A TETRA TECH COMPANY

February 26, 2013

ISSUED FOR USE
EBA FILE: W14103122
Via Email: bthrall@alexcoresource.com

Alexco Resource Corp.
3 – 151 Industrial Road
Whitehorse, YT Y1A 2V3

Attention: Brad Thrall – Chief Operating Officer

Subject: Dry Stacked Tailings Facility – Risk Assessment Stability Model Update
Keno Hill District Mill Site, Yukon

1.0 INTRODUCTION

Alexco Resource Corp. (Alexco) retained EBA Engineering Consultants Ltd. operating as EBA, A Tetra Tech Company (EBA) to update the parameters in the stability model previously used for design of the Dry Stacked Tailings Facility (DSTF) being constructed at the Keno Hill District Mill Site, Yukon. EBA completed the original DSTF design using a combination of measured and conservatively assumed design parameters. For additional conditions regarding use of this report, please refer to EBA's General Conditions in Appendix A.

On September 24, 2012 representatives from Alexco, EBA, and Na-Cho Nyak Dun met to complete a risk assessment for the DSTF. As a result of the risk assessment process, Alexco committed to have EBA review and update the parameters of the DSTF stability model based on data being collected during construction of the facility. This letter summarizes the parameters of the stability model that have been updated, the data supporting the updates, and the resulting changes to factors of safety.

The parameters used in the original DSTF slope stability model are detailed in the following report:

- Detailed Design Dry-Stacked Tailings Facility, Keno Hill District Mill Site, Yukon (EBA, May 2011).

2.0 STABILITY MODEL UPDATES

The following sections describe the updates to the DSTF slope stability model and summarize the supporting data.

2.1 "Permafrost Thawed to 1.0 m Depth" Scenario

Based on thermal analysis, the Detailed DSTF Design assumed the placement of warm tailings on the surface of the permafrost would result in thaw to a depth of 1.0 m within the first month of construction. The fine grained nature of the foundation soils and the assumed rapid rate of permafrost thaw led to the inclusion of elevated porewater pressures in the stability model.

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Ground temperature data collected within the footprint of the DSTF during placement of the tailings indicates the permafrost surface has remained frozen. It is anticipated that any future permafrost thaw will occur at a much slower rate, allowing porewater to dissipate prior to developing excess porewater pressures.

The "Permafrost Thawed to 1.0 m Depth" scenario has been removed from the DSTF stability model because of the ground temperature data collected within the DSTF footprint during construction.

2.2 Tailings Strength

Direct shear testing was completed on a tailings sample collected during commissioning of the Keno Hill District Mill. The direct shear testing yielded an inferred angle of shearing resistance equal to 32°. An internal angle of friction (Φ) equal to 32° was used for the tailings in the Detailed DSTF Design stability model.

In partial fulfilment of the Tailings Characterization Plan for the Keno Hill District Mill, Alexco submits composite tailings samples quarterly for direct shear testing. The 2012 quarterly direct shear results yielded an inferred angle of shearing resistance equal to 35°.

The internal angle of friction (Φ) for the tailings in the DSTF stability model has been increased from 32° to 35° based on the quarterly direct shear test results.

2.3 Recommended Factors of Safety

Minimum factors of safety are suggested in the Mined Rock and Overburden Piles Investigation and Design Manual (BC Mine Waste Rock Pile Research Committee, 1991). The suggested factors of safety are provided for two cases: Case A and Case B. Case A is typically used when less rigorous analyses are conducted or when material properties and failure mechanisms are not well understood. Case B is typically used when more rigorous analyses are conducted or when material properties and failure mechanisms are well understood.

For the Detailed DSTF Design, EBA compared most of the calculated factors of safety against Case A. The calculated factors of safety for the updated stability model have been compared against the recommended values in Case B. EBA has been collecting ground temperature and slope movement data for the DSTF since construction began. The physical properties of the tailings have been verified through testing of monthly samples. This ongoing data collection and laboratory testing supports the DSTF design parameters and the application of the minimum factors of safety recommended in Case B.

3.0 UPDATED FACTORS OF SAFETY

The following sections summarize the updated factors of safety for the DSTF in the fully frozen and fully thawed conditions. The factors of safety were calculated using Geostudio 2007 - Slope /W module, which is a computer program that uses limit equilibrium theory to compute the factor of safety of slopes.

3.1 Fully Frozen Case

This scenario is intended to model the condition where the tailings have been placed and the underlying soils have remained frozen. This is the existing condition at the DSTF at the time this report was prepared. A summary of the updated factors of safety is provided in Table 1. The suggested minimum and original calculated factors of safety have been included for reference. Fully frozen case slope stability plots are in Appendix B.

Table 1: DSTF Slope Stability Factors of Safety – Fully Frozen Case

Stability Condition	Factor of Safety Suggested Minimum[1]	Calculated Factor of Safety May 2011 Detailed Design Tailings Φ = 32˚		Calculated Factor of Safety Updated Design Tailings Φ = 35˚	
		Alignment A	Alignment B	Alignment A	Alignment B
Stability of Surface					
Short-term (during construction – static)	1.0	1.8	2.0	2.0	2.2
Long-term (after construction – static)	1.1	1.9	2.0	2.0	2.3
Deep Seated Stability					
Short-term (during construction – static)	1.1-1.3	2.0	1.8	2.0	2.0
Short-term (during construction – pseudo-static)	1.0	1.3	1.2	1.4	1.4
Long-term (after closure – static)	1.3	1.4	1.3	1.5	1.4
Long-term (after closure – pseudo-static)	1.0	1.3	1.2	1.4	1.5

[1] Mined Rock and Overburden Piles Investigation and Design Manual (BC Mine Waste Rock Pile Research Committee, 1991)

3.2 Fully Thawed Case

This scenario is intended to model the anticipated long-term condition where the tailings are placed and the underlying soils have fully thawed and consolidated. The rate of thaw is assumed to be slow enough that no excess porewater pressure is anticipated. A summary of the updated factors of safety is provided in Table 2. The suggested minimum and original calculated factors of safety have been included for reference. Fully thawed case slope stability plots are in Appendix C.

Table 2: DSTF Slope Stability Factor of Safety – Fully Thawed Case

Stability Condition	Factor of Safety Suggested Minimum[1]	Calculated Factor of Safety May 2011 Design Tailings Φ = 32˚		Calculated Factor of Safety Revised Design Tailings Φ = 35˚	
		Alignment A	Alignment B	Alignment A	Alignment B
Stability of Surface					
Short-term (during construction – static)	1.0	N/A[2]		N/A[2]	
Long-term (after construction – static)	1.1	1.6	2.0	1.8	2.0
Deep Seated Stability					
Short-term (during construction – static)	1.1-1.3	N/A[2]		N/A[2]	
Short-term (during construction – pseudo-static)	1.0	N/A[2]		N/A[2]	
Long-term (after closure – static)	1.3	2.0	1.9	2.0	2.4
Long-term (after closure – pseudo-static)	1.0	1.4	1.4	1.4	1.6

[1] Mined Rock and Overburden Piles Investigation and Design Manual (BC Mine Waste Rock Pile Research Committee, 1991)

[2] Foundation will not be fully thawed during construction of the pile.

4.0 LIMITATIONS OF REPORT

This report and its contents are intended for the sole use of Alexco Resource Corp. and their agents. EBA Engineering Consultants Ltd. operating as EBA, A Tetra Tech Company, does not accept any responsibility for the accuracy of any of the data, the analysis, or the recommendations contained or referenced in the report when the report is used or relied upon by any Party other than Alexco Resource Corp., or for any Project other than the proposed development at the subject site. Any such unauthorized use of this report is at the sole risk of the user. Use of this report is subject to the terms and conditions stated in EBA's Services Agreement. EBA's General Conditions are provided in Appendix A of this report.

5.0 CLOSURE

We trust this report meets your present requirements. If you have any questions or comments, please contact the undersigned.

Sincerely,
EBA Engineering Consultants Ltd.

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Principal Consultant, Arctic Region
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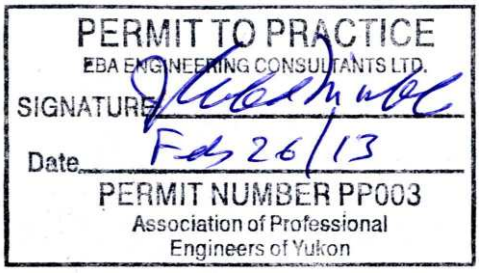

APPENDIX A
EBA'S GENERAL CONDITIONS

GENERAL CONDITIONS

GEOTECHNICAL REPORT

This report incorporates and is subject to these “General Conditions”.

1.0 USE OF REPORT AND OWNERSHIP

This geotechnical report pertains to a specific site, a specific development and a specific scope of work. It is not applicable to any other sites nor should it be relied upon for types of development other than that to which it refers. Any variation from the site or development would necessitate a supplementary geotechnical assessment.

This report and the recommendations contained in it are intended for the sole use of EBA’s Client. EBA does not accept any responsibility for the accuracy of any of the data, the analyses or the recommendations contained or referenced in the report when the report is used or relied upon by any party other than EBA’s Client unless otherwise authorized in writing by EBA. Any unauthorized use of the report is at the sole risk of the user.

This report is subject to copyright and shall not be reproduced either wholly or in part without the prior, written permission of EBA. Additional copies of the report, if required, may be obtained upon request.

2.0 ALTERNATE REPORT FORMAT

Where EBA submits both electronic file and hard copy versions of reports, drawings and other project-related documents and deliverables (collectively termed EBA’s instruments of professional service), only the signed and/or sealed versions shall be considered final and legally binding. The original signed and/or sealed version archived by EBA shall be deemed to be the original for the Project.

