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Project Number:	PTG/04039
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Project Name:	Proposed Residential Subdivision

Global Stability Assessment
Proposed replacement of Retaining Walls with Batter Slopes
98 GLENMORE DRIVE, BONOGIN, QLD, 4213

1 INTRODUCTION

This letter report presents the results of the global stability analyses undertaken by PTG Consulting (PTG) for the proposed replacement of retaining walls with batter slope at the proposed residential subdivision to be located at 98 GLENMORE DRIVE, BONOGIN.

2 SUPPLIED DOCUMENTS

The following supporting documentation was provided to PTG and relied upon for the analysis:

- Geotechnical investigation report – 'PTG/04039-0001-Rev0' dated 2 March 2026 by PTG Consulting.
- Geotechnical investigation report – 'PTG/04039-0001-Rev1' dated 1 May 2026 by PTG Consulting.
- For detailed design drawings for 'LC25079 REV1' PDF dated 25 March 2026 by Legend Consultants.

The detailed design drawings show that the proposed retaining wall comprise single tier (up to 1.5 m max. height), double tier (up to 3.0 m max. height) and triple tier (up to 4.0 m max. height) concrete sleeper retaining wall systems, designed to retain both cut and fill conditions.

At the Client's request, the proposed retaining walls have been replaced with batter slopes (maximum 2H:1V) in the nominated fill areas. PTG Consulting has reviewed the proposed design changes based on the available geotechnical information to provide preliminary geotechnical advice regarding the feasibility of the proposed batter slopes.

For the purpose of this assessment, the proposed batter slopes were modelled at a maximum inclination of 2H:1V with 1.0 m wide benches provided at vertical intervals of 2.5 m.

3 PTG GEOTECHNICAL INVESTIGATION

PTG geotechnical investigation comprised 5 boreholes drilled to 6.0 m depth using a 4WD utility mounted drilling rig fitted with 100 mm diameter solid flight augers. The drilling was undertaken by an experienced geotechnician who logged the bores and collected samples.

Disturbed samples of representative soil types were collected from the boreholes for soil description and classification purposes. The visual-tactile description and classification methods undertaken on disturbed samples, and shown on the attached logs, are described in accordance with AS1726:2017.

DCP testing was undertaken adjacent to the boreholes from the surface with the number of blows to achieve 100 mm depth penetration recorded in accordance with AS1289.6.3.2.

Soil consistency and relative density described on the borehole logs were inferred from the DCP results, tactile assessment and published correlations.

The soil profile generally comprised a silty sand topsoil extending to a depth of 0.2 m, underlain by sandy clay to depths ranging between 1.0 m and 3.6 m. The sandy clay was underlain by extremely weathered sandstone and transitioned into highly weathered sandstone. The highly weathered sandstone was encountered in all boreholes from depths of approximately 1.0 m below ground level and resulted in drilling refusal.

Table 1 summarises the soils encountered within the boreholes.

At the time of investigation, groundwater was not encountered in the boreholes. It should be noted that groundwater levels can be perched and fluctuate seasonally and during and after heavy rainfall events. Given this natural variability, it is prudent to assume that water levels can fluctuate.

Table 1: Summary of Materials Encountered in Boreholes

Borehole No.	Silty SAND Topsoil (m)	Sandy CLAY (m)	Sandy GRAVEL (Extremely Weathered Sandstone) (m)	Weathered Sandstone (m)
BH1	0.0 – 0.2	0.2 – 3.0	3.0 – 3.3	3.3 – 3.4(1)
BH2	0.0 – 0.1	0.1 – 3.6	3.6 – 3.9	3.9 – 4.0(1)
BH3	0.0 -0.2	0.2 – 1.0	-	1.0 – 3.0(1)
BH4	0.0 – 0.2	0.2 – 1.5	-	1.5 – 1.6(1)
BH5	0.0 – 0.1	0.1 – 0.4	0.4 – 1.1	1.1 – 1.2(1)

Notes: (1) Termination.

4 GLOBAL STABILITY ANALYSIS

Four sections as indicated in Figures 1 to 8 were analysed for global stability.

