



Quality Engineering | Valued Relationships

March 29, 2017

File No. 0015 016 00

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City of Winnipeg  
Planning, Property & Development Department  
Municipal Accommodations Division / Project Services Branch  
4th Floor 185 King Street, Winnipeg, MB R3B 1J1

**RE: Cornish Library Addition  
Geotechnical Design Report Addendum No. 1  
Revised Slope Stabilization Measures**

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This letter is an addendum to the geotechnical investigation report issued by TREK on February 1<sup>st</sup>, 2017 for the proposed Cornish Library addition at 20 West Gate in Winnipeg, MB. The addendum provides updated slope stabilization measures for detailed design.

**Project Understanding**

TREK provided conceptual slope stabilization measures to improve riverbank stability and determine a development set-back for the building addition such that potential slip surfaces of target factors of safety of 1.3 and 1.5 for short and long-term conditions, respectively, do not infringe upon the addition. The stabilization measures included placement a 1 m thick riprap blanket at the riverbank toe and re-grading the upper bank to 5H:1V (5Horizontal:1Vertical). TREK understands however that to preserve the mature trees on the property, re-grading is not a preferred stabilization option. As such, TREK re-assessed the riprap geometry on this premise.

**Stability Analysis and Results**

Stability analyses were performed to re-assess alternative riprap placement for detailed design. The soil stratigraphy, groundwater conditions, and numerical model described in the original geotechnical report were used in the re-assessment. To improve riverbank stability without re-grading the upper bank, the geometry of the riprap blanket was adjusted to achieve the target factors of safety for the short and long-term conditions. The results include a 1.1 m thick riprap blanket as shown in the attached figures.

A hydraulics engineer should be retained to review the proposed riprap geometry to determine the potential impact on the river levels and velocities as well as bank erosion of adjacent properties. A smooth transition of the riprap into the riverbank of the adjacent properties should be designed to avoid abrupt changes in geometry and minimize impacts.

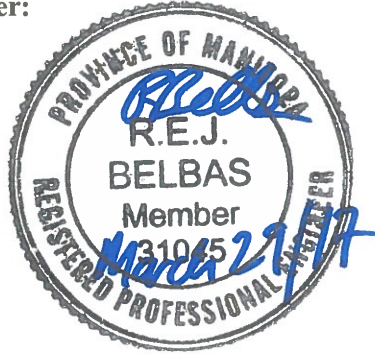


If you have any questions, please contact the undersigned.

Kind Regards,

**TREK Geotechnical**

Per:



**Ryan Belbas, M.Sc., P.Eng.**  
Geotechnical Engineer

Reviewed By:

**James Blatz, Ph.D., P.Eng., FEC**  
Senior Geotechnical Engineer / Principal



# Cornish Library Addition 0015 016 00

Riprap at Bank Toe - approx. 1.1 m thick  
 GWL at approx. 2.5 m below ground surface  
 River Level at Elev. 224.0 m (RSRL)  
 Long-Term (Normal Summer)

Name: RIP RAP  
 Unit Weight: 21 kN/m<sup>3</sup>  
 Cohesion': 0 kPa  
 Phi': 40 °