Both electronic file and hard copy versions of EBA’s instruments of professional service shall not, under any circumstances, no matter who owns or uses them, be altered by any party except EBA. EBA’s instruments of professional service will be used only and exactly as submitted by EBA.

Electronic files submitted by EBA have been prepared and submitted using specific software and hardware systems. EBA makes no representation about the compatibility of these files with the Client’s current or future software and hardware systems.

3.0 ENVIRONMENTAL AND REGULATORY ISSUES

Unless stipulated in the report, EBA has not been retained to investigate, address or consider and has not investigated, addressed or considered any environmental or regulatory issues associated with development on the subject site.

4.0 NATURE AND EXACTNESS OF SOIL AND ROCK DESCRIPTIONS

Classification and identification of soils and rocks are based upon commonly accepted systems and methods employed in professional geotechnical practice. This report contains descriptions of the systems and methods used. Where deviations from the system or method prevail, they are specifically mentioned.

Classification and identification of geological units are judgmental in nature as to both type and condition. EBA does not warrant conditions represented herein as exact, but infers accuracy only to the extent that is common in practice.

Where subsurface conditions encountered during development are different from those described in this report, qualified geotechnical personnel should revisit the site and review recommendations in light of the actual conditions encountered.

5.0 LOGS OF TESTHOLES

The testhole logs are a compilation of conditions and classification of soils and rocks as obtained from field observations and laboratory testing of selected samples. Soil and rock zones have been interpreted. Change from one geological zone to the other, indicated on the logs as a distinct line, can be, in fact, transitional. The extent of transition is interpretive. Any circumstance which requires precise definition of soil or rock zone transition elevations may require further investigation and review.

6.0 STRATIGRAPHIC AND GEOLOGICAL INFORMATION

The stratigraphic and geological information indicated on drawings contained in this report are inferred from logs of test holes and/or soil/rock exposures. Stratigraphy is known only at the locations of the test hole or exposure. Actual geology and stratigraphy between test holes and/or exposures may vary from that shown on these drawings. Natural variations in geological conditions are inherent and are a function of the historic environment. EBA does not represent the conditions illustrated as exact but recognizes that variations will exist. Where knowledge of more precise locations of geological units is necessary, additional investigation and review may be necessary.

7.0 PROTECTION OF EXPOSED GROUND

Excavation and construction operations expose geological materials to climatic elements (freeze/thaw, wet/dry) and/or mechanical disturbance which can cause severe deterioration. Unless otherwise specifically indicated in this report, the walls and floors of excavations must be protected from the elements, particularly moisture, desiccation, frost action and construction traffic.

8.0 SUPPORT OF ADJACENT GROUND AND STRUCTURES

Unless otherwise specifically advised, support of ground and structures adjacent to the anticipated construction and preservation of adjacent ground and structures from the adverse impact of construction activity is required.

9.0 INFLUENCE OF CONSTRUCTION ACTIVITY

There is a direct correlation between construction activity and structural performance of adjacent buildings and other installations. The influence of all anticipated construction activities should be considered by the contractor, owner, architect and prime engineer in consultation with a geotechnical engineer when the final design and construction techniques are known.

10.0 OBSERVATIONS DURING CONSTRUCTION

Because of the nature of geological deposits, the judgmental nature of geotechnical engineering, as well as the potential of adverse circumstances arising from construction activity, observations during site preparation, excavation and construction should be carried out by a geotechnical engineer. These observations may then serve as the basis for confirmation and/or alteration of geotechnical recommendations or design guidelines presented herein.

11.0 DRAINAGE SYSTEMS

Where temporary or permanent drainage systems are installed within or around a structure, the systems which will be installed must protect the structure from loss of ground due to internal erosion and must be designed so as to assure continued performance of the drains. Specific design detail of such systems should be developed or reviewed by the geotechnical engineer. Unless otherwise specified, it is a condition of this report that effective temporary and permanent drainage systems are required and that they must be considered in relation to project purpose and function.

12.0 BEARING CAPACITY

Design bearing capacities, loads and allowable stresses quoted in this report relate to a specific soil or rock type and condition. Construction activity and environmental circumstances can materially change the condition of soil or rock. The elevation at which a soil or rock type occurs is variable. It is a requirement of this report that structural elements be founded in and/or upon geological materials of the type and in the condition assumed. Sufficient observations should be made by qualified geotechnical personnel during construction to assure that the soil and/or rock conditions assumed in this report in fact exist at the site.

13.0 SAMPLES

EBA will retain all soil and rock samples for 30 days after this report is issued. Further storage or transfer of samples can be made at the Client's expense upon written request, otherwise samples will be discarded.

14.0 INFORMATION PROVIDED TO EBA BY OTHERS

During the performance of the work and the preparation of the report, EBA may rely on information provided by persons other than the Client. While EBA endeavours to verify the accuracy of such information when instructed to do so by the Client, EBA accepts no responsibility for the accuracy or the reliability of such information which may affect the report.

APPENDIX B

SLOPE STABILITY PLOTS – FULLY FROZEN CASE

Name: Alignment A
Description: Static w/o PWP Conditions (Frozen State)
File Name: W14101178.011_AlignmentA_R04A2_Static_NoPWP.gsz
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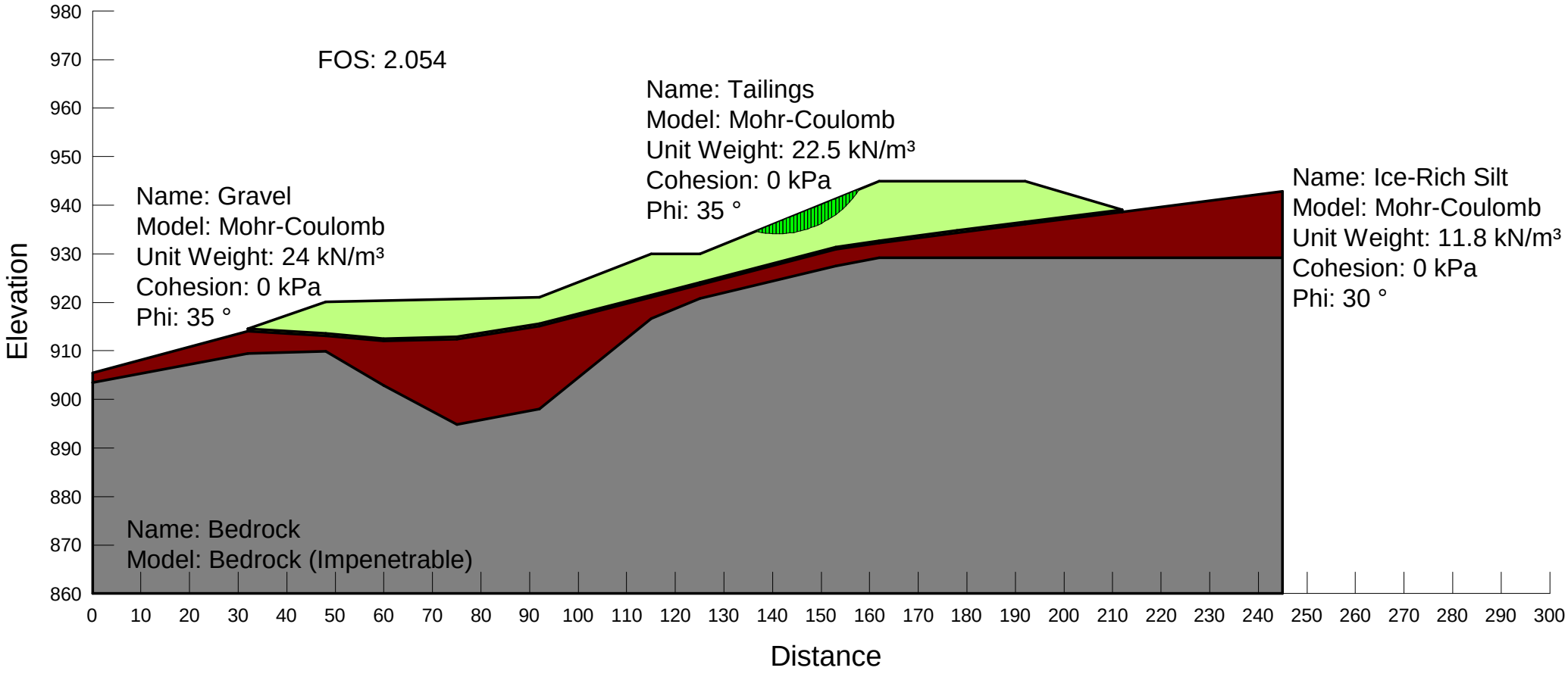
Horizontal Scale: 1250
Vertical Scale: 1250
Minimum Slip Surface Depth: 1 m



