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June 12, 2026

Redman & Watson
191 Eagle Crescent
Singhampton, Ontario

Attn: Jo Redman

Re: Slope Stability Assessment – 192 Hidden Lake Road, Town of Blue Mountains, ON
Cambium Reference: 02605305.000

Dear Ms. Redman,

Cambium Inc. (Cambium) is pleased to provide you with this letter detailing the findings of a visual slope stability assessment and slope analysis conducted at 192 Hidden Lake Road, in the Town of Blue Mountains, Ontario (Site).

It is understood that the slope stability assessment is required to support permitting processes for a proposed residential dwelling renovation at the Site, due to regulation of the property under O.Reg. 41/24 by the Grey Sauble Conservation Authority (GSCA).

REVIEWED DOCUMENTS

The following documents were reviewed by Cambium prior to drafting this letter:

- [1] Capes Engineering – Preliminary Plan for Pre-Consultation
Drawing #C1, 192 Hidden Lake Road, Town of Blue Mountains dated
February 25, 2026
- [2] Grey Sauble Conservation Authority Policies for the Administration of the
Development, Interference with Wetlands and Alterations to Shorelines and
Watercourses Regulation, Ontario Regulation 151/06; Grey Sauble
Conservation Authority; January 13, 2010.

BACKGROUND

The property at 192 Hidden Lake Road currently contains a two-storey dwelling with a walkout basement. The property is approximately 30.5 m wide and 68.8 m deep and is located on the north side of Hidden Lake Road. The contains a slope



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that slope that slopes from the south side of the property down towards the north side of the property.

It is understood that renovations to the existing dwelling are proposed which include an addition at the back of the existing dwelling and an addition on the east side of the existing dwelling. It is also understood that the proposed renovations will include a new septic system to be located to the north of the existing dwelling.

The property lies within an area regulated by the Grey Sauble Conservation Authority (GSCA). It is understood that the GSCA and the Town of Blue Mountains may require that a Slope Stability Assessment be conducted to determine the Long Term Stable Top of Slope of the slope at the rear of the property and to ensure that the appropriate 6 m setback from the Stable Top of Slope is maintained.

The current scope completed by Cambium was developed based on the proposal request and the GSCA comments referenced above and consists of the following components:

- Desktop review of background information relating to the proposed development including the provided site plan, topographic survey data and proposed/existing development setbacks indicated on the provided site plan, GSCA requirements and available GSCA mapping, historical aerial imagery, available Lidar mapping, and available Ontario Geological Survey (OGS) quaternary geologic and bedrock mapping.
- Visual slope assessment according to Ontario Ministry of Natural Resources (MNR) criteria, based on the Slope Stability Rating Chart provided as Table 4.2 of the MNR Technical Guide: River and Stream Systems – Erosion Hazard Limit, 2002.
- Determination of a long term stable top of slope based on high-level slope stability analysis, assuming conservative soil strength parameters for the inferred soil stratigraphy.



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- Development of recommendations/commentary related to slope stability in light of the proposed development, visual slope assessment results and high-level slope stability analysis results, including recommendations for maintaining stable slope conditions.

DESKTOP REVIEW

Site description

The Site is situated on the north side of Hidden Lake Road in the Town of Blue Mountains, Ontario, and is bordered to the east and west by residential properties, and to the south and north by heavily forested lands. The subject property currently contains a two-storey dwelling with a walkout basement. The property is approximately 30.5 m wide and 68.8 m deep and contains a slope that slopes from the south side of the property down towards the north side of the property. The rear portion of the property is forested, while the portion of the property surrounding the existing dwelling mainly consist of manicured grass with some mature trees and gardens.

There are two retaining walls to the north of the dwelling, the first is a gabion basket retaining wall approximately 0.5 m high, which is located approximately 5-6 m north of the existing dwelling. The second retaining wall is located approximately 9-10 m further north and down slope of the first retaining wall, is composed of concrete blocks and is approximately 1-1.5 m in height.

