

**APPENDIX 9-D**  
**KSM PROJECT GEOHAZARD RISK ASSESSMENT OF**  
**UPDATED FACILITY LOCATIONS**

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## **SEABRIDGE GOLD INC.**

### **KSM PROJECT**

# **GEOHAZARD RISK ASSESSMENT OF UPDATED FACILITY LOCATIONS**

PROJECT NO: 0638-013  
DATE: December 10, 2012  
DOCUMENT NO: KSM12-34

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December 10, 2012  
Project No: 0638-013

Brent Murphy, M.Sc., P.Geo.  
Seabridge Gold Inc.  
106 Front Street East  
Toronto, Ontario, M5A 1E1

Dear Mr. Murphy,

**Re: KSM Project: Geohazard Risk Assessment of Updated Facility Locations**

Please find attached a copy of the above referenced report dated December 10, 2012.

Should you have any questions or comments, please do not hesitate to contact the undersigned. We appreciate having the opportunity to work on such an interesting and challenging project.

Yours sincerely,

**BGC ENGINEERING INC.**  
per:

Kris Holm, M.Sc., P.Geo.  
Senior Geoscientist

## EXECUTIVE SUMMARY

This report provides a geohazard and risk assessment of landslides and snow avalanches for several facilities whose locations have been revised since BGC's Rev C (June 1, 2012) geohazard and risk report was issued. The revised locations of the following facilities are included in this report:

- North seepage pond
- South seepage pond
- TMF discharge pipe
- Coulter Access Road
- Mitchell operating camp

BGC estimated order-of-magnitude likelihoods of occurrence for each geohazard and their likelihood of leading to a loss. Consequences were estimated for each geohazard scenario with respect to human safety, economic loss, environmental loss, and reputation loss to the company. The likelihood and consequence ratings for each facility were combined into a risk matrix that defines relative risk values ranging from Very Low to Very High for each facility. All geohazard risk estimates assume existing conditions (e.g. no implemented mitigation).

The results are shown in Table E-1.

**Table E-1 Summary Risk Statistics for the Unmitigated Case**

Facility	Process/Scenario	Direct Consequence	Risk
<b>TMF discharge pipe*</b>	Snow Avalanche impact	potential injury or fatalities	<b>High</b>
<b>North seepage dam</b>	No scenarios identified	-	-
<b>South seepage dam</b>	Snow Avalanche impact	potential injury or fatalities	<b>Moderate</b>
<b>Mitchell Operating Camp</b>	Snow Avalanche impact	potential injury or fatalities	<b>High</b>

\* during construction and servicing only

Snow avalanches pose the highest relative risk due to their spatial abundance, their high frequency of occurrence, their potentially high impact forces, and the potential for avalanches to present a safety hazard.

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## LIMITATIONS

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## 1.0 INTRODUCTION

### 1.1. General

BGC Engineering was previously retained by Seabridge Gold Inc. to complete a geohazard risk assessment for proposed facilities associated with the KSM project (BGC 2012 a, b). Since then, the proposed locations of several facilities (Table 1-1) have changed, and Seabridge requested in an email dated November 1, 2012 that BGC complete a geohazard risk assessment for the proposed new sites.

This memo summarizes the results of our assessment, based on landslide and snow avalanche mapping previously completed for the KSM Project (BGC 2012b and 2012c). No additional fieldwork was completed for this assessment. Table 1-1 lists the facilities locations that have changed, and the footprints of the proposed locations are shown on Drawings 01A – 06B.

**Table 1-1. List of facilities that have been relocated**

Area	Facility	Description of Change
TMF	TMF North seepage collection Dam	Moved 500 m downstream
	South Seepage Collection Dam	Moved 500 m downstream
	TMF discharge pipe	Added from TMF to Treaty Creek
Coulter Creek	Coulter Creek access road	Access road moved 500 m east at kilometer 7.5
Minesite	Mitchell operations camp	added to layout

### 1.2. Report Objective and Work Scope

Rescan provided drawings titled *KSM project Mine Site Area End of Operation* dated Oct. 17, 2012, and *KSM Project Processing and Tailing Management Area, End of Operation* dated October 24, 2012.

The scope of work included:

- summarizing terrain and geohazards for each proposed updated facility location;
- identifying geohazard risk scenarios with the potential to impact particular facilities locations; and
- assessing semi-quantitatively geohazard risk for identified scenarios.

Hazard and risk-assessment methodologies used for the relocated facilities are similar to those applied to other proposed permanent facilities in BGC (2012 a,b). The reader should refer to BGC (2012a,b) for description of methodology and limitations of assessment. The work scope does not include an engineering geologic assessment of foundation conditions for the purpose of foundation design.



## **2.0 TERRAIN AND GEOHAZARD DESCRIPTIONS**

### **2.1. Tailings Management Area**

#### **2.1.1. North Seepage Collection Dam and Seepage Collection Pond**

The North Seepage Dam is has been moved 500 m north to a position about 2.0 km north of the North Dam Crest (Drawing 1a and 1b). No avalanche or landslide geohazards were identified at this location. Based on air photo interpretation, the dam footprint extends across a steep, bedrock-controlled, V-shaped valley bottom partially overlain by thin (< 1 m) colluvium. No active landslides were identified on air photos; however slopes in the vicinity of the dam footprint are undercut by gully and fluvial erosion and may be subject to localized instability above the creek channel.

#### **2.1.2. Southeast Seepage Collection Dam and Seepage Collection Pond**

The Southeast Seepage Dam has been moved 500 m south to a position 2.0 km downstream of the South Dam (Drawings 2a and 2b). The southwest boundary of the dam footprint is immediately adjacent to the runout of an avalanche path to the west. Avalanches are not expected to be a hazard to the collection dam or the pond. There is potential for hazard to personnel during construction and serving, depending on the location of worksites. No other avalanche or landslide geohazards have been identified at this location.

#### **2.1.3. TMF Discharge Pipe**

The TMF discharge pipe runs from the north cell of the TMF to Treaty Creek. From the north cell to the Southeast Dam the pipe replaces the South Diversion Channel. From the Southeast Dam the pipe parallels the North Treaty road and North Treaty Creek to Treaty Creek (Drawings 2a and 2b). The pipe crosses avalanche paths between the Southeast Dam and Treaty Creek. These could be a hazard during construction or servicing. No geohazards were identified that could impact a buried pipe.

### **2.2. Coulter Creek**

The Coulter Creek access road was relocated approximately 500 m east at kilometer 7.5 to the base of a talus slope to avoid a wet area. The proposed road now passes through a polygon that was originally mapped as slope stability V due to rock fall. The terrain stability mapping was re-examined in light of field visits, and the Class V polygon was split into Class V at the top of the slope where the rock fall initiates, and Class IV at the base where the rock fall is deposited (Drawing 3a and 3b). The new road alignment traverses the new Class IV polygon. It will be subject to rockfall in this area. A minor adjustment was made to terrain polygon 479, to move the boundary to the crest of a small ridge that more accurately marks the edge of the Class V terrain (Drawing 4).

## **2.3. Minesite**

### **2.3.1. Mitchell Operations Camp**

This camp is located on the north side of Sulphurets Creek approximately 600 m west of Gingrass Creek (Drawings 5a and 5b). No landslide geohazards were identified with the potential to impact the camp location. However the structures at the western edge of the camp are adjacent to a slump in thick colluvial material. The western edge of the camp footprint extends near an avalanche path runout area and could be subject to avalanche mass or powder impact. A small gully located to the north is capable of producing wet flowing avalanches. The analysis completed suggests it does not reach the camp footprint, but this is subject to field confirmation.