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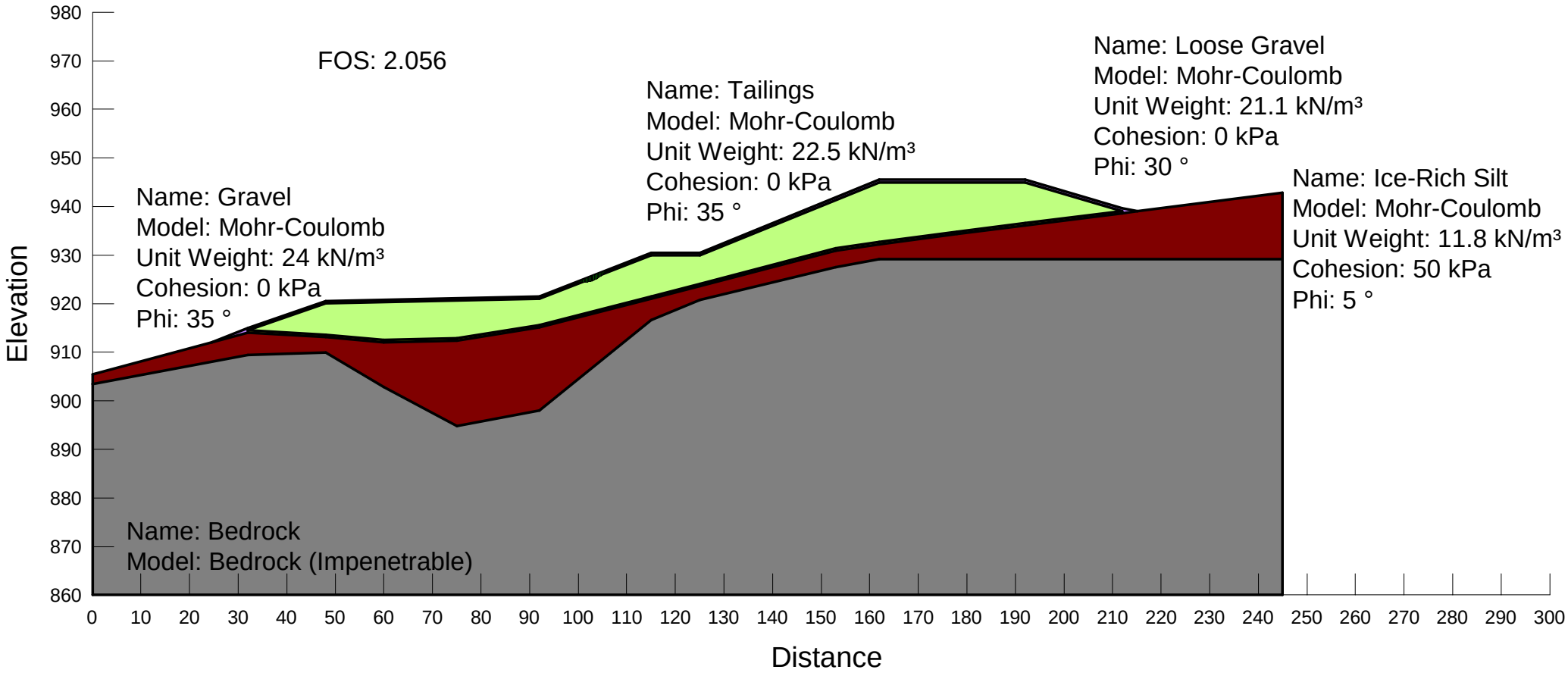

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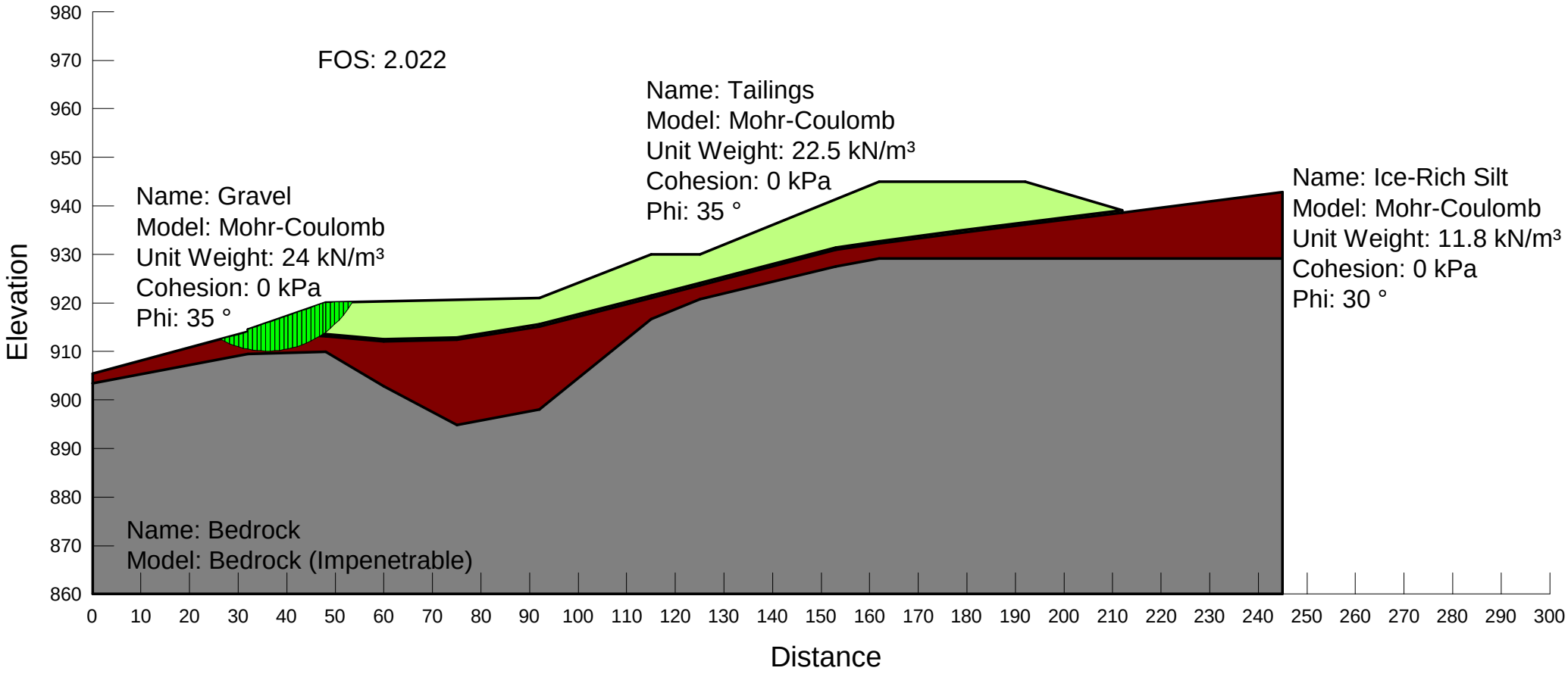

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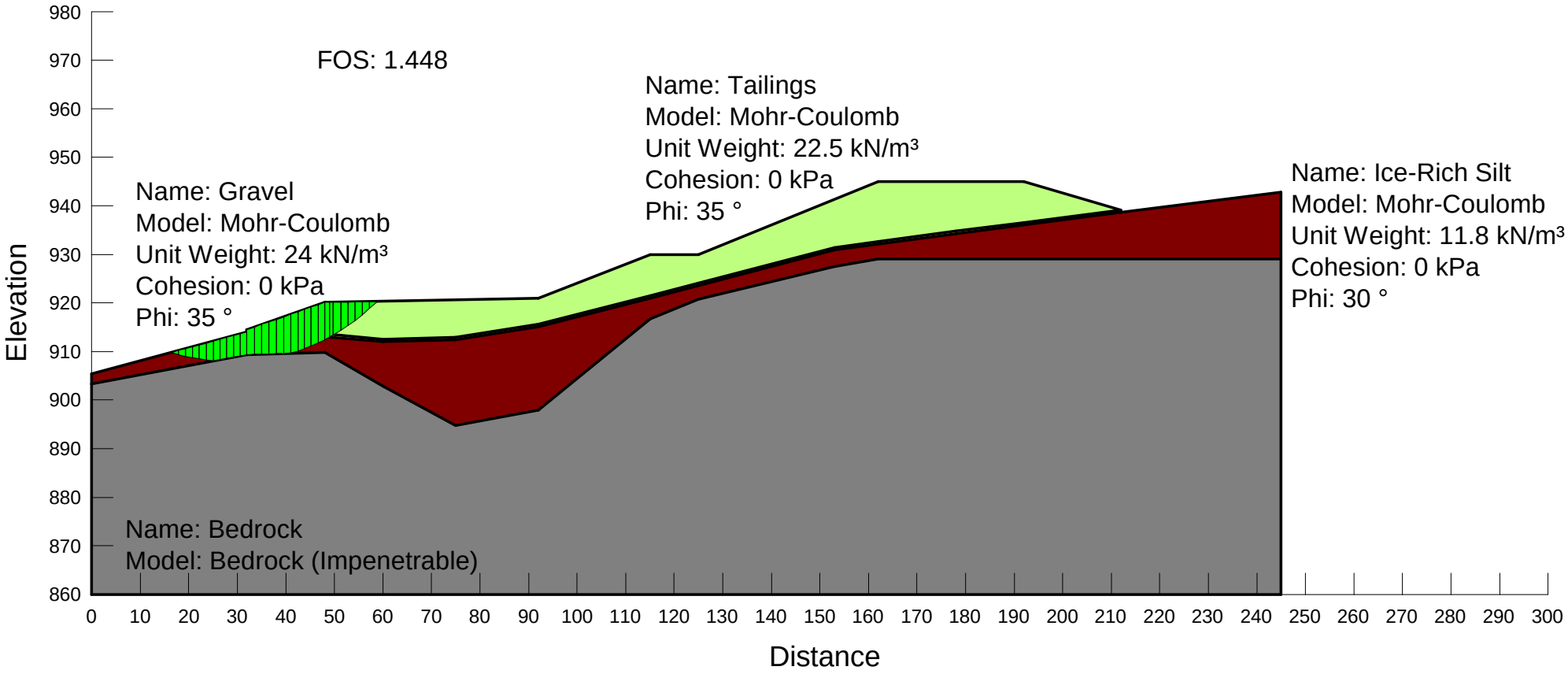

