

6 November 2012

Structerre reference number: S598518/DG

Andrew Laughton
11b Keble Heights
COLLEGE GROVE WA 6230

Attn: Andrew Laughton

Dear Andrew

RETAINING WALL
at
#11B KEBLE HEIGHTS COLLEGE GROVE

In response to your recent request, a representative from this Office visited the abovementioned site on 26 October 2012.

1. PURPOSE

The purpose of the visit was to inspect and comment upon the retaining wall built along the left side of the property.

2. OBSERVATIONS

It was observed that the boundary retaining wall in question had moved forward a minimum 20mm along its entire length. The profile revealed that the wall had no backing blocks to a depth of 1000mm and was constructed of 270mm wide limestone blocks. Below this depth of 1000mm, it was not possible to ascertain the use of backing blocks, as the 700mm high stack of sand precluded this investigation.

At the retaining walls maximum height of 1800mm, an additional 700mm of sand was stacked behind the now broken fence and then further sloped upwards to a height of 1500mm above the top of wall to a new retaining wall on the neighbour's property.

This new wall was built 2600mm from the face of the boundary retaining wall and another higher wall, a further 1100mm away had also been constructed. Both these walls retained 1050mm and were embedded to a depth of 350mm.

It was also noted that a suckling tree, on the lower side, has been secured via I-bolt directly to the top block of the boundary wall.

3. COMMENTS

The locations and height of the retaining walls on the neighbouring property will be directly surcharging the boundary wall and hence be partially causing the failure and movement of this wall. Furthermore, the stacked sand behind the now broken fence will be adding load to this surcharge and hence further enhancing the problem.

It is evident also that the boundary wall has not been constructed with enough backing blocks to meet the Structerre minimum detail as shown in attached HOR Detail. Had it been built to this minimum detail, it still would not guarantee no overturn or failure, as the surcharge loads are in excess of those this detail is capable of restraining. Therefore, partial cause of failure needs to be attributed to this under-design of the wall.

Finally, the tightly secured tree, due to growth restraint and wind loading, would likely contribute to the movement and cracking of the boundary wall.

4. RECOMMENDATIONS

As each wall is now reliant upon the stability of the boundary wall, it is our recommendation that the ground behind the wall be stabilized via cement injection grouting to a depth and width yet to be formalised by more prudent design and detail.

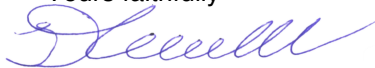
This office should be engaged to formalize a quote to carry out a more detailed design and investigation. As it affects both neighbours, it is suggested a meeting be held between both parties to formulate a planned rectification process.

5. CONCLUSION

We trust this report clarifies the extend of the problem and assists with resolution of this issue.

Thank you for the opportunity to assist you in this matter. If this Office can be of further assistance, please do not hesitate to contact us again.

Yours faithfully



Daniel Goodall
Engineer's Assistant

Enclosed:
- HOR Detail

Authorisation

This report has been reviewed and authorised for release



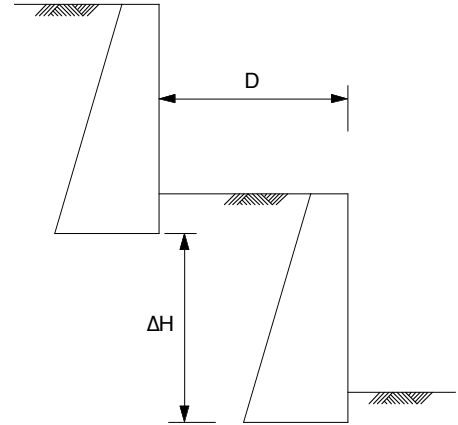
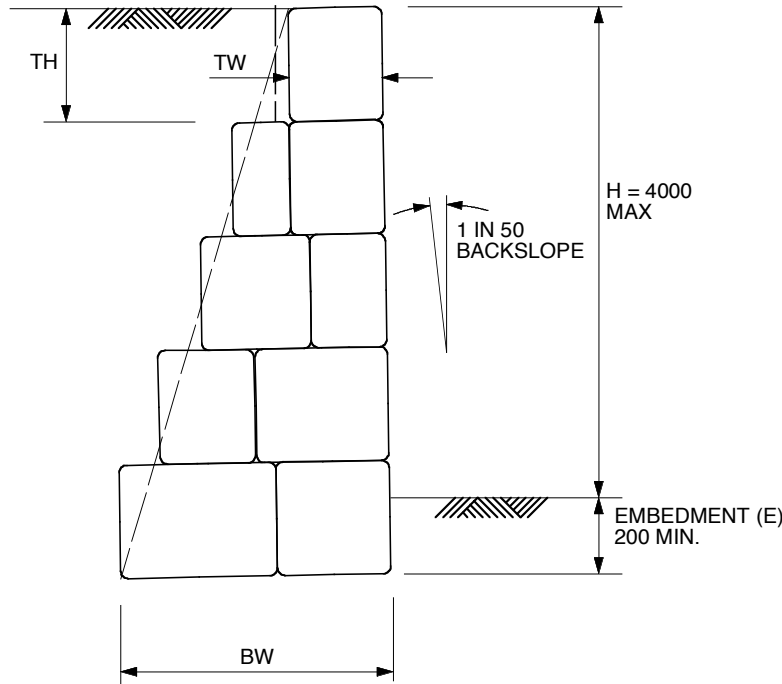
Greg Hamilton
Bunbury Manager

