 Berkley Avenue	Berkley	Broadly Acceptable	Appendix H
2279 Berkley Avenue	Berkley	Broadly Acceptable	Appendix H
2293 Berkley Avenue	Berkley	Broadly Acceptable	Appendix H
2307 Berkley Avenue	Berkley	Broadly Acceptable	Appendix H
2321 Berkley Avenue	Berkley	Broadly Acceptable	Appendix H
2335 Berkley Avenue	Berkley	Broadly Acceptable	Appendix H
2349 Berkley Avenue	Berkley	Broadly Acceptable	Appendix H
2363 Berkley Avenue	Berkley	Broadly Acceptable	Appendix H
2377 Berkley Avenue	Berkley	Broadly Acceptable	Appendix H
2391 Berkley Avenue	Berkley	Broadly Acceptable	Appendix H
2409 Berkley Avenue	Berkley	Broadly Acceptable	Appendix H
2425 Berkley Avenue	Berkley	Broadly Acceptable	Appendix H
2477 Berton Place	Berkley	Broadly Acceptable	Appendix H
2475 Berton Place	Berkley	Broadly Acceptable	Appendix H
2469 Berton Place	Berkley	Broadly Acceptable	Appendix H
2465 Berton Place	Berkley	Broadly Acceptable	Appendix H
2461 Berton Place	Berkley	Broadly Acceptable	Appendix H
689 Bow Court	Riverside West	Tolerable	Appendix F
687 Bow Court	Riverside West	Tolerable	Appendix F
683 Bow Court	Riverside West	Tolerable	Appendix F
677 Bow Court	Riverside West	Broadly Acceptable	Appendix F
1893 Bowser Avenue	Pemberton Heights	Tolerable	Appendix C
1877 Bowser Avenue	Pemberton Heights	Broadly Acceptable	Appendix C
1890 Bowser Avenue	Pemberton Heights	Tolerable	Appendix C
1866 Bowser Avenue	Pemberton Heights	Broadly Acceptable	Appendix C
1850 Bowser Avenue	Pemberton Heights	Broadly Acceptable	Appendix C
1844 Bowser Avenue	Pemberton Heights	Broadly Acceptable	Appendix C
1898 Burril Avenue	Westlynn	Broadly Acceptable	Appendix F
3373-3377 Capilano Crescent	Capilano	Broadly Acceptable	Appendix B
3275 Capilano Crescent	Capilano	Broadly Acceptable	Appendix B
3225 Capilano Crescent	Capilano	Broadly Acceptable	Appendix B
3201 Capilano Crescent	Capilano	Broadly Acceptable	Appendix B
3179 Capilano Crescent	Capilano	Broadly Acceptable	Appendix B
4075 Capilano Park Road	Capilano	Broadly Acceptable	Appendix B
4617 Capilano Road	Capilano	Broadly Acceptable	Appendix B
4613 Capilano Road	Capilano	Broadly Acceptable	Appendix B
4085 Capilano Road	Capilano	Broadly Acceptable	Appendix B
3943 Capilano Road	Capilano	Broadly Acceptable	Appendix B
3929 Capilano Road	Capilano	Broadly Acceptable	Appendix B
3917 Capilano Road	Capilano	Broadly Acceptable	Appendix B
3905 Capilano Road	Capilano	Broadly Acceptable	Appendix B
3575 Capilano Road	Capilano	Tolerable	Appendix B
3547-3571 Capilano Road	Capilano	Broadly Acceptable	Appendix B
3433-3457 Capilano Road	Capilano	Broadly Acceptable	Appendix B

TABLE A1

ADDRESS	ESCARPMENT	DNV's RISK TOLERANCE LEVEL [1]	REFERENCE LOCATION [2]
2899 Capilano Road	Capilano	Broadly Acceptable	Appendix B
2893-2897 Capilano Road	Capilano	Broadly Acceptable	Appendix B
2881-2889 Capilano Road	Capilano	Broadly Acceptable	Appendix B
2871-2873 Capilano Road [3]	Capilano	Unacceptable	Appendix B
2875-2877 Capilano Road	Capilano	Tolerable	Appendix B
2074 Cardinal Crescent	Deep Cove - Cove Cliff	Broadly Acceptable	Appendix J
2050 Cardinal Crescent	Deep Cove - Cove Cliff	Broadly Acceptable	Appendix J
2048 Cardinal Crescent	Deep Cove - Cove Cliff	Broadly Acceptable	Appendix J
2025 Cardinal Crescent	Deep Cove - Cove Cliff	Broadly Acceptable	Appendix J
2022 Cardinal Crescent	Deep Cove - Cove Cliff	Broadly Acceptable	Appendix J
1999 Cardinal Crescent	Deep Cove - Cove Cliff	Broadly Acceptable	Appendix J
1996 Cardinal Crescent	Deep Cove - Cove Cliff	Broadly Acceptable	Appendix J
1972 Cardinal Crescent	Deep Cove - Cove Cliff	Broadly Acceptable	Appendix J
1944 Cardinal Crescent	Deep Cove - Cove Cliff	Broadly Acceptable	Appendix J
1938 Cardinal Crescent	Deep Cove - Cove Cliff	Broadly Acceptable	Appendix J
1937 Cardinal Crescent	Deep Cove - Cove Cliff	Broadly Acceptable	Appendix J
1922 Cardinal Crescent	Deep Cove - Cove Cliff	Broadly Acceptable	Appendix J
1921 Cardinal Crescent	Deep Cove - Cove Cliff	Broadly Acceptable	Appendix J
1864 Cardinal Crescent	Deep Cove - Cove Cliff	Broadly Acceptable	Appendix J
1760 Cardinal Crescent	Deep Cove - Cove Cliff	Broadly Acceptable	Appendix J
2391 Carman Place	Berkley	Broadly Acceptable	Appendix H
2379 Carman Place	Berkley	Broadly Acceptable	Appendix H
2372 Carman Place	Berkley	Broadly Acceptable	Appendix H
2386 Carman Place	Berkley	Broadly Acceptable	Appendix H
2360 Carman Place North	Berkley	Broadly Acceptable	Appendix H
2360 Carman Place South	Berkley	Broadly Acceptable	Appendix H
2424 Carmaria Court	Westlynn	Broadly Acceptable	Appendix F
2344 Carmaria Court	Westlynn	Tolerable	Appendix F
2306 Carmaria Court	Westlynn	Tolerable	Appendix F
2252 Carmaria Court	Westlynn	Tolerable	Appendix F
2220 Carmaria Court	Westlynn	Tolerable	Appendix F
2194 Carmaria Court	Westlynn	Tolerable	Appendix F
2180 Carmaria Court	Westlynn	Tolerable	Appendix F
2112 Chapman Way	Berkley	Broadly Acceptable	Appendix H
2124 Chapman Way	Berkley	Broadly Acceptable	Appendix H
2136 Chapman Way	Berkley	Broadly Acceptable	Appendix H
2148 Chapman Way	Berkley	Tolerable	Appendix H
2158 Chapman Way	Berkley	Tolerable	Appendix H
2170 Chapman Way	Berkley	Tolerable	Appendix H
2180 Chapman Way	Berkley	Tolerable	Appendix H
2192 Chapman Way	Berkley	Tolerable	Appendix H
2206 Chapman Way	Berkley	Tolerable	Appendix H
2222 Chapman Way	Berkley	Tolerable	Appendix H
2230 Chapman Way	Berkley	Tolerable	Appendix H
2256 Chapman Way	Berkley	Tolerable	Appendix H
2296 Chapman Way	Berkley	Broadly Acceptable	Appendix H
2430 Chapman Way	Berkley	Tolerable	Appendix H
2243 Chapman Way	Berkley	Broadly Acceptable	Appendix H
2225 Chapman Way	Berkley	Broadly Acceptable	Appendix H
2207 Chapman Way	Berkley	Broadly Acceptable	Appendix H
2185 Chapman Way	Berkley	Broadly Acceptable	Appendix H
2151 Chapman Way	Berkley	Broadly Acceptable	Appendix H
1256 Coleman Close	Mount Fromme East	Broadly Acceptable	Appendix E
1254 Coleman Close	Mount Fromme East	Tolerable	Appendix E
1252 Coleman Close	Mount Fromme East	Tolerable	Appendix E
1250 Coleman Close	Mount Fromme East	Tolerable	Appendix E
1229 Coleman Street	Mount Fromme East	Broadly Acceptable	Appendix E
1231 Coleman Street	Mount Fromme East	Broadly Acceptable	Appendix E
1233 Coleman Street	Mount Fromme East	Broadly Acceptable	Appendix E
1239 Coleman Street	Mount Fromme East	Broadly Acceptable	Appendix E
4857 Cove Cliff Place	Deep Cove - Cove Cliff	Broadly Acceptable	Appendix J
4879 Cove Cliff Place	Deep Cove - Cove Cliff	Broadly Acceptable	Appendix J
4885 Cove Cliff Place	Deep Cove - Cove Cliff	Broadly Acceptable	Appendix J
1808 Crawford Road	Westlynn	Broadly Acceptable	Appendix F
647 Croydon Place	Mosquito Creek	Broadly Acceptable	Appendix D
1672 Davenport Place	Westlynn	Broadly Acceptable	Appendix F
1680 Davenport Place	Westlynn	Tolerable	Appendix F
1688 Davenport Place	Westlynn	Tolerable	Appendix F
1516 East 27th Avenue	Westlynn	Broadly Acceptable	Appendix F
1527 East 27th Avenue	Westlynn	Broadly Acceptable	Appendix F
4636 Eastridge Road	Deep Cove - Cove Cliff	Broadly Acceptable	Appendix J

