DATE January 31, 2024 **Project No.** 21482114

TO Mr. Kyle Kazda, Development Manager
St. Mary's Land Corporation, c/o Taggart Realty Management

FROM Kinjal Gajjar **EMAIL kinjal.gajjar@wsp.com**
Chris Hendry **chris.hendry@wsp.com**

RESPONSE TO GEOTECHNICAL PEER REVIEW COMMENTS FROM GEMTEC
PROPOSED RESIDENTIAL DEVELOPMENT
3930 AND 3960 RIVERSIDE DRIVE, OTTAWA, ONTARIO

This letter provides WSP's response to the peer review carried out by Gemtec Consulting Engineers and Scientists (GEMTEC) for the planned development at 3930 and 3960 Riverside Road in Ottawa, Ontario.

A geotechnical peer review was completed by GEMTEC on behalf of the City of Ottawa and the relevant comments were provided in GEMTEC Letter no. 100008.025 – Rev0, dated Dec 7, 2023. The comments are noted below with response from WSP.

1) "The site plan in the report (i.e., Figure 1) indicates the locations for the following test pits or borehole but the records do not seem to be included in the report.

- Testpits 1 to 17 (Project No. 011-2898);
- Testpits 94-15 an 94-18 (Project No. 941-2135);
- Testpits ST-1A, ST-1B, ST-1C, ST-2A, ST-2C (Project No. 1111210050); and,
- Boreholes 3, 5, and 6 (Project No. 841-2470)"

Response *- The above noted records could not be located in our achieves and have therefore not been included in the report. The locations of these boreholes and test pits have also been removed from the site plan for clarity.*

2) "In addition, the following was also noted with respect to the testhole records and site plan:

- TP 11-102 (011-2835) and TP 11-02 (1111210050) seem to be mis-labelled; and,
- There appears to be an unlabelled testpit marker in the area between BH 91-3, CPT23-02/02B/02C, and 17-203 (approximately in the middle of the site)."

Response *- The above has been corrected on the site plan.*

3) "The MASW testing was carried out within the North Area, where the fill thicknesses are significantly less than in the South Area (i.e., 6 to 7 metres at the MASW lines versus up to 20 m thickness in the South Area). Due to the significant difference in stratigraphy, it is not clear that the obtained shear wave velocity values are representative within the South Area or that the interpreted Site Class D based on those values is also applicable for the South Area. "

Response *– Additional MASW testing within the South Area was carried out by Conetec on 2 March 2023 (See Appendix G of the WSP report). The results are consistent with a Site Class D. This MASW line has now been added to the Site Plan (Figure 1).*

4) "The following comments are provided for the slope stability analysis carried out for Sections A-A', B-B', C-C', and D-D'. The safety map for the static and seismic analyses for the values of less than 1.5 and 1.1 respectively, extends past the upper edge of the point grid (for the slip circle centre), which may indicate there are slip circles with those factors of safety or less that extend horizontally farther than currently shown. This could potentially result in an increased stable slope allowance, and it is suggested that the model geometry be revised (by extending the point grid) to check the limits."

Response *– The models for the sections identified above were revised (by extending the point grid), no differences have been observed in the stable slope allowance.*

5) "The groundwater level assumed in the static analyses for the South Area is at the base of the existing fill (i.e., at elevations of about 82 to 83 m) and is indicated to be based on the water levels measured in the various monitoring wells at the site. This would be Case 3 as outlined in the slope stability guidelines and may not be a realistic assumption. The fill materials above the native sands are not uniform in composition and contain cohesive layers and materials with high silt and clay contents that will tend to retain water and therefore it may not be reasonably conservative to assume the fill materials are fully drained as assumed in the slope stability analyses. The water levels summary in Section 4.1 of the report notes that: "In the South Area, the groundwater level was generally found to be between 12 to 16 m depth (i.e., between elevations of about 75 to 83 m), but as shallow as about 6 m (i.e., elevation of about 88 m)."

Response *– While the water level in the south area was recorded to be between elevations of 75.1 and 87.6 m (in monitoring wells as well as from CPT Dissipation testing), it was generally found to be below elevation of 79 m. Only one single borehole location had a higher water level of 87.6. We therefore feel that the original assumptions regarding groundwater level are reasonable assumptions for the overall groundwater depth in the area of interest. Nonetheless, as a precautionary measure and an additional check, the slope stability models for these four sections were revised to take into account for the possibility of a higher groundwater level in South Area by adjusting the piezometric line in the analysis upward in the east side of the site (where the single high level was recorded). This adjustment results in a very minor change to the slope stability (well within the margin of error of the data and assumptions which go into the analysis). The change is of sufficiently small magnitude as to make no meaningful difference to recommended stable slope allowance, and therefore we feel that the* originally recommended setbacks may be maintained. *The results of the revised slope stability analysis are attached to this memorandum.*

We trust that this memorandum provides sufficient information for your current requirements. If you have any questions regarding the contents of this memo or require additional information, please do not hesitate to contact the undersigned.

WSP Canada Inc.

Kinjal Gajjar
Geotechnical Consultant

Chris Hendry, P.Eng.
Principal, Senior Geotechnical Engineer

Attachments: Important Information and Limitations of This Report
Figures 1, 1A, 1B: Site Plan
Revised Slope Stability Results for Sections A-A', B-B', C-C', and D-D'

https://golderassociates.sharepoint.com/sites/150381/project files/6 deliverables/peer review response letter/21482114-tm-rev0-2024'01'12-response to comments.docx

IMPORTANT INFORMATION AND LIMITATIONS OF THIS REPORT

Standard of Care: WSP Canada Inc. (WSP) has prepared this report in a manner consistent with that level of care and skill ordinarily exercised by members of the engineering and science professions currently practising under similar conditions in the jurisdiction in which the services are provided, subject to the time limits and physical constraints applicable to this report. No other warranty, expressed or implied is made.

Basis and Use of the Report: This report has been prepared for the specific site, design objective, development and purpose described to WSP by the Client. The factual data, interpretations and recommendations pertain to a specific project as described in this report and are not applicable to any other project or site location. Any change of site conditions, purpose, development plans or if the project is not initiated within eighteen months of the date of the report may alter the validity of the report. WSP cannot be responsible for use of this report, or portions thereof, unless WSP is requested to review and, if necessary, revise the report.

The information, recommendations and opinions expressed in this report are for the sole benefit of the Client. No other party may use or rely on this report or any portion thereof without WSP's express written consent. If the report was prepared to be included for a specific permit application process, then upon the reasonable request of the client, WSP may authorize in writing the use of this report by the regulatory agency as an Approved User for the specific and identified purpose of the applicable permit review process. Any other use of this report by others is prohibited and is without responsibility to WSP. The report, all plans, data, drawings and other documents as well as all electronic media prepared by WSP are considered its professional work product and shall remain the copyright property of WSP, who authorizes only the Client and Approved Users to make copies of the report, but only in such quantities as are reasonably necessary for the use of the report by those parties. The Client and Approved Users may not give, lend, sell, or otherwise make available the report or any portion thereof to any other party without the express written permission of WSP. The Client acknowledges that electronic media is susceptible to unauthorized modification, deterioration and incompatibility and therefore the Client can not rely upon the electronic media versions of WSP's report or other work products.

The report is of a summary nature and is not intended to stand alone without reference to the instructions given to WSP by the Client, communications between WSP and the Client, and to any other reports prepared by WSP for the Client relative to the specific site described in the report. In order to properly understand the suggestions, recommendations and opinions expressed in this report, reference must be made to the whole of the report. WSP can not be responsible for use of portions of the report without reference to the entire report.

Unless otherwise stated, the suggestions, recommendations and opinions given in this report are intended only for the guidance of the Client in the design of the specific project. The extent and detail of investigations, including the number of test holes, necessary to determine all of the relevant conditions which may affect construction costs would normally be greater than has been carried out for design purposes. Contractors bidding on, or undertaking the work, should rely on their own investigations, as well as their own interpretations of the factual data presented in the report, as to how subsurface conditions may affect their work, including but not limited to proposed construction techniques, schedule, safety and equipment capabilities.

Soil, Rock and Ground Water Conditions: Classification and identification of soils, rocks, and geologic units have been based on commonly accepted methods employed in the practice of geotechnical engineering and related disciplines. Classification and identification of the type and condition of these materials or units involves judgment, and boundaries between different soil, rock or geologic types or units may be transitional rather than abrupt. Accordingly, WSP does not warrant or guarantee the exactness of the descriptions.

Special risks occur whenever engineering or related disciplines are applied to identify subsurface conditions and even a comprehensive investigation, sampling and testing program may fail to detect all or certain subsurface conditions. The environmental, geologic, geotechnical, geochemical and hydrogeologic conditions that WSP interprets to exist between and beyond sampling points may differ from those that actually exist. In addition to soil variability, fill of variable physical and chemical composition can be present over portions of the site or on adjacent properties. The professional services retained for this project include only the geotechnical aspects of the subsurface conditions at the site, unless otherwise specifically stated and identified in the report. The presence or implication(s) of possible surface and/or subsurface contamination resulting from previous activities or uses of the site and/or resulting from the introduction onto the site of materials from off-site sources are outside the terms of reference for this project and have not been investigated or addressed.

Soil and groundwater conditions shown in the factual data and described in the report are the observed conditions at the time of their determination or measurement. Unless otherwise noted, those conditions form the basis of the recommendations in the report. Groundwater conditions may vary between and beyond reported locations and can be affected by annual, seasonal and meteorological conditions. The condition of the soil, rock and groundwater may be significantly altered by construction activities (traffic, excavation, groundwater level lowering, pile driving, blasting, etc.) on the site or on adjacent sites. Excavation may expose the soils to changes due to wetting, drying or frost. Unless otherwise indicated the soil must be protected from these changes during construction.