## **3.0 GEOHAZARD RISK ESTIMATES**

### **3.1. General**

This section discusses risk to proposed changed facilities locations (Table 1-1) from the geohazards described in Section 2. The assessment is based on the estimated likelihood that a geohazard event will occur and impact a facility with a particular level of consequence. The assessment methodology is similar to that described in BGC (2012a, b). Criteria used to evaluate the risk, as well as limitations of the assessment, are described in those reports. In summary, the methodology involves:

1. Defining geohazard risk scenarios that could potentially result in specific undesirable outcomes.
2. Estimating the probability of a geohazard resulting in a specific undesirable outcome for each defined geohazard scenario. This is based on the estimated likelihood that the geohazard will occur and reach the element at risk when the element is present within the hazard zone.
3. Estimating the consequences from the undesirable outcome of the geohazard scenarios, in the categories of Safety, Environment, Economic, and Reputation.
4. Combining the probability of undesirable outcome with the severity of potential consequences via a semi-quantitative risk matrix to arrive at a risk ranking, ranging from Very Low to Very High for each potential consequence.

All geohazard risk estimates assume existing conditions (e.g. no implemented mitigation).

### **3.2. Results**

Results of the risk assessment are summarized in Table 3-1 and tabulated in more detail in Appendix A. The table is structured similarly to Appendices D and B in BGC 2012a and 2012b, respectively, and a more detailed description of each column is provided in the results section of these reports.

**Table 3-1. Summary Risk Statistics for the Unmitigated Case**

<b>Facility</b>	<b>Process/Scenario</b>	<b>Direct Consequence</b>	<b>Risk</b>
<b>TMF discharge pipe*</b>	Snow Avalanche impact	potential injury or fatalities	<b>High</b>
<b>North seepage dam</b>	No scenarios identified	-	-
<b>South seepage dam</b>	Snow Avalanche impact	potential injury or fatalities	<b>Moderate</b>
<b>Mitchell Operating Camp</b>	Snow Avalanche impact	potential injury or fatalities	<b>High</b>

\* during construction and servicing only

#### **4.0 CLOSURE**

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:**

Betsy Waddington, M.Sc., P.Geo.  
Project Geoscientist

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Alpine Solutions Avalanche Services

Reviewed by:

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Senior Geoscientist

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

## REFERENCES

BGC Engineering, 2012a. Geohazard Risk Assessment: Proposed Construction Camps-Rev B. Report prepared for Seabridge Gold, dated May 30, 2012. 8pp

BGC Engineering, 2012b. KSM Project Geohazard and Risk Assessment, Minesite and Coulter Creek Access, Revision C Final Report prepared for Seabridge Gold, dated March 19, 2012.

BGC Engineering, 2012c. KSM Project Geohazard and Risk Assessment, Tailings Management Facility and Teigen Creek Access, Revision C Final Report prepared for Seabridge Gold, dated March 19, 2012.

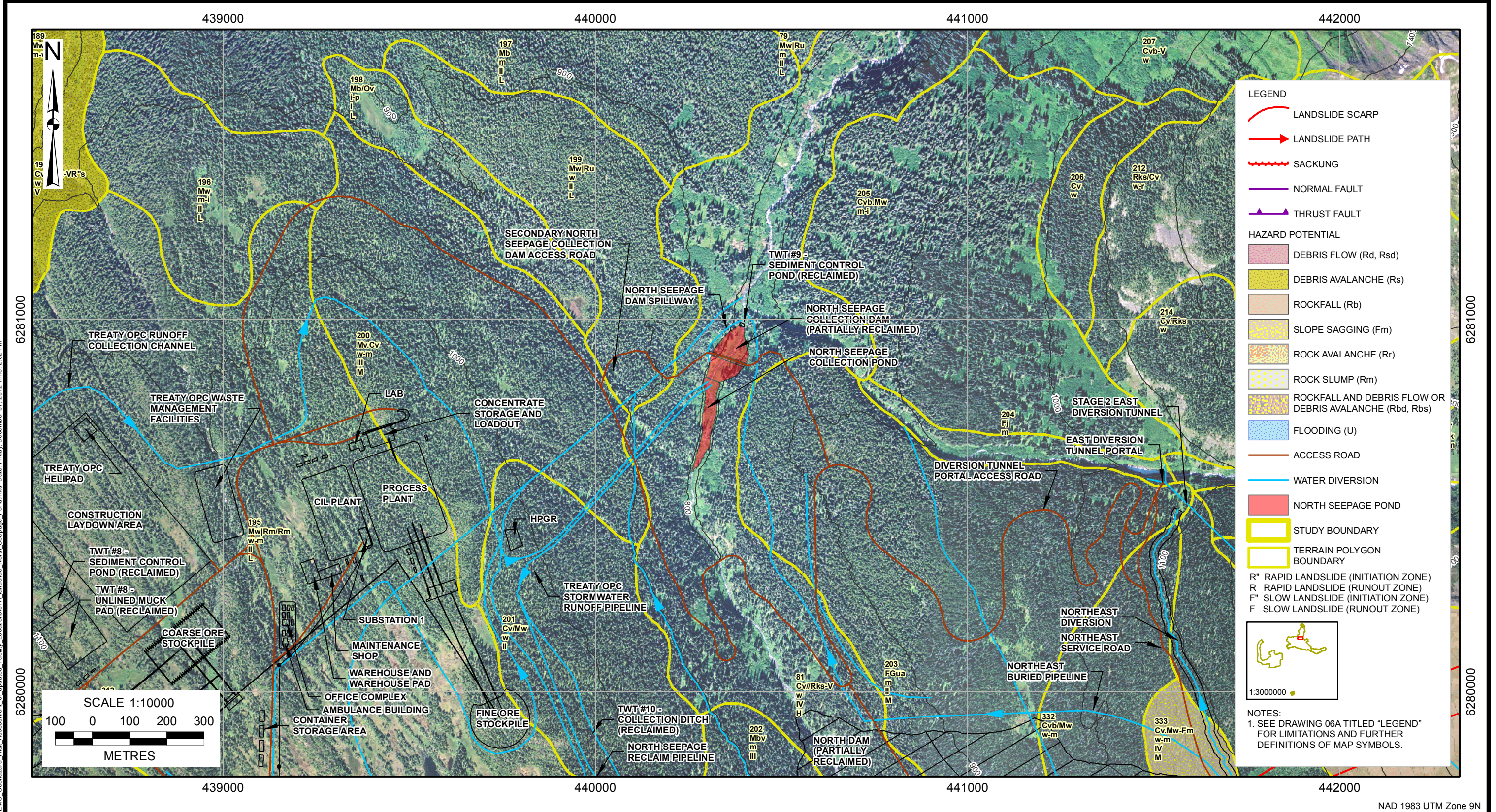
## **APPENDIX A GEOHAZARD RISK TABLE**

TABLE A-1. REVISED FACILITIES GEOHAZARD RISK ASSESSMENT

HAZARD IDENTIFICATION			ANNUAL HAZARD FREQ.		ANNUAL PROBABILITY OF UNWANTED OUTCOME						CONSEQUENCE ESTIMATION (OPERATION)					UNMITIGATED
Facility	Process/Scenario	Direct Consequence	F <sub>(min)</sub>	F <sub>(max)</sub>	P <sub>S:H</sub>	P <sub>T:H</sub>	V	P <sub>(min)</sub>	P <sub>(max)</sub>	Likelihood	Safety	Environment	Economic	Reputation	Max Cons.	RISK
TMF discharge pipe*	Snow Avalanche impact	potential injury or fatalities	0.1	1	1	0.01	1	0.001	0.01	Unlikely	2	5	3	3	2	High
North seepage dam	No scenarios identified	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
South seepage dam	Snow Avalanche impact	potential injury or fatalities	0.01	0.1	1	0.01	1	0.0001	0.001	Very Unlikely	2	5	3	3	2	Moderate
Mitchell Operating Camp	Snow Avalanche impact	potential injury or fatalities	0.5	1	1	0.01	1	0.005	0.01	Unlikely	2	5	3	3	2	High