TABLE A1

ADDRESS	ESCARPMENT	DNV's RISK TOLERANCE LEVEL (1)	REFERENCE LOCATION (2)
4644 Eastridge Road	Deep Cove - Cove Cliff	Broadly Acceptable	Appendix J
4652 Eastridge Road	Deep Cove - Cove Cliff	Broadly Acceptable	Appendix J
4660 Eastridge Road	Deep Cove - Cove Cliff	Broadly Acceptable	Appendix J
4670 Eastridge Road	Deep Cove - Cove Cliff	Broadly Acceptable	Appendix J
4678 Eastridge Road	Deep Cove - Cove Cliff	Broadly Acceptable	Appendix J
4680 Eastridge Road	Deep Cove - Cove Cliff	Broadly Acceptable	Appendix J
4682 Eastridge Road	Deep Cove - Cove Cliff	Broadly Acceptable	Appendix J
4684 Eastridge Road	Deep Cove - Cove Cliff	Broadly Acceptable	Appendix J
4688 Eastridge Road	Deep Cove - Cove Cliff	Broadly Acceptable	Appendix J
4696 Eastridge Road	Deep Cove - Cove Cliff	Broadly Acceptable	Appendix J
4720 Eastridge Road	Deep Cove - Cove Cliff	Broadly Acceptable	Appendix J
4726 Eastridge Road	Deep Cove - Cove Cliff	Broadly Acceptable	Appendix J
4734 Eastridge Road	Deep Cove - Cove Cliff	Broadly Acceptable	Appendix J
4742 Eastridge Road	Deep Cove - Cove Cliff	Broadly Acceptable	Appendix J
4750 Eastridge Road	Deep Cove - Cove Cliff	Tolerable	Appendix J
4760 Eastridge Road	Deep Cove - Cove Cliff	Tolerable	Appendix J
1349 Eldon Road	Capilano	Broadly Acceptable	Appendix B
1357 Eldon Road	Capilano	Broadly Acceptable	Appendix B
1365 Eldon Road	Capilano	Broadly Acceptable	Appendix B
4540 Epps Avenue	Deep Cove - Cove Cliff	Broadly Acceptable	Appendix J
4546 Epps Avenue	Deep Cove - Cove Cliff	Broadly Acceptable	Appendix J
4566 Epps Avenue	Deep Cove - Cove Cliff	Broadly Acceptable	Appendix J
4570 Epps Avenue	Deep Cove - Cove Cliff	Broadly Acceptable	Appendix J
2012 Flynn Place	Pemberton Heights	Broadly Acceptable	Appendix C
1567 Graveley Street	Pemberton Heights	Broadly Acceptable	Appendix C
1565 Graveley Street	Pemberton Heights	Broadly Acceptable	Appendix C
1595 Graveley Street (S)	Pemberton Heights	Broadly Acceptable	Appendix C
1595 Graveley Street (W)	Pemberton Heights	Broadly Acceptable	Appendix C
2240 Greylynn Crescent	Westlynn	Broadly Acceptable	Appendix F
2248 Greylynn Crescent	Westlynn	Broadly Acceptable	Appendix F
2448 Hayseed Close	Berkley	Broadly Acceptable	Appendix H
2454 Hayseed Close	Berkley	Broadly Acceptable	Appendix H
2462 Hayseed Close	Berkley	Broadly Acceptable	Appendix H
2468 Hayseed Close	Berkley	Broadly Acceptable	Appendix H
2474 Hayseed Close	Berkley	Broadly Acceptable	Appendix H
2480 Hayseed Close	Berkley	Broadly Acceptable	Appendix H
2486 Hayseed Close	Berkley	Broadly Acceptable	Appendix H
Hayseed Layton Gully	Berkley	Broadly Acceptable	Appendix H
1179 Heritage Boulevard	Riverside West	Tolerable	Appendix F
1175 Heritage Boulevard	Riverside West	Tolerable	Appendix F
1171 Heritage Boulevard	Riverside West	Tolerable	Appendix F
1167 Heritage Boulevard	Riverside West	Tolerable	Appendix F
1163 Heritage Boulevard	Riverside West	Tolerable	Appendix F
1159 Heritage Boulevard	Riverside West	Tolerable	Appendix F
1155 Heritage Boulevard	Riverside West	Tolerable	Appendix F
1151 Heritage Boulevard	Riverside West	Tolerable	Appendix F
1147 Heritage Boulevard	Riverside West	Tolerable	Appendix F
1143 Heritage Boulevard	Riverside West	Broadly Acceptable	Appendix F
1139 Heritage Boulevard	Riverside West	Broadly Acceptable	Appendix F
1135 Heritage Boulevard	Riverside West	Broadly Acceptable	Appendix F
1131 Heritage Boulevard	Riverside West	Broadly Acceptable	Appendix F
1127 Heritage Boulevard	Riverside West	Broadly Acceptable	Appendix F
1123 Heritage Boulevard	Riverside West	Broadly Acceptable	Appendix F
1119 Heritage Boulevard	Riverside West	Broadly Acceptable	Appendix F
1115 Heritage Boulevard	Riverside West	Broadly Acceptable	Appendix F
1111 Heritage Boulevard	Riverside West	Broadly Acceptable	Appendix F
1107 Heritage Boulevard	Riverside West	Broadly Acceptable	Appendix F
1091 Heritage Boulevard	Riverside West	Broadly Acceptable	Appendix F
1003 Heritage Boulevard	Riverside West	Broadly Acceptable	Appendix F
1001 Heritage Boulevard	Riverside West	Broadly Acceptable	Appendix F
985 Heritage Boulevard	Riverside West	Tolerable	Appendix F
979 Heritage Boulevard	Riverside West	Tolerable	Appendix F
973 Heritage Boulevard	Riverside West	Tolerable	Appendix F
967 Heritage Boulevard	Riverside West	Tolerable	Appendix F
961 Heritage Boulevard	Riverside West	Broadly Acceptable	Appendix F
955 Heritage Boulevard	Riverside West	Broadly Acceptable	Appendix F
949 Heritage Boulevard	Riverside West	Broadly Acceptable	Appendix F
943 Heritage Boulevard	Riverside West	Broadly Acceptable	Appendix F
937 Heritage Boulevard	Riverside West	Broadly Acceptable	Appendix F
931 Heritage Boulevard	Riverside West	Broadly Acceptable	Appendix F
911 Heritage Boulevard	Riverside West	Broadly Acceptable	Appendix F
909 Heritage Boulevard	Riverside West	Broadly Acceptable	Appendix F