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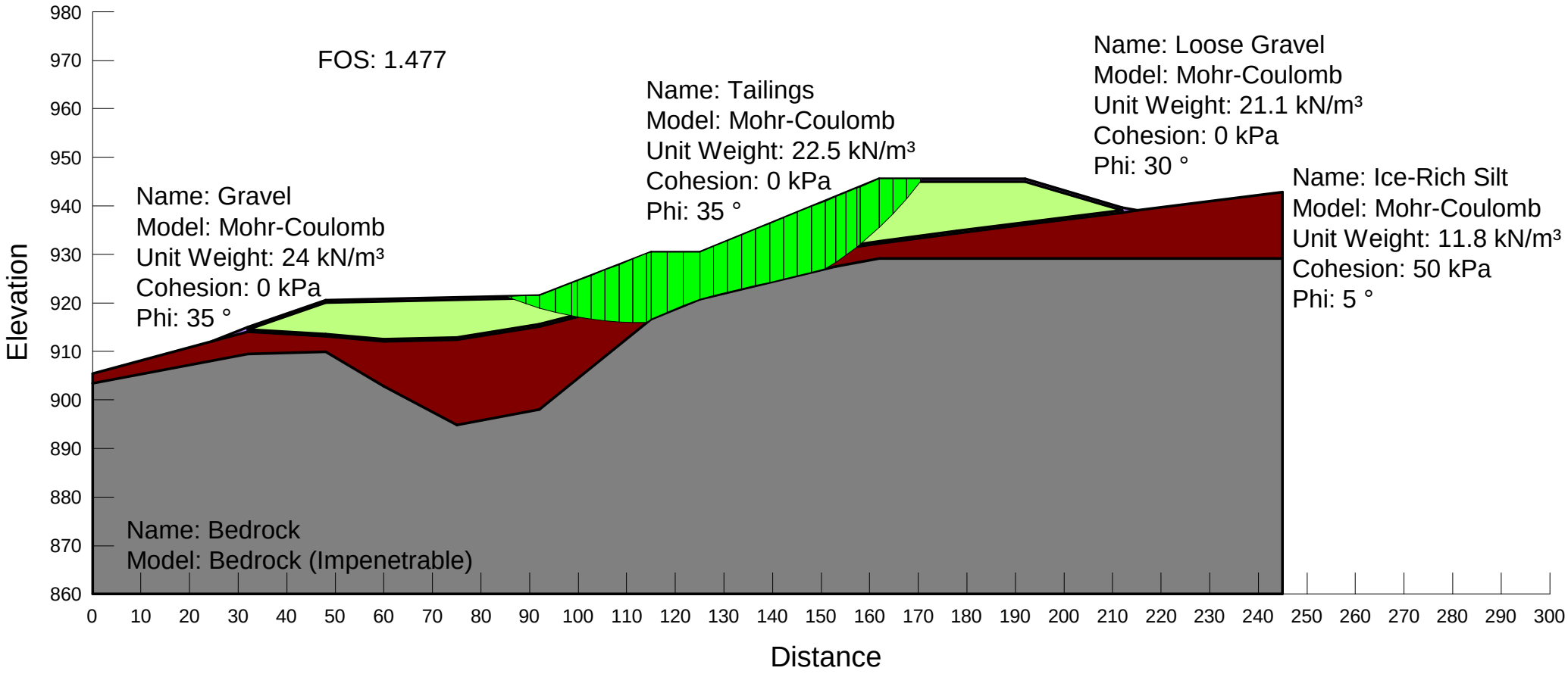

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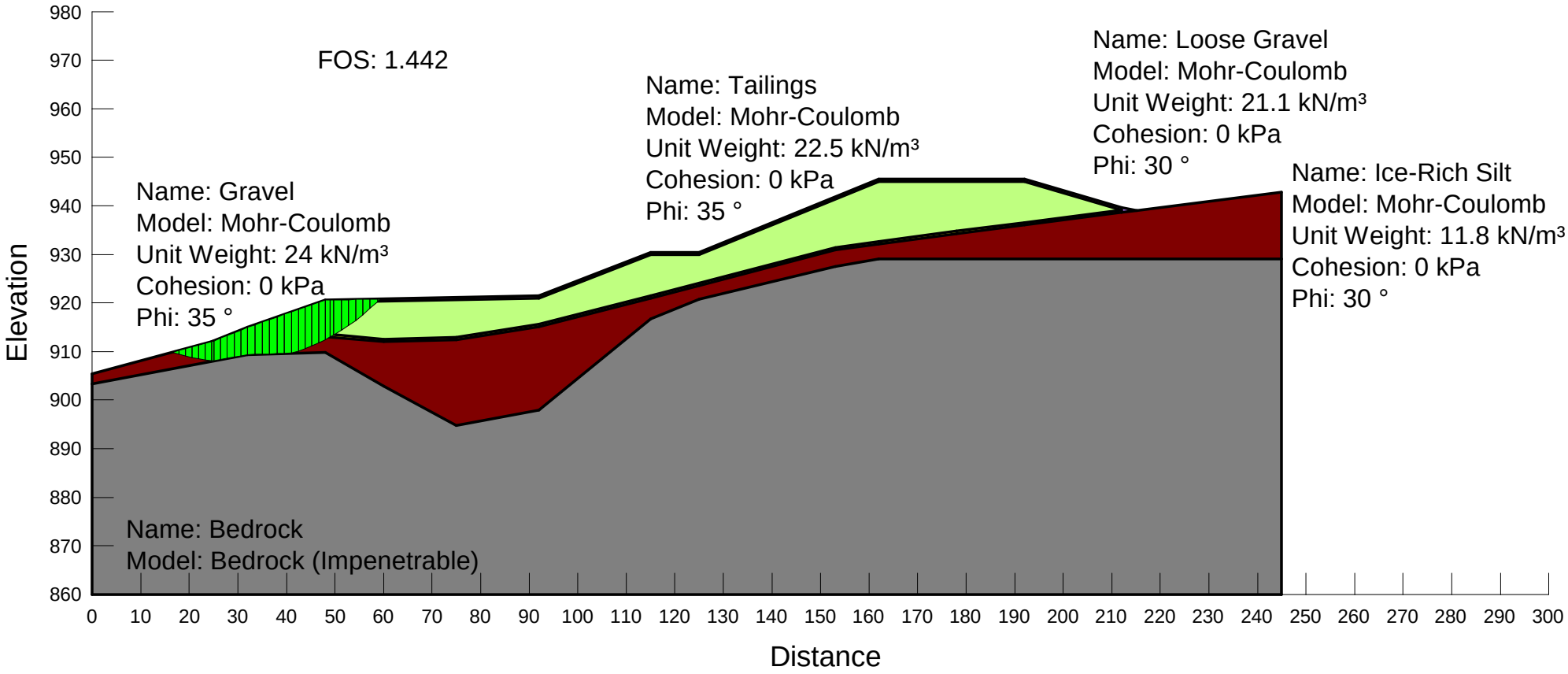

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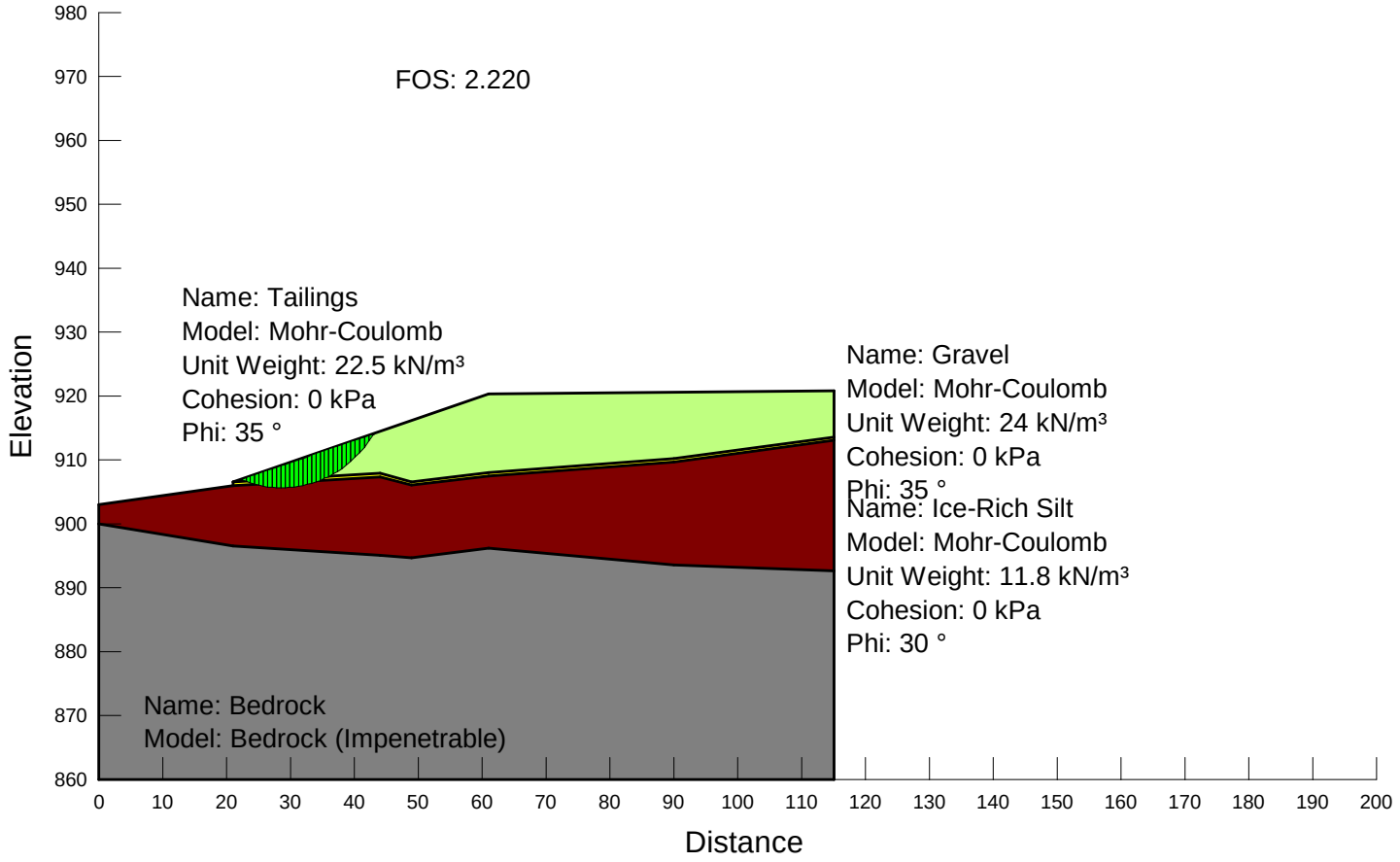