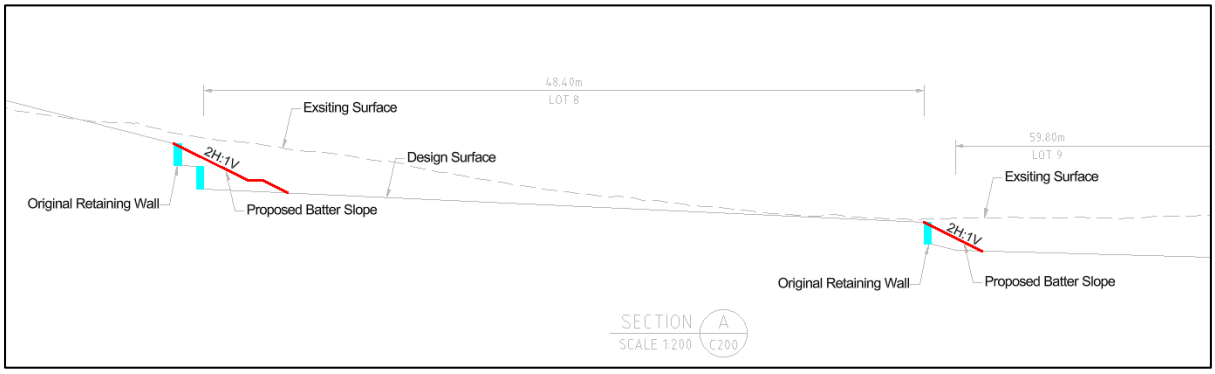


Figure 1: Section A – Lot 8 and 9 locations

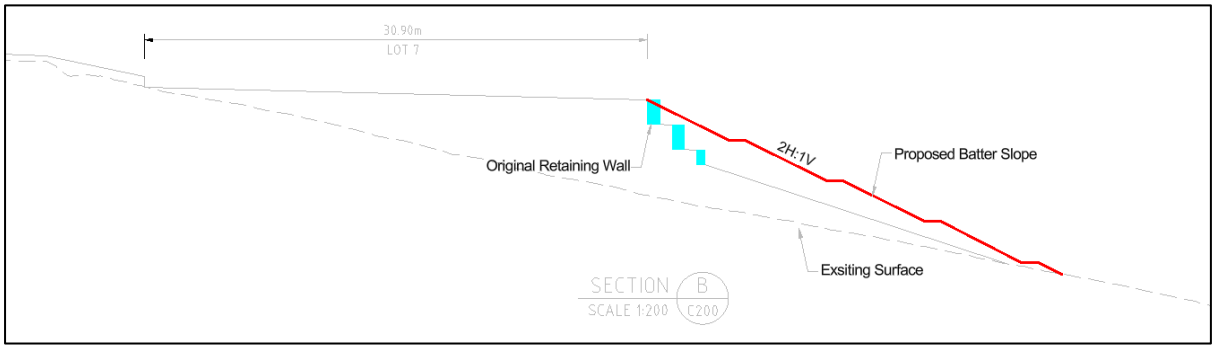


Figure 2: Section B – Lot 7 locations

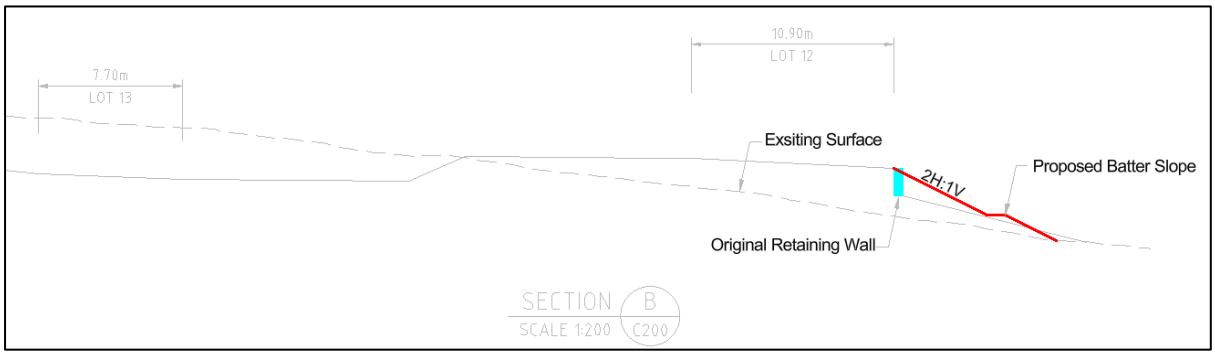


Figure 3: Section B – Lot 12 locations

