

Appendix 5

Building Site Location Report for Lot 436

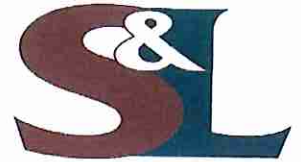
Our ref: 20533

25 February 2014

The Lakes (2012) Ltd
PO Box 348
Tauranga

Attention: Tony Mills

**Re: Building Site Location Report
Lot 436 of Stage 2H
The Lakes**



1.0 Introduction

In our geotechnical assessment report reference 20533 and dated 4 September 2013 we advised, for lot 436, that

"building development will be dependent on the location of the sloping ground to the west that leads down to the (proposed) local purpose reserve and possibly within the restriction area to the south east".

We recommended that additional investigation work be undertaken to determine whether ground improvement work is required during the subdivision construction or whether the future building would be partly supported on deep (piled) foundations.

2.0 Additional Investigation

Site information described in the geotechnical assessment report indicated that the subdivision earthworks of 2007 had removed and replaced the original peat out to the boundary line now shown between Lot 436 and the local purpose reserve. Nearby borehole 8 showed this replacement filling to be 3.5 m deep and that the underlying natural soils comprise firm light grey estuarine silts.

To determine whether the replacement filling made up the batter leading down to the lower level of the reserve, two trenches were excavated from the top of the batter down to the lower levels under our observation on 10 December 2013.

The trenches confirmed that the extent of the subdivision filling is present only out to the top of the slope and that the soils present in the 12 degree (1 in 4.7) batters comprise dark brown organic silts.

3.0 Analysis

In our report of September 2013 we advised that we had identified a slope stability issue whereby loss of support to the structural filling could occur if the support of the organic filling from the building platform down and into the lake should subside. Accordingly a setback was recommended for building away from these lakeside slopes. In those analyses the batters were taken as at least 4 m high down to the water level.

The batter slopes from Lot 436 westwards towards the local purpose reserve are 2.5 m high and are low strength organic soils they are also buttressed by organic filling placed in the reserve to create the flat "landing area" above the lake level. Any slope failure surfaces are therefore likely to be within the fill batter or, in a more global condition, passing into the landing buttress filling. From these analyses, stabilisation measures as described in 4.0 below have been developed.

4.0 Building Platform Stabilising Measures

We recommend that a subsurface palisade wall system be installed as shown on attached drawings 20533-08 and 20533-09. Underground piles would provide a "retaining wall" to confine the filling placed in 2007 behind the wall, if instability of the adjacent batters did take place. The wall system would be located 2.0 m from the western boundary as shown on 20533-08.

The wall system has been designed as a line of temporary support only and it would be incumbent on the owner of lot 436 to have any lost ground in front of the wall reinstated immediately, under professional geotechnical advice.

An analysis of the slope profile with the palisade wall in place shows that any failure surface would then pass under the embedded poles, and that stability factors of safety would be in excess of 2.0.

To avoid the possibility of a future house surcharging the palisade wall it is recommended that future buildings should be located at least 2.5 m away from the line of this wall. Such a setback is applicable because, in the event that the wall does become loaded due to loss of ground in front of the wall, horizontal deflections on the wall poles may be of the order of 150 mm with associated ground movement immediately behind the wall. In addition, the piled wall has not been designed to support significant surcharges from future buildings.

For the remainder of the property we recommend that the building set back lines that were described in our report of September 2013 and shown on subdivision plan 134463-2H-RC01 revision R1, are maintained. The installation of a palisade pile system on the eastern and southern side of lot 436 is feasible but the construction would be considerably more extensive because the wall system would be required to temporarily support a height greater than the 2.5 m that the wall described above is intended to support.

As stated in Section 5.0 of the report of September 2013, it is possible to cantilever floor slabs beyond the building restriction lines to the east and south but this would be a specific slab design undertaken by a chartered professional structural engineer. The engineer would assume a fuchrum line for the cantilever at the building restriction line. The property owner would be aware of the possibility of ground subsidence beyond the building restriction lines as this possibility of future ground movement increases towards the sloping ground leading down to the lake levels.