TABLE A1

ADDRESS	ESCARPMENT	DNV's RISK TOLERANCE LEVEL (1)	REFERENCE LOCATION (2)
899 Heritage Boulevard	Riverside West	Broadly Acceptable	Appendix F
897 Heritage Boulevard	Riverside West	Broadly Acceptable	Appendix F
895 Heritage Boulevard	Riverside West	Broadly Acceptable	Appendix F
893 Heritage Boulevard	Riverside West	Broadly Acceptable	Appendix F
879 Heritage Boulevard	Riverside West	Broadly Acceptable	Appendix F
877 Heritage Boulevard	Riverside West	Broadly Acceptable	Appendix F
875 Heritage Boulevard	Riverside West	Broadly Acceptable	Appendix F
873 Heritage Boulevard	Riverside West	Broadly Acceptable	Appendix F
823 Heritage Boulevard	Riverside West	Broadly Acceptable	Appendix F
817 Heritage Boulevard	Riverside West	Broadly Acceptable	Appendix F
805 Heritage Boulevard	Riverside West	Broadly Acceptable	Appendix F
799 Heritage Boulevard	Riverside West	Broadly Acceptable	Appendix F
791 Heritage Boulevard	Riverside West	Broadly Acceptable	Appendix F
783 Heritage Boulevard	Riverside West	Broadly Acceptable	Appendix F
777 Heritage Boulevard	Riverside West	Broadly Acceptable	Appendix F
765 Heritage Boulevard	Riverside West	Broadly Acceptable	Appendix F
1404 Hope Road	Pemberton Heights	Broadly Acceptable	Appendix C
1412 Hope Road	Pemberton Heights	Broadly Acceptable	Appendix C
2470 Hoskins Road	Westlynn	Broadly Acceptable	Appendix F
2454 Hoskins Road	Westlynn	Broadly Acceptable	Appendix F
2438 Hoskins Road	Westlynn	Broadly Acceptable	Appendix F
4780 Hoskins Road	Westlynn	Broadly Acceptable	Appendix F
4778 Hoskins Road	Westlynn	Broadly Acceptable	Appendix F
4774 Hoskins Road	Westlynn	Broadly Acceptable	Appendix F
4772 Hoskins Road	Westlynn	Broadly Acceptable	Appendix F
1728 Irene Place	Westlynn	Broadly Acceptable	Appendix F
1742 Irene Place	Westlynn	Broadly Acceptable	Appendix F
1751 Irene Place	Westlynn	Broadly Acceptable	Appendix F
4516 Jerome Place	Westlynn	Broadly Acceptable	Appendix F
4508 Jerome Place	Westlynn	Broadly Acceptable	Appendix F
695 Kerry Place	Mosquito Creek	Broadly Acceptable	Appendix D
2725 Kilmarnock Crescent	Westlynn	Broadly Acceptable	Appendix F
2717 Kilmarnock Crescent	Westlynn	Broadly Acceptable	Appendix F
2441 Kilmarnock Crescent	Westlynn	Broadly Acceptable	Appendix F
2429 Kilmarnock Crescent	Westlynn	Broadly Acceptable	Appendix F
2357 Kilmarnock Crescent	Westlynn	Broadly Acceptable	Appendix F
2307 Kilmarnock Crescent	Westlynn	Broadly Acceptable	Appendix F
2315 Kilmarnock Crescent	Westlynn	Broadly Acceptable	Appendix F
2345 Kilmarnock Crescent	Westlynn	Broadly Acceptable	Appendix F
2339 Kilmarnock Crescent	Westlynn	Broadly Acceptable	Appendix F
1290 Langdale Drive	Capilano	Broadly Acceptable	Appendix B
1297 Langdale Drive	Capilano	Broadly Acceptable	Appendix B
1860 Langworthy Street	Westlynn	Broadly Acceptable	Appendix F
1870 Langworthy Street	Westlynn	Broadly Acceptable	Appendix F
2674 Lauralynn Drive	Westlynn	Broadly Acceptable	Appendix F
2656 Lauralynn Drive	Westlynn	Broadly Acceptable	Appendix F
2620 Lauralynn Drive	Westlynn	Broadly Acceptable	Appendix F
2604 Lauralynn Drive	Westlynn	Broadly Acceptable	Appendix F
2574 Lauralynn Drive	Westlynn	Broadly Acceptable	Appendix F
2558 Lauralynn Drive	Westlynn	Broadly Acceptable	Appendix F
2590 Lauralynn Drive	Westlynn	Broadly Acceptable	Appendix F
2602 Lauralynn Drive	Westlynn	Broadly Acceptable	Appendix F
2438 Lauralynn Drive	Westlynn	Broadly Acceptable	Appendix F
1677 Layton Drive	Berkley	Broadly Acceptable	Appendix H
1691 Layton Drive	Berkley	Broadly Acceptable	Appendix H
1709 Layton Drive	Berkley	Broadly Acceptable	Appendix H
1731 Layton Drive	Berkley	Broadly Acceptable	Appendix H
1753 Layton Drive	Berkley	Broadly Acceptable	Appendix H
1775 Layton Drive	Berkley	Broadly Acceptable	Appendix H
1797 Layton Drive	Berkley	Broadly Acceptable	Appendix H
1815 Layton Drive	Berkley	Broadly Acceptable	Appendix H
1839 Layton Drive	Berkley	Broadly Acceptable	Appendix H
1847 Layton Drive	Berkley	Broadly Acceptable	Appendix H
1855 Layton Drive	Berkley	Broadly Acceptable	Appendix H
1863 Layton Drive	Berkley	Broadly Acceptable	Appendix H
1231 Lennox Street	Berkley	Broadly Acceptable	Appendix H
1275 Lennox Street	Berkley	Broadly Acceptable	Appendix H
1279 Lennox Street	Berkley	Broadly Acceptable	Appendix H
1305 Lennox Street	Berkley	Broadly Acceptable	Appendix H
1345 Lennox Street	Berkley	Broadly Acceptable	Appendix H
1383 Lennox Street	Berkley	Broadly Acceptable	Appendix H
1425 Lennox Street	Berkley	Broadly Acceptable	Appendix H