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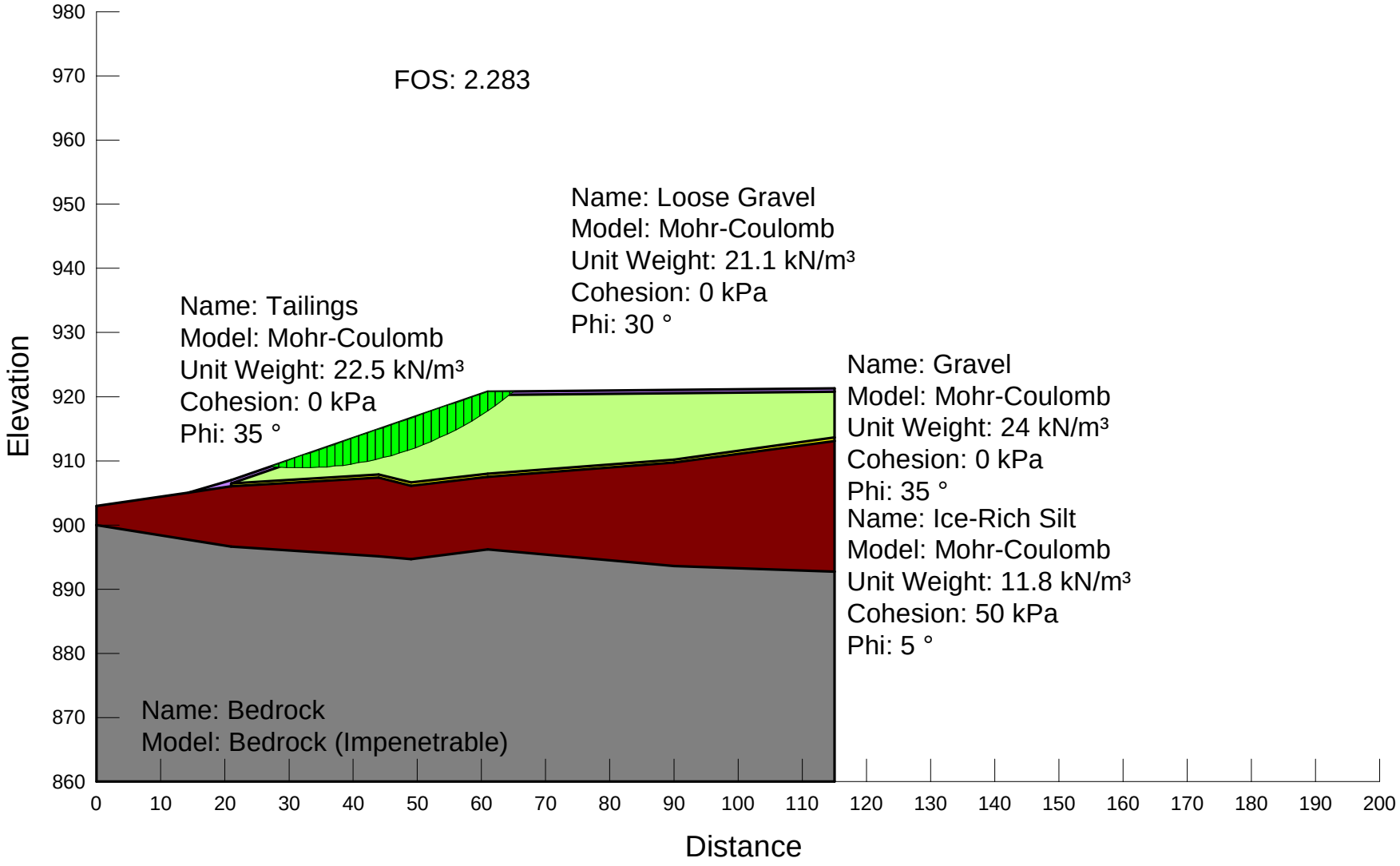

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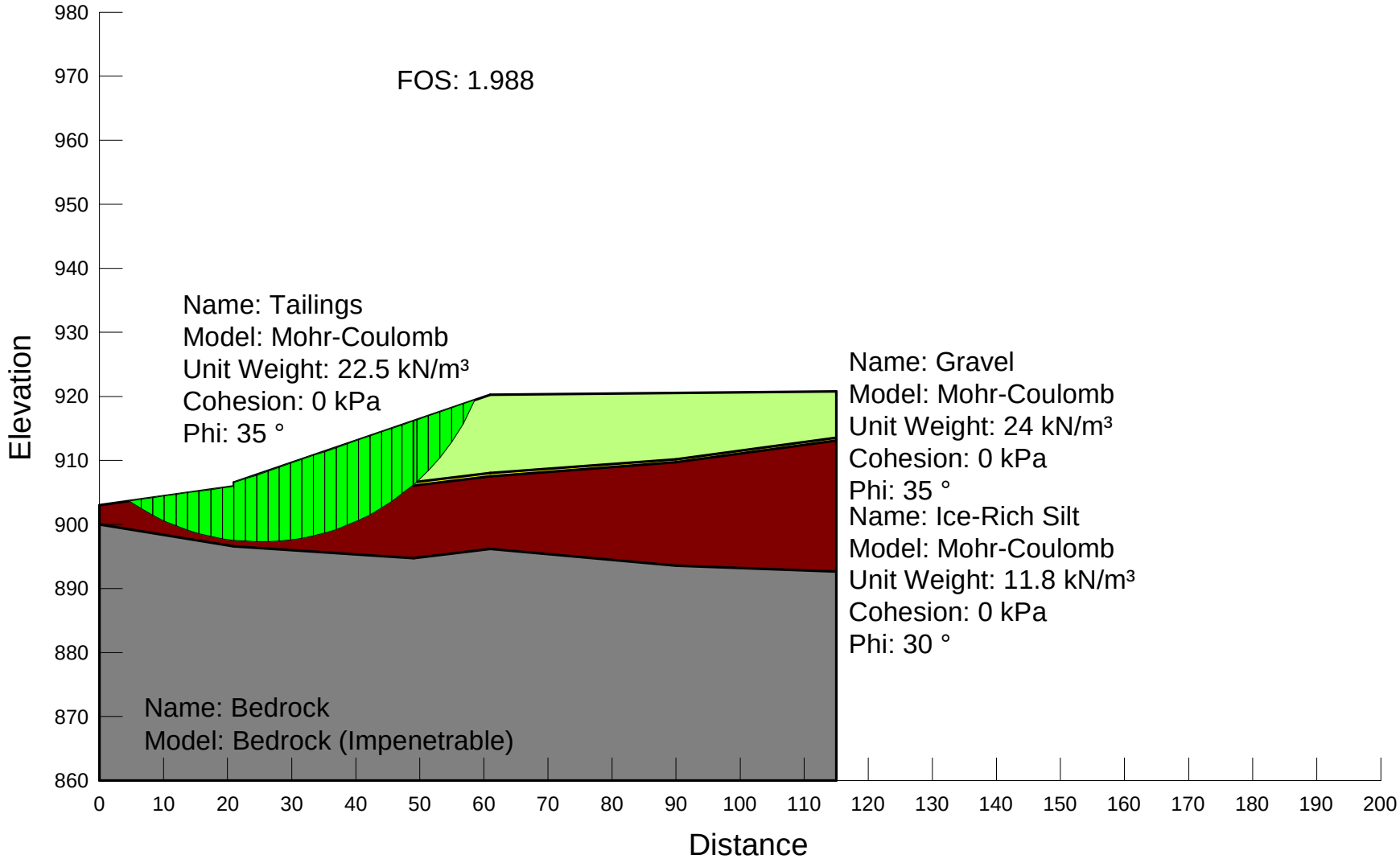