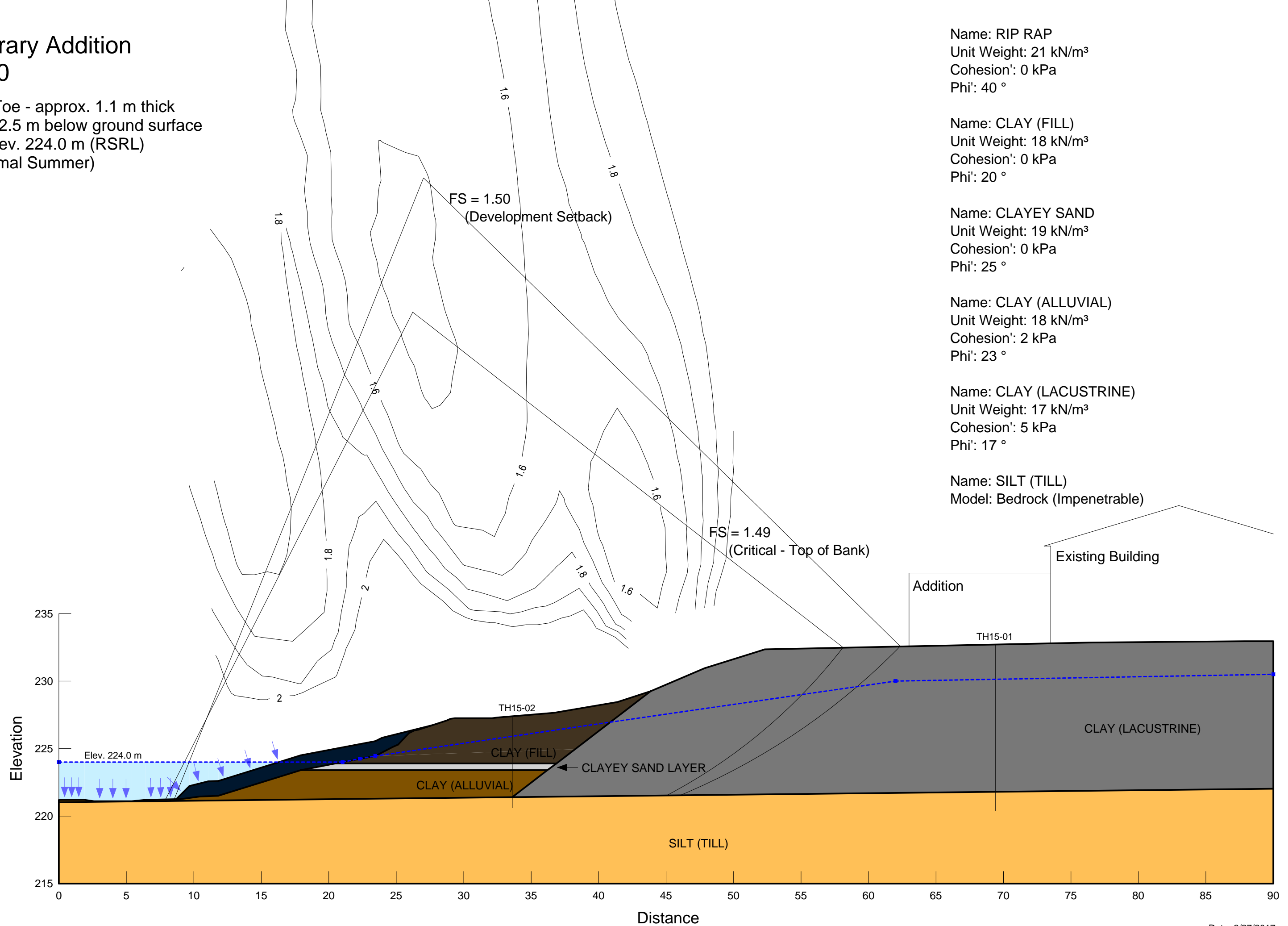
Name: CLAY (FILL)  
 Unit Weight: 18 kN/m<sup>3</sup>  
 Cohesion': 0 kPa  
 Phi': 20 °

Name: CLAYEY SAND  
 Unit Weight: 19 kN/m<sup>3</sup>  
 Cohesion': 0 kPa  
 Phi': 25 °

Name: CLAY (ALLUVIAL)  
 Unit Weight: 18 kN/m<sup>3</sup>  
 Cohesion': 2 kPa  
 Phi': 23 °

Name: CLAY (LACUSTRINE)  
 Unit Weight: 17 kN/m<sup>3</sup>  
 Cohesion': 5 kPa  
 Phi': 17 °

Name: SILT (TILL)  
 Model: Bedrock (Impenetrable)



# Cornish Library Addition 0015 016 00

Riprap at Bank Toe - approx. 1.1 m thick  
 GWL at approx. 2 m below ground surface  
 River Level at Elev. 223.0 m (RWRL)  
 Short-Term (Extreme)

Name: RIP RAP  
 Unit Weight: 21 kN/m<sup>3</sup>  
 Cohesion': 0 kPa  
 Phi': 40 °

Name: CLAY (FILL)  
 Unit Weight: 18 kN/m<sup>3</sup>  
 Cohesion': 0 kPa  
 Phi': 20 °

Name: CLAYEY SAND  
 Unit Weight: 19 kN/m<sup>3</sup>  
 Cohesion': 0 kPa  
 Phi': 25 °

Name: CLAY (ALLUVIAL)  
 Unit Weight: 18 kN/m<sup>3</sup>  
 Cohesion': 2 kPa  
 Phi': 23 °

Name: CLAY (LACUSTRINE)  
 Unit Weight: 17 kN/m<sup>3</sup>  
 Cohesion': 5 kPa  
 Phi': 17 °

Name: SILT (TILL)  
 Model: Bedrock (Impenetrable)