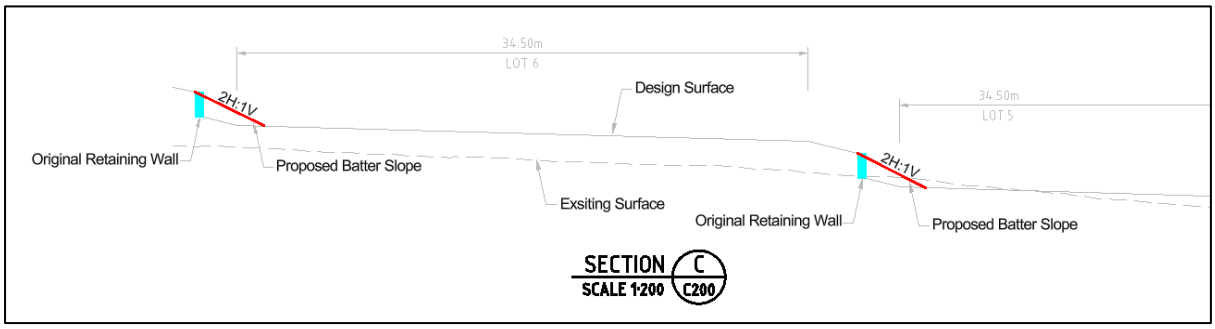


Figure 4: Section C – Lot 5 and 6 locations

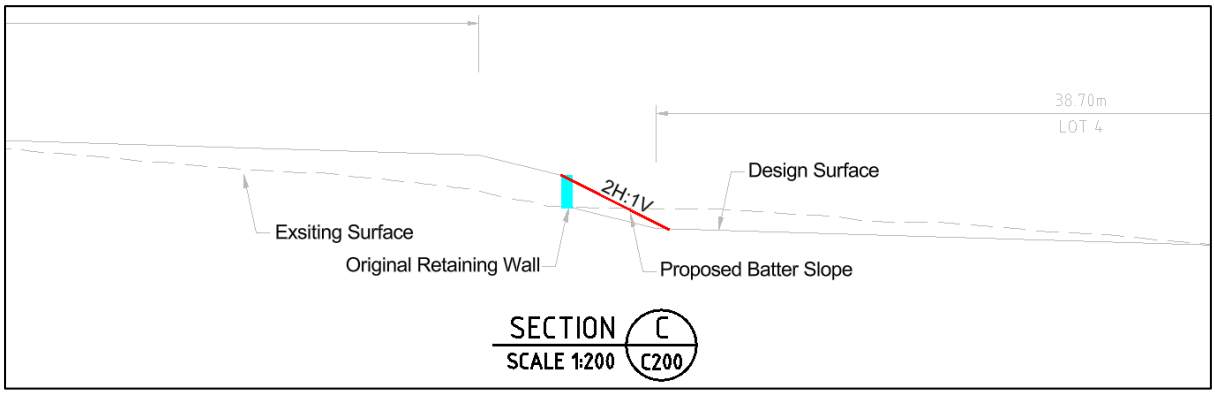


Figure 5: Section C – Lot 4 locations

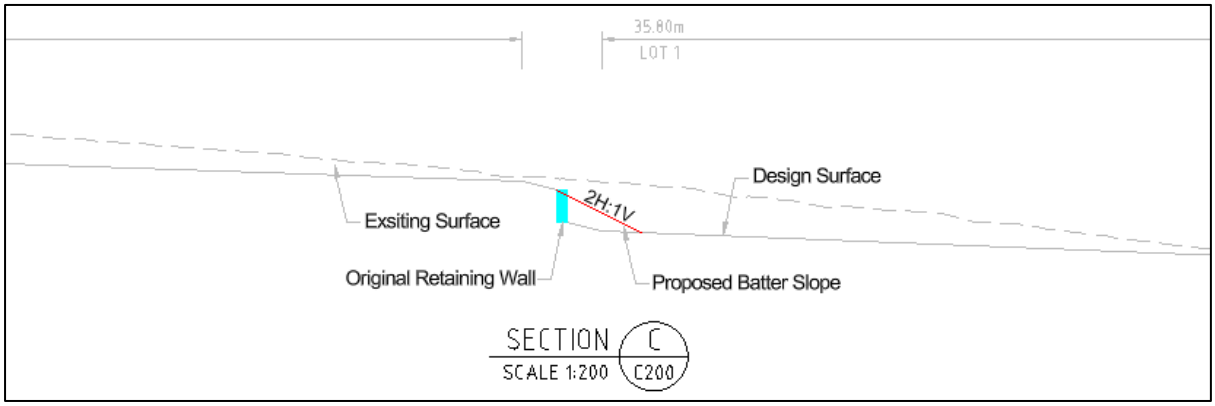


Figure 6: Section C – Lot 1 locations