The slope on the property continues to descend past the rear property line and the toe of the slope is approximately 110 m north of the rear extent of the existing dwelling. The toe of the slope was determined based on the lidar derived Digital Terrain Model prepared by the Ontario Ministry of Natural Resources and Forestry, as well as physical measurements and observations made by Cambium during the visual slope assessment. A creek is located a further 25 m north of the toe of the slope. The total height of the slope, from the toe of the slope to the rear of the existing dwelling is approximately 31.5 m and was determined based on the lidar derived digital terrain model, the provided topographic survey conducted on site, and physical measurements and observations made in the field. The



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overall inclination of the slope from the toe of the slope to the rear extent of the dwelling is thus approximately 3.5H:1V.

Based on a cursory review of available data from the Ontario Geological Survey (OGS) surficial geology maps, as well as visual observations made in the field, the property lies within a formation of clay to silt textured till derived from glaciolacustrine deposits. Geologic mapping indicates that the bedrock consists of shale and limestone of the Georgian Bay Formation and shale of the Blue Mountains formation.





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Cross Section
for Slope
Analyses

Embedded Figure 1: Slope area and existing property





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VISUAL SLOPE ASSESSMENT

A visual slope assessment was conducted by a qualified Geotechnical Engineer from Cambium on May 20, 2026. Photographs taken during the site inspection are provided in Appendix B and are referenced throughout this letter.

During the visual assessment, the potential for slope instability was evaluated using the rating criteria provided in the Ministry of Natural Resources (MNR) Technical Guide – River and Stream Systems: Erosion Hazard Limit (henceforth referred to as the MNR Technical Guide).

The existing property and slope are shown in Photograph 1 to Photograph 8, including the existing dwelling, existing retaining walls, the slope face, and table lands.

The table lands above the slope are generally grassed with large mature trees and generally slope down towards the top of the slope from Hidden Lake Road at the south end of the property. The existing dwelling exhibits no visual signs of differential settlement with no cracks observed in the concrete foundation/basement walls. Roof drainage from the existing dwelling is currently carried through drainage pipes down to just below the concrete block retaining wall. There are some signs of erosion and erosion repairs around the drainage pipes. There are also some signs of erosion by way of small gullies in areas around the retaining walls.

The two retaining walls are generally in sound condition with no visual signs of failures within the walls. Some weathering of the concrete blocks was observed. Some soil cracks and gullies were observed below the concrete retaining wall which are likely the result of some minor settlement of the backfilled soils around the retaining wall and drainage erosion.

The upper slope face is vegetated with primarily manicured grass and some mature trees and gardens. The existing mature trees on and surrounding the slope have straight trunks and do not exhibit any obvious bowing. The lower portion of the slope is heavily forested with mature trees. There were no visual signs of erosion on the slope face.



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The base of the slope is located approximately 110 m south of the existing dwelling in a heavily forested area. There was no obvious signs of erosion at the toe of the slope. A small creek was located approximately 25 m north of the toe of the slope and ran perpendicular to the slope in a generally east to west direction.

Visual bedrock outcrops can be observed in the north ditch along Hidden Lake Road, approximately 30 m east of the Site.

SLOPE STABILITY RATING

The completed slope stability rating chart, according to the MNR Technical Guide, is included as Appendix A of this letter, and the results are described in the following section. As previously noted, the slope rating was determined for the assessed slope area shown on Embedded Figure 1 above.

1. Slope inclination: The average slope inclination from the toe of the slope to the rear extent of the existing dwelling is estimate to be approximately 3.5H:1V based on the provided survey, available lidar data and field measurements. It is recommended that a rating value of **0** be applied for the slope.
2. Soil stratigraphy: based on available quaternary geologic mapping, visual observations, and observed bedrock outcrops, the soil stratigraphy at the site contains native clay to silt textured till, containing some cobbles and boulders overlying shallow shale bedrock. A rating value of **6** is recommended.
3. Seepage from slope face: no seepage was observed from the slope face, giving a rating value of **0**.
4. Slope height: the total height of the slope within the assessed area, between the surveyed top of slope and the toe of the slope, is estimated to be about 31.5 m, giving a rating value of **8**.
5. Vegetation cover on slope face: the vegetation on the face of the assessed slope generally consisted of manicured grass in the upper portions and a



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mature forest in the lower portions of the slope, giving a recommended rating value of **4**.