## **DRAWINGS**



**LEGEND**

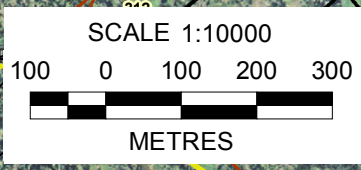
- LANDSLIDE SCARP
- LANDSLIDE PATH
- SACKUNG
- NORMAL FAULT
- THRUST FAULT

**HAZARD POTENTIAL**

- DEBRIS FLOW (Rd, Rsd)
- DEBRIS AVALANCHE (Rs)
- ROCKFALL (Rb)
- SLOPE SAGGING (Fm)
- ROCK AVALANCHE (Rr)
- ROCK SLUMP (Rm)
- ROCKFALL AND DEBRIS FLOW OR DEBRIS AVALANCHE (Rbd, Rbs)
- FLOODING (U)
- ACCESS ROAD
- WATER DIVERSION
- NORTH SEEPAGE POND
- STUDY BOUNDARY
- TERRAIN POLYGON BOUNDARY

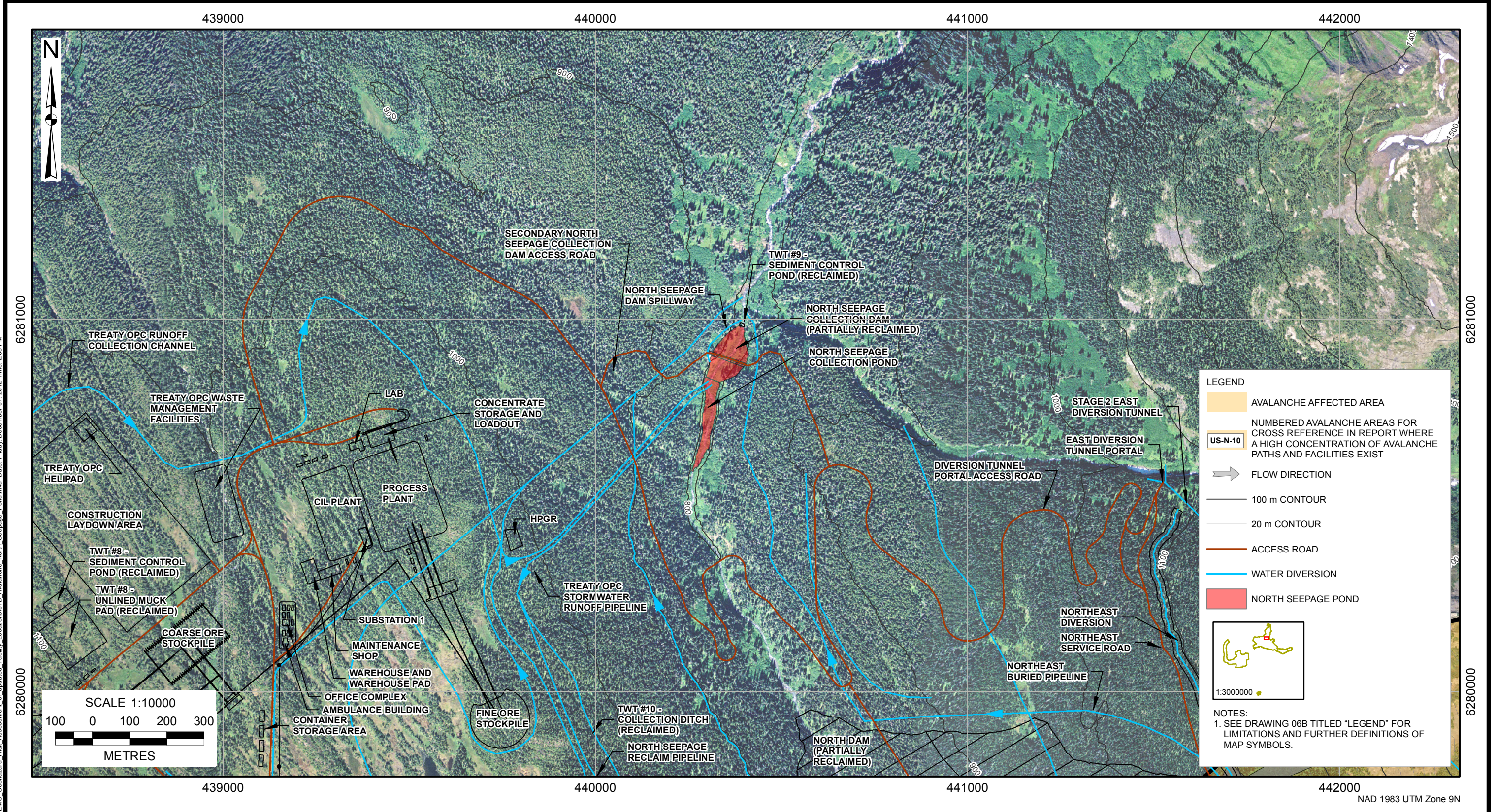
R" RAPID LANDSLIDE (INITIATION ZONE)  
R RAPID LANDSLIDE (RUNOUT ZONE)  
F" SLOW LANDSLIDE (INITIATION ZONE)  
F SLOW LANDSLIDE (RUNOUT ZONE)

**NOTES:**  
1. SEE DRAWING 06A TITLED "LEGEND" FOR LIMITATIONS AND FURTHER DEFINITIONS OF MAP SYMBOLS.



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					<p>DRAWN: LL</p>		<p>CLIENT: SEABRIDGE GOLD INC.</p>		<p>PROJECT No.: 0638013</p>	
					<p>DESIGNED: BW</p>		<p>APPROVED: MJ</p>		<p>DWG No.: 01A</p>	
					<p>CHECKED: KH</p>		<p>REV. DATE REVISION NOTES DRAWN CHECK APPR.</p>		<p>REV.:</p>	
					<p>APPROVED: MJ</p>		<p>DWG TO BE READ WITH BGC MEMO TITLED "GEOHAZARD RISK ASSESSMENT OF UPDATED FACILITY LOCATIONS" DATED FACILITY LOCATIONS" DATED DECEMBER 2012</p>		<p>REV.:</p>	