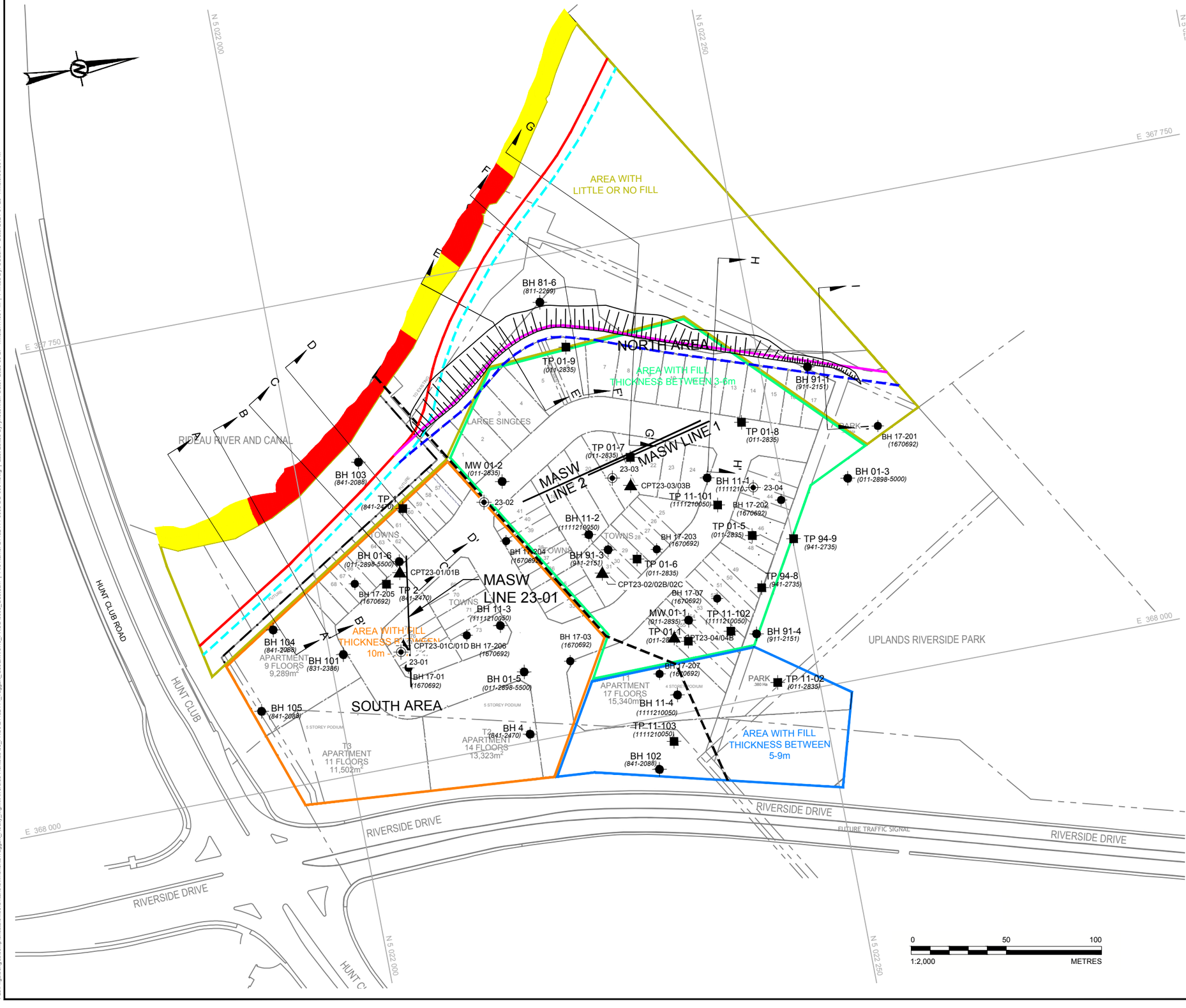
Sample Disposal: WSP will dispose of all uncontaminated soil and/or rock samples 90 days following issue of this report or, upon written request of the Client, will store uncontaminated samples and materials at the Client's expense. In the event that actual contaminated soils, fills or groundwater are encountered or are inferred to be present, all contaminated samples shall remain the property and responsibility of the Client for proper disposal.

Follow-Up and Construction Services: All details of the design were not known at the time of submission of WSP's report. WSP should be retained to review the final design, project plans and documents prior to construction, to confirm that they are consistent with the intent of WSP's report.

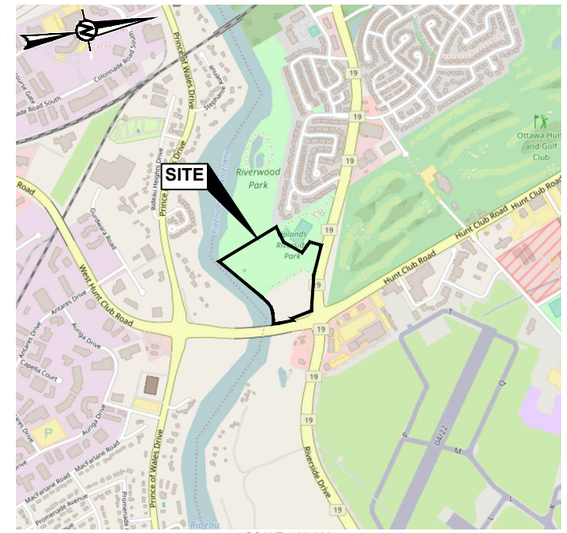
During construction, WSP should be retained to perform sufficient and timely observations of encountered conditions to confirm and document that the subsurface conditions do not materially differ from those interpreted conditions considered in the preparation of WSP's report and to confirm and document that construction activities do not adversely affect the suggestions, recommendations and opinions contained in WSP's report. Adequate field review, observation and testing during construction are necessary for WSP to be able to provide letters of assurance, in accordance with the requirements of many regulatory authorities. In cases where this recommendation is not followed, WSP's responsibility is limited to interpreting accurately the information encountered at the borehole locations, at the time of their initial determination or measurement during the preparation of the Report.

Changed Conditions and Drainage: Where conditions encountered at the site differ significantly from those anticipated in this report, either due to natural variability of subsurface conditions or construction activities, it is a condition of this report that WSP be notified of any changes and be provided with an opportunity to review or revise the recommendations within this report. Recognition of changed soil and rock conditions requires experience and it is recommended that WSP be employed to visit the site with sufficient frequency to detect if conditions have changed significantly.

Drainage of subsurface water is commonly required either for temporary or permanent installations for the project. Improper design or construction of drainage or dewatering can have serious consequences. WSP takes no responsibility for the effects of drainage unless specifically involved in the detailed design and construction monitoring of the system.



KEY MAP



SCALE 1:25,000

LEGEND

- APPROXIMATE BOREHOLE LOCATION, CURRENT INVESTIGATION BY WSP
- APPROXIMATE CPT LOCATION, CURRENT INVESTIGATION BY CONETEC
- APPROXIMATE BOREHOLE LOCATION, PREVIOUS INVESTIGATION BY GOLDER
- APPROXIMATE TEST PIT LOCATION, PREVIOUS INVESTIGATION BY GOLDER
- APPROXIMATE SLOPE CROSS-SECTION LOCATION IN PLAN
- LIMIT OF HAZARD LANDS (STABLE SLOPE AND EROSION ALLOWANCE) LOWER SLOPE
- LIMIT OF HAZARD LANDS (ACCESS ALLOWANCE) LOWER SLOPE
- LIMIT OF HAZARD LANDS (STABLE SLOPE AND EROSION ALLOWANCE) UPPER SLOPE
- LIMIT OF HAZARD LANDS (ACCESS ALLOWANCE) UPPER SLOPE
- APPROXIMATE BOUNDARY BETWEEN ASSESSMENT AREAS
- APPROXIMATE SITE BOUNDARY
- SLOPE MODIFICATION AREA - 2.5H:1V
- AREA WITH MODERATE TO SEVERE EROSION
- AREA WITH MODERATE EROSION

REFERENCE(S)

1. BASE PLAN PROVIDED IN ELECTRONIC FORMAT BY HOBIN ARCHITECTURE INCORPORATED ON SEPTEMBER 25, 2023, DRAWING NO. Riverside_Site Plan_230920.dwg
2. PROJECTION: TRANSVERSE MERCATOR DATUM: NAD 83,COORDINATE SYSTEM: MTM ZONE 9, VERTICAL DATUM: CGVD28T