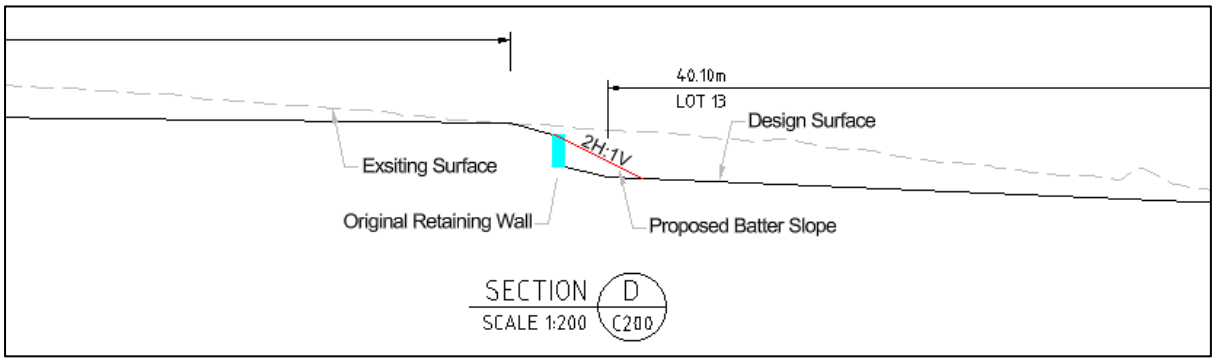


Figure 7: Section D – Lot 13 locations

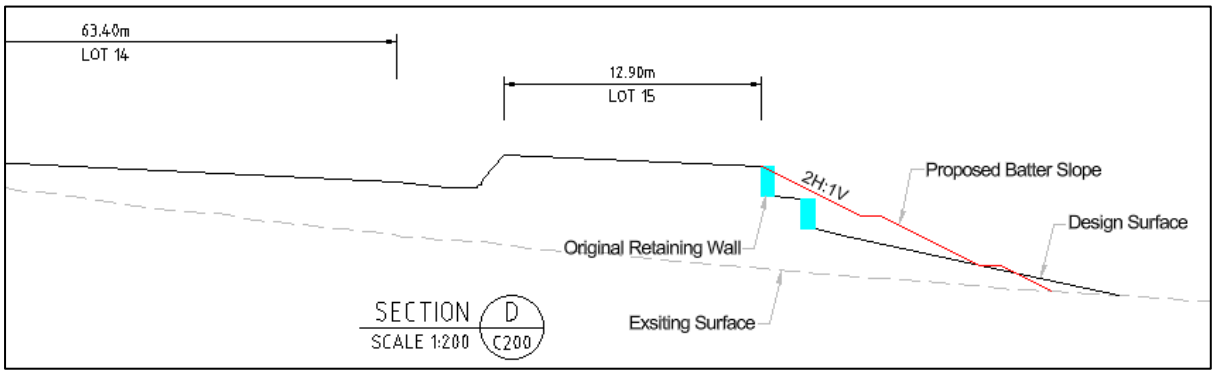


Figure 8: Section D – Lot 15 locations

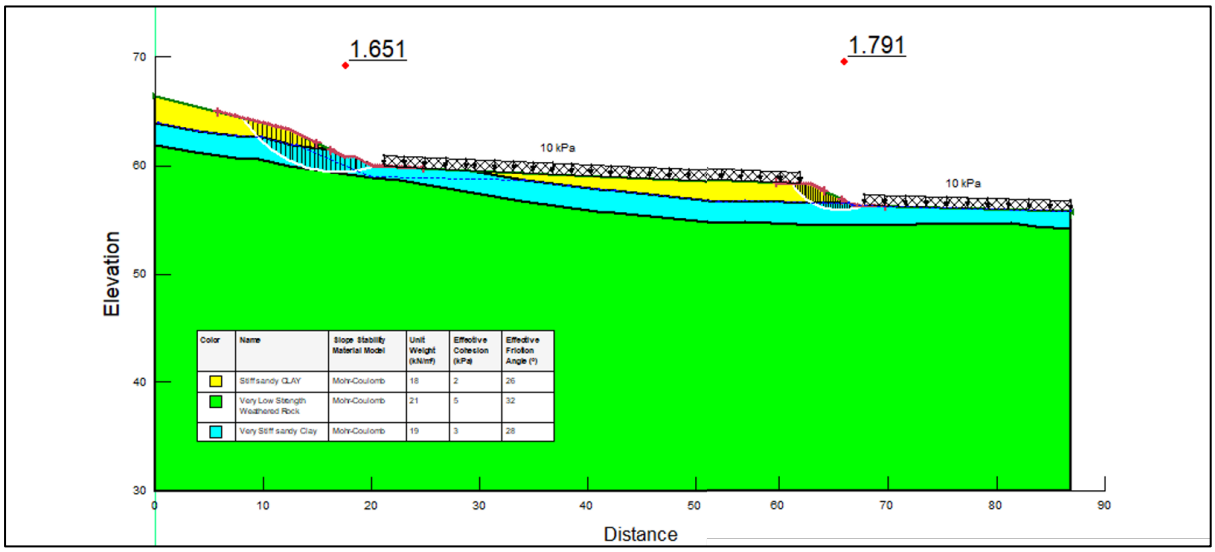
Table 2 shows the soil parameters inferred and used in the analysis.