6. Table land drainage: The table land generally has a slight slope down from the south edge of the property towards the top of the slope. Roof drainage from the existing dwelling is controlled by drainage pipes extending down to below the retaining walls. There are some visual signs of erosion due to drainage over the slope and around drainage pipes. A rating value of **4** is recommended.
7. Proximity of watercourse to slope toe: a small creek was located approximately 25 m north of the toe of the slope. Therefore, a rating value of **0** is recommended.
8. Previous landslide activity: No evidence of previous landslide activity was confirmed, giving a rating of **0**.

Based on the above, a rating value of **22** was determined for the slope which falls into the range of **<24**, indicating **low potential** for slope instability.

For low potential slopes, investigation requirements would require a site inspection for confirmation of stability and a report letter.

For slight potential slopes (rating value range of 25-35), investigation requirements would include a visual site inspection, a detailed topographic survey of the Site, and high-level slope stability analysis based on conservative soil strength parameters to confirm Factors of Safety under existing/proposed conditions. It is noted that the current scope completed by Cambium fulfills the visual site inspection requirement and high-level slope stability analyses for slopes of slight potential.



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HIGH-LEVEL SLOPE STABILITY ANALYSIS AND STABLE TOP OF SLOPE

General

As part of the scope requested by the Client, Cambium completed a preliminary/high-level slope stability analysis for one representative section of the assessed slope area, to support the determination of a Stable Top of Slope for the proposed development at the Site. The high-level analysis was completed using conservative soil strength parameters which were based on the observed soils conditions at the site including the observations soil observations, visual confirmations of bedrock outcrops, and available geological mapping.

A cross section of the slope was created utilizing data from the topographic survey completed for the property as well as data from a lidar derived DTM completed by The Ministry of Natural Resources and Forestry in 2022.

As defined in the GSCA Policy Document, in Section 8.4, *on over steep slopes where the toe is stable, the Slope Hazard is defined using a Stable Slope Angle. The Stable Slope Angle is based on a stable slope gradient determined from a geotechnical study or engineering assessment. Where a geotechnical study or engineering assessment does not exist, the Stable Slope Line will be considered to be at a gradient of 3H:1V measured from the toe of the slope.* The stable top of slope is the point at which the stable slope gradient, rising from the same toe position, intersects the ground surface and includes an appropriate factor of safety.

The Stable Slope gradient of 3H:1V is considered to be appropriate for project site based on the observed conditions and native soils at the site. A Stable Slope Line was drawn on the cross section of the slope from the toe of the slope and this showed that the intersection of the stable slope gradient and the ground surface is actually located approximately 90 m north of the rear extent of the existing dwelling (see Figure 1). As such, none of the subject property in its current configuration should lie within a Slope Hazard Zone.



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A high-level slope stability analysis conducted to confirm the stable slope gradient and to confirm the proposed development will have no impact to the existing and future slope stability.

It is assumed for the purposes of the current report that the stable slope is the maximum slope inclination at which the design minimum factor of safety according to Table 4.3 of the MNR Technical Guide can be satisfied, as supported by slope stability analysis. The currently proposed development represents a land use category of **C – Active Land Use** according to the aforementioned table (habitable or occupied structures near slope), and the corresponding design minimum factor of safety range is 1.3 to 1.5. It is noted that the design minimum factors of safety stipulated in the aforementioned table generally apply to riverine erosion hazards, however, they have been adopted in this letter for the purpose of determining the stable slope in the absence of a site-specific design minimum factor of safety stipulated by the GSCA. It is noted that the GSCA may stipulate a design minimum factor of safety specific to the site within the aforementioned range at their discretion. For the purposes of the current analysis, it is assumed that the design minimum factor of safety range of 1.3 to 1.5 represents an acceptable criterion for the current Site.