CLIENT
ST. MARY'S LANDS CORPORATION

PROJECT
GEOTECHNICAL ASSESSMENT
PROPOSED RESIDENTIAL DEVELOPMENT
3930 AND 3960 RIVERSIDE DRIVE, OTTAWA, ONTARIO

TITLE
SITE PLAN

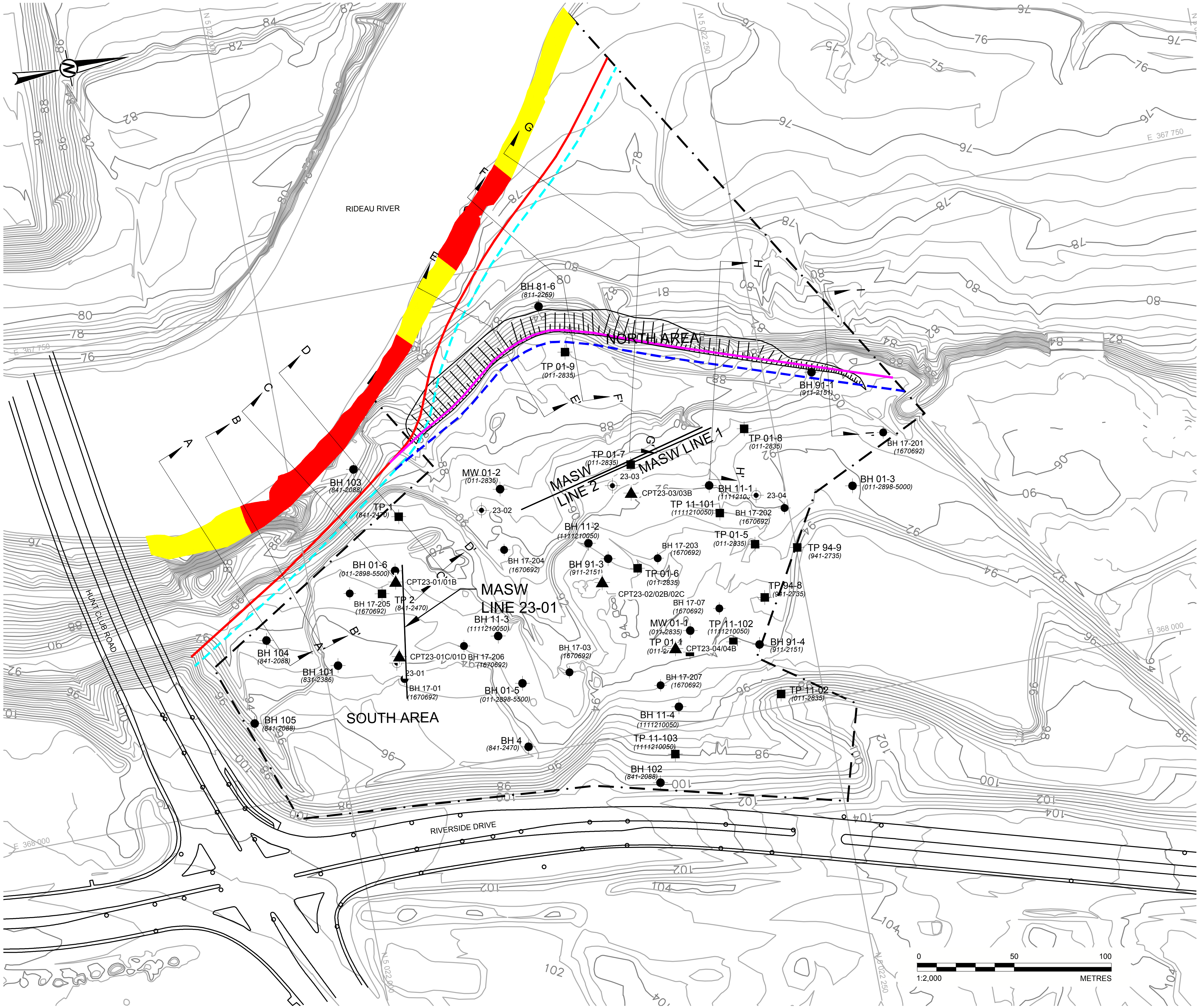
CONSULTANT

YYYY-MM-DD	2023-09-26
DESIGNED	CRG
PREPARED	ABD/JM
REVIEWED	CRG
APPROVED	CH

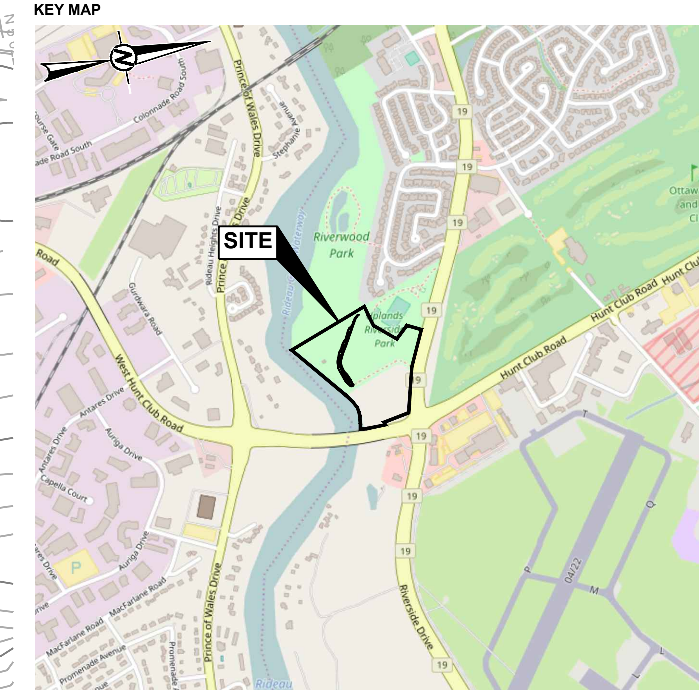
PROJECT NO.	CONTROL	REV.	FIGURE
21482114	0005	0	1

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

0 25 mm



KEY MAP



SCALE 1:25,000

LEGEND

- APPROXIMATE BOREHOLE LOCATION, CURRENT INVESTIGATION BY WSP
- APPROXIMATE CPT LOCATION, CURRENT INVESTIGATION BY CONETEC
- APPROXIMATE BOREHOLE LOCATION, PREVIOUS INVESTIGATION BY GOLDER
- APPROXIMATE TEST PIT LOCATION, PREVIOUS INVESTIGATION BY GOLDER
- A' — APPROXIMATE SLOPE CROSS-SECTION LOCATION IN PLAN
- LIMIT OF HAZARD LANDS (STABLE SLOPE AND EROSION ALLOWANCE) LOWER SLOPE
- LIMIT OF HAZARD LANDS (ACCESS ALLOWANCE) LOWER SLOPE
- LIMIT OF HAZARD LANDS (STABLE SLOPE AND EROSION ALLOWANCE) UPPER SLOPE
- LIMIT OF HAZARD LANDS (ACCESS ALLOWANCE) UPPER SLOPE
- APPROXIMATE SITE BOUNDARY
- SLOPE MODIFICATION AREA - 2.5H:1V
- AREA WITH MODERATE TO SEVERE EROSION
- AREA WITH MODERATE EROSION

REFERENCE(S)

1. PROJECTION: TRANSVERSE MERCATOR DATUM: NAD 83, COORDINATE SYSTEM: MTM ZONE 9, VERTICAL DATUM: CGVD28

CLIENT
ST. MARY'S LANDS CORPORATION

PROJECT
GEOTECHNICAL ASSESSMENT
PROPOSED RESIDENTIAL DEVELOPMENT
3930 AND 3960 RIVERSIDE DRIVE, OTTAWA, ONTARIO

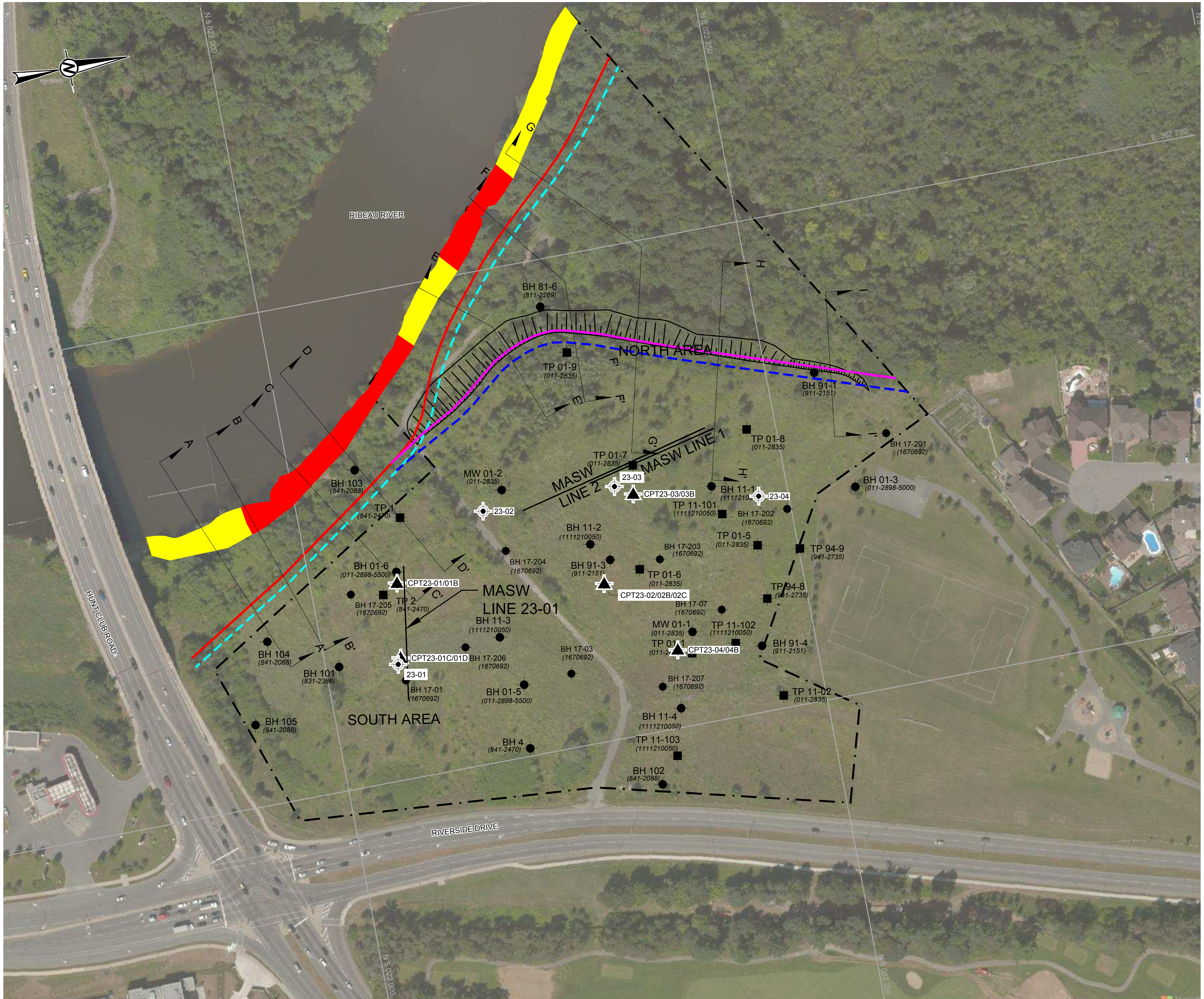
TITLE
SITE PLAN

CONSULTANT
wsp

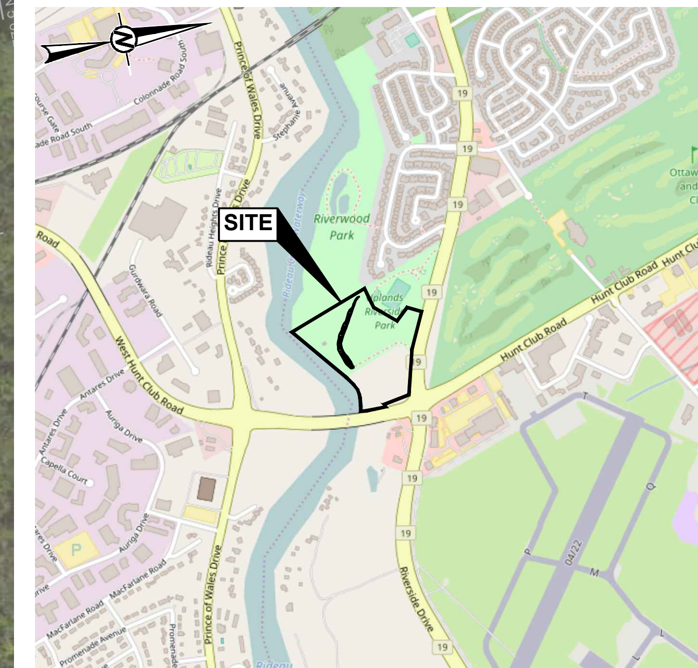
YYYY-MM-DD	2023-09-26
DESIGNED	CRG
PREPARED	ABD/JM
REVIEWED	CRG
APPROVED	CH

PROJECT NO.	CONTROL	REV.	FIGURE
21482114	0005	0	1A

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B
25 mm



KEY MAP



SCALE 1:25,000

LEGEND

- APPROXIMATE BOREHOLE LOCATION, CURRENT INVESTIGATION BY WSP
- APPROXIMATE CPT LOCATION, CURRENT INVESTIGATION BY CONETEC
- APPROXIMATE BOREHOLE LOCATION, PREVIOUS INVESTIGATION BY GOLDER
- APPROXIMATE TEST PIT LOCATION, PREVIOUS INVESTIGATION BY GOLDER
- A' APPROXIMATE SLOPE CROSS-SECTION LOCATION IN PLAN
- LIMIT OF HAZARD LANDS (STABLE SLOPE AND EROSION ALLOWANCE) LOWER SLOPE
- LIMIT OF HAZARD LANDS (ACCESS ALLOWANCE) LOWER SLOPE
- LIMIT OF HAZARD LANDS (STABLE SLOPE AND EROSION ALLOWANCE) UPPER SLOPE
- LIMIT OF HAZARD LANDS (ACCESS ALLOWANCE) UPPER SLOPE
- APPROXIMATE SITE BOUNDARY
- SLOPE MODIFICATION AREA - 2.5H:1V
- AREA WITH MODERATE TO SEVERE EROSION
- AREA WITH MODERATE EROSION