Table 2: Inferred Drained Geotechnical Parameters

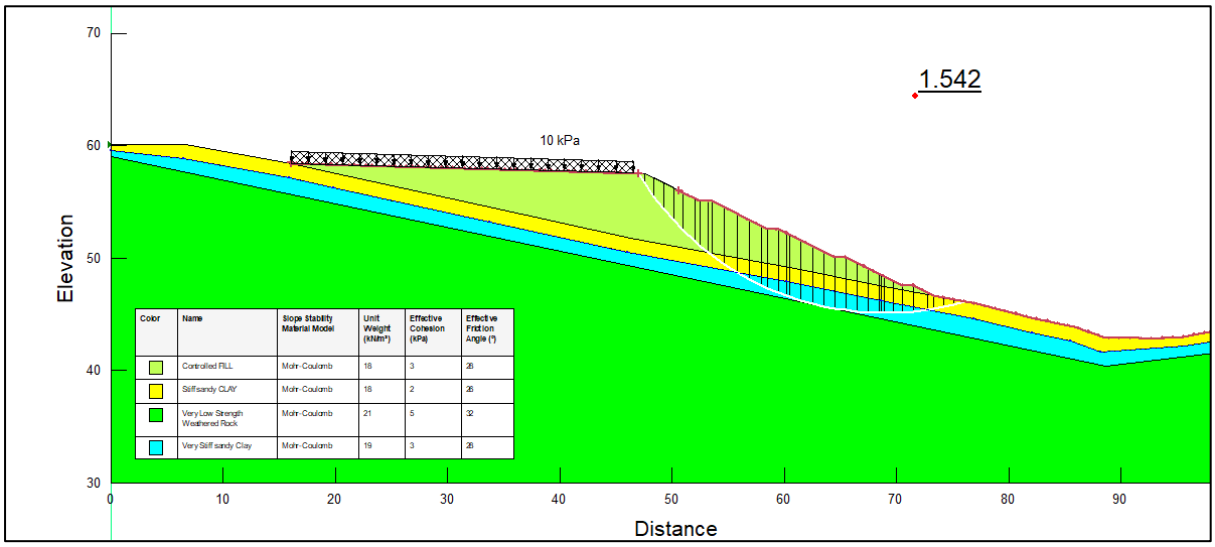
Material	Material Model	Unit Weight (kN/m³)	Drained Cohesion (c′) (kPa)	Drained Friction Angle (ϕ′) (⁰)
Controlled fill*	Mohr-Coulomb	18	3	28
Stiff sandy clay	Mohr-Coulomb	18	2	26
Very stiff sandy clay	Mohr-Coulomb	19	3	28
Very low strength weathered rock	Mohr-Coulomb	21	5	32

**Gravelly clay material*

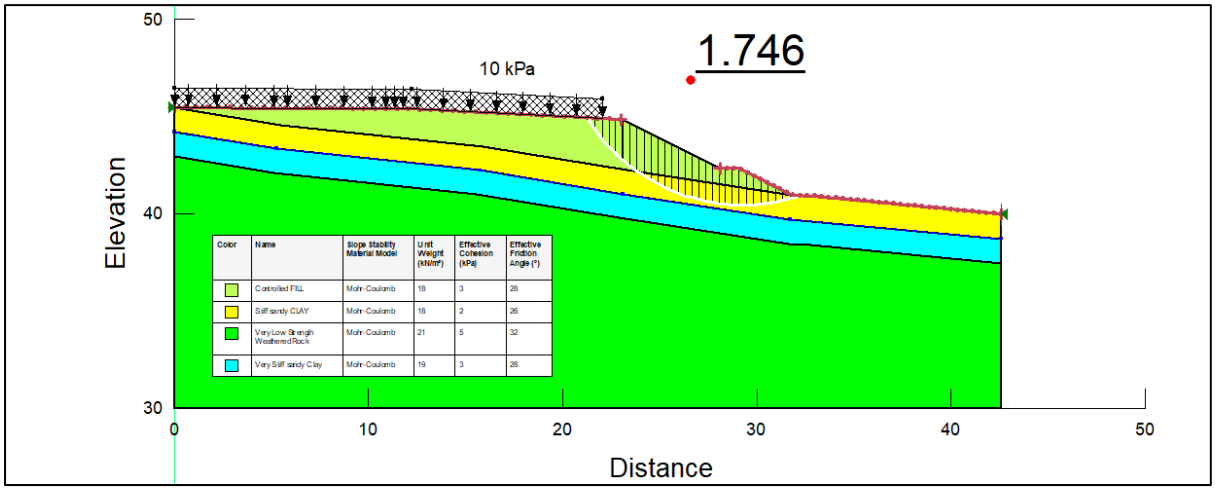
The developed geotechnical models were analysed using commercially available 'SlopeW' software for global stability. Refer Figure 9 to Figure 16.