Modelling Assumptions

The slope analysis was completed according to the assumptions stipulated above for one representative section of the slope, The analysis was completed for two loading cases, as follows:

- Loading Case 1 – Existing Conditions: analysis to determine the high-level factor of safety of the slope against deep-seated global failures under existing conditions.
- Loading Case 2 – Proposed Conditions: analysis to determine the high-level factor of safety of the slope against deep-seated/global failure under proposed development conditions represented by a surcharge load applied from the closest foundation element of the proposed dwelling addition.



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The following conservative assumptions were made for the purposes of the high-level analysis:

- A uniform clayey silt till subsurface stratigraphy was adopted with the following soil strength parameters:
 - Bulk Unit Weight $\gamma = 20 \text{ kN/m}^3$
 - Friction Angle $\phi = 28^\circ$
 - Cohesion $c = 0 \text{ kN/m}^2$
- A Shale bedrock profile determined from confirmed bedrock outcrops and average bedrock depth from bedrock topographic mapping.
- A Groundwater table elevation following the local topography interpolated from the observed creek beyond the toe of the slope.
- A surcharge of 75 kPa from 1 m wide footings was adopted for the proposed addition to the dwelling. Conventional strip footings at a depth of 1.5 m below ground surface were assumed for the foundation.
- The presence of the existing retaining walls would prevent surficial failures of the slope. As such the slope analyses modeling prevented slip surfaces from running through the retaining walls.

Analysis Results

The results of the high-level slope stability analysis for each of the loading cases described above can be summarized as follows:

- Loading Case 1 – Existing Conditions: The analysis indicated that the assessed slope has an estimated minimum factor of safety of 1.6 against surficial failure under existing conditions for the area of the slope within the vicinity of the dwelling, and a minimum factor of safety of 1.5 for the Top of Slope as determined from the 3H:1V stable slope gradient. The determinative slip surface for this loading case as shown on Figure 1 and Figure 2 in Appendix C returned the lowest factor of safety calculated for the slope based



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on the analysis assumptions described above. Detailed results for this loading case are provided on Figure 1 and 2 in Appendix C.

- Loading Case 2 – Proposed Conditions: The analysis indicates that the assessed slope has an estimated factor of safety of 1.5 against deep-seated/global failure when a surcharge is applied from the extent of the proposed dwelling addition. Detailed results for this loading case are provided on Figure 3 in Appendix C.

DISCUSSION AND RECOMMENDATIONS

In the following section of this letter, recommendations pertaining to slope stability and other geotechnical aspects relevant to the proposed development are provided.

Based on the analysis results described above, the factors of safety calculated on a high-level basis for both the existing and proposed conditions are anticipated to be within the range of 1.3 to 1.5 as stipulated in the MNR Technical Guide for active land use. As such, the 3H:1V Stable Slope Line is considered to be appropriate for both the existing and proposed conditions at the site.

Based on the Stable Slope Line drawn from the toe of the slope, the Stable Top of Slope is located approximately 90 north of the existing dwelling and no part of the property encroaches into the Slope Hazard. As shown Figure 3, should the Stable Slope Line be extended up to the elevation of the Finished Floor Elevation (FFE) of the existing and proposed dwelling, the proposed addition would be setback approximately 10 m from the Stable Slope Envelope on that elevation plane, and thus the 6 m setback from the Stable Slope Line stipulated by the GSCA planning policy would be met.

It is understood that a new septic system and/or septic bed has been proposed for the subject property. Based on the analysis conducted in this letter, the septic system would not lie within the Slope Hazard Allowance should it be constructed anywhere on the property. However, any septic system should be designed by a qualified septic system designer taking into consideration the existing slope and



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the importance of maintaining proper drainage features around slope and slope face.

Any proposed developments to the slope and property should maintain efforts to keep the face of the slope vegetated. In addition, roof drainage from the existing dwelling and any proposed development should be directed away from the slope or beyond the base of the retaining walls and should implement erosion protection around drainage outflow pipes.