The construction of the cantilevered sections can take place in the subdivision filling with dependable support being given to that section of the building by the subdivision filling. The cantilever would only be loaded as such, if any future ground movement did occur.

We trust that the enclosed information is helpful in progressing the sale of lot 436 further. The recommendations contained in this report will be incorporated in the geotechnical completion report for Stage 2H.

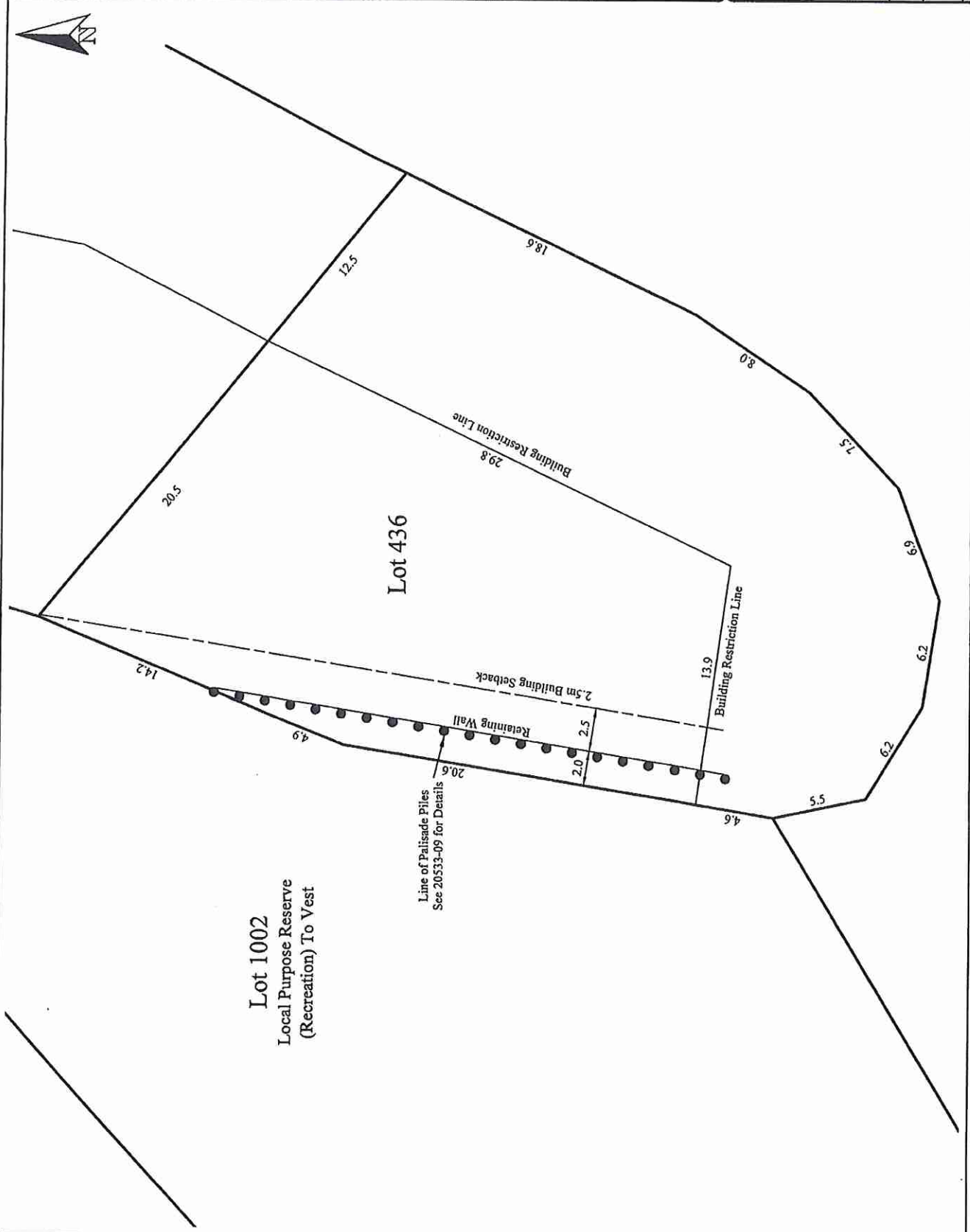
Yours faithfully
S & L Consultants Ltd



M W Hughes CPEng
Geotechnical Engineer

encl. Reference plan 20533-08
 Palisade wall detail 20533-09

Note:
See 20533-09 for Wall
Details



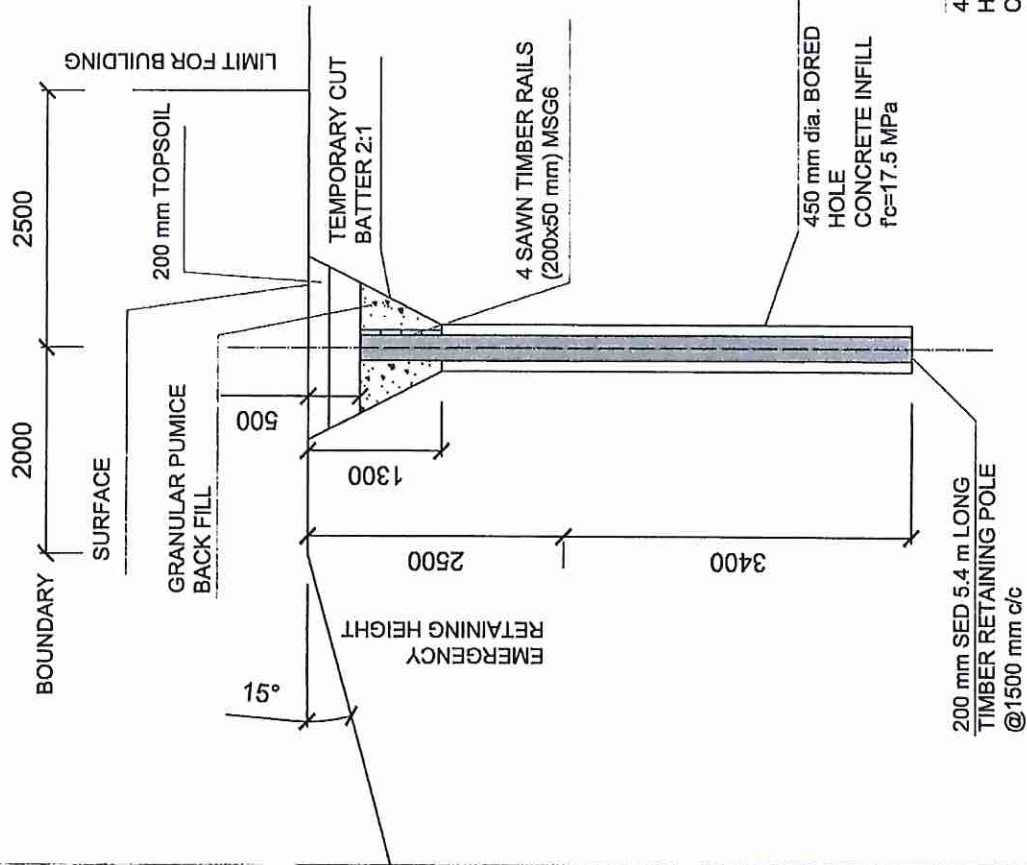
NO.	DATE	DESCRIPTION	ISSUE FOR REPORT
1	02/14		02/14
Drawn	02/14	MVP	
Checked	02/14	MVP	
Reviewed	02/14	MVP	