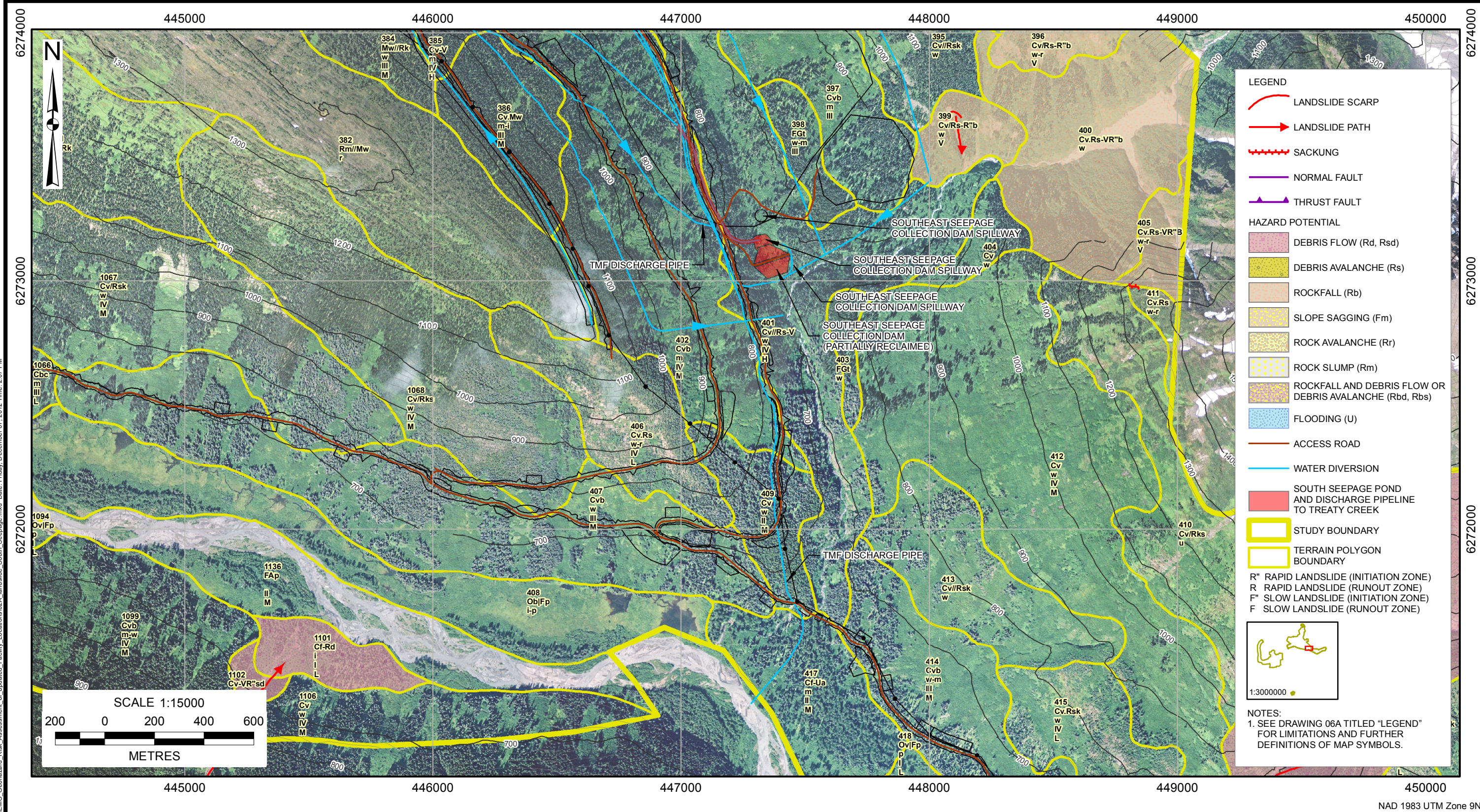


**LEGEND**

- AVALANCHE AFFECTED AREA
- NUMBERED AVALANCHE AREAS FOR CROSS REFERENCE IN REPORT WHERE A HIGH CONCENTRATION OF AVALANCHE PATHS AND FACILITIES EXIST
- US-N-10
- FLOW DIRECTION
- 100 m CONTOUR
- 20 m CONTOUR
- ACCESS ROAD
- WATER DIVERSION
- NORTH SEEPAGE POND

**NOTES:**  
 1. SEE DRAWING 06B TITLED "LEGEND" FOR LIMITATIONS AND FURTHER DEFINITIONS OF MAP SYMBOLS.

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**LEGEND**

- LANDSLIDE SCARP
- LANDSLIDE PATH
- SACKUNG
- NORMAL FAULT
- THRUST FAULT

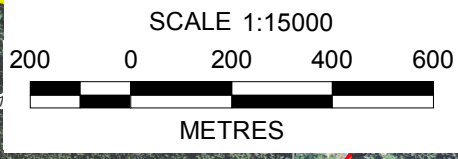
**HAZARD POTENTIAL**

- DEBRIS FLOW (Rd, Rsd)
- DEBRIS AVALANCHE (Rs)
- ROCKFALL (Rb)
- SLOPE SAGGING (Fm)
- ROCK AVALANCHE (Rr)
- ROCK SLUMP (Rm)
- ROCKFALL AND DEBRIS FLOW OR DEBRIS AVALANCHE (Rbd, Rbs)
- FLOODING (U)