REFERENCE(S)

1. PROJECTION: TRANSVERSE MERCATOR DATUM: NAD 83, COORDINATE SYSTEM: MTM ZONE 9, VERTICAL DATUM: CGVD28

0 50 100

1:2,000 METRES

CLIENT

ST. MARY'S LANDS CORPORATION

PROJECT

GEOTECHNICAL ASSESSMENT
PROPOSED RESIDENTIAL DEVELOPMENT 3930
AND 3960 RIVERSIDE DRIVE, OTTAWA, ONTARIO

TITLE

SITE PLAN

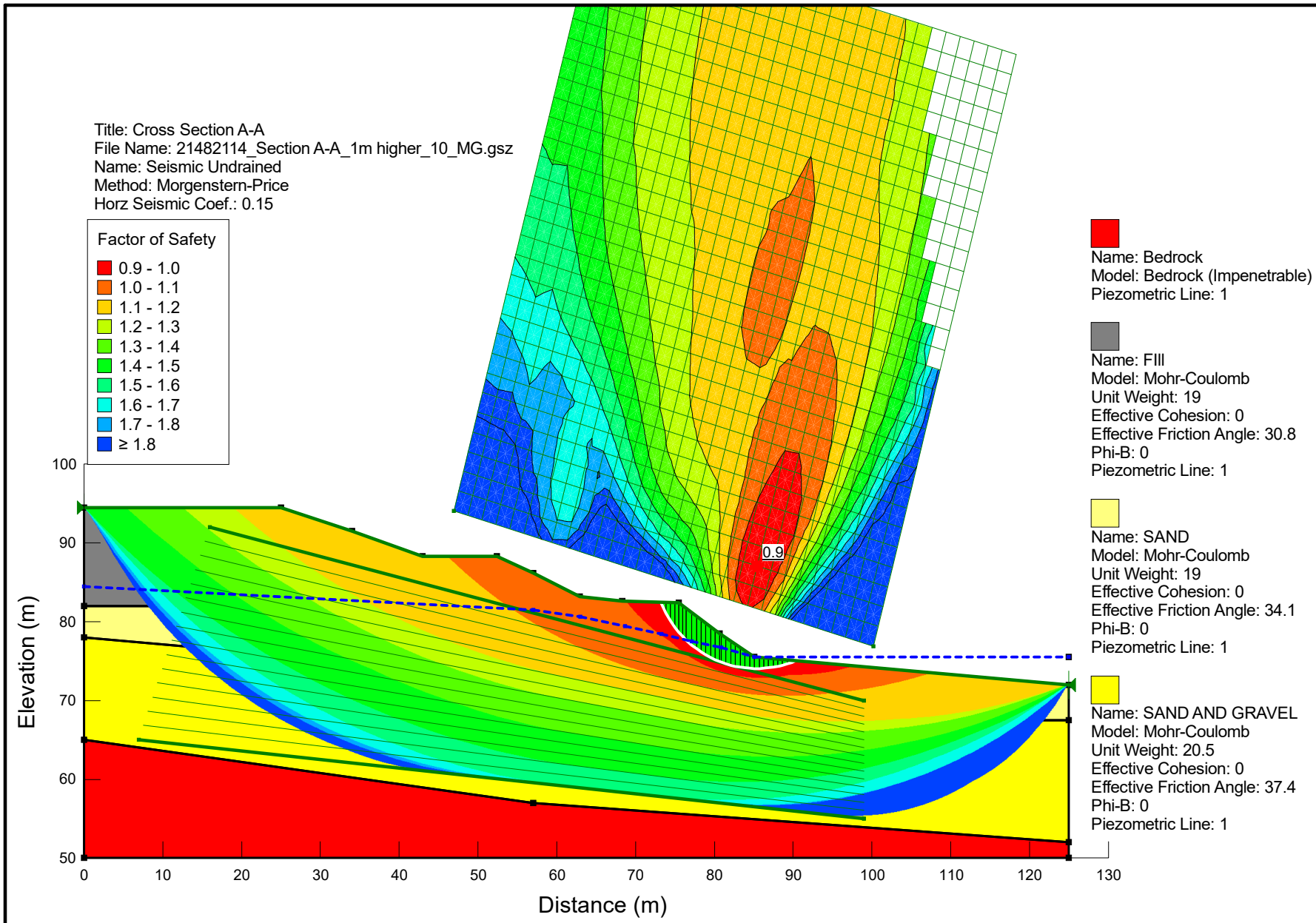
CONSULTANT

wsp

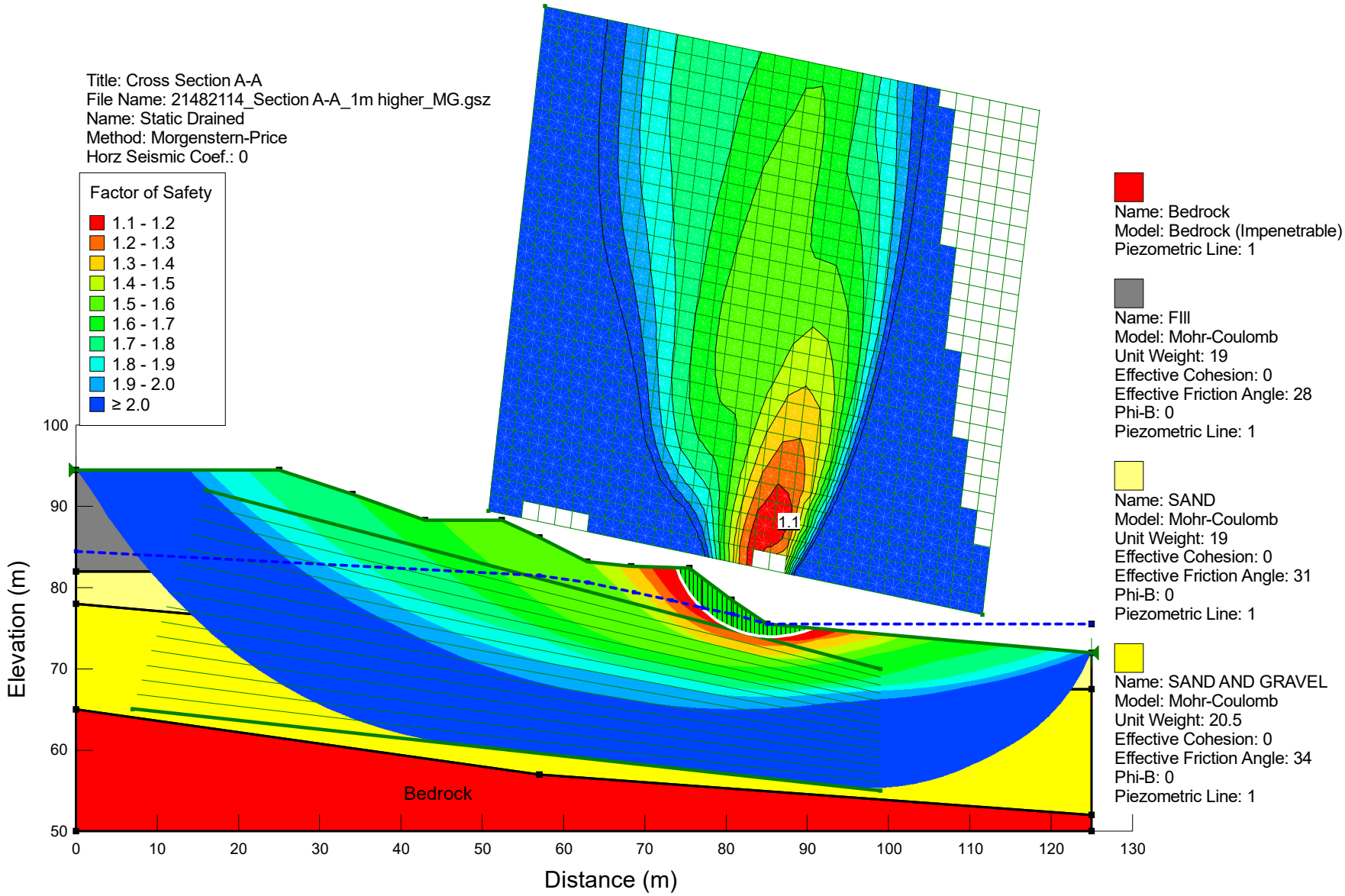
YYYY-MM-DD	2023-09-26
DESIGNED	CRG
PREPARED	ABD/JM
REVIEWED	CRG
APPROVED	CH

PROJECT NO.	CONTROL	REV.	FIGURE
21482114	0005	0	1B

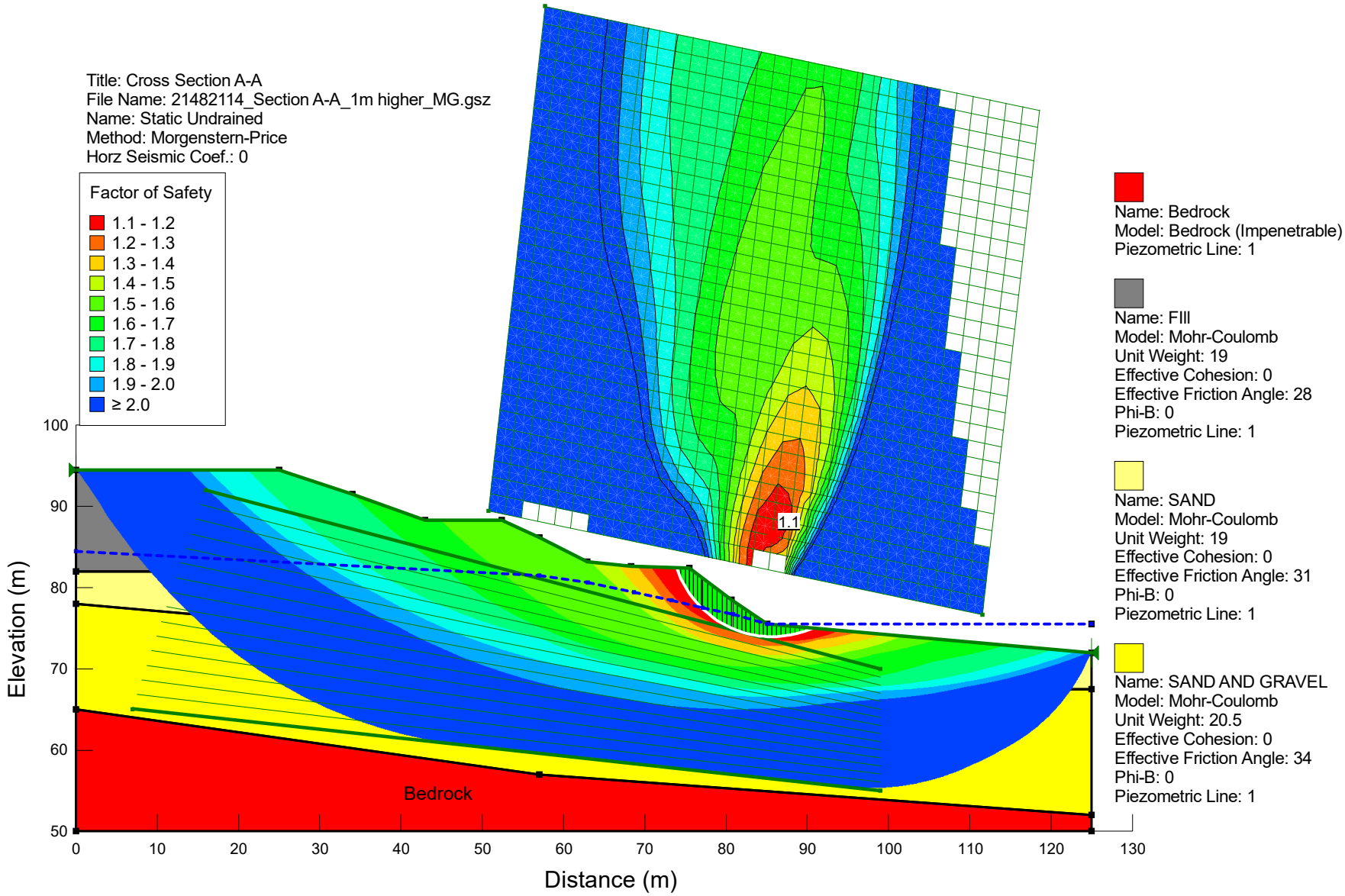
25 mm IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B



Seismic Undrained	
21482114_Section A-A_1m higher_10_MG.gsz	