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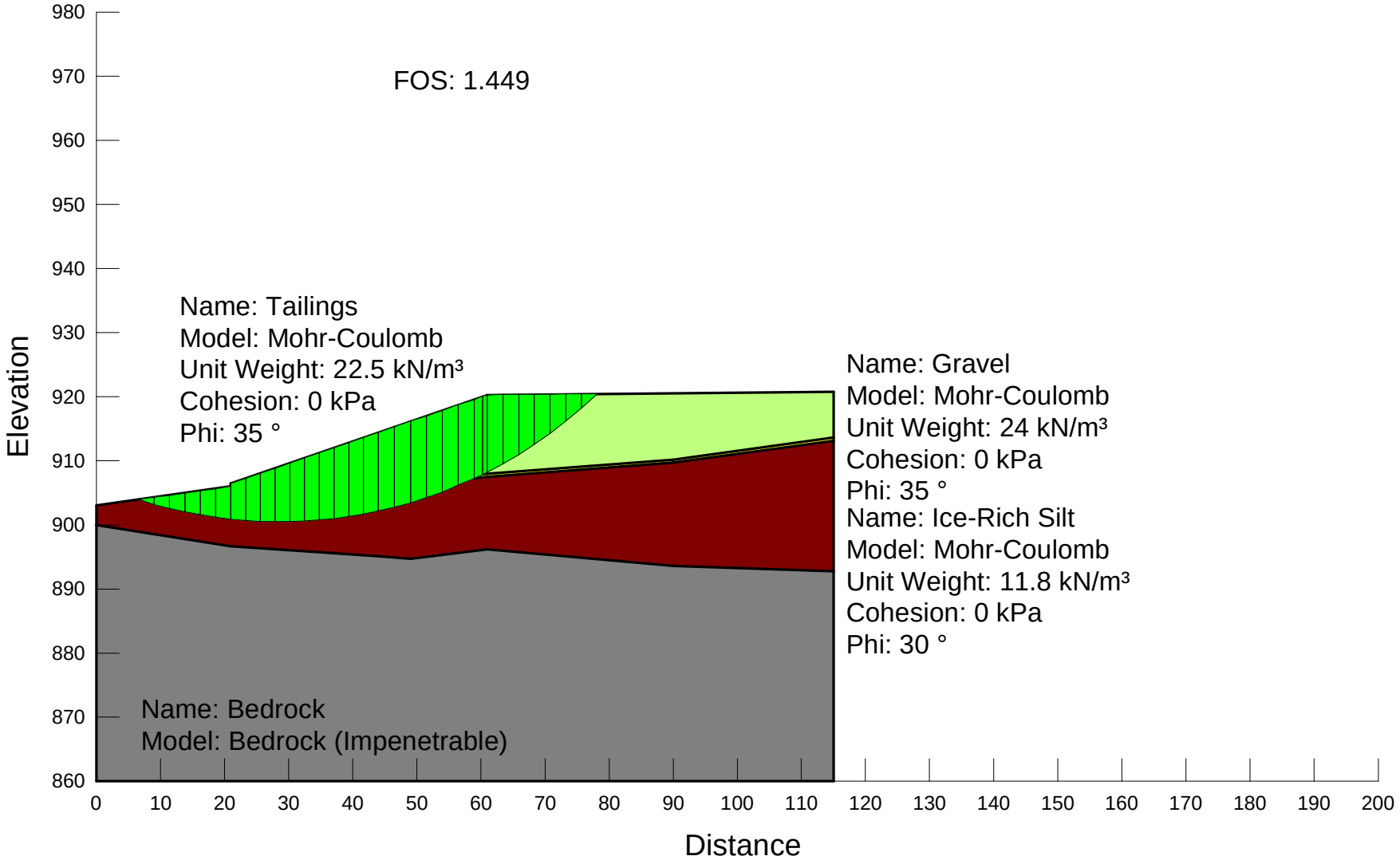

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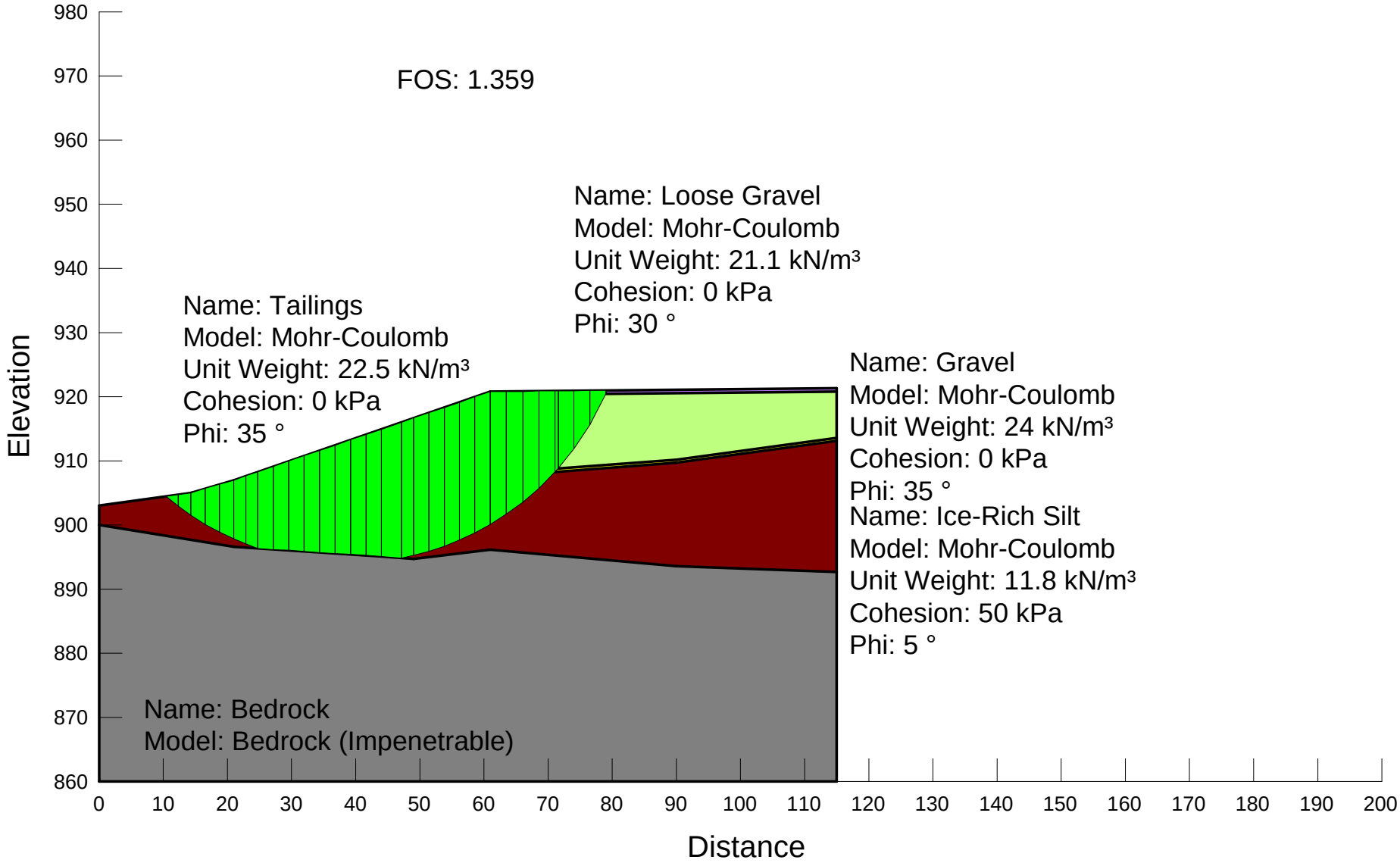

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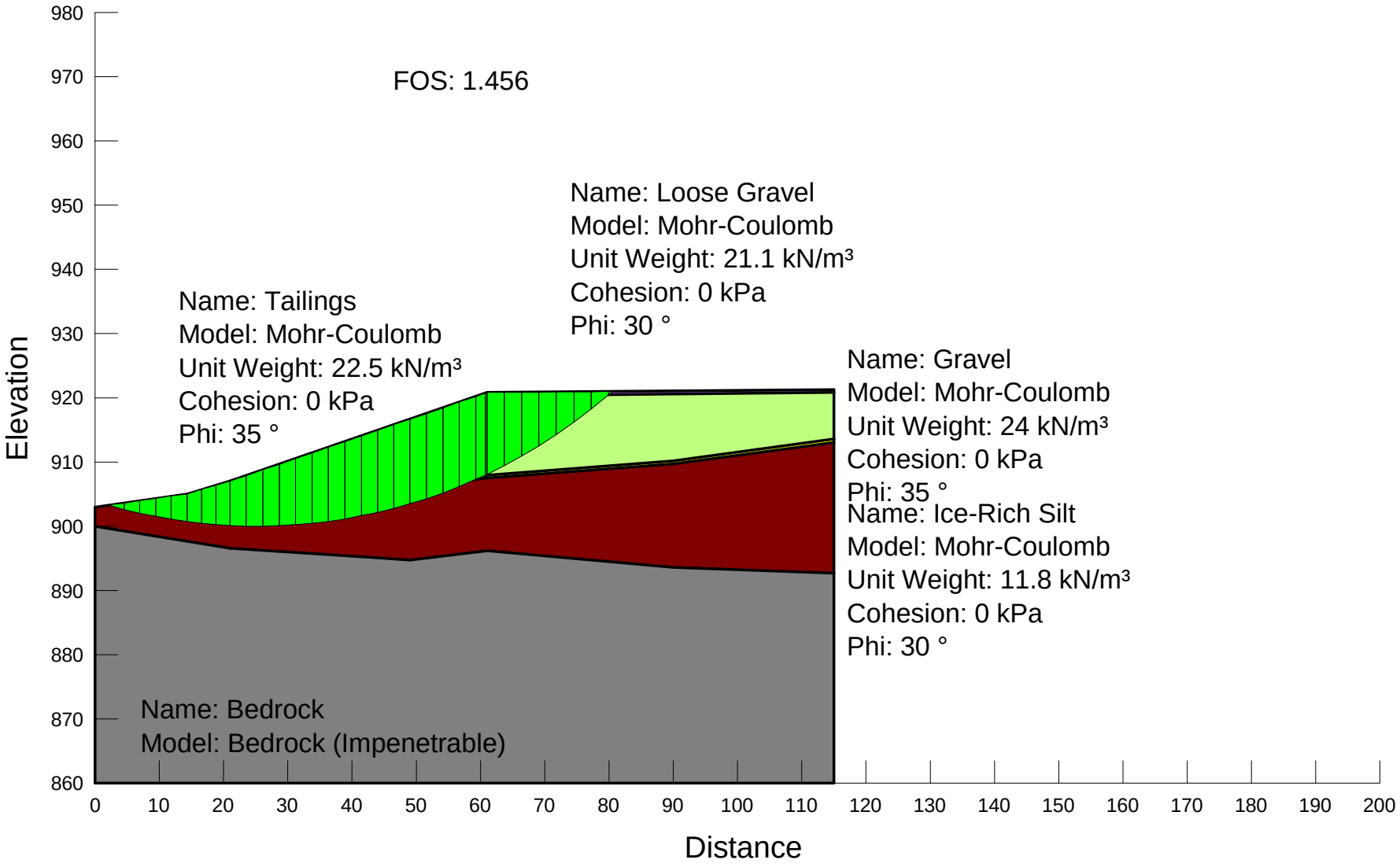