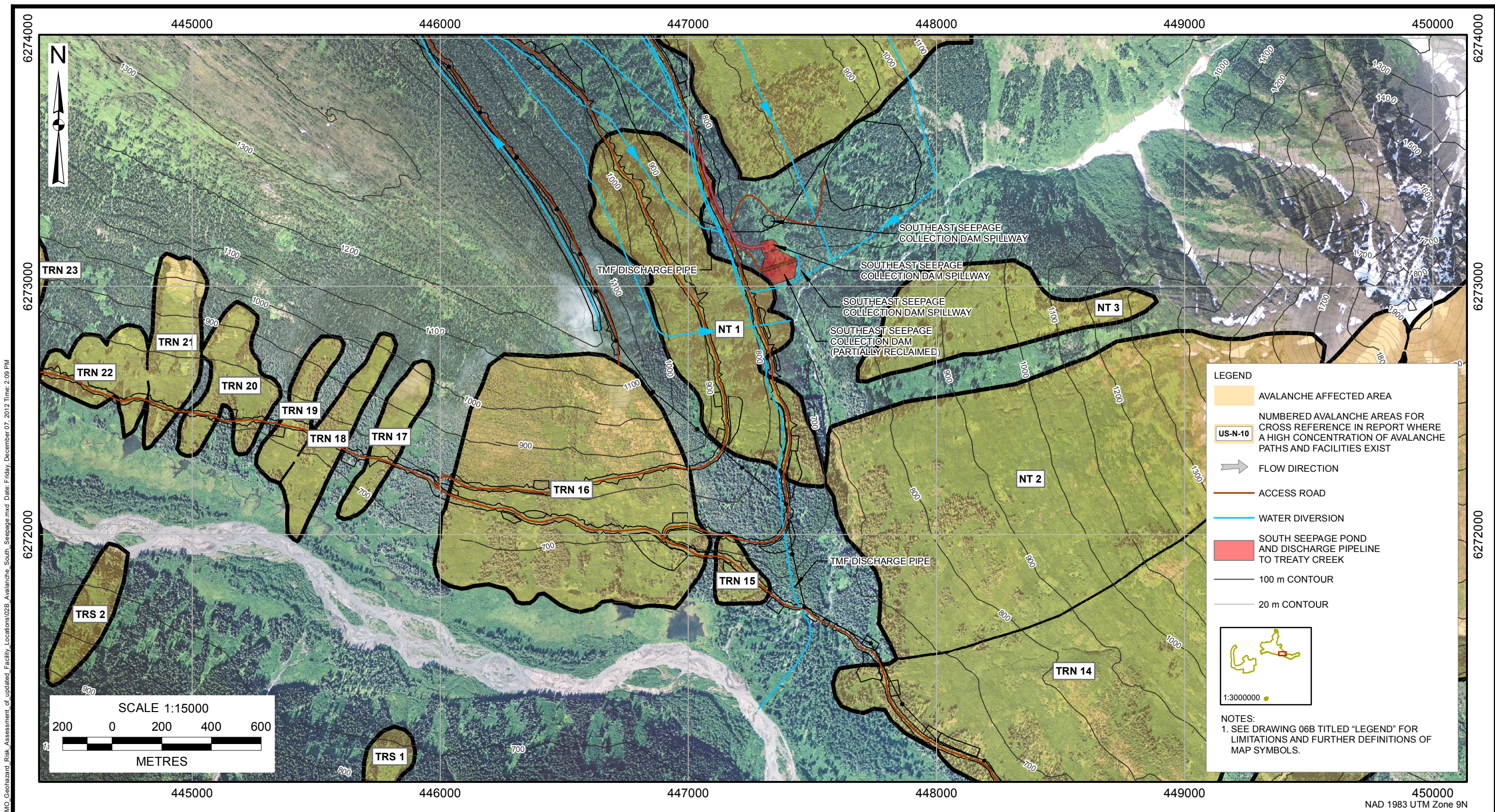
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					DRAWN: LL		CLIENT: <b>SEABRIDGE GOLD INC.</b>
					DESIGNED: BW		PROJECT No.: 0638013
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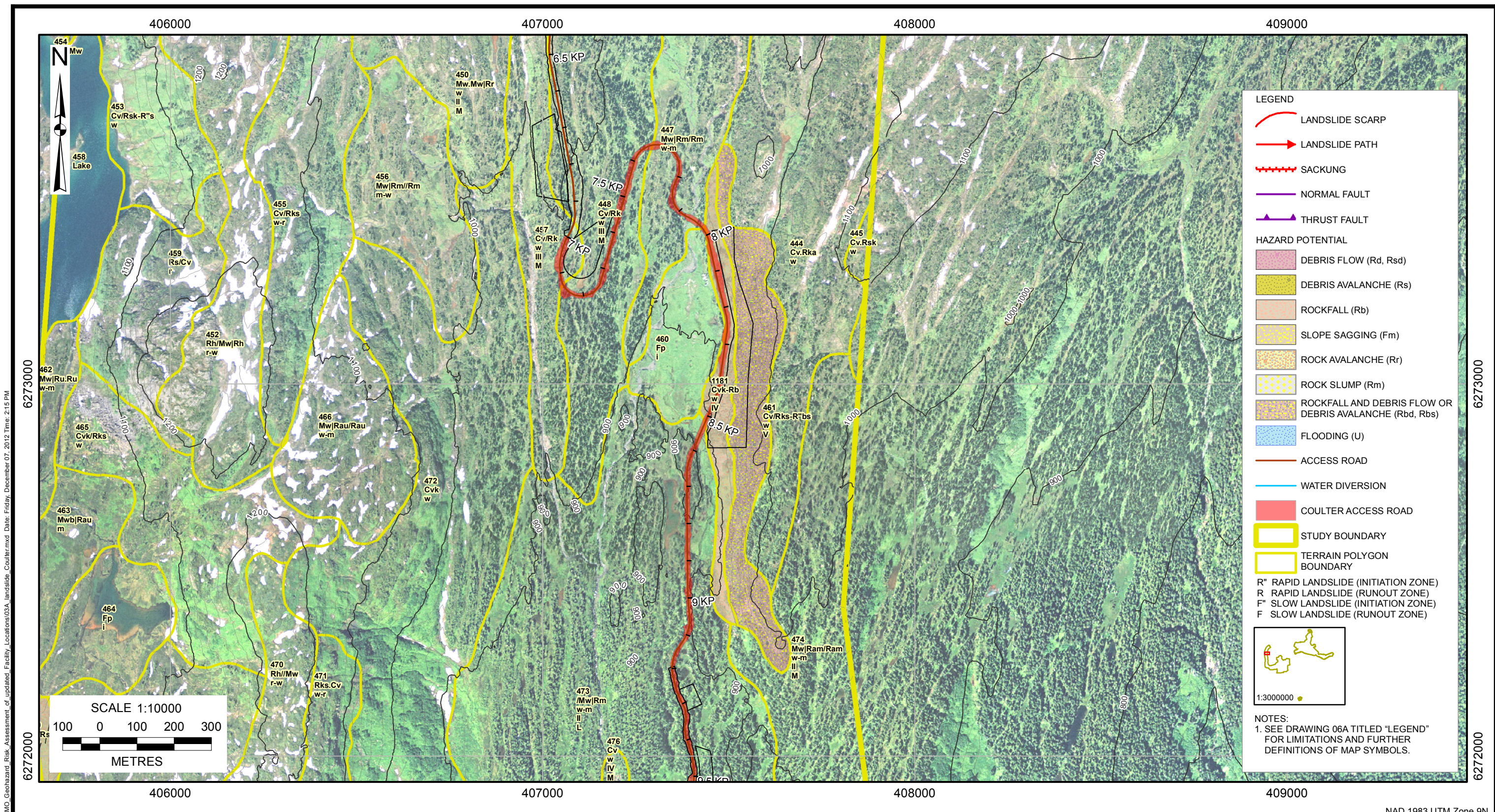
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DATE:	DEC 2012
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TITLE: AVALANCHE GEOHAZARDS: SOUTH SEEPAGE POND AND DISCHARGE PIPELINE TO TREATY CREEK		
PROJECT No.: 0638013	DWG No.: 02B	REV.:



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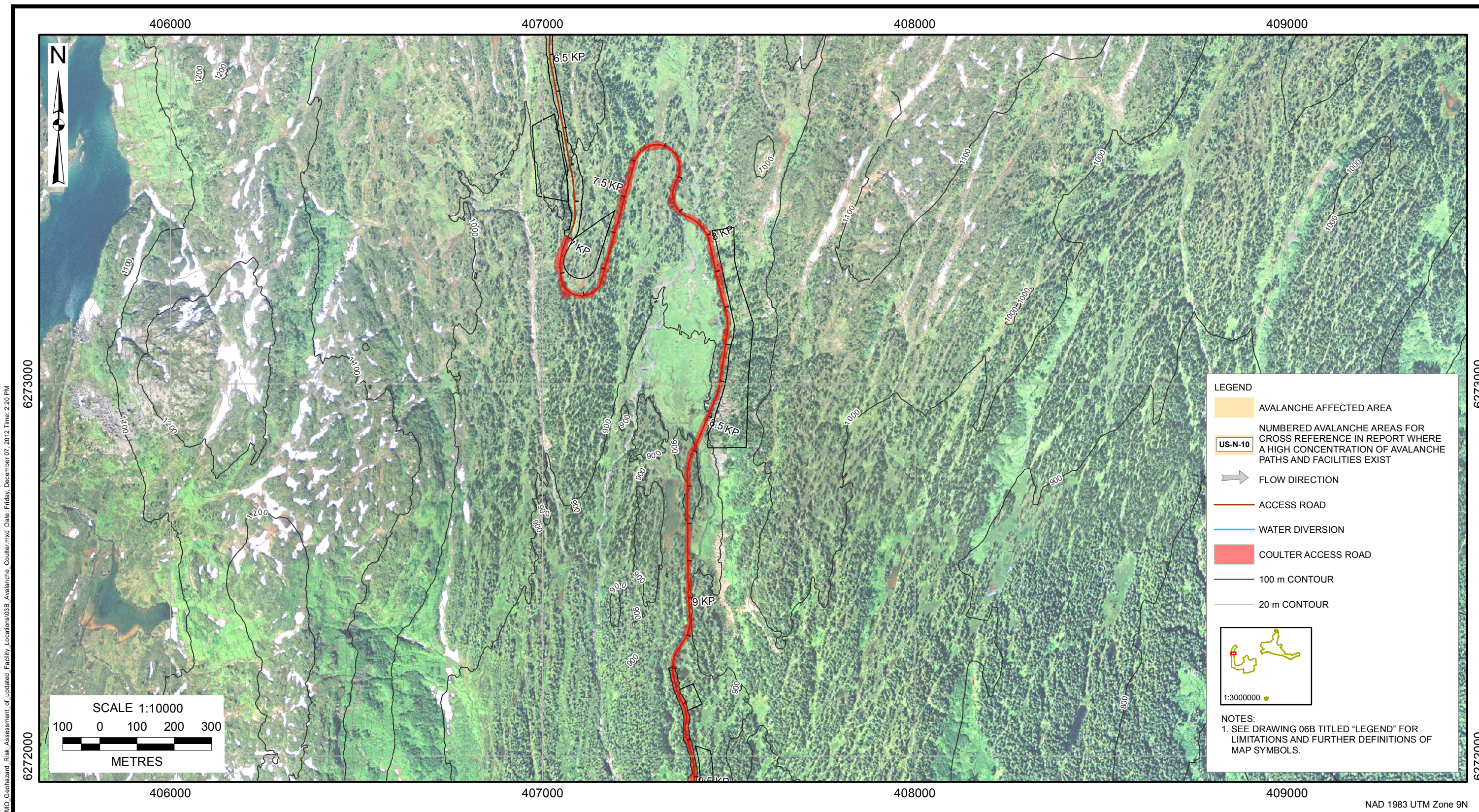
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DATE:	DEC 2012
DRAWN:	LL
DESIGNED:	BW
CHECKED:	KH
APPROVED:	MJ