LIMITATIONS AND REVIEW

The contents of this letter of opinion are subject to the following limitations:

- The recommendations in this letter have been developed and provided based solely on drawings/information provided by the Client, a visual site inspection and on high-level, publicly available information as detailed above.
- Geotechnical recommendations specifically related to the demolition of existing structures/features and subsequent restoration works (i.e., backfilling of any excavations required to facilitate demolition works, etc.) are beyond the scope of this letter. Additionally, geotechnical recommendations pertaining to the subsequent construction of the proposed dwelling and other permanent structures that may be proposed at the Site, including but not limited to site preparation, excavation/dewatering recommendations, frost penetration depth and bearing capacity of foundations, and backfill/compaction works, are beyond the scope of this letter.
- The slope stability analysis results, including the stable top of slope as presented in this letter, are based on the results of a high-level analysis using conservative soil strength parameters for an inferred subsurface stratigraphy.





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CLOSING

We trust that the information contained in this letter report meets your current needs. If you have any questions or comments regarding this document, please do not hesitate to contact the undersigned at (705)-719-0700.

Best regards,

Cambium Inc.

Signed by:

28340F3B75A14DC...



Cory Zanatta, P.Eng.

Project Manager –
Geotechnical/Hydrogeological Engineer

2026-06-12

CZ

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The findings and results presented in reports prepared by Cambium are based on the materials and information provided by the client to Cambium and on the facts, conditions and circumstances encountered by Cambium during the performance of the work requested by the client. In formulating its findings and results into a report, Cambium assumes that the information and materials provided by the client or obtained by Cambium from the client or otherwise are factual, accurate and represent a true depiction of the circumstances that exist. Cambium relies on its client to inform Cambium if there are changes to any such information and materials. Cambium does not review, analyze or attempt to verify the accuracy or completeness of the information or materials provided, or circumstances encountered, other than in accordance with applicable accepted industry practice. Cambium will not be responsible for matters arising from incomplete, incorrect or misleading information or from facts or circumstances that are not fully disclosed to or that are concealed from Cambium during the provision of services, work or reports.

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When preparing reports, Cambium considers applicable legislation, regulations, governmental guidelines and policies to the extent they are within its knowledge, but Cambium is not qualified to advise with respect to legal matters. The presentation of information regarding applicable legislation, regulations, governmental guidelines and policies is for information only and is not intended to and should not be interpreted as constituting a legal opinion concerning the work completed or conditions outlined in a report. All legal matters should be reviewed and considered by an appropriately qualified legal practitioner.

Site Assessments

A site assessment is created using data and information collected during the investigation of a site and based on conditions encountered at the time and particular locations at which fieldwork is conducted. The information, sample results and data collected represent the conditions only at the specific times at which and at those specific locations from which the information, samples and data were obtained and the information, sample results and data may vary at other locations and times. To the extent that Cambium's work or report considers any locations or times other than those from which information, sample results and data was specifically received, the work or report is based on a reasonable extrapolation from such information, sample results and data but the actual conditions encountered may vary from those extrapolations.

Only conditions at the site and locations chosen for study by the client are evaluated; no adjacent or other properties are evaluated unless specifically requested by the client. Any physical or other aspects of the site chosen for study by the client, or any other matter not specifically addressed in a report prepared by Cambium, are beyond the scope of the work performed by Cambium and such matters have not been investigated or addressed.

Reliance

Cambium's services, work and reports may be relied on by the client and its corporate directors and officers, employees, and professional advisors. Cambium is not responsible for the use of its work or reports by any other party, or for the reliance on, or for any decision which is made by any party using the services or work performed by or a report prepared by Cambium without Cambium's express written consent. Any party that relies on services or work performed by Cambium or a report prepared by Cambium without Cambium's express written consent, does so at its own risk. No report of Cambium may be disclosed or referred to in any public document without Cambium's express prior written consent. Cambium specifically disclaims any liability or responsibility to any such party for any loss, damage, expense, fine, penalty or other such thing which may arise or result from the use of any information, recommendation or other matter arising from the services, work or reports provided by Cambium.