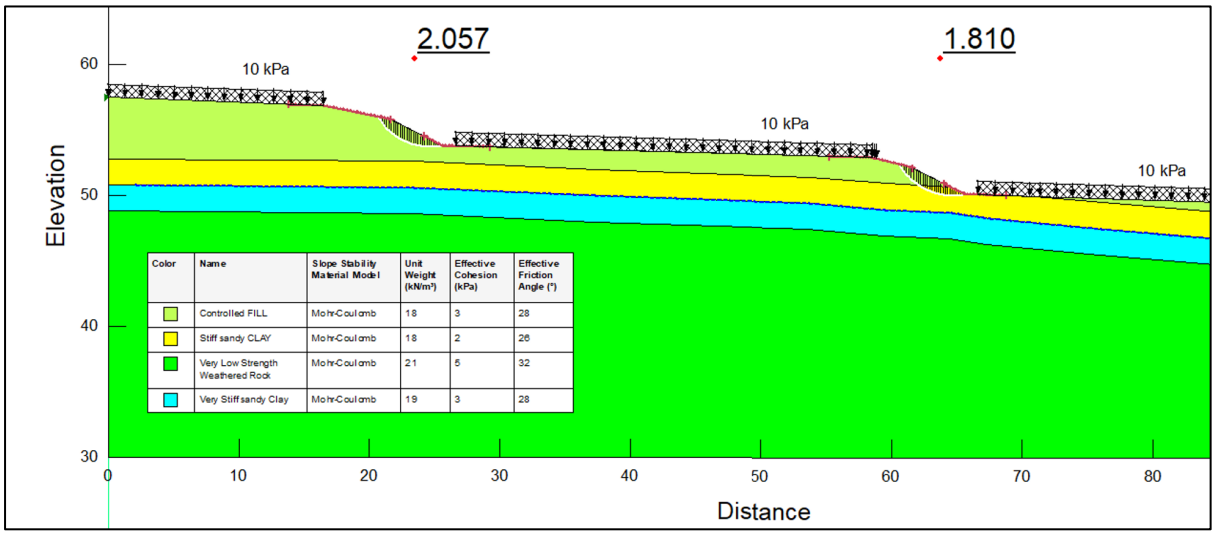
Figures 9: Global Stability: Section A– Lot 8 and 9 locations



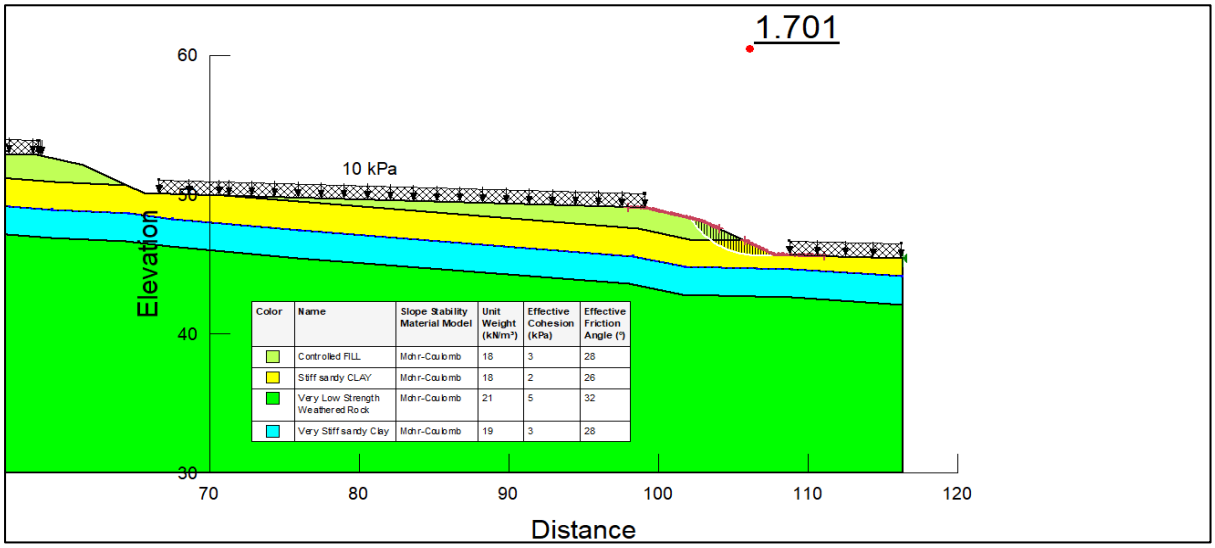
Figures 10: Global Stability: Section B – Lot 7 locations