TABLE A1

ADDRESS	ESCARPMENT	DNV's RISK TOLERANCE LEVEL (1)	REFERENCE LOCATION (2)
1477 Lennox Street	Berkley	Broadly Acceptable	Appendix H
1479 Lennox Street	Berkley	Broadly Acceptable	Appendix H
1491 Lennox Street	Berkley	Broadly Acceptable	Appendix H
1535 Lennox Street	Berkley	Broadly Acceptable	Appendix H
1557 Lennox Street	Berkley	Broadly Acceptable	Appendix H
1583 Lennox Street	Berkley	Broadly Acceptable	Appendix H
1593 Lennox Street	Berkley	Broadly Acceptable	Appendix H
2128 Lockehaven Road	Deep Cove - Cove Cliff	Broadly Acceptable	Appendix J
1574 Look Out Point	Deep Cove - Cove Cliff	Broadly Acceptable	Appendix J
1580 Look Out Point	Deep Cove - Cove Cliff	Broadly Acceptable	Appendix J
1584 Look Out Point	Deep Cove - Cove Cliff	Broadly Acceptable	Appendix J
605 Lucerne Place	Mosquito Creek	Broadly Acceptable	Appendix D
4150 Lynn Valley Road	Westlynn	Broadly Acceptable	Appendix F
4160 Lynn Valley Road	Westlynn	Broadly Acceptable	Appendix F
4030 Lynn Valley Road	Westlynn	Broadly Acceptable	Appendix F
1255 McNair Drive	Mount Fromme East	Broadly Acceptable	Appendix E
1277 McNair Drive	Mount Fromme East	Broadly Acceptable	Appendix E
1588 Merlynn Crescent	Westlynn	Broadly Acceptable	Appendix F
1582 Merlynn Crescent	Westlynn	Tolerable	Appendix F
1576 Merlynn Crescent	Westlynn	Tolerable	Appendix F
1221 Mill Street	Mount Fromme East	Broadly Acceptable	Appendix E
1223 Mill Street	Mount Fromme East	Broadly Acceptable	Appendix E
1225 Mill Street	Mount Fromme East	Broadly Acceptable	Appendix E
1227 Mill Street	Mount Fromme East	Broadly Acceptable	Appendix E
1229 Mill Street	Mount Fromme East	Broadly Acceptable	Appendix E
1231 Mill Street	Mount Fromme East	Broadly Acceptable	Appendix E
1233 Mill Street	Mount Fromme East	Broadly Acceptable	Appendix E
498 Monteray Avenue	Mosquito Creek	Broadly Acceptable	Appendix D
4759 Mountain Highway	Mount Fromme East	Broadly Acceptable	Appendix E
4749 Mountain Highway	Mount Fromme East	Broadly Acceptable	Appendix E
4737 Mountain Highway	Mount Fromme East	Broadly Acceptable	Appendix E
4727 Mountain Highway	Mount Fromme East	Broadly Acceptable	Appendix E
4717 Mountain Highway	Mount Fromme East	Broadly Acceptable	Appendix E
4691 Mountain Highway	Mount Fromme East	Broadly Acceptable	Appendix E
4665 Mountain Highway	Mount Fromme East	Broadly Acceptable	Appendix E
4657 Mountain Highway	Mount Fromme East	Broadly Acceptable	Appendix E
4645 Mountain Highway	Mount Fromme East	Broadly Acceptable	Appendix E
4633 Mountain Highway	Mount Fromme East	Broadly Acceptable	Appendix E
4623 Mountain Highway	Mount Fromme East	Broadly Acceptable	Appendix E
4615 Mountain Highway	Mount Fromme East	Broadly Acceptable	Appendix E
4601 Mountain Highway	Mount Fromme East	Broadly Acceptable	Appendix E
2441 Mowat Place	Berkley	Broadly Acceptable	Appendix H
2437 Mowat Place	Berkley	Broadly Acceptable	Appendix H
2433 Mowat Place	Berkley	Broadly Acceptable	Appendix H
2429 Mowat Place	Berkley	Broadly Acceptable	Appendix H
2425 Mowat Place	Berkley	Broadly Acceptable	Appendix H
1894 Naomi Place	Deep Cove - Cove Cliff	Broadly Acceptable	Appendix J
1866 Naomi Place	Deep Cove - Cove Cliff	Broadly Acceptable	Appendix J
1840 Naomi Place	Deep Cove - Cove Cliff	Broadly Acceptable	Appendix J
1814 Naomi Place	Deep Cove - Cove Cliff	Broadly Acceptable	Appendix J
1788 Naomi Place	Deep Cove - Cove Cliff	Broadly Acceptable	Appendix J
1762 Naomi Place	Deep Cove - Cove Cliff	Broadly Acceptable	Appendix J
552 Palisade Drive	Mosquito Creek	Tolerable	Appendix D
568 Palisade Drive	Mosquito Creek	Tolerable	Appendix D
2094 Parkside Lane	Deep Cove - Cove Cliff	Broadly Acceptable	Appendix J
4423 Patterdale Drive	Capilano	Broadly Acceptable	Appendix B
4421 Patterdale Drive	Capilano	Broadly Acceptable	Appendix B
4419 Patterdale Drive	Capilano	Broadly Acceptable	Appendix B
4417 Patterdale Drive	Capilano	Broadly Acceptable	Appendix B
4411 Patterdale Drive	Capilano	Broadly Acceptable	Appendix B
4399 Patterdale Drive	Capilano	Broadly Acceptable	Appendix B
4385 Patterdale Drive	Capilano	Broadly Acceptable	Appendix B
4371 Patterdale Drive	Capilano	Broadly Acceptable	Appendix B
4357 Patterdale Drive	Capilano	Broadly Acceptable	Appendix B
4343 Patterdale Drive	Capilano	Broadly Acceptable	Appendix B
1871 Philip Avenue	Pemberton Heights	Tolerable	Appendix C
1861 Philip Avenue	Pemberton Heights	Broadly Acceptable	Appendix C
1856 Philip Avenue	Pemberton Heights	Broadly Acceptable	Appendix C
1840 Philip Avenue	Pemberton Heights	Broadly Acceptable	Appendix C
3940 Phyllis Road	Westlynn	Broadly Acceptable	Appendix F
3910 Phyllis Road	Westlynn	Broadly Acceptable	Appendix F
4685 Prospect Road	Mosquito Creek	Broadly Acceptable	Appendix D