2024-01-26	1:710

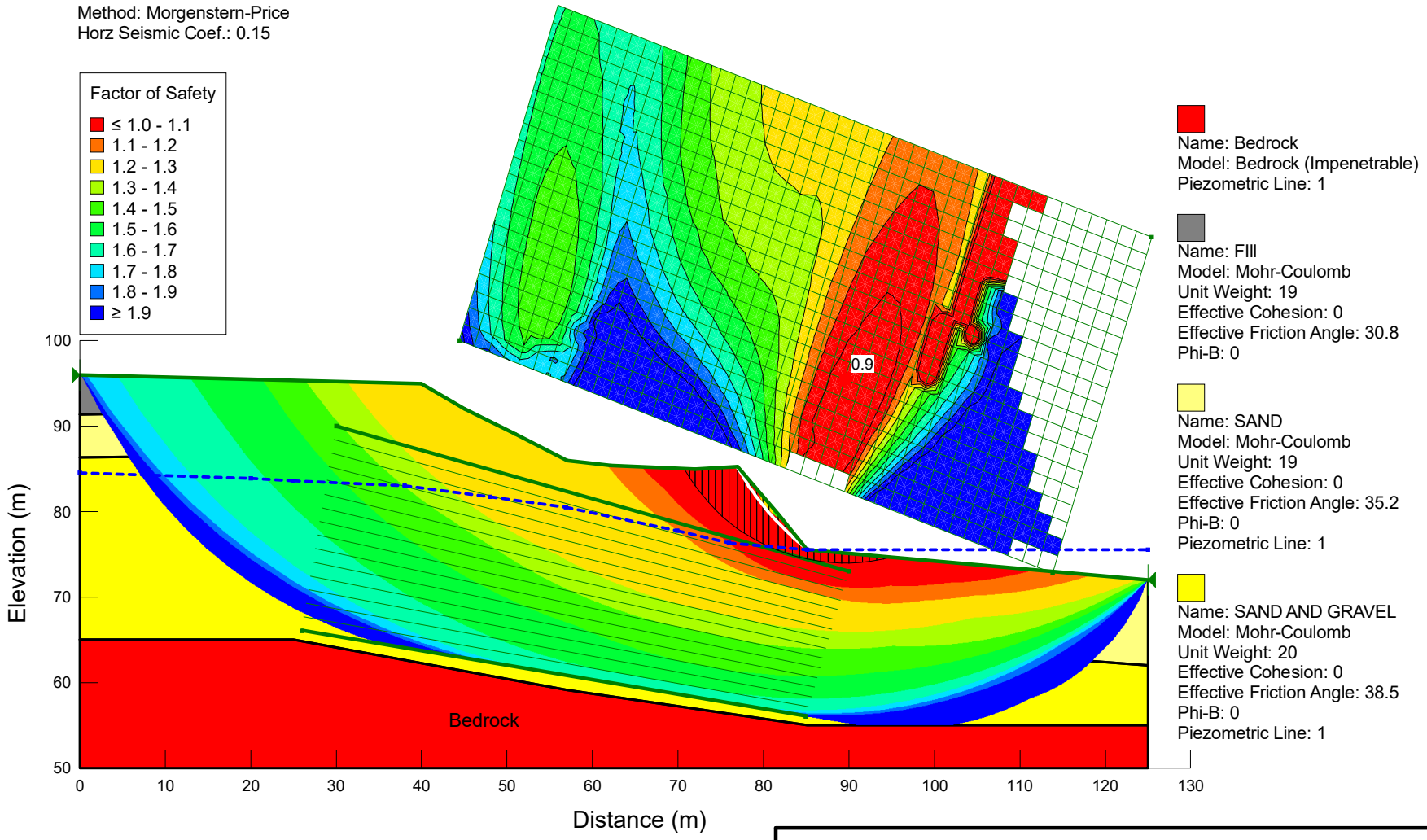


Static Drained	
21482114_Section A-A_1m higher_MG.gsz	
2024-01-26	1:710



Static Undrained	
21482114_Section A-A_1m higher_MG.gsz	
2024-01-26	1:710

Title: Cross Section B-B
File Name: 21482114_Section B-B_1m higher_10_MG.gsz
Name: Seismic Undrained
Method: Morgenstern-Price
Horz Seismic Coef.: 0.15



Name: Bedrock
Model: Bedrock (Impenetrable)
Piezometric Line: 1

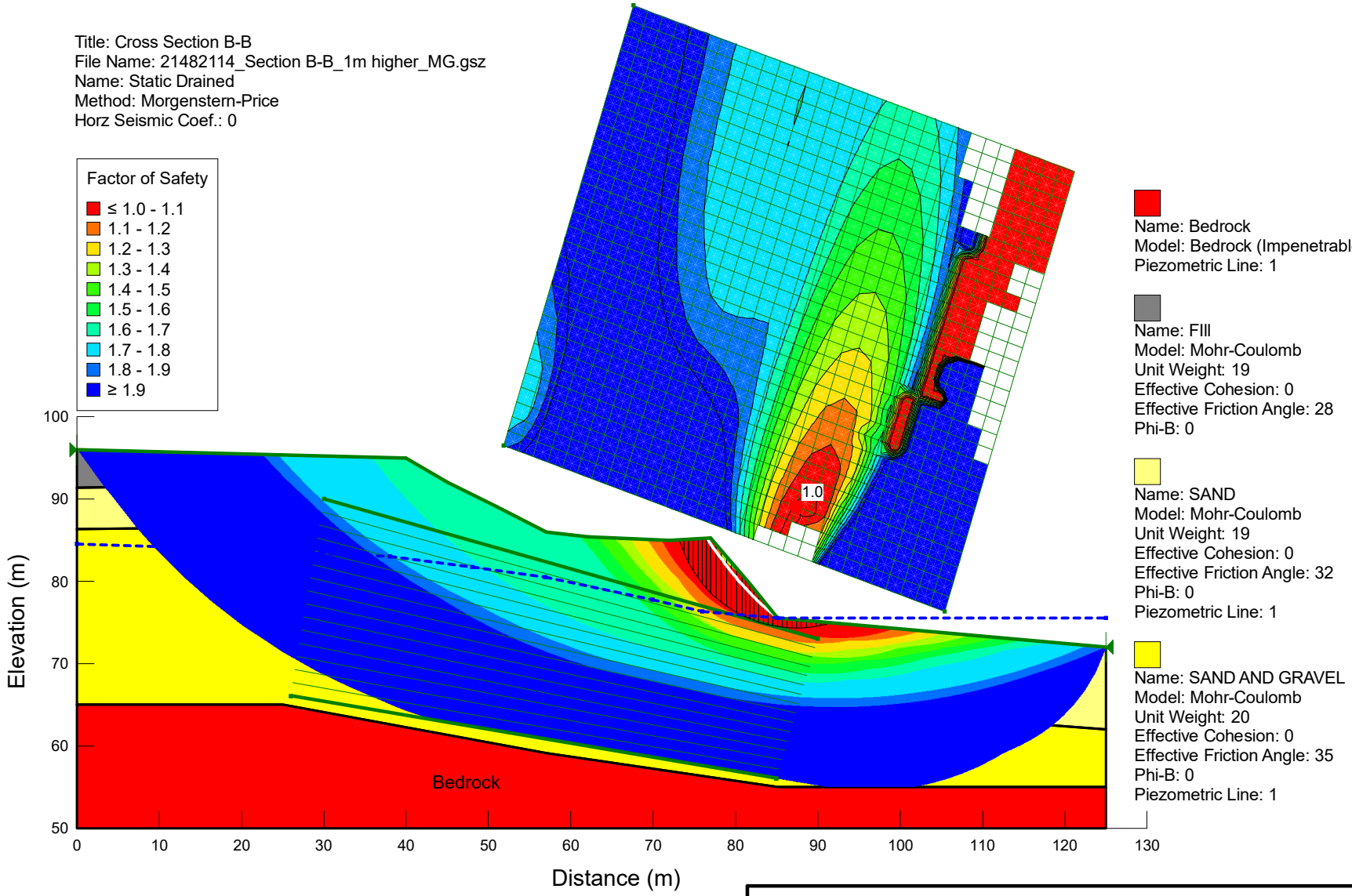
Name: FIll
Model: Mohr-Coulomb
Unit Weight: 19
Effective Cohesion: 0
Effective Friction Angle: 30.8
Phi-B: 0

Name: SAND
Model: Mohr-Coulomb
Unit Weight: 19
Effective Cohesion: 0
Effective Friction Angle: 35.2
Phi-B: 0
Piezometric Line: 1