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Potential liability to the client arising out of the report is limited to the amount of Cambium's professional liability insurance coverage. Cambium shall only be liable for direct damages to the extent caused by Cambium's negligence and/or breach of contract. Cambium shall not be liable for consequential damages.

Personal Liability

The client expressly agrees that Cambium employees shall have no personal liability to the client with respect to a claim, whether in contract, tort and/or other cause of action in law. Furthermore, the client agrees that it will bring no proceedings nor take any action in any court of law against Cambium employees in their personal capacity.





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Appendix A

Slope Stability Rating Chart



SLOPE STABILITY RATING CHART

Site Location: 192 Hidden Lake Road		File No. 2605305
Client: Redman and Watson		Inspection Date: 5/20/2026
Inspected By: CZ		Weather: clear 12C
Inspection Task		Rating Value
1. SLOPE INCLINATION		
Degrees	Horizontal:Vertical	
a) 18 or less	3:1 or flatter	0
b) 18 to 26	2:1 to more than 3:1	6
c) more than 26	Steeper than 2:1	16
2. SOIL STRATIGRAPHY		
a) Shale, Limestone, Granite (Bedrock)		0
b) Sand, Gravel		6
c) Glacial Till		9
d) Clay, Silt		12
e) Fill		16
f) Leda Clay		24
3. SEEPAGE FROM SLOPE FACE		
a) None or near bottom only		0
b) Near mid-slope only		6
c) Near crest only or from several levels		12
4. SLOPE HEIGHT		
a) 2 m or less		0
b) 2.1 to 5 m		2
c) 5.1 to 10 m		4
d) more than 10 m		8
5. VEGETATION COVER ON SLOPE FACE		
a) Well vegetated, heavy shrubs or forested with mature trees		0
b) Light Vegetation; Mostly grass, weeds, occasional trees, shrubs		4
c) No vegetaion, bare		8
6. TABLE LAND DRAINAGE		
a) Table land flat, no apparent drainage over slope		0
b) Minor drainage over slope, no active erosion		2
c) Drainage over slope, active erosion, gullies		4
7. PROXIMITY OF WATERCOURSE TO SLOPE TOE		
a) 15 m or more from slope toe		0
b) Less than 15 m from slope toe		6
8. PREVIOUS LANDSLIDE ACTIVITY		
a) No		0
b) Yes		6
RATING VALUES TOTAL		22
SLOPE INSTABILITY RATING		INVESTIGATION REQUIREMENTS
1. Low Potential	≤24	Site inspection only, confirmation, report letter
2. Slight Potential	25 - 35	Site inspection and surveying, preliminary study, detailed report
3. Moderate Potential	>35	Boreholes, piezometers, lab tests, surveying detailed report
Notes: a) Choose only one rating value from each category; compare total rating value with above requirements b) If there is a waterbody (stream, creek, river, pond, bay, lake) at the slope toe, the potential for toe erosion and undercutting should be evaluated in detail and protection provided if required. c) For leda clay and rock slopes, additional evaluation must be carried out		



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- Building Sciences
- Construction Testing & Inspection

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Whitby

Laboratory
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Appendix B

Site Photographs





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Photograph 1 – View of rear extent of existing dwelling (looking south)





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Photograph 2 – View looking north from concrete block retaining wall





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Photograph 3 – View of concrete block retaining wall looking west





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Photograph 4 – View of gabion basket retaining wall looking west





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Photograph 5 – View of forested area near toe of slope





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Photograph 6 – View of east side of property looking south





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Photograph 7 – View of drainage pipe outflow





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Photograph 8 – View of existing shed looking west