PROFESSIONAL SEAL:

**BGC** **BGC ENGINEERING INC.**  
AN APPLIED EARTH SCIENCES COMPANY

CLIENT: SEABRIDGE GOLD INC.

PROJECT: GEOHAZARD RISK ASSESSMENT OF UPDATED FACILITY LOCATIONS		
TITLE: LANDSLIDE GEOHAZARDS: COULTER		
PROJECT No.:	DWG No.:	REV.:
0638013	03A	



**LEGEND**

- AVALANCHE AFFECTED AREA
- NUMBERED AVALANCHE AREAS FOR CROSS REFERENCE IN REPORT WHERE A HIGH CONCENTRATION OF AVALANCHE PATHS AND FACILITIES EXIST
- US-N-10**
- FLOW DIRECTION
- ACCESS ROAD
- WATER DIVERSION
- COULTER ACCESS ROAD
- 100 m CONTOUR
- 20 m CONTOUR

**NOTES:**  
1. SEE DRAWING 06B TITLED "LEGEND" FOR LIMITATIONS AND FURTHER DEFINITIONS OF MAP SYMBOLS.

REV.	DATE	REVISION NOTES	DRAWN	CHECK	APPR.

SCALE:	1:10,000
DATE:	DEC 2012
DRAWN:	LL
DESIGNED:	BW
CHECKED:	KH
APPROVED:	MJ

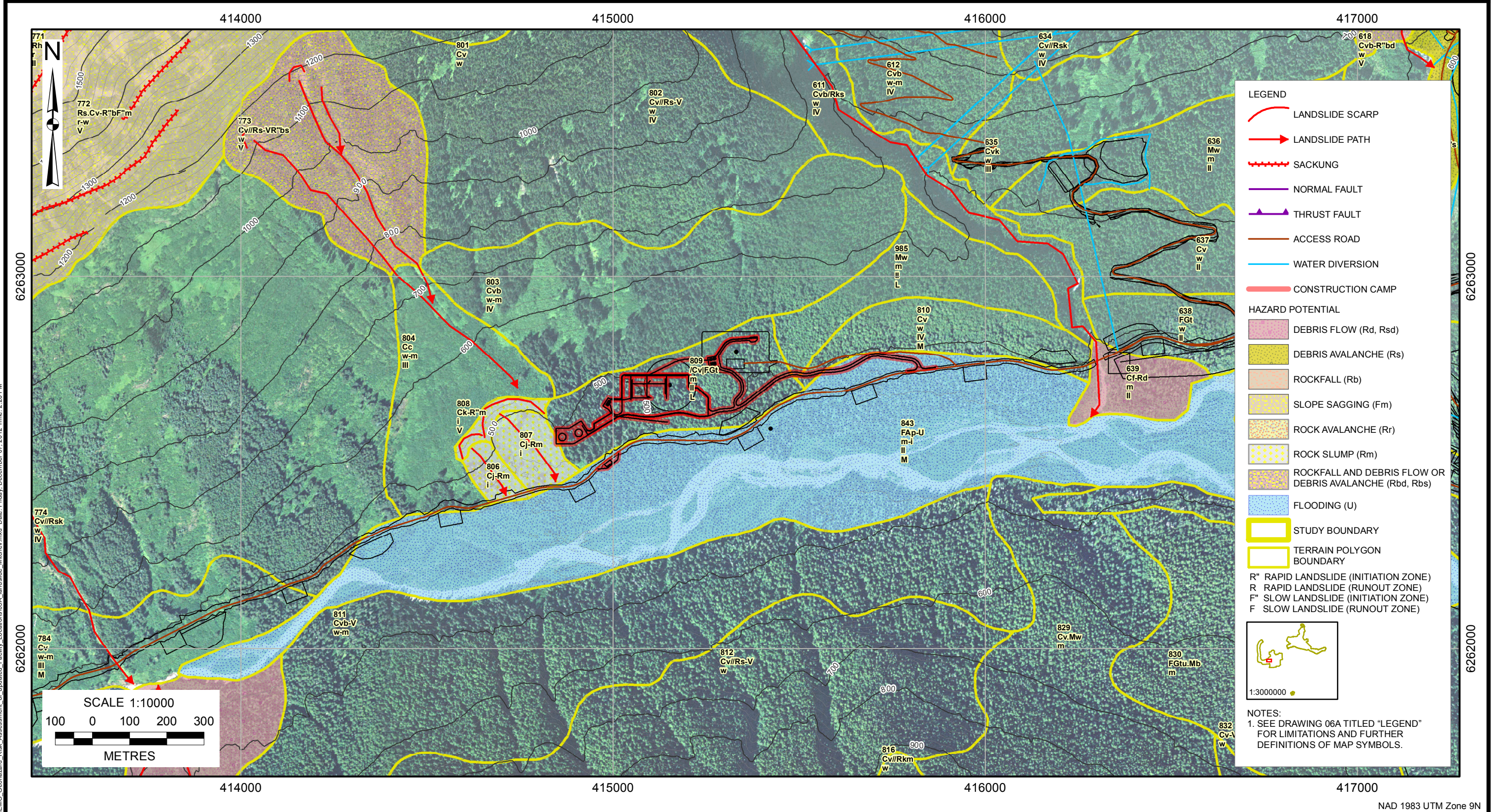
**BGC ENGINEERING INC.**  
AN APPLIED EARTH SCIENCES COMPANY

CLIENT: SEABRIDGE GOLD INC.