Name: SAND AND GRAVEL
Model: Mohr-Coulomb
Unit Weight: 20
Effective Cohesion: 0
Effective Friction Angle: 38.5
Phi-B: 0
Piezometric Line: 1

Seismic Undrained	
21482114_Section B-B_1m higher_10_MG.gsz	
2024-01-26	1:720

Title: Cross Section B-B
File Name: 21482114_Section B-B_1m higher_MG.gsz
Name: Static Drained
Method: Morgenstern-Price
Horz Seismic Coef.: 0



Name: Bedrock
Model: Bedrock (Impenetrable)
Piezometric Line: 1

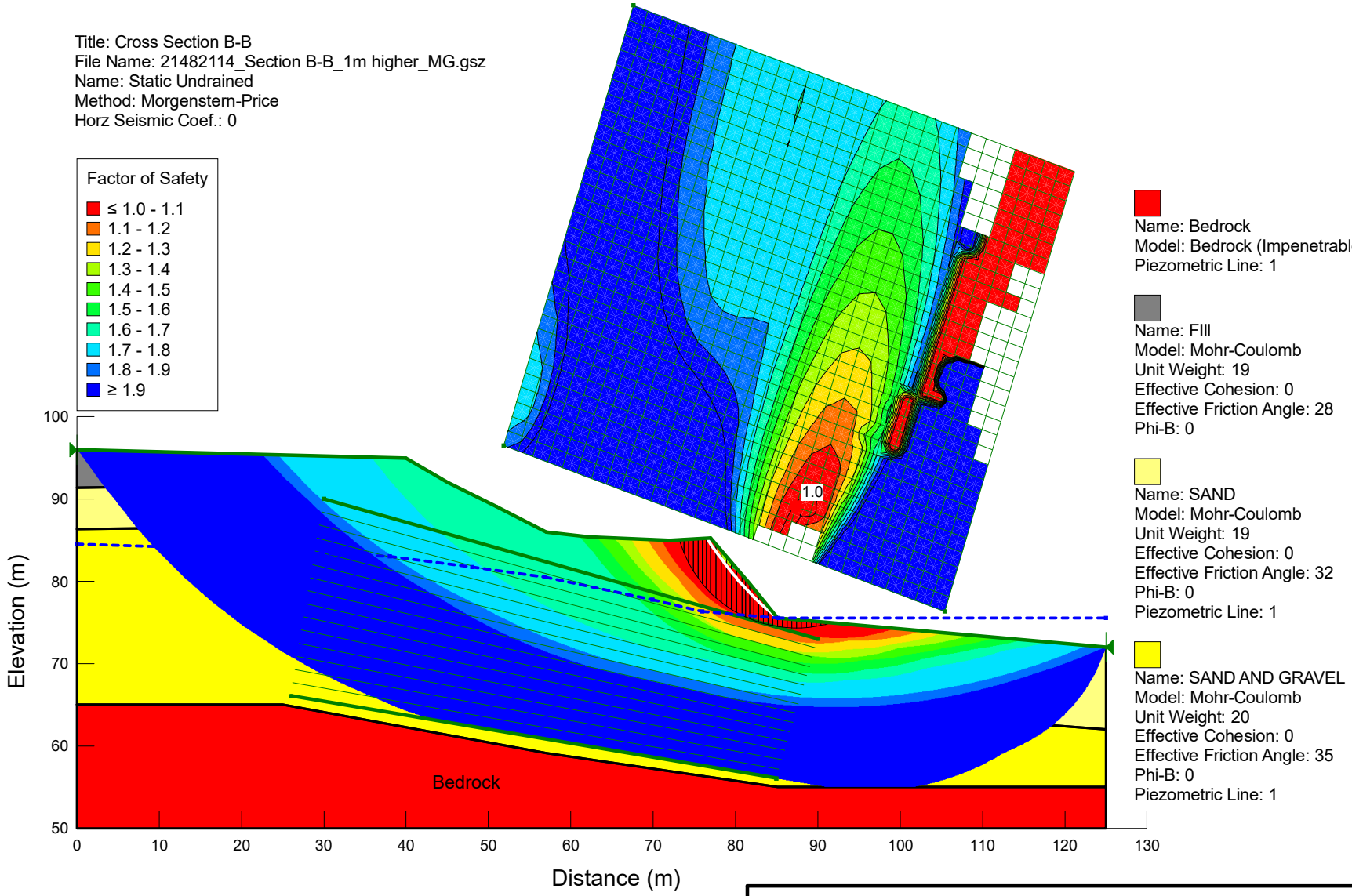
Name: FIll
Model: Mohr-Coulomb
Unit Weight: 19
Effective Cohesion: 0
Effective Friction Angle: 28
Phi-B: 0

Name: SAND
Model: Mohr-Coulomb
Unit Weight: 19
Effective Cohesion: 0
Effective Friction Angle: 32
Phi-B: 0
Piezometric Line: 1

Name: SAND AND GRAVEL
Model: Mohr-Coulomb
Unit Weight: 20
Effective Cohesion: 0
Effective Friction Angle: 35
Phi-B: 0
Piezometric Line: 1

Static Drained	
21482114_Section B-B_1m higher_MG.gsz	
2024-01-26	1:720

Title: Cross Section B-B
File Name: 21482114_Section B-B_1m higher_MG.gsz
Name: Static Undrained
Method: Morgenstern-Price
Horz Seismic Coef.: 0



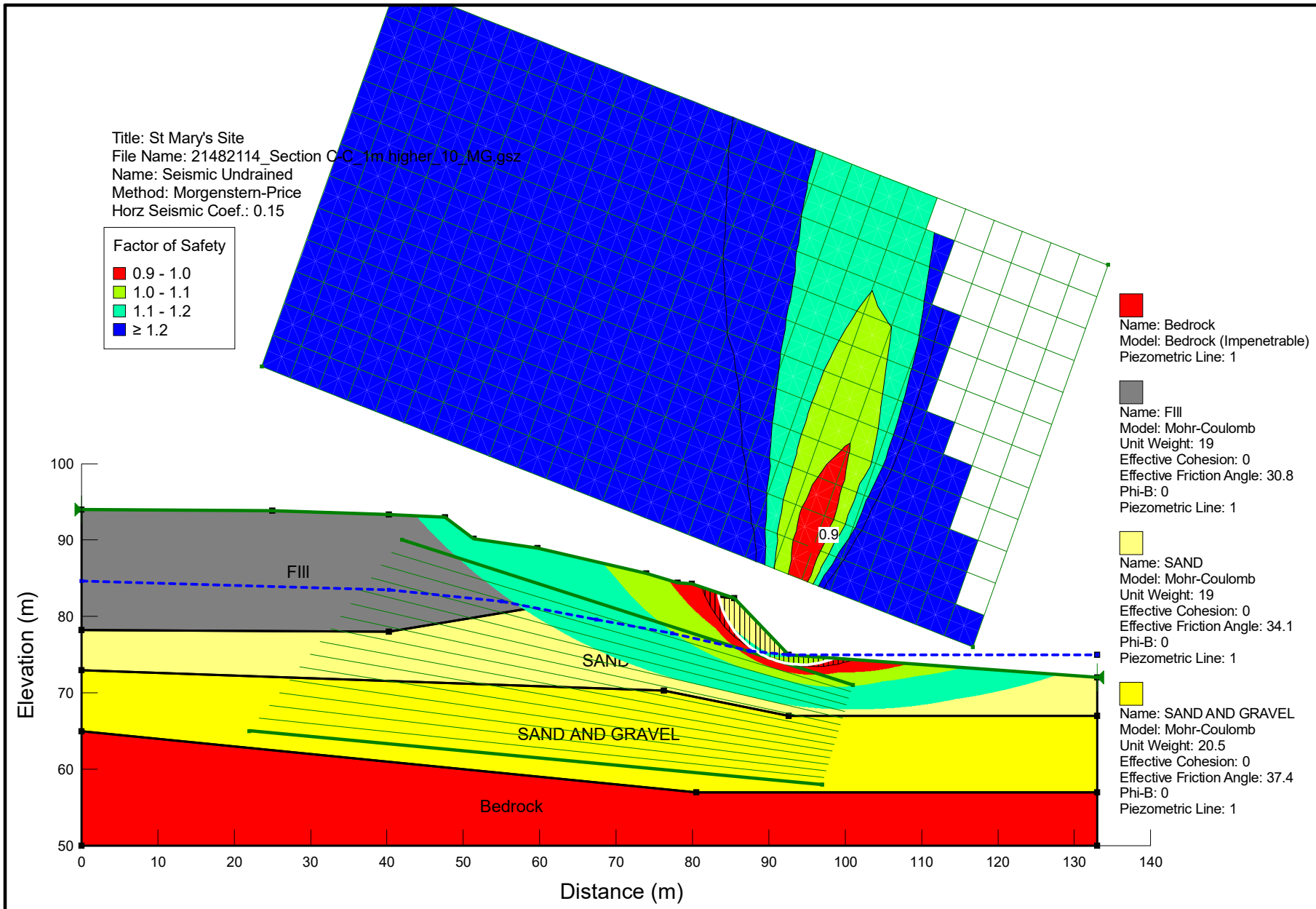
Name: Bedrock
Model: Bedrock (Impenetrable)
Piezometric Line: 1

Name: FIll
Model: Mohr-Coulomb
Unit Weight: 19
Effective Cohesion: 0
Effective Friction Angle: 28
Phi-B: 0