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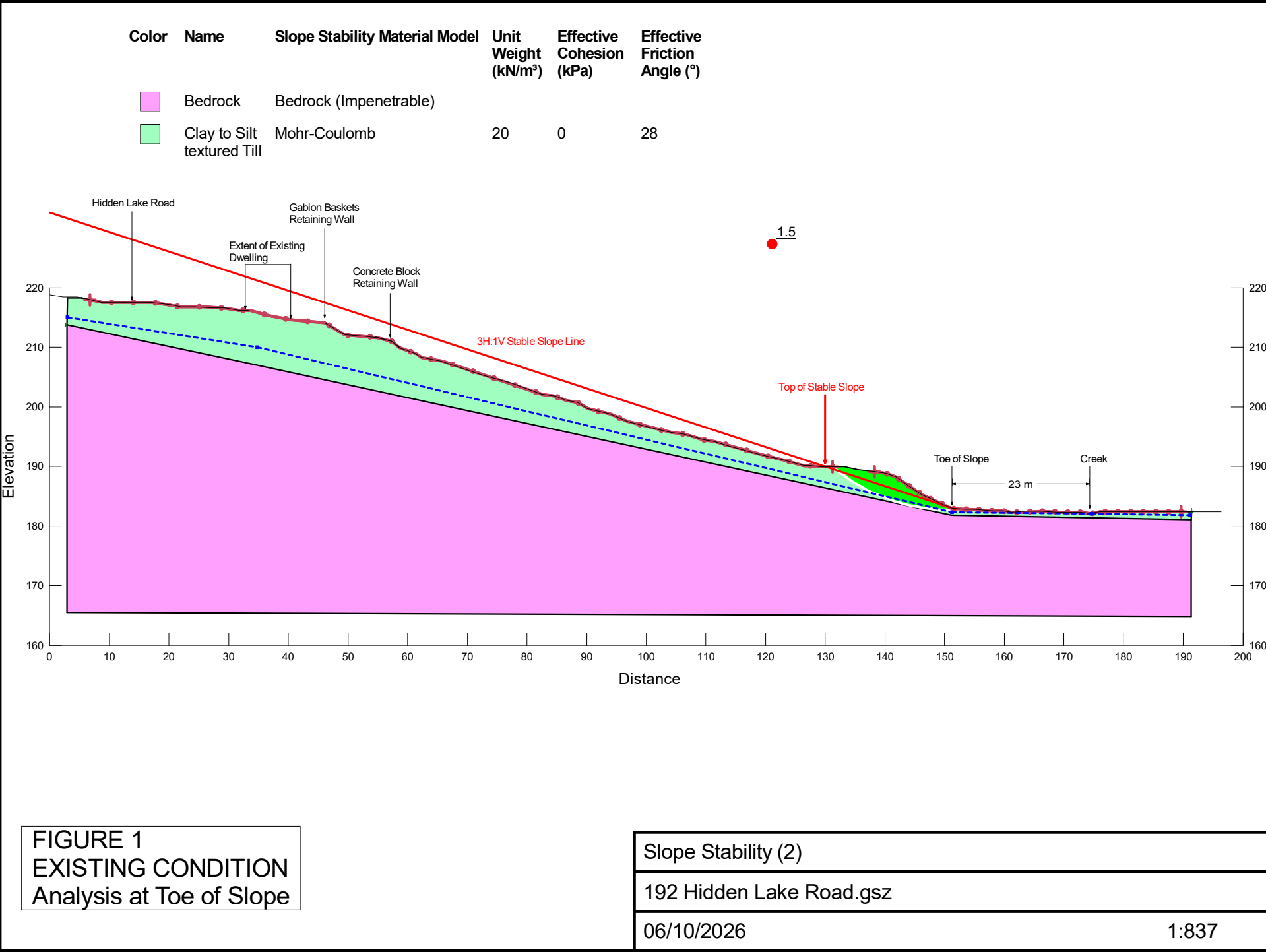
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Appendix C