APPENDIX C

SLOPE STABILITY PLOTS – FULLY THAWED CASE

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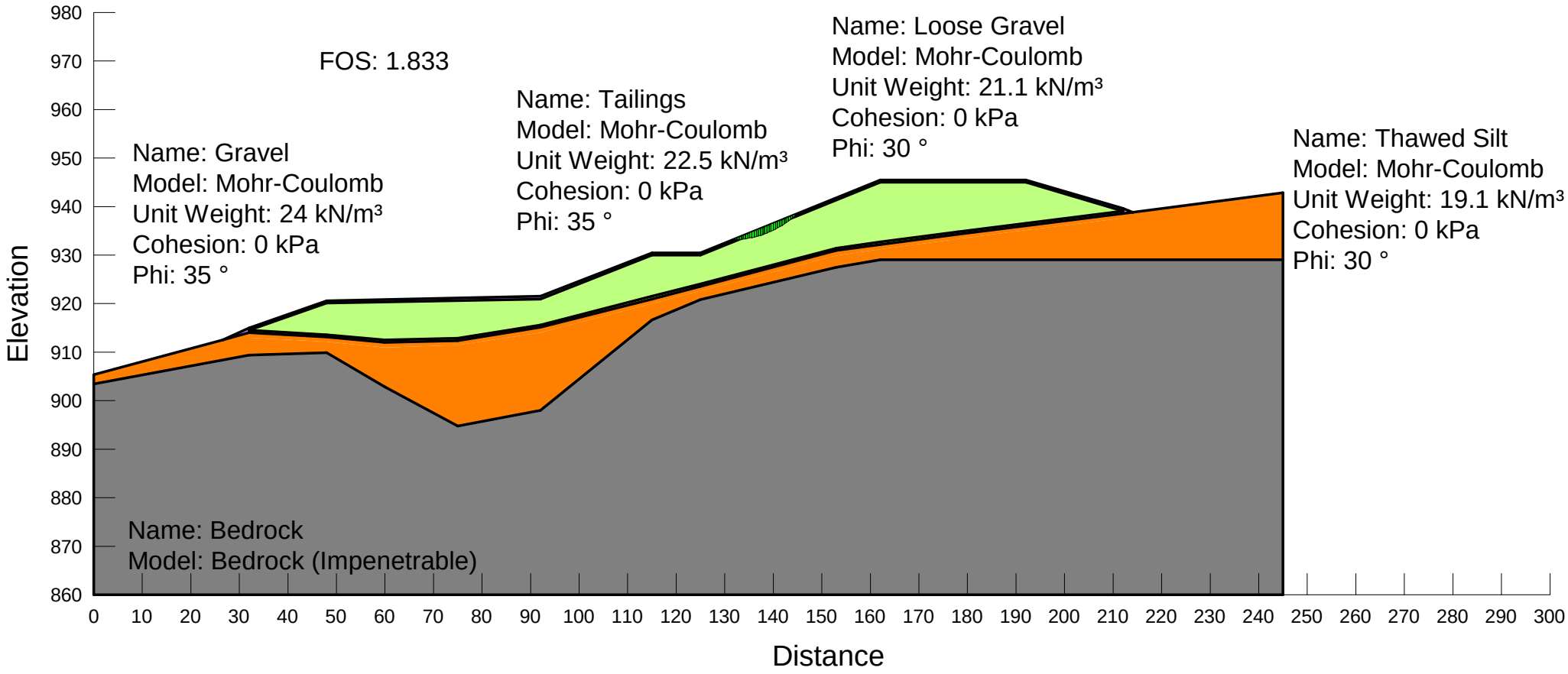

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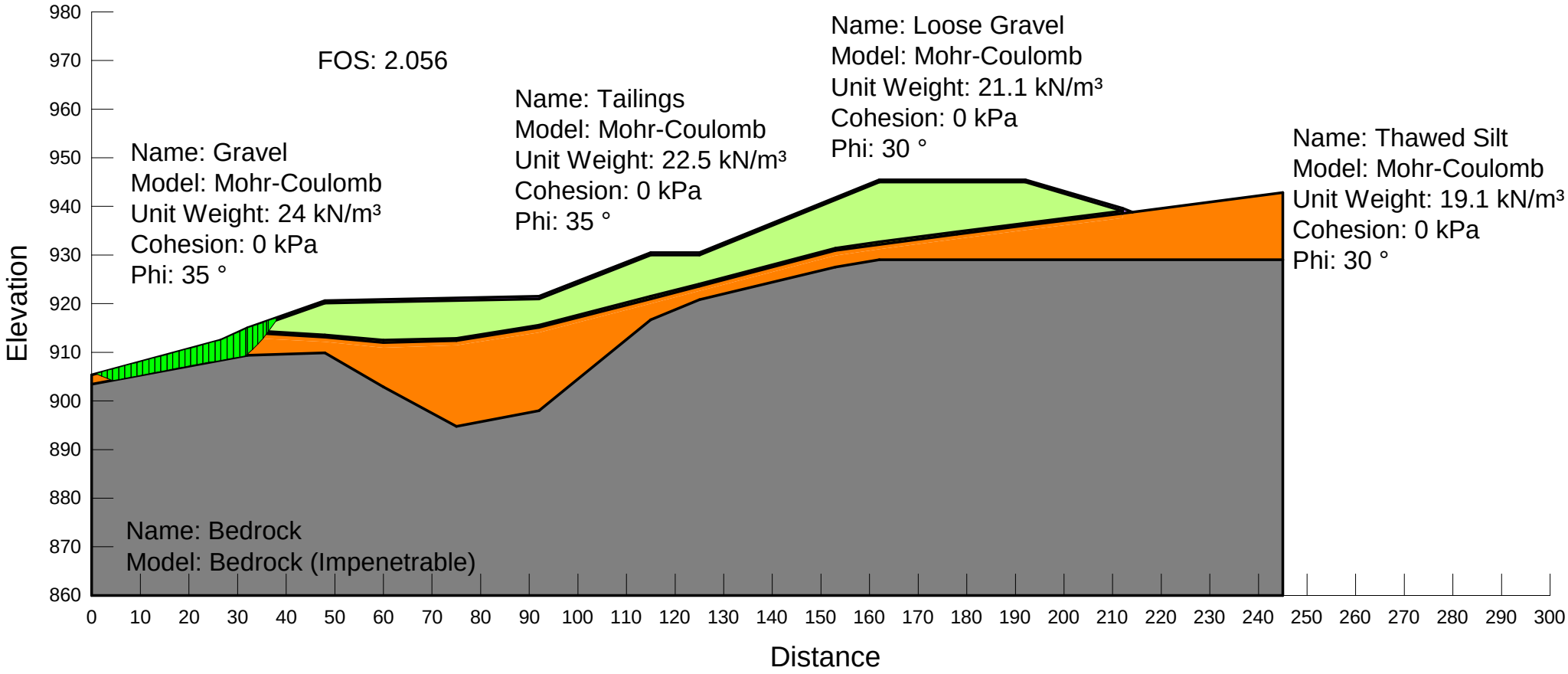

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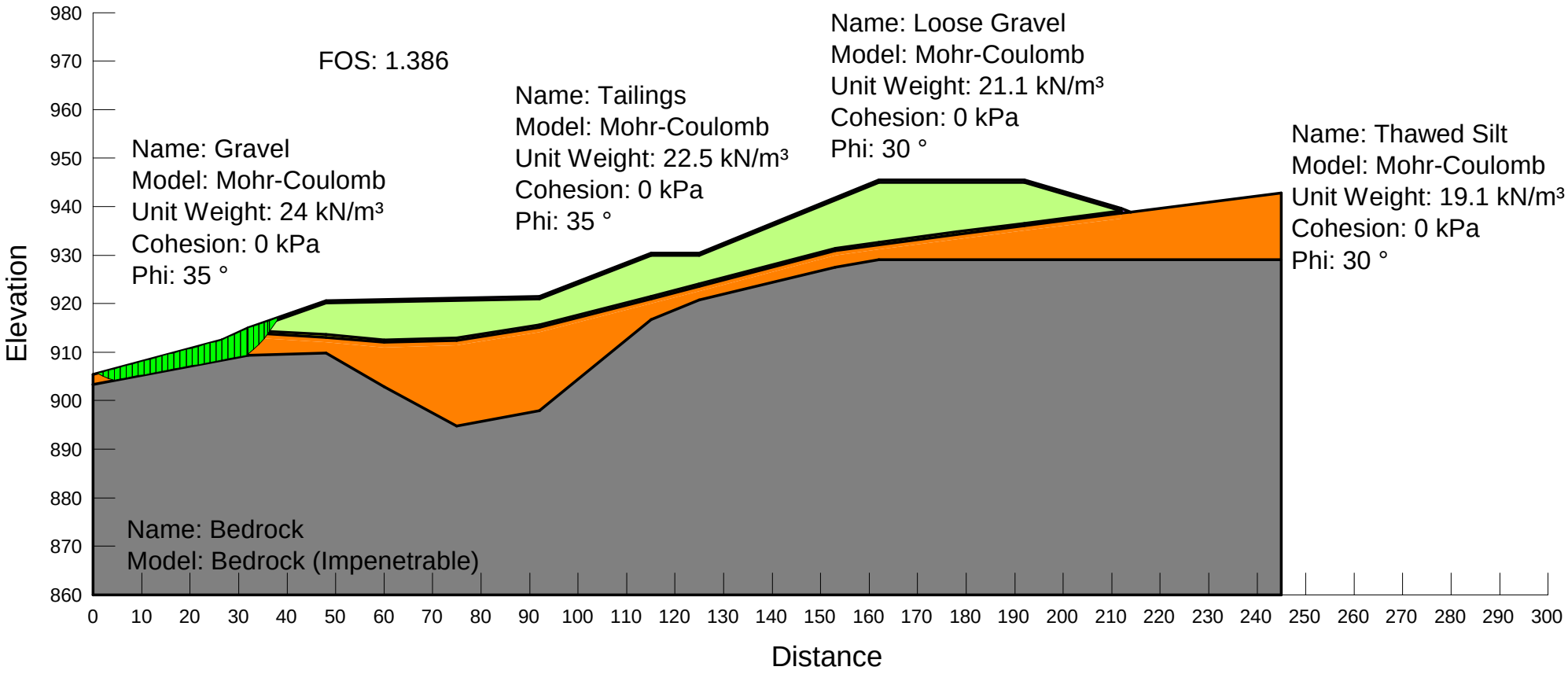