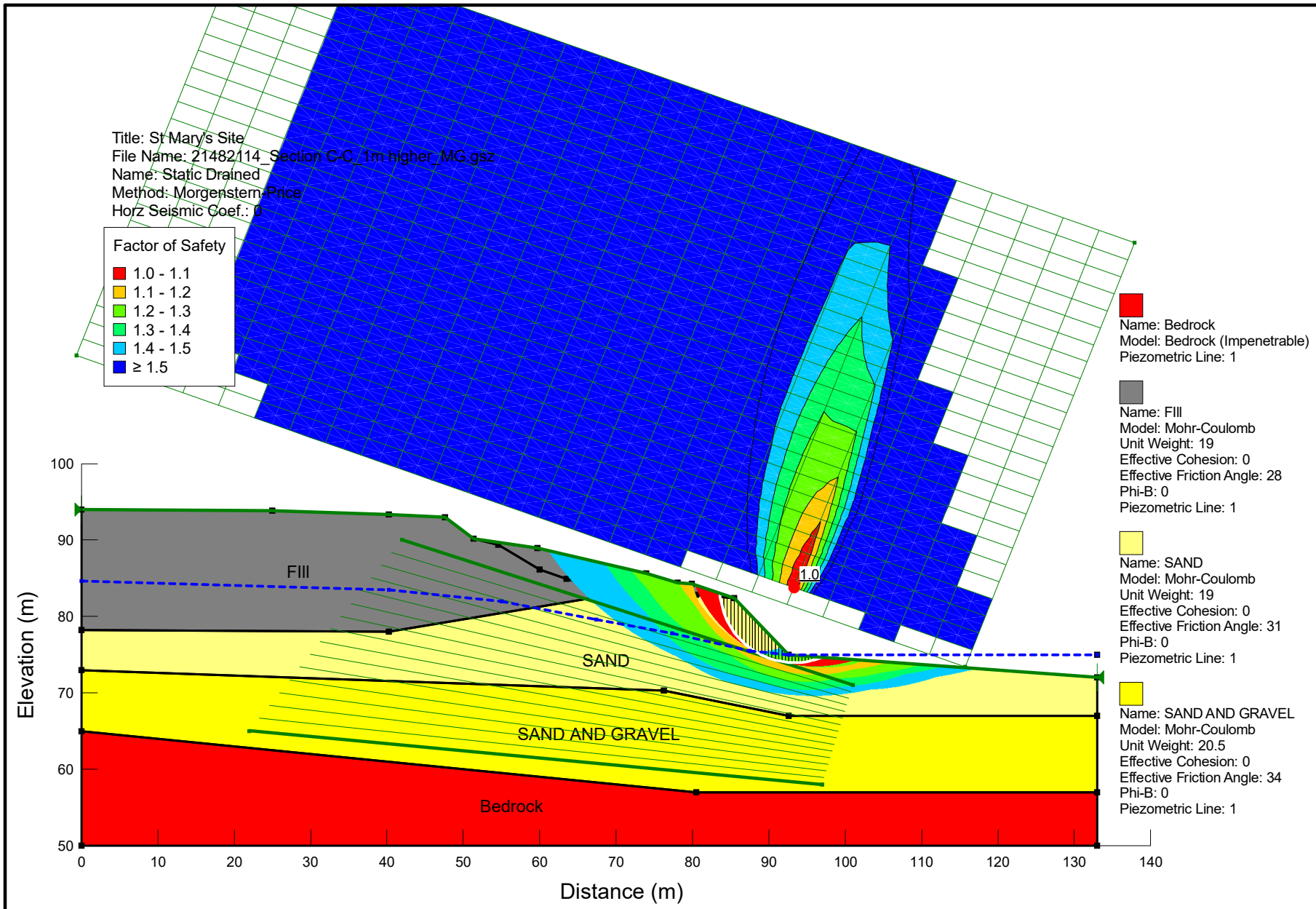
Name: SAND
Model: Mohr-Coulomb
Unit Weight: 19
Effective Cohesion: 0
Effective Friction Angle: 32
Phi-B: 0
Piezometric Line: 1

Name: SAND AND GRAVEL
Model: Mohr-Coulomb
Unit Weight: 20
Effective Cohesion: 0
Effective Friction Angle: 35
Phi-B: 0
Piezometric Line: 1

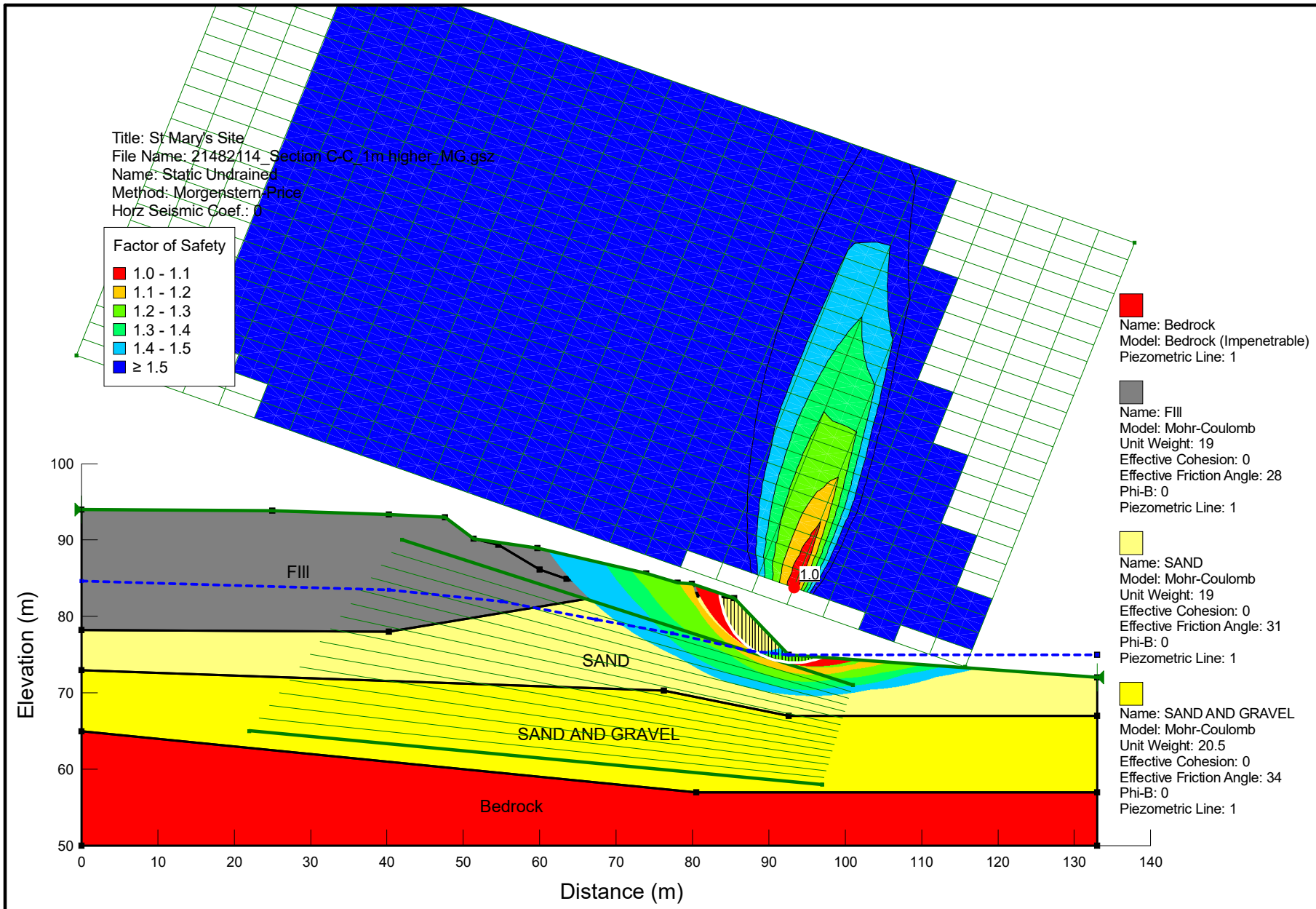
Static Undrained	
21482114_Section B-B_1m higher_MG.gsz	
2024-01-26	1:720



Seismic Undrained	
21482114_Section C-C_1m higher_10_MG.gsz	
2024-01-26	1:720



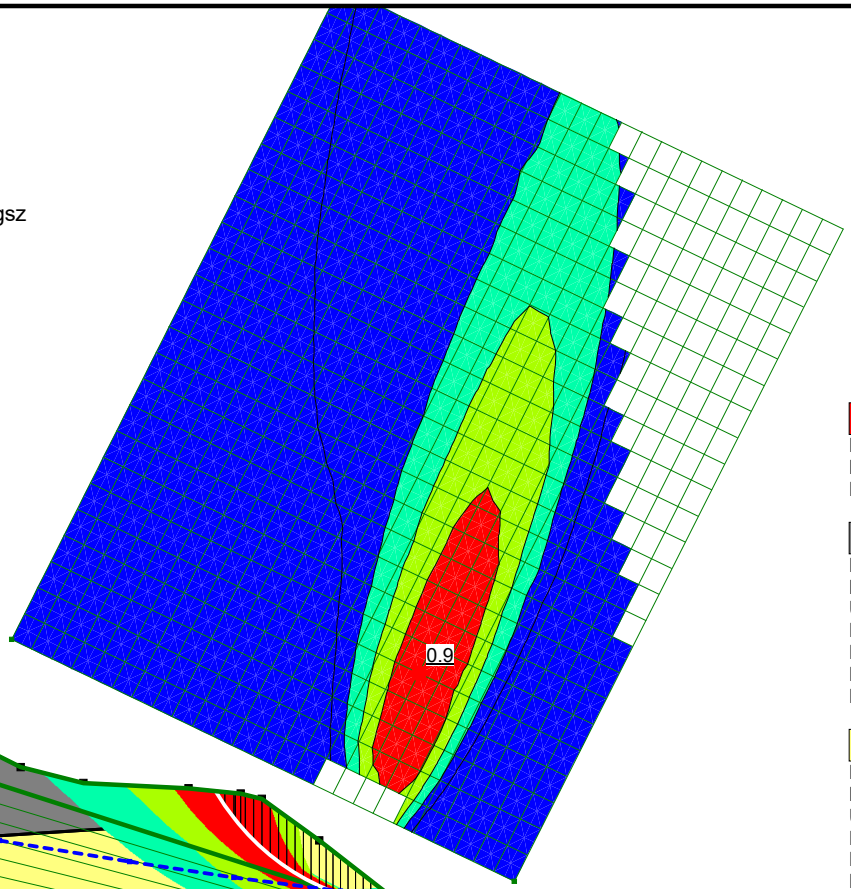
Static Drained	
21482114_Section C-C_1m higher_MG.gsz	
2024-01-26	1:720