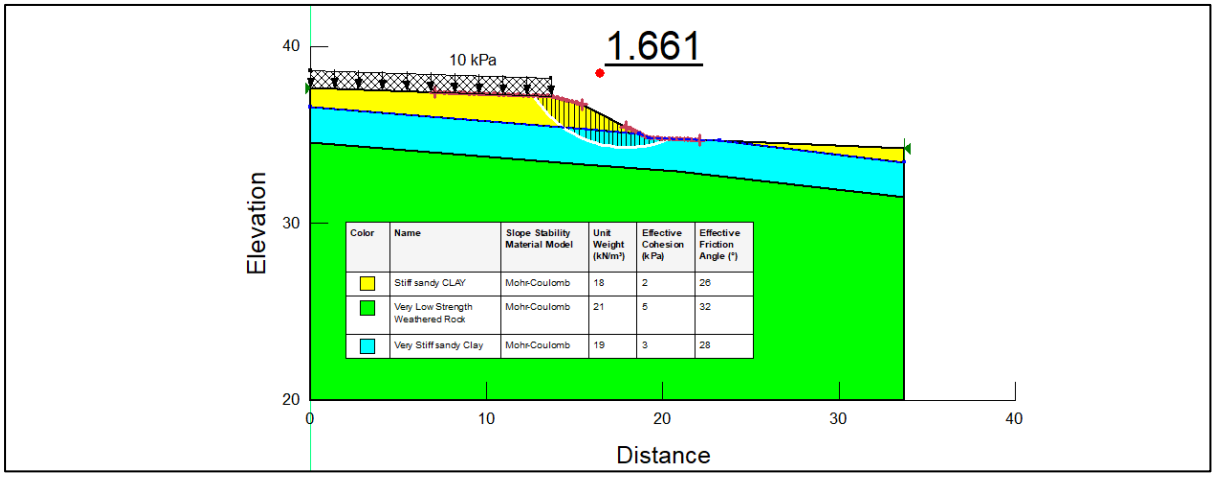
Figures 11: Global Stability: Section B – Lot 12 locations



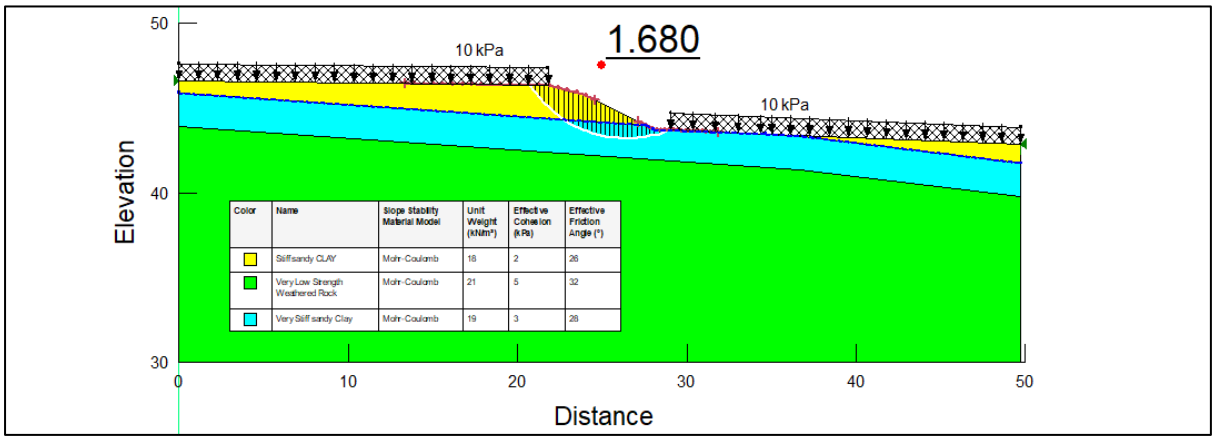
Figures 12: Global Stability: Section C – Lot 5 and 6 locations