TABLE A1

ADDRESS	ESCARPMENT	DNV's RISK TOLERANCE LEVEL (1)	REFERENCE LOCATION (2)
4717 Prospect Road	Mosquito Creek	Tolerable	Appendix D
2353 Riverbank Place	Berkley	Broadly Acceptable	Appendix H
2352 Riverbank Place	Berkley	Tolerable	Appendix H
2346 Riverbank Place	Berkley	Broadly Acceptable	Appendix H
2336 Riverbank Place	Berkley	Broadly Acceptable	Appendix H
2322 Riverbank Place	Berkley	Broadly Acceptable	Appendix H
2310 Riverbank Place	Berkley	Broadly Acceptable	Appendix H
1904 Rivergrove Place	Berkley	Broadly Acceptable	Appendix H
1935 Rivergrove Place	Berkley	Broadly Acceptable	Appendix H
1951 Rivergrove Place	Berkley	Broadly Acceptable	Appendix H
1977 Rivergrove Place	Berkley	Broadly Acceptable	Appendix H
1985 Rivergrove Place	Berkley	Broadly Acceptable	Appendix H
2015 Rivergrove Place	Berkley	Broadly Acceptable	Appendix H
2029 Rivergrove Place	Berkley	Broadly Acceptable	Appendix H
1916 Rivergrove Place	Berkley	Tolerable	Appendix H
1928 Rivergrove Place	Berkley	Tolerable	Appendix H
1940 Rivergrove Place	Berkley	Tolerable	Appendix H
1946 Rivergrove Place	Berkley	Tolerable	Appendix H
1950 Rivergrove Place	Berkley	Tolerable	Appendix H
1978 Rivergrove Place	Berkley	Tolerable	Appendix H
1988 Rivergrove Place	Berkley	Tolerable	Appendix H
2002 Rivergrove Place	Berkley	Tolerable	Appendix H
2018 Rivergrove Place	Berkley	Tolerable	Appendix H
2026 Rivergrove Place	Berkley	Tolerable	Appendix H
2038 Rivergrove Place	Berkley	Tolerable	Appendix H
2050 Rivergrove Place	Berkley	Tolerable	Appendix H
2064 Rivergrove Place	Berkley	Tolerable	Appendix H
2078 Rivergrove Place	Berkley	Tolerable	Appendix H
2086 Rivergrove Place	Berkley	Tolerable	Appendix H
2067 Rivergrove Place	Berkley	Tolerable	Appendix H
1226 Riverside Drive	Berkley	Broadly Acceptable	Appendix H
1238 Riverside Drive	Berkley	Broadly Acceptable	Appendix H
1260 Riverside Drive	Berkley	Broadly Acceptable	Appendix H
1320 Riverside Drive	Berkley	Broadly Acceptable	Appendix H
1321 Riverside Drive	Berkley	Broadly Acceptable	Appendix H
1333 Riverside Drive	Berkley	Broadly Acceptable	Appendix H
1350 Riverside Drive	Berkley	Tolerable	Appendix H
1372 Riverside Drive	Berkley	Tolerable	Appendix H
1400 Riverside Drive	Berkley	Broadly Acceptable	Appendix H
1408 Riverside Drive	Berkley	Tolerable	Appendix H
1418 Riverside Drive	Berkley	Tolerable	Appendix H
1426 Riverside Drive	Berkley	Broadly Acceptable	Appendix H
1433 Riverside Drive	Berkley	Broadly Acceptable	Appendix H
1444 Riverside Drive	Berkley	Tolerable	Appendix H
1458 Riverside Drive	Berkley	Tolerable	Appendix H
1460 Riverside Drive	Berkley	Tolerable	Appendix H
1488 Riverside Drive	Berkley	Tolerable	Appendix H
1502 Riverside Drive	Berkley	Tolerable	Appendix H
1530 Riverside Drive	Berkley	Tolerable	Appendix H
1554 Riverside Drive	Berkley	Tolerable	Appendix H
1580 Riverside Drive	Berkley	Tolerable	Appendix H
1590 Riverside Drive	Berkley	Tolerable	Appendix H
1632 Riverside Drive	Berkley	Broadly Acceptable	Appendix H
1640 Riverside Drive	Berkley	Broadly Acceptable	Appendix H
1650 Riverside Drive	Berkley	Broadly Acceptable	Appendix H
1677 Riverside Drive	Berkley	Broadly Acceptable	Appendix H
1701 Riverside Drive	Berkley	Broadly Acceptable	Appendix H
1710 Riverside Drive	Berkley	Broadly Acceptable	Appendix H
1715 Riverside Drive	Berkley	Broadly Acceptable	Appendix H
1733 Riverside Drive	Berkley	Broadly Acceptable	Appendix H
1749 Riverside Drive	Berkley	Broadly Acceptable	Appendix H
1777 Riverside Drive	Berkley	Broadly Acceptable	Appendix H
1819 Riverside Drive	Berkley	Broadly Acceptable	Appendix H
1829 Riverside Drive	Berkley	Broadly Acceptable	Appendix H
1833 Riverside Drive	Berkley	Broadly Acceptable	Appendix H
1837 Riverside Drive	Berkley	Broadly Acceptable	Appendix H
1843 Riverside Drive	Berkley	Broadly Acceptable	Appendix H
1875 Riverside Drive	Berkley	Broadly Acceptable	Appendix H
1893 Riverside Drive	Berkley	Broadly Acceptable	Appendix H
1943 Riverside Drive	Berkley	Broadly Acceptable	Appendix H
1975 Riverside Drive	Berkley	Broadly Acceptable	Appendix H
1981 Riverside Drive	Berkley	Broadly Acceptable	Appendix H