Disclaimer:

This report is at the request of the addressee and no liability is accepted by Structerre Consulting Engineers to any third person reading or relying upon the report, not withstanding any rule of law and/or equity to the contrary and that this report is strictly confidential and intended to be read and relied upon only by the addressee.

Job #	Revision	Authored	Reviewed	Authorised
S598518	0	DG	GRH	GRH

"SUPER SIX" FENCE OR SIMILAR, IF REQUIRED.



OPTION FOR TIERED WALLS

DIMENSION 'D' ALWAYS TO BE GREATER THAN DIMENSION 'ΔH'.

LIMESTONE RETAINING WALL

H	BW	E
0 - 1000	H/2 + 200 BUT NOT LESS THAN 500	200
1000 - 3000	H/2 + 200	300
3000 - 3500	H/2 + 200	400
3500 - 4000	H/2 + 400	400

TH	TW
350	250
600	350

NOTES:

- THIS WALL IS DESIGNED FOR USE IN STABLE SAND OR ROCK SOILS WITH FREE DRAINING GRANULAR BACKFILL. MAXIMUM WATER TABLE TO BE BELOW BOTTOM OF WALL. IF OTHER CONDITIONS ENCOUNTERED ON SITE CONTACT THE ENGINEER.
- REMOVE ALL TOPSOIL, VEGETATION & DELETERIOUS FILL MATERIAL FROM THE FOUNDATION AREA.
- COMPACT THE FOUNDATION LINE TO MIN 6 BLOWS / 300mm (AS TESTED WITH THE PERTH SAND PENETROMETER) FOR A DEPTH OF AT LEAST 750mm BELOW BOTTOM OF WALL.
- LIMESTONE MAY BE NATURAL CUT BLOCKS OR RECONSTITUTED BLOCKS (MINIMUM DENSITY TO BE 1700kg/m³). STONES TO INTERLOCK TO FORM A STRONG BOND. USE STANDARD Ø3.15 GALVANIZED MASONRY TIES BETWEEN EACH LEAF, AT 500mm CRS HORIZONTALLY IN EACH BED JOINT. CONTACT THE ENGINEER PRIOR TO PROCEEDING, IF UNSURE.
- LIMESTONE TO BE NON-FRIABLE.
- ALL JOINTS TO BE MORTARED. MORTAR TO BE M3 CLASSIFICATION, EXCEPT PROJECTS LOCATED WITHIN 1km OF THE OCEAN MORTAR TO BE M4 CLASSIFICATION. CEMENTS OTHER THAN TYPE GP PORTLAND CEMENT & 100% WHITE PORTLAND CEMENT SHALL NOT BE USED. RUBBLE NOT TO BE USED TO FILL VOIDS.
- DO NOT BACKFILL WALL UNTIL AT LEAST 5 DAYS AFTER COMPLETION.
- BACKFILL TO BE COMPACTED TO MIN 5 BLOWS/ 300mm. BACKFILL WITHIN 1m OF WALL MAY BE COMPACTED TO MIN 4 BLOWS/300mm.
- ENSURE NO DEAD LOAD (INCLUDING BUILDINGS) IS PLACED CLOSER TO THE WALL THAN A DISTANCE EQUAL TO THE TOTAL HEIGHT OF THE WALL. MAXIMUM SURCHARGE LOAD TO BE 5 kPa WHICH INCLUDES LIGHT VEHICLE SURCHARGE.
- ENSURE THE WALL DOES NOT SURCHARGE OR UNDERMINE ANY ADJACENT RETAINING WALLS OR STRUCTURES EITHER ON THIS OR ADJOINING PROPERTIES.
- IF WALLS HAVE OTHER WALLS IN TIERS BEHIND THEM, BUILD IN ACCORDANCE WITH OPTIONS DRAWN ABOVE.
- DO NOT BUILD OVER OR ADJACENT TO ANY WATER AUTHORITY SEWERS WITHOUT WATER CORPORATION APPROVAL.
- PROVIDE 10mm EXPANSION JOINTS AT MAX 7000 CENTRES IN STRAIGHT LENGTHS OF WALL.

THE APPROVED SIGNATURE ON THIS DETAIL ENDORSES ITS USE ON CLASS A STABLE SITES.

HOR

LAST MODIFIED: 08/02/11



PROJECT: #11B KEBLE HTS COLLEGE GROVE

CLIENT: ANDREW LAUGHTON

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SCALE 1:20
DATE 20/11/12

APPROVED