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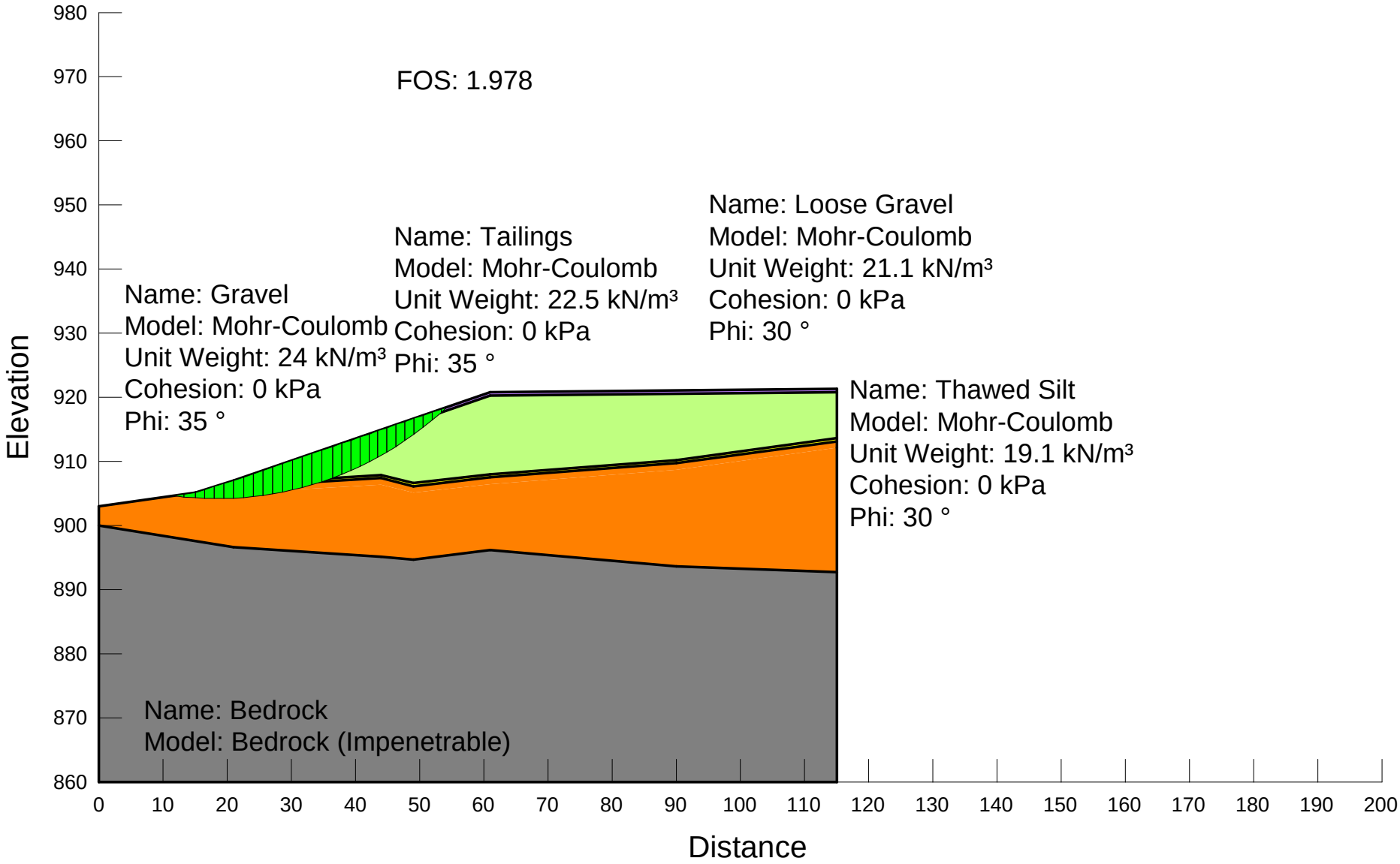

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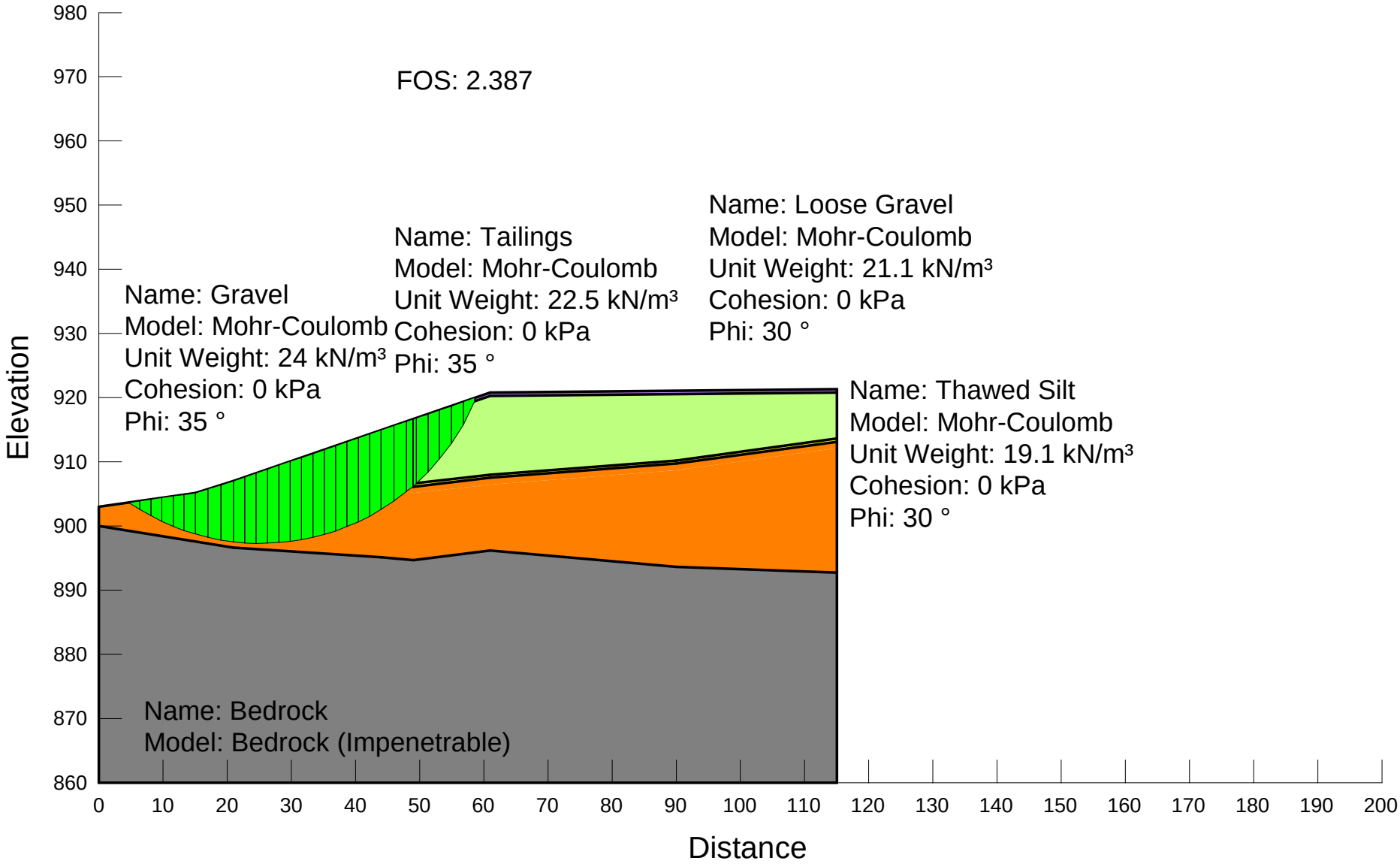
Vertical Scale: 1000
Minimum Slip Surface Depth: 1 m



Name: Alignment B
Description: Dynamic (1:475) w/o PWP Conditions (Fully Thawed)
File Name: W14101178.011_AlignmentB_R06B2_Dynamic475_NoPWP.gsz
Method: Morgenstern-Price
Horz Seismic Load: 0.138
PWP Conditions Source: (none)
Length(L) Units: meters
Horizontal Scale: 1000
Vertical Scale: 1000
Minimum Slip Surface Depth: 1 m