TABLE A1

ADDRESS	ESCARPMENT	DNV's RISK TOLERANCE LEVEL (1)	REFERENCE LOCATION (2)
1718 Riverside Drive	Berkley	Broadly Acceptable	Appendix H
1730 Riverside Drive	Berkley	Tolerable	Appendix H
1748 Riverside Drive	Berkley	Tolerable	Appendix H
1758 Riverside Drive	Berkley	Tolerable	Appendix H
1780 Riverside Drive	Berkley	Tolerable	Appendix H
1788 Riverside Drive	Berkley	Tolerable	Appendix H
1802 Riverside Drive	Berkley	Tolerable	Appendix H
1810 Riverside Drive	Berkley	Tolerable	Appendix H
1818 Riverside Drive	Berkley	Tolerable	Appendix H
1838 Riverside Drive	Berkley	Tolerable	Appendix H
1880 Riverside Drive	Berkley	Tolerable	Appendix H
1884 Riverside Drive	Berkley	Tolerable	Appendix H
1892 Riverside Drive	Berkley	Tolerable	Appendix H
2044 Riverside Drive	Berkley	Broadly Acceptable	Appendix H
2058 Riverside Drive	Berkley	Broadly Acceptable	Appendix H
2062 Riverside Drive	Berkley	Broadly Acceptable	Appendix H
2172 Riverside Drive	Berkley	Broadly Acceptable	Appendix H
2184 Riverside Drive	Berkley	Broadly Acceptable	Appendix H
3212 Robinson Road	Westlynn	Broadly Acceptable	Appendix F
3192 Robinson Road	Westlynn	Broadly Acceptable	Appendix F
1670 Roxbury Place	Deep Cove - Cove Cliff	Broadly Acceptable	Appendix J
1668 Roxbury Place	Deep Cove - Cove Cliff	Broadly Acceptable	Appendix J
1664 Roxbury Place	Deep Cove - Cove Cliff	Broadly Acceptable	Appendix J
1660 Roxbury Place	Deep Cove - Cove Cliff	Broadly Acceptable	Appendix J
1650 Roxbury Place	Deep Cove - Cove Cliff	Broadly Acceptable	Appendix J
1646 Roxbury Place	Deep Cove - Cove Cliff	Broadly Acceptable	Appendix J
1640 Roxbury Place	Deep Cove - Cove Cliff	Broadly Acceptable	Appendix J
4798 Rush Court	Westlynn	Broadly Acceptable	Appendix F
4778 Rush Court	Westlynn	Broadly Acceptable	Appendix F
4748 Rush Court	Westlynn	Broadly Acceptable	Appendix F
1287 Seymour Boulevard	Riverside West	Tolerable	Appendix G
1273 Seymour Boulevard	Riverside West	Tolerable	Appendix G
1261 Seymour Boulevard	Riverside West	Tolerable	Appendix G
1195 Seymour Boulevard	Riverside West	Broadly Acceptable	Appendix G
1193 Seymour Boulevard	Riverside West	Broadly Acceptable	Appendix G
1191 Seymour Boulevard	Riverside West	Broadly Acceptable	Appendix G
1103 Seymour Boulevard	Riverside West	Broadly Acceptable	Appendix G
679 Seymour Boulevard	Riverside West	Tolerable	Appendix G
657 Seymour Court	Riverside West	Broadly Acceptable	Appendix G
647 Seymour Court	Riverside West	Tolerable	Appendix G
639 Seymour Court	Riverside West	Tolerable	Appendix G
633 Seymour Court	Riverside West	Tolerable	Appendix G
631 Seymour Court	Riverside West	Tolerable	Appendix G
625 Seymour Court	Riverside West	Tolerable	Appendix G
621 Seymour Court	Riverside West	Tolerable	Appendix G
615 Seymour Court	Riverside West	Broadly Acceptable	Appendix G
672 Silverdale Place	Mosquito Creek	Broadly Acceptable	Appendix D
679 Silverdale Place	Mosquito Creek	Broadly Acceptable	Appendix D
4875 Skyline Drive	Mosquito Creek	Broadly Acceptable	Appendix D
4867 Skyline Drive	Mosquito Creek	Broadly Acceptable	Appendix D
4596 Skyline Drive	Mosquito Creek	Broadly Acceptable	Appendix D
4540 Skyline Drive	Mosquito Creek	Broadly Acceptable	Appendix D
4528 Skyline Drive	Mosquito Creek	Broadly Acceptable	Appendix D
4488 Skyline Drive	Mosquito Creek	Broadly Acceptable	Appendix D
4476 Skyline Drive	Mosquito Creek	Broadly Acceptable	Appendix D
4464 Skyline Drive	Mosquito Creek	Broadly Acceptable	Appendix D
4424 Skyline Drive	Mosquito Creek	Broadly Acceptable	Appendix D
4416 Skyline Drive	Mosquito Creek	Broadly Acceptable	Appendix D
4408 Skyline Drive	Mosquito Creek	Broadly Acceptable	Appendix D
4374 Skyline Drive	Mosquito Creek	Broadly Acceptable	Appendix D
4358 Skyline Drive	Mosquito Creek	Broadly Acceptable	Appendix D
4576 Strathcona Road	Deep Cove - Cove Cliff	Broadly Acceptable	Appendix J
4568 Strathcona Road	Deep Cove - Cove Cliff	Broadly Acceptable	Appendix J
4522 Strathcona Road	Deep Cove - Cove Cliff	Broadly Acceptable	Appendix J
4542 Strathcona Road	Deep Cove - Cove Cliff	Broadly Acceptable	Appendix J
4539 Strathcona Road	Deep Cove - Cove Cliff	Broadly Acceptable	Appendix J
4533 Strathcona Road	Deep Cove - Cove Cliff	Broadly Acceptable	Appendix J
4531 Strathcona Road	Deep Cove - Cove Cliff	Broadly Acceptable	Appendix J
4528 Strathcona Road	Deep Cove - Cove Cliff	Broadly Acceptable	Appendix J
4527 Strathcona Road	Deep Cove - Cove Cliff	Broadly Acceptable	Appendix J
4526 Strathcona Road	Deep Cove - Cove Cliff	Broadly Acceptable	Appendix J

