

LVD Industries Pty Ltd
83 Marine Parade
Avalon NSW 2107

Project 86970.02
18 March 2021
86970.02.R.005.Rev2
DEM/pc

Attention: Mr Luke van Dyck

Email: info@lvdbuilders.com

Geotechnical Slope Risk Assessment Proposed Garden Retaining Wall GW1 at 9 Ocean Road, Palm Beach

Recent excavations on the upper slope of the above site has revealed worse ground conditions than was previously anticipated.

Around 1 m to 2 m of soft to firm, residual clay has been exposed below the toe of the sandstone cliff line and probing by Douglas Partners (DP) indicates that these soils extend beneath two partially undercut and detached sections of the cliff line. These residual clays transition into 3 m to 4 m of highly weathered, low then low to medium strength interbedded shale and sandstone.

From our stability analyses, DP considers that this profile requires an increased height in the anchored retaining wall (GW1) to retain the clay and highly weathered shale/sandstone, and to leave a short, gently inclined soil profile which can be planted out.

An increased wall height will allow for a generally reduced batter angle within the soils between the top of the wall and the toe of the cliff line. A safe batter angle within the soils will only be achievable below the cliff line near the southern site boundary if the wall height is increased.

The less stable alternative would be to shotcrete the steep slope above the currently proposed RL 19.1 AHD wall to the base of the cliff line and stabilise the shotcrete with permanent rock anchors. However, this would not allow for the establishment of vegetation.

Hence, based on ground conditions and the results of our stability analyses, DP strongly recommends that the height of GW1 be increased to RL 23 AHD with the wall to be supported by permanent rock anchors remaining entirely within the site boundaries. DP has provided advice to the project's structural engineer, in relation to recommended anchor layout and loadings, to assist with the design of the wall.

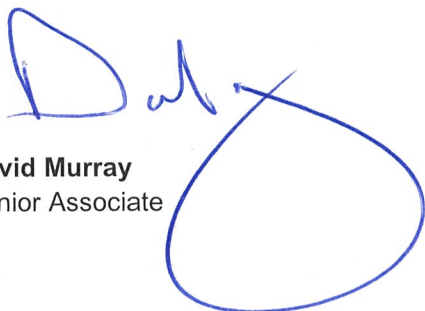
There is now an urgency to complete GW1 as earthworks have commenced and the slope is now exposed. There will be an unacceptable increased level of slope instability if the above planned slope stabilisation works are not carried out as soon as possible.

Future plantings above and at the base of the wall can be used to screen the wall.

We trust that these comments are sufficient for your present requirements. If further assistance is required, please do not hesitate to contact the undersigned.

Yours faithfully

Douglas Partners Pty Ltd



David Murray
Senior Associate

Reviewed by



John Braybrooke
Principal