PROJECT: GEOHAZARD RISK ASSESSMENT OF UPDATED FACILITY LOCATIONS		
TITLE: AVALANCHE GEOHAZARDS: COULTER		
PROJECT No.: 0638013	DWG No.: 03B	REV.:







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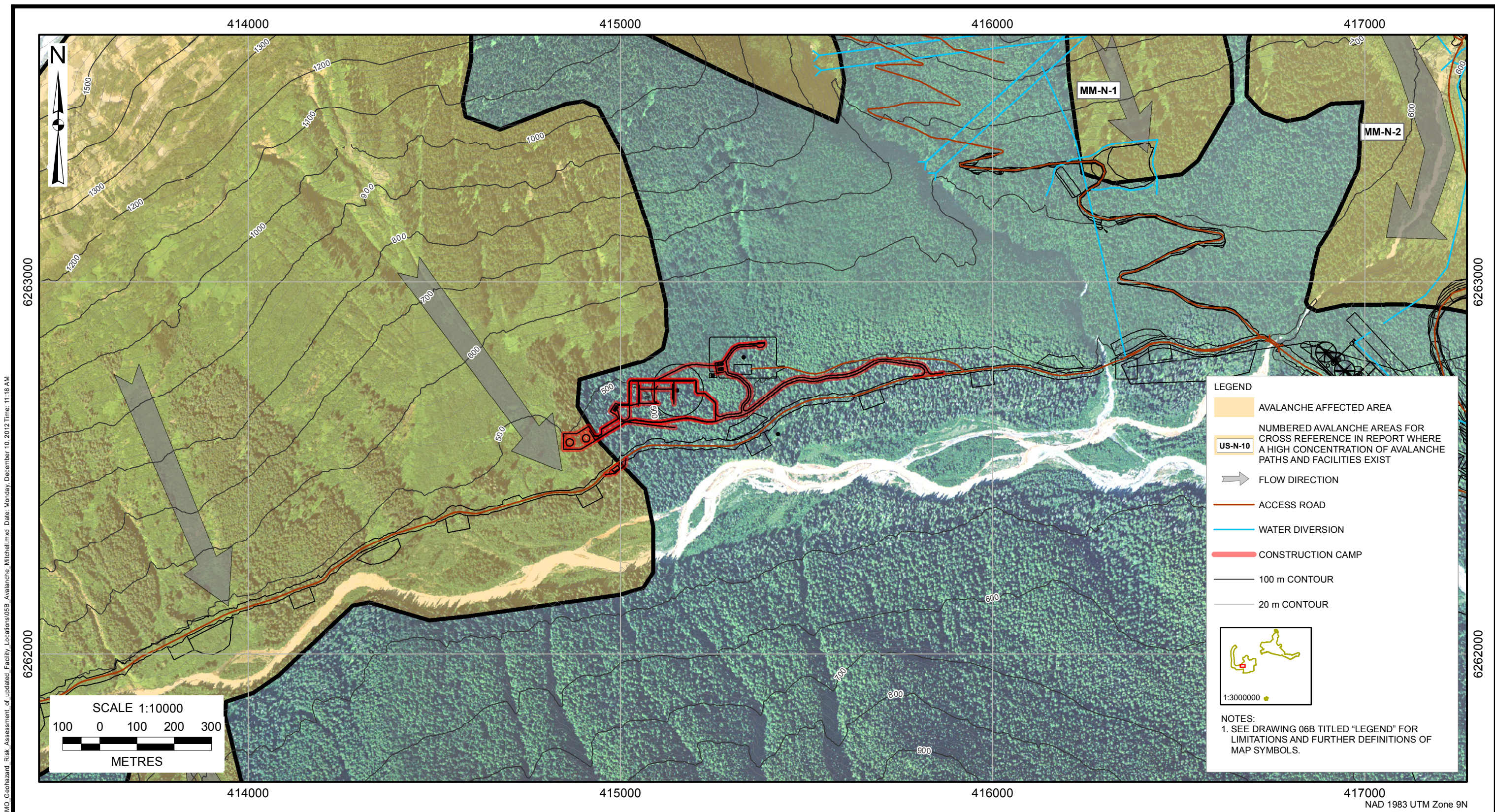
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APPROVED:	MJ

PROFESSIONAL SEAL:

**BGC ENGINEERING INC.**  
AN APPLIED EARTH SCIENCES COMPANY

CLIENT: SEABRIDGE GOLD INC.

PROJECT:	GEOHAZARD RISK ASSESSMENT OF UPDATED FACILITY LOCATIONS		
TITLE:	LANDSLIDE GEOHAZARDS: MITCHELL OPERATING CAMP		
PROJECT No.:	0638013	DWG No.:	05A
REV.:			



**LEGEND**

- AVALANCHE AFFECTED AREA
- NUMBERED AVALANCHE AREAS FOR CROSS REFERENCE IN REPORT WHERE A HIGH CONCENTRATION OF AVALANCHE PATHS AND FACILITIES EXIST
- US-N-10 NUMBERED AVALANCHE AREAS FOR CROSS REFERENCE IN REPORT WHERE A HIGH CONCENTRATION OF AVALANCHE PATHS AND FACILITIES EXIST
- FLOW DIRECTION
- ACCESS ROAD
- WATER DIVERSION
- CONSTRUCTION CAMP
- 100 m CONTOUR
- 20 m CONTOUR

1:3000000

**NOTES:**  
 1. SEE DRAWING 06B TITLED "LEGEND" FOR LIMITATIONS AND FURTHER DEFINITIONS OF MAP SYMBOLS.

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SCALE:	1:10,000
DATE:	DEC 2012
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APPROVED:	MJ






















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CLIENT: SEABRIDGE GOLD INC.

PROJECT: GEOHAZARD RISK ASSESSMENT OF UPDATED FACILITY LOCATIONS		
TITLE: AVALANCHE GEOHAZARDS: MITCHELL OPERATING CAMP		
PROJECT No.:	DWG No.:	REV.:
0638013	05B	

**LEGEND**

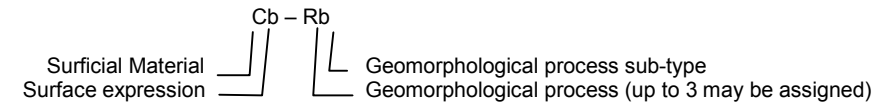
-  STUDY BOUNDARY
-  CHANGED FEATURE
-  LANDSLIDE PATH
-  LANDSLIDE SCARP
-  SACKUNG
-  NORMAL FAULT
-  THRUST FAULT
-  GLACIAL TRIMLINE
-  DEBRIS FLOW (Rd, Rsd)
-  DEBRIS AVALANCHE (Rs)
-  ROCKFALL (Rb)
-  SLOPE SAGGING (Fm)
-  ROCK AVALANCHE (Rr)
-  ROCK SLUMP (Rm)
-  ROCKFALL AND DEBRIS FLOW OR DEBRIS AVALANCHE (Rbd, Rbs)
-  FLOODING (U)
-  ACCESS ROAD
-  WATER DIVERSION
-  100 m CONTOUR
-  20 m CONTOUR
-  TERRAIN POLYGON BOUNDARY
  - R" Rapid Landslide (Initiation Zone)
  - R Rapid Landslide (Runout Zone)
  - F" Slow Landslide (Initiation Zone)
  - F Slow Landslide (Runout Zone)

**POLYGON LABELS**

Polygon number 123  
 Terrain symbol Cv/Rs - R"b  
 Drainage class w  
 Terrain stability class V  
 Surface erosion potential M

**TERRAIN SYMBOLS**

Simple Terrain Symbols: Used when one surficial material is present within a polygon

Example: 

Composite Terrain Symbols: Used when 2 or 3 terrain types are present within a polygon