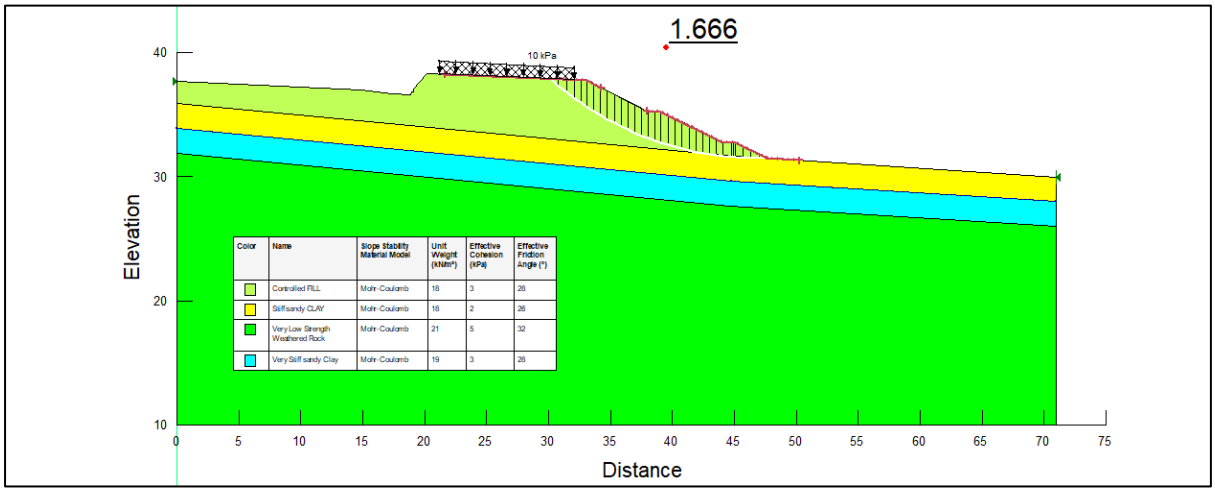
Figures 13: Global Stability: Section C – Lot 4 locations



Figures 14: Global Stability: Section C – Lot 1 locations



Figures 15: Global Stability: Section D – Lot 13 locations



Figures 16: Global Stability: Section D – Lot 15 locations

In summary, the results of the global stability analyses indicate that suitable global stability factors of safety (FoS) were achieved for the analysed sections for long -term conditions. Although, it is noted that some sections required specific minimum structural requirements to achieve suitable factors of safety of greater than 1.5.

The results of the global stability analysis are summarised in Table 3.

Table 3: Summary of Global Stability Analysis

Section	Location	Resultant FoS for Long-term case
Section A	Lot 8	1.651
	Lot 9	1.791
Section B	Lot 7	1.542
	Lot 12	1.764
Section C	Lot 1	1.661
	Lot 4	1.701
	Lot 5	1.810
	Lot 6	2.057
Section D	Lot 13	1.680
	Lot 15	1.666

5 GENERAL RECOMMENDATIONS

5.1 SAFE TEMPORARY AND PERMANENT BATTER SLOPES

- Permanent batters should be protected from erosion. Topsoiling and planting, or erosion matting should be applied to the batter as soon as possible;
- Suitable drainage and stormwater provisions must be installed for the batters. Surface and stormwater runover must be directed away from batters and prevented from pooling at the base and crest. At a minimum, spoon drained should be installed at the crest and base of permanent batters;
- Batters exceeding 3 m or batters that contain buildings or surcharge loads within a distance equal to one batter height from the crest, should undergo detailed stability analysis to determine risk levels.

It should be noted that the borehole data simply give a representation of what the soil profile is expected to be across the entirety of the site. However, it is possible for the soil profile to differ at other locations within the site and due to this PTG requires notification of any varying conditions that are found during construction as it may alter the assumptions and models adopted within this report.

We trust this information is satisfactory for your current needs. Should you have any questions, please feel free to contact the undersigned.

6 ASSUMPTIONS

- Uniformly distributed surcharge loads of 10 kPa (at 1 m offset) was used to represent the proposed lots/roads.
- Proposed new fill was assumed to be placed and compacted under Level 1 supervision and testing.
- Gravelly fill material should be tested to verify its suitability as engineered fill, including compliance with the specified grading and compaction requirements.

The above conditions were adopted only for the global stability assessment. The batter slope designer should consider any additional assumptions and design requirements necessary to satisfy all other aspects of slope performance.

Regards,

PTG Consulting



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