Preliminary Slope Stability Analysis





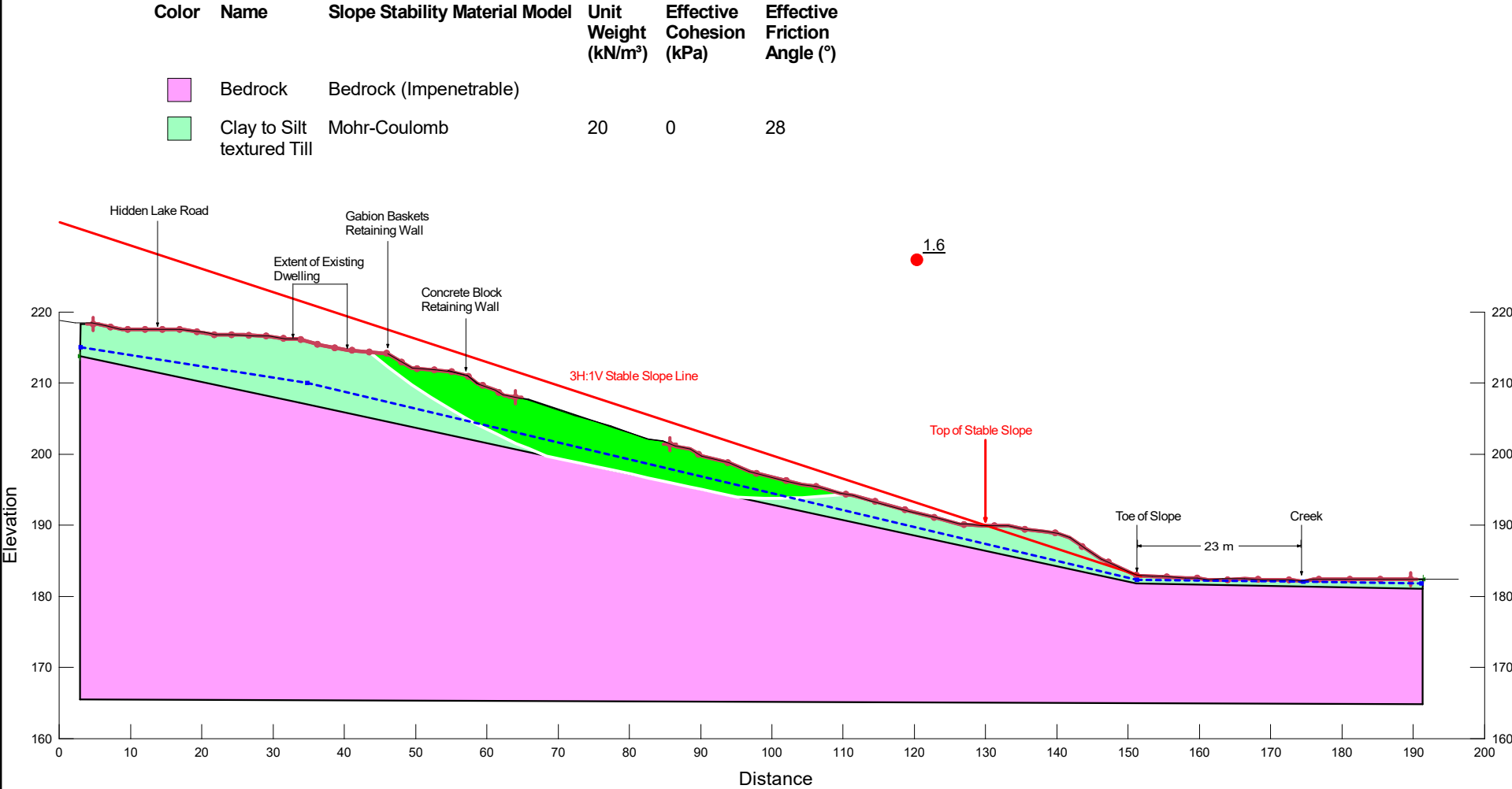


FIGURE 2
EXISTING CONDITION
Analysis at Existing Dwelling

Slope Stability (2)	
192 Hidden Lake Road.gsz	
06/10/2026	1:837