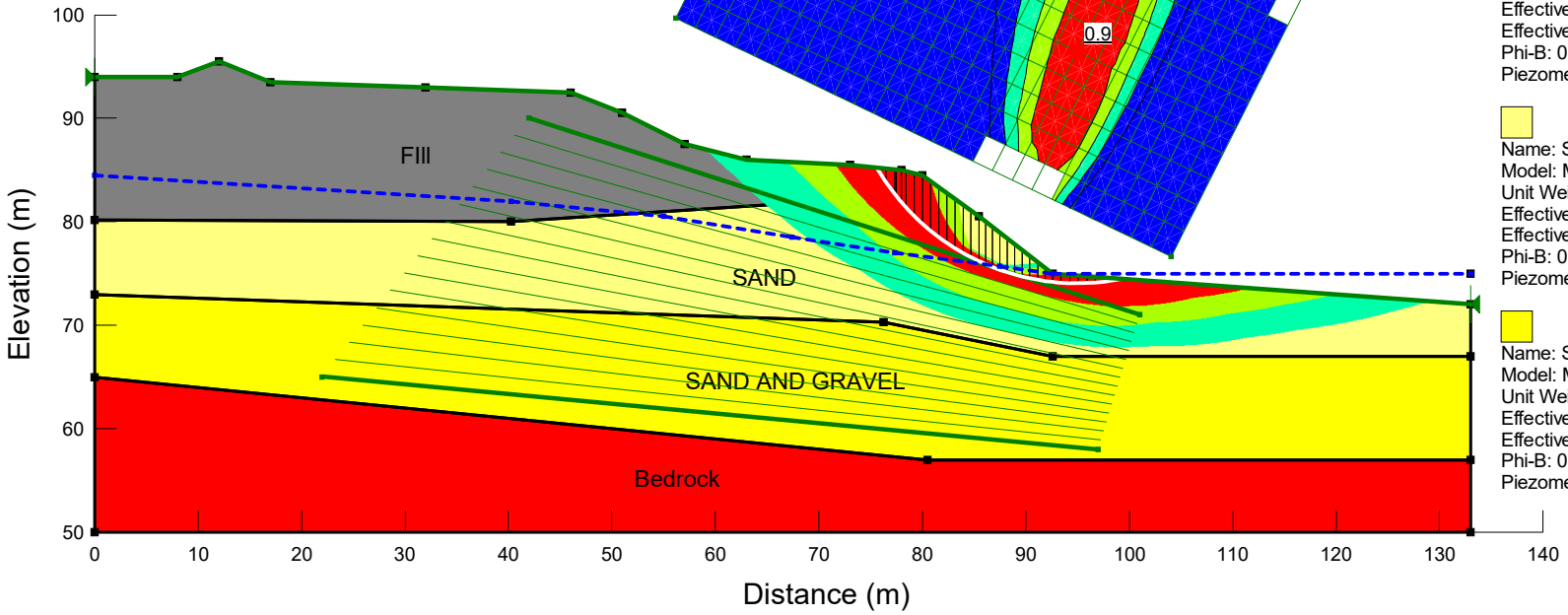


Static Undrained	
21482114_Section C-C_1m higher_MG.gsz	
2024-01-26	1:720

Title: Cross Section D-D
File Name: 21482114_Section D-D_1m higher_10_MG.gsz
Name: Seismic Undrained
Method: Morgenstern-Price
Horz Seismic Coef.: 0.15

Factor of Safety
- 0.9 - 1.0
- 1.0 - 1.1
- 1.1 - 1.2
- ≥ 1.2





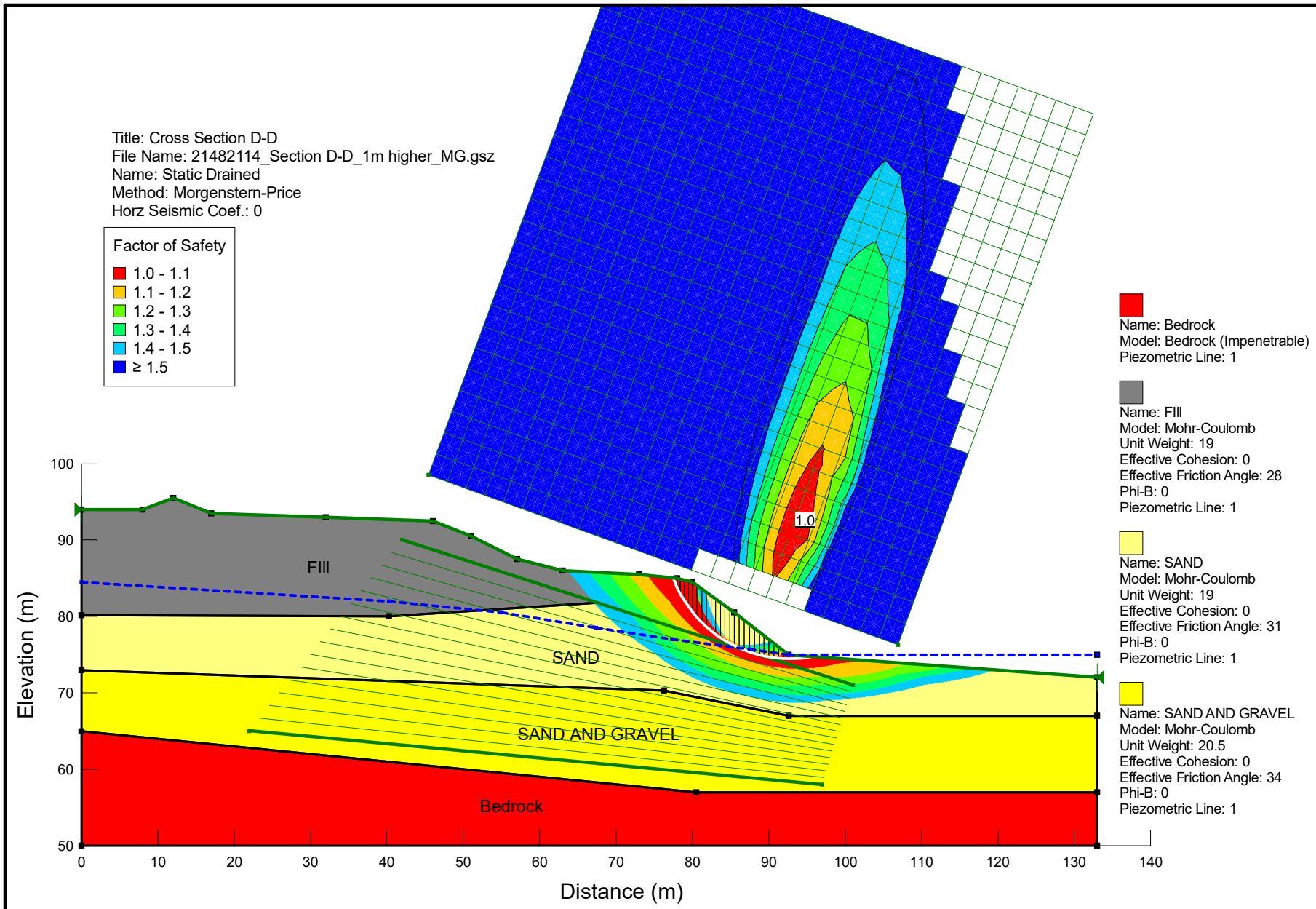
Name: Bedrock
Model: Bedrock (Impenetrable)
Piezometric Line: 1

Name: FIll
Model: Mohr-Coulomb
Unit Weight: 19
Effective Cohesion: 0
Effective Friction Angle: 30.8
Phi-B: 0
Piezometric Line: 1

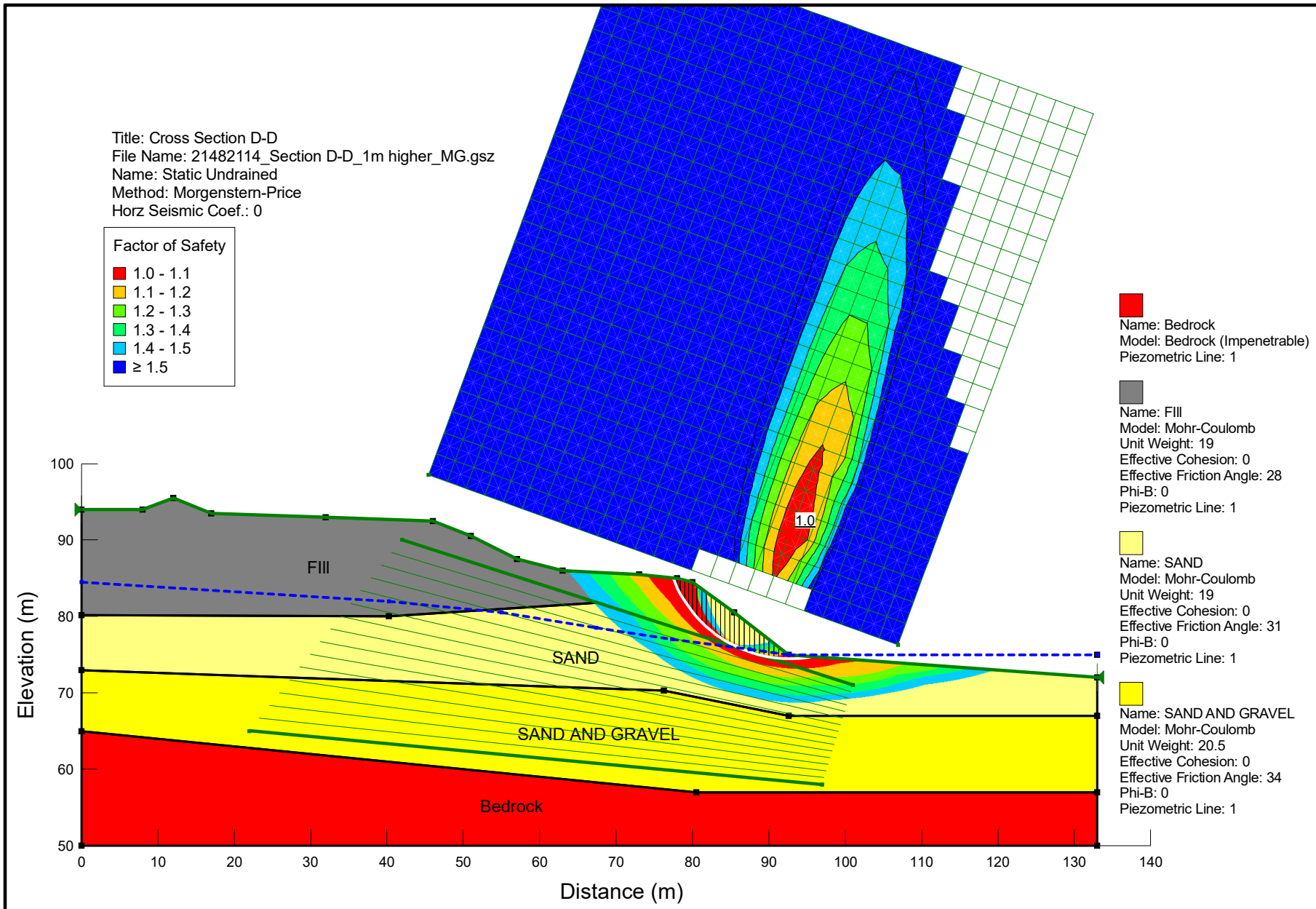
Name: SAND
Model: Mohr-Coulomb
Unit Weight: 19
Effective Cohesion: 0
Effective Friction Angle: 34.1
Phi-B: 0
Piezometric Line: 1

Name: SAND AND GRAVEL
Model: Mohr-Coulomb
Unit Weight: 20.5
Effective Cohesion: 0
Effective Friction Angle: 37.4
Phi-B: 0
Piezometric Line: 1

Seismic Undrained	
21482114_Section D-D_1m higher_10_MG.gsz	
2024-01-26	1:720



Static Drained	
21482114_Section D-D_1m higher_MG.gsz	
2024-01-26	1:720



Static Undrained	
21482114_Section D-D_1m higher_MG.gsz	
2024-01-26	1:720