TABLE A1

ADDRESS	ESCARPMENT	DNV's RISK TOLERANCE LEVEL (1)	REFERENCE LOCATION (2)
4520 Strathcona Road	Deep Cove - Cove Cliff	Broadly Acceptable	Appendix J
4509 Strathcona Road	Deep Cove - Cove Cliff	Broadly Acceptable	Appendix J
4495 Strathcona Road	Deep Cove - Cove Cliff	Broadly Acceptable	Appendix J
4489 Strathcona Road	Deep Cove - Cove Cliff	Broadly Acceptable	Appendix J
4481 Strathcona Road	Deep Cove - Cove Cliff	Broadly Acceptable	Appendix J
2402 Swinburne Avenue	Berkley	Broadly Acceptable	Appendix H
2410 Swinburne Avenue	Berkley	Broadly Acceptable	Appendix H
2414 Swinburne Avenue	Berkley	Broadly Acceptable	Appendix H
2311 Swinburne Avenue	Berkley	Tolerable	Appendix H
2315 Swinburne Avenue	Berkley	Tolerable	Appendix H
2326 Swinburne Avenue	Berkley	Tolerable	Appendix H
2320 Swinburne Avenue	Berkley	Tolerable	Appendix H
2316 Swinburne Avenue	Berkley	Tolerable	Appendix H
2312 Swinburne Avenue	Berkley	Broadly Acceptable	Appendix H
2300 Swinburne Avenue	Berkley	Broadly Acceptable	Appendix H
2336 Tree Top Lane	Berkley	Broadly Acceptable	Appendix H
2354 Tree Top Lane	Berkley	Broadly Acceptable	Appendix H
4819 Underwood Avenue	Westlynn	Broadly Acceptable	Appendix F
4848 Underwood Avenue	Westlynn	Broadly Acceptable	Appendix F
4728 Underwood Avenue	Westlynn	Broadly Acceptable	Appendix F
4726 Underwood Avenue	Westlynn	Broadly Acceptable	Appendix F
4722 Underwood Avenue	Westlynn	Broadly Acceptable	Appendix F
4706 Underwood Avenue	Westlynn	Broadly Acceptable	Appendix F
4700 Underwood Avenue	Westlynn	Broadly Acceptable	Appendix F
4327 Valencia Avenue	Mosquito Creek	Broadly Acceptable	Appendix D
499 Ventura Crescent	Mosquito Creek	Broadly Acceptable	Appendix D
485 Ventura Crescent	Mosquito Creek	Broadly Acceptable	Appendix D
481 Ventura Crescent	Mosquito Creek	Broadly Acceptable	Appendix D
477 Ventura Crescent	Mosquito Creek	Broadly Acceptable	Appendix D
500 Ventura Crescent	Mosquito Creek	Broadly Acceptable	Appendix D
522 Ventura Crescent	Mosquito Creek	Tolerable	Appendix D
544 Ventura Crescent	Mosquito Creek	Tolerable	Appendix D
550 Ventura Crescent	Mosquito Creek	Tolerable	Appendix D
2784 Wembley Drive	Westlynn	Broadly Acceptable	Appendix F
2770 Wembley Drive	Westlynn	Broadly Acceptable	Appendix F
2722 Wembley Drive	Westlynn	Broadly Acceptable	Appendix F
2730 Wembley Drive	Westlynn	Broadly Acceptable	Appendix F
1415 West Keith Road	Pemberton Heights	Broadly Acceptable	Appendix C
1395 West Keith Road	Pemberton Heights	Broadly Acceptable	Appendix C
1247 West Keith Road	Pemberton Heights	Broadly Acceptable	Appendix C
1251 West Keith Road	Pemberton Heights	Broadly Acceptable	Appendix C
4761 Woodrow Crescent	Westlynn	Broadly Acceptable	Appendix F
4757 Woodrow Crescent	Westlynn	Broadly Acceptable	Appendix F
4753 Woodrow Crescent	Westlynn	Broadly Acceptable	Appendix F
4749 Woodrow Crescent	Westlynn	Broadly Acceptable	Appendix F
4745 Woodrow Crescent	Westlynn	Broadly Acceptable	Appendix F
4741 Woodrow Crescent	Westlynn	Broadly Acceptable	Appendix F

Notes:

1. This table summarizes all available landslide risk information completed within the District of North Vancouver since the January 2005 Berkley Landslide and should be read in conjunction with BGC Landslide Risk Summary report for the District of North Vancouver, October 2010.

2. DNV adopted Risk Tolerance Criteria in 2009 (DNV 2009). Three risk tolerance criteria levels were adopted by DNV - 'Broadly Acceptable', 'Tolerable' and 'Unacceptable'.

3. This site is undergoing mitigation design by others at the time of report prepartion.

TABLE A1

DEEP COVE - COVE CLIFF - LANDSLIDE RISK SUMMARY

DEEP COVE - COVE CLIFF ADDRESS	PHASE I APRIL 2009 - PARTIAL RISK ASSESSMENT [1]					PHASE II JANUARY 2010 - QUANTITATIVE RISK ASSESSMENT [2]		DNV'S RISK TOLERANCE LEVEL [4]	REPORT REFERENCE					
						Factor of Safety Method [3]			PHASE I APRIL 2009 [1]			PHASE II JANUARY 2010 [2]		
	P_H - Hazard Probability	x	P_{SH} - Spatial Probability of Impact	=	P_{HA} - Qualitative Partial Risk	Factor of Safety	Seismic Slope Deformation (1:475)		Table No.	Table Location	DWG No.	Table No.	Table Location	DWG No.
2094 Parkside Lane	Moderate	x	Moderate	=	MODERATE	See Comment Below [5]		Broadly Acceptable	8	Page 13	2	N/A		
2128 Lockehaven Road	Low	x	High	=	MODERATE			Broadly Acceptable	8	Page 13	2			
4636 Eastridge Road	Low	x	Moderate	=	LOW			Broadly Acceptable	Appendix C		2			
4644 Eastridge Road	Moderate	x	Low	=	LOW			Broadly Acceptable	Appendix C		2			
4652 Eastridge Road	Low	x	High	=	MODERATE			Broadly Acceptable	8	Page 13	2			
4660 Eastridge Road	Low	x	High	=	MODERATE			Broadly Acceptable	8	Page 13	2			
4670 Eastridge Road	Low	x	High	=	MODERATE			Broadly Acceptable	8	Page 13	2			
4678 Eastridge Road	Low	x	High	=	MODERATE			Broadly Acceptable	8	Page 13	2			
4680 Eastridge Road	Low	x	High	=	MODERATE			Broadly Acceptable	8	Page 13	2			
4682 Eastridge Road	Low	x	High	=	MODERATE			Broadly Acceptable	8	Page 13	2			
4684 Eastridge Road	Low	x	High	=	MODERATE			Broadly Acceptable	8	Page 13	2			
4688 Eastridge Road	Low	x	High	=	MODERATE			Broadly Acceptable	8	Page 13	2			
4696 Eastridge Road	Low	x	High	=	MODERATE			Broadly Acceptable	8	Page 13	2			
4720 Eastridge Road	Moderate	x	Low	=	LOW			Broadly Acceptable	Appendix C		2			
4726 Eastridge Road	Moderate	x	Moderate	=	MODERATE			Broadly Acceptable	8	Page 13	2			
4734 Eastridge Road	Moderate	x	Moderate	=	MODERATE			Broadly Acceptable	8	Page 13	2			
4742 Eastridge Road	Low	x	High	=	MODERATE			Broadly Acceptable	8	Page 13	2			
4750 Eastridge Road	High	x	Moderate	=	HIGH	1.4 - 1.5	0.09 m	Tolerable	7	Page 11	2	6	Page 21	18
4760 Eastridge Road [6]	N/A					See Comment Below [5]		Tolerable	N/A			DWG No. 18		
2074 Cardinal Crescent	Low	x	High	=	MODERATE			Broadly Acceptable	8	Page 13	2	N/A		
2050 Cardinal Crescent	Low	x	High	=	MODERATE			Broadly Acceptable	8	Page 13	2			
2048 Cardinal Crescent	Low	x	High	=	MODERATE			Broadly Acceptable	8	Page 13	2			
2025 Cardinal Crescent	Low	x	High	=	MODERATE			Broadly Acceptable	8	Page 13	2			
2022 Cardinal Crescent	Low	x	Low	=	VERY LOW			Broadly Acceptable	Appendix C		2			
1999 Cardinal Crescent	Low	x	Moderate	=	LOW			Broadly Acceptable	Appendix C		2			
1996 Cardinal Crescent	Low	x	Moderate	=	LOW			Broadly Acceptable	Appendix C		2			
1972 Cardinal Crescent	Low	x	High	=	MODERATE			Broadly Acceptable	8	Page 13	2			
1944 Cardinal Crescent	Low	x	High	=	MODERATE			Broadly Acceptable	8	Page 13	2			
1938 Cardinal Crescent	Moderate	x	Moderate	=	MODERATE			Broadly Acceptable	8	Page 13	2			
1937 Cardinal Crescent	Low	x	Moderate	=	LOW			Broadly Acceptable	Appendix C		2			
1922 Cardinal Crescent	Low	x	Moderate	=	LOW			Broadly Acceptable	Appendix C		2			
1921 Cardinal Crescent	Low	x	High	=	MODERATE			Broadly Acceptable	8	Page 13	2			
1894 Naomi Place	Low	x	High	=	MODERATE			Broadly Acceptable	8	Page 13	2			
1864 Cardinal Crescent	Low	x	High	=	MODERATE			Broadly Acceptable	8	Page 13	2			
1760 Cardinal Crescent	Low	x	High	=	MODERATE			Broadly Acceptable	8	Page 13	2			
1866 Naomi Place	Low	x	High	=	MODERATE			Broadly Acceptable	8	Page 13	2			
1840 Naomi Place	Low	x	High	=	LOW			Broadly Acceptable	Appendix C		2			