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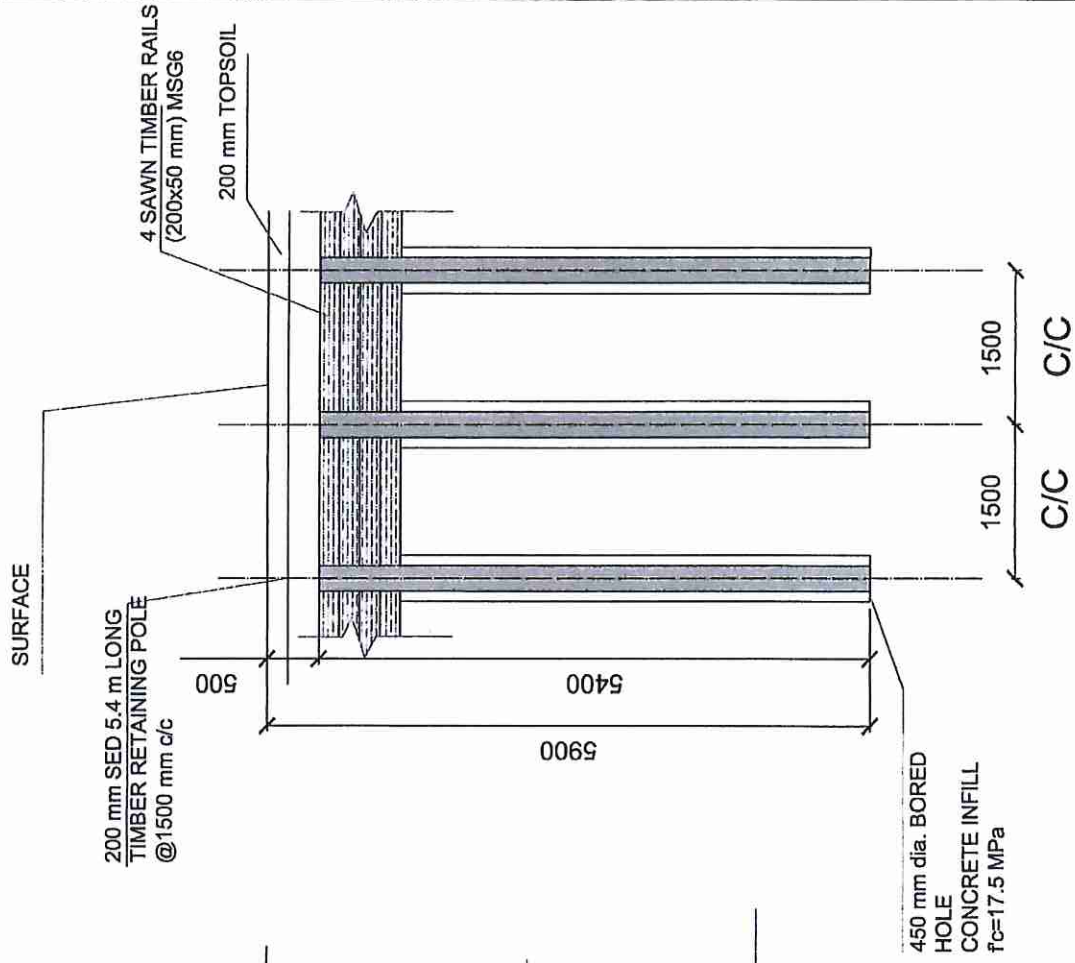
TITLE
**The Lakes
 (2012) Ltd**
 Stage 2H - Lot 436
 Palisade Wall
 Location

Scale	1 : 200 @ A3
Date	02/14
Project No.	20533-08
Sheet No.	11

TYPICAL CROSS-SECTION



TYPICAL ELEVATION



Wall Position Shown on
20533-08

NO.	DESCRIPTION	DATE	BY	DATE	BY
1	Issue for Report	02/14			
	NAME	DATE	DATE	DATE	DATE
	Checked	02/14			
	Approved	MWH 02/14			
REFERENCES					

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TITLE
The Lakes (2012) Ltd
Stage 2H
LOT 436
Palisade Wall
Detail

DATE	02/14
SCALE	1:50 @ A3
DRAWING NO.	20533 - 09
NO. OF SHEETS	1

NOTES: 19 POLES REQUIRED (see 20533-08)
TIMBER POLES TREATMENT H5, HORIZONTAL RAILS TREATMENT H5