Cv.Mv indicates that 'C' and 'M' are roughly equal in extent  
 Cv/Mv indicates that 'C' is greater in extent than 'M' (about 60:40)  
 Cv//Mv indicates that 'C' is much greater in extent than 'M' (about 80:20)

Stratigraphic Terrain Symbols

Cv|Mj indicates that 'Cv' overlies 'Mj'  
 /Cv|Mj indicates that 'Cv' partially overlies 'Mj'

Surficial Material Types

C	Colluvium	R	Bedrock	LG	Glaciolacustrine
L	Lacustrine	M	Glacial Till	FG	Glaciofluvial
F	Fluvial	O	Organic		

Surface Expressions

p	Plain (0-3°)	v	Veneer (0-2 m thick deposit)
j	Gentle Slope (4-14°)	b	Blanket (>2 m thick deposit)
a	Moderate Slope (15-26°)	w	Variable Thickness Deposit)
k	Moderately Steep Slope (27-35°)	m	Rolling
s	Steep Slope (>35°)	h	Hummocky
c	Cone (>15°)	f	Fan (<15°)
r	Ridge	u	Undulating
t	Terrace		

Geomorphologic Processes

R	Rapid landslide (runout zone)	V	Gully erosion
R"	Rapid landslide (initiation zone)	F"	Slow landslide (initiation zone)
U	Flooding		

Geomorphological Process Subtypes (May be Combined)

b	Rockfall	r	Rock slides (Rr, R"r)	c	Soil creep
d	Debris flows	s	Debris avalanches	m	Slump
e	Earthflow	a	Channel Avulsion		

Examples

/Cv|Mb Partial cover of a Colluvial Veneer over a till blanket  
 Rs//Cv - VR"bd Steep bedrock with <20% cover of a colluvial veneer; gullied with initiation zones for rockfall and debris flows.

Drainage

r	Rapid	w	Well	m	Moderate
i	Imperfect	p	Poor	vp	Very Poor

Surface Erosion Potential (Assigned to polygons intersecting proposed access roads)

VL	Very low potential - Flat or gently sloping terrain, organic soils, floodplain
L	Low potential - Gentle slopes, short slopes
M	Moderate potential - Moderate steep slopes and long slopes; erodible (fine -textured) soils
H	High potential - Moderate steep slopes and highly erodible soil textures
VH	Very high potential - Steep slopes with erodible soil textures, active surface/gully erosion

Terrain Stability Class (Assigned to polygons intersecting proposed roads and fixed facilities)

I	No significant stability problems exist.
II	There is a very low likelihood of landslides following road construction. Minor slumping is expected along road cuts, especially for 1 or 2 years following construction.
III	There is a low likelihood of landslide initiation following road construction. Minor slumping is expected along road cuts, especially for 1 or 2 years following construction.
IV	Expected to contain areas with a moderate likelihood of landslide initiation following road construction.
V	Expected to contain areas with a high likelihood of landslide initiation following road construction.









**NOTES:**

1. THIS MAP SHOULD BE READ WITH THE ACCOMPANYING REPORT.
2. GENERAL ARRANGEMENT PROVIDED BY RESCAN ON NOVEMBER 2, 2012.
3. SMALL MAGNITUDE GEOHAZARDS EXIST (E.G. LOCALIZED ROCKFALL) THAT WERE TOO SMALL TO MAP.
4. ARROWED LANDSLIDE PATHS SHOW GENERAL SLIDE TRAJECTORIES. THEY DO NOT SHOW HAZARD EXTENTS. PATH ARROWS EXTEND INTO THE GENERAL RUNOUT ZONE BUT DO NOT REPRESENT THE MAXIMUM RUNOUT LIMIT.
5. LANDSLIDE HAZARD EXENTS ARE SHOWN BY SHADED POLYGONS. THEY SHOW EXISTING LANDSLIDE HAZARD INITIATION ZONE AND RUNOUT AREAS. POLYGON BOUNDARIES SHOULD BE REGARDED AS TRANSITIONS, NOT SHARP BOUNDARIES.
6. RUNOUT ZONES OF POTENTIAL LARGE LANDSLIDES (E.G. ROCK AVALANCHES) ARE NOT SHOWN ON THE MAP. WHERE EXISTING, THESE ARE DESCRIBED AS RISK SCENARIOS IN THE TEXT.
7. THIS MAP IS A SNAPSHOT IN TIME. CHANGES IN LAND USE (E.G. DEVELOPMENT, GLACIAL RETREAT) MAY WARRANT RE-DRAWING OF CERTAIN AREAS.

X:\Projects\0638013\workspace\20121102\_Memo\_Geohazard\_Risk\_Assessment\_of\_Updated\_Facility\_Locations\06A\_LEGEND\_Landslide\_Geohazard\_Construction\_Camp.mxd Date: Friday, December 07, 2012 Time: 2:30 PM

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REV.	DATE	REVISION NOTES	DRAWN	CHECK	APPR.						

**LEGEND**

-  CHANGED FEATURE
-  AVALANCHE AFFECTED AREAS
-  NUMBERED AVALANCHE AREAS FOR CROSS REFERENCE IN REPORT WHERE A HIGH CONCENTRATION OF AVALANCHE PATHS AND FACILITIES EXIST
-  FLOW DIRECTION
-  ACCESS ROAD
-  WATER DIVERSION
-  100 m CONTOUR
-  20 m CONTOUR

**NOTES:**

1. THIS MAP SHOULD BE READ WITH THE ACCOMPANYING REPORT.
2. **AVALANCHE HAZARD INTERPRETATIONS WERE PROVIDED BY ALPINE SOLUTIONS AVALANCHE SERVICES LTD.**
3. GENERAL ARRANGEMENT PROVIDED BY RESCAN ON NOVEMBER 2, 2012.
4. SMALL AVALANCHE PATHS (SIZE ≤ 2) EXIST OUTSIDE THE AREAS DELINEATED BUT THOSE ARE TOO SMALL TO BE MAPPED AT THIS SCALE.
5. AVALANCHE AFFECTED LOCATIONS MAY BE AFFECTED BY MORE THAN ONE PATH. DOTTED LINES WITHIN SELECTED AVALANCHE AFFECTED AREAS INDICATE APPROXIMATE INDIVIDUAL PATH BOUNDARIES WITHIN AREAS THAT OVERLAP.
6. AVALANCHE ZONES ARE MAINLY SHOWN IN THE STUDY AREA IN WHICH FACILITIES ARE PROPOSED. ANY NEW FACILITIES OR RELOCATION OF EXISTING FACILITIES SHOULD BE RE-EXAMINED WITH RESPECT TO AVALANCHE HAZARDS
7. THIS MAP IS A SNAPSHOT IN TIME. CHANGES IN TOPOGRAPHY THROUGH FILL PLACEMENT, CUTSLOPES, GLACIAL RETREAT OR ADVANCE, LANDSLIDING AS WELL AS TREE REMOVAL MAY REQUIRE REDRAWING OF AVALANCHE ZONES IN THOSE AREAS.

X:\Projects\0638013\workspace\20121102\_Memo\_Geohazard\_Risk\_Assessment\_of\_Updated\_Facility\_Locations\06B\_LEGEND\_Avalanche\_Geohazard\_Construction\_Camp.mxd Date: Monday, December 10, 2012 Time: 11:24 AM

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REV.	DATE	REVISION NOTES	DRAWN	CHECK	APPR.	CLIENT: SEABRIDGE GOLD INC.		PROJECT No.:	DWG No.:	REV.:	
								0638013	06B		