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DEEP COVE - COVE CLIFF ADDRESS	PHASE I APRIL 2009 - PARTIAL RISK ASSESSMENT [1]					PHASE II JANUARY 2010 - QUANTITATIVE RISK ASSESSMENT [2]		DNV'S RISK TOLERANCE CRITERIA RISK LEVEL [4]	REPORT REFERENCE					
						Factor of Safety Method [3]			PHASE I APRIL 2009 [1]			PHASE II JANUARY 2010 [2]		
	P_H - Hazard Probability	x	P_{SH} - Spatial Probability of Impact	=	P_{HA} - Qualitative Partial Risk	Factor of Safety	Slope Deformation		Table No.	Table Location	DWG No.	Table No.	Table Location	DWG No.
1814 Naomi Place	Low	x	High	=	MODERATE			Broadly Acceptable	8	Page 13	2			
1788 Naomi Place	Low	x	High	=	MODERATE			Broadly Acceptable	8	Page 13	2			
1762 Naomi Place	Low	x	High	=	MODERATE			Broadly Acceptable	8	Page 13	2			
4857 Cove Cliff Place	Low	x	High	=	MODERATE			Broadly Acceptable	8	Page 13	2			
4879 Cove Cliff Place	Low	x	High	=	MODERATE			Broadly Acceptable	8	Page 13	2			
4885 Cove Cliff Place	Low	x	High	=	MODERATE			Broadly Acceptable	8	Page 13	2			
1670 Roxbury Place	Low	x	High	=	MODERATE			Broadly Acceptable	8	Page 13	2			
1668 Roxbury Place	Low	x	Low	=	VERY LOW			Broadly Acceptable	Appendix C		2			
1664 Roxbury Place	Low	x	High	=	MODERATE			Broadly Acceptable	8	Page 13	2			
1660 Roxbury Place	Low	x	High	=	MODERATE			Broadly Acceptable	8	Page 13	2			
1650 Roxbury Place	Low	x	High	=	MODERATE			Broadly Acceptable	8	Page 13	2			
1646 Roxbury Place	Low	x	High	=	MODERATE			Broadly Acceptable	8	Page 13	2			
1640 Roxbury Place	Low	x	High	=	MODERATE			Broadly Acceptable	8	Page 13	2			
1574 Look Out Point	Low	x	High	=	MODERATE			Broadly Acceptable	8	Page 13	2			
1580 Look Out Point	Low	x	High	=	MODERATE			Broadly Acceptable	8	Page 13	2			
1584 Look Out Point	Low	x	High	=	MODERATE			Broadly Acceptable	8	Page 13	2			
4576 Strathcona Road	Moderate	x	Moderate	=	MODERATE			Broadly Acceptable	8	Page 13	2			
4568 Strathcona Road	Low	x	High	=	MODERATE	**See Comment Below (5)**		Broadly Acceptable	8	Page 13	2	N/A		
4522 Strathcona Road	Low	x	High	=	MODERATE			Broadly Acceptable	8	Page 13	2			
4542 Strathcona Road	Low	x	High	=	MODERATE			Broadly Acceptable	8	Page 13	2			
4539 Strathcona Road	Low	x	Moderate	=	LOW			Broadly Acceptable	Appendix C		2			
4533 Strathcona Road	Low	x	High	=	MODERATE			Broadly Acceptable	8	Page 13	2			
4531 Strathcona Road	Low	x	High	=	MODERATE			Broadly Acceptable	8	Page 13	2			
4528 Strathcona Road	Low	x	Moderate	=	LOW			Broadly Acceptable	Appendix C		2			
4527 Strathcona Road	Low	x	High	=	MODERATE			Broadly Acceptable	8	Page 13	2			
4526 Strathcona Road	Low	x	High	=	MODERATE			Broadly Acceptable	8	Page 13	2			
4520 Strathcona Road	Low	x	High	=	MODERATE			Broadly Acceptable	8	Page 13	2			
4509 Strathcona Road	Low	x	Moderate	=	LOW			Broadly Acceptable	Appendix C		2			
4495 Strathcona Road	Low	x	High	=	MODERATE			Broadly Acceptable	8	Page 13	2			
4489 Strathcona Road	Low	x	High	=	MODERATE			Broadly Acceptable	8	Page 13	2			
4481 Strathcona Road	Low	x	High	=	MODERATE			Broadly Acceptable	8	Page 13	2			
4540 Epps Avenue	Low	x	High	=	MODERATE			Broadly Acceptable	8	Page 13	2			
4546 Epps Avenue	Low	x	High	=	MODERATE			Broadly Acceptable	8	Page 13	2			
4566 Epps Avenue	Low	x	High	=	MODERATE			Broadly Acceptable	8	Page 13	2			
4570 Epps Avenue	Low	x	High	=	MODERATE			Broadly Acceptable	8	Page 13	2			

Notes:

1. BGC Engineering Inc. report to the District of North Vancouver - Deep Cove - Cove Cliff Preliminary Landslide Hazard Assessment and Risk Analysis. April 30, 2009. This report assigned a Partial Landslide Risk Estimate to each property studied.
2. BGC Engineering Inc. report to the District of North Vancouver - 2009 Landslide Risk Assessment for Select Escarpment Slopes. January 04, 2010. This report estimated a quantitive landslide risk for each property studied.
3. In some cases geological conditions or landslide failure mechanisms differed from the Berkley Escarpment. In these instances results of rock fall risk assessments or limit equilibrium slope stability analyses were compared to DNV's risk acceptance criteria for new and existing development.
4. DNV adopted Risk Tolerance Criteria in 2009 (DNV 2009). Three risk tolerance criteria levels were adopted by DNV - 'Broadly Acceptable', 'Tolerable' and 'Unacceptable'.
5. Properties assigned a Partial Risk Rating of 'Very Low', 'Low' or 'Moderate' were considered to pose risks similar to DNV's Broadly Acceptable risk tolerance level and not studied further.
6. 4760 Eastridge Road buidling (adjacent to ocean) 'Tolerable' risk tolerance level based on a Factor of Safety estimate for a hypothetical fill failure originating from the upper driveway of 4750 Eastridge Road.

TABLE J1