

8 Addison Road, Manly

Undercut Rock

Scope

To access the undercut rock exposure at the harbour front of the property for stability, taking into consideration owners wish to reduce geotechnical risk on the site.

Observations

The access stairs down to the water front passes under overhanging rock (Photo 1) and is supported on rock that is undercut (Photo 2 & 3). The storage area for water craft near the end of the access stairs is located under a thin, long overhanging bed of rock (Photo 4 & 6). North of this area lower on the rock face and close to the rock platform, the rock is undercut slightly (Photo 5) and is cracked through the supporting cantilever arm. However, this is close to the rock platform and waterline and the owners inform us this area is rarely frequented due to its location. The upper rock out crop is undercut by up to ~ 4.0m (Photo 6 & 7). The rock formation is Medium Strength or better. The undercutting is occurring along the bedding planes which vary from ~ 0.5 to 2.5m thick. The upper beds in the formation show some tightly spaced jointing at 0.4 to 1.5m that strike NNE, roughly following the shore line.



Photo 1



Photo 2



Photo 3



Photo 4



Photo 5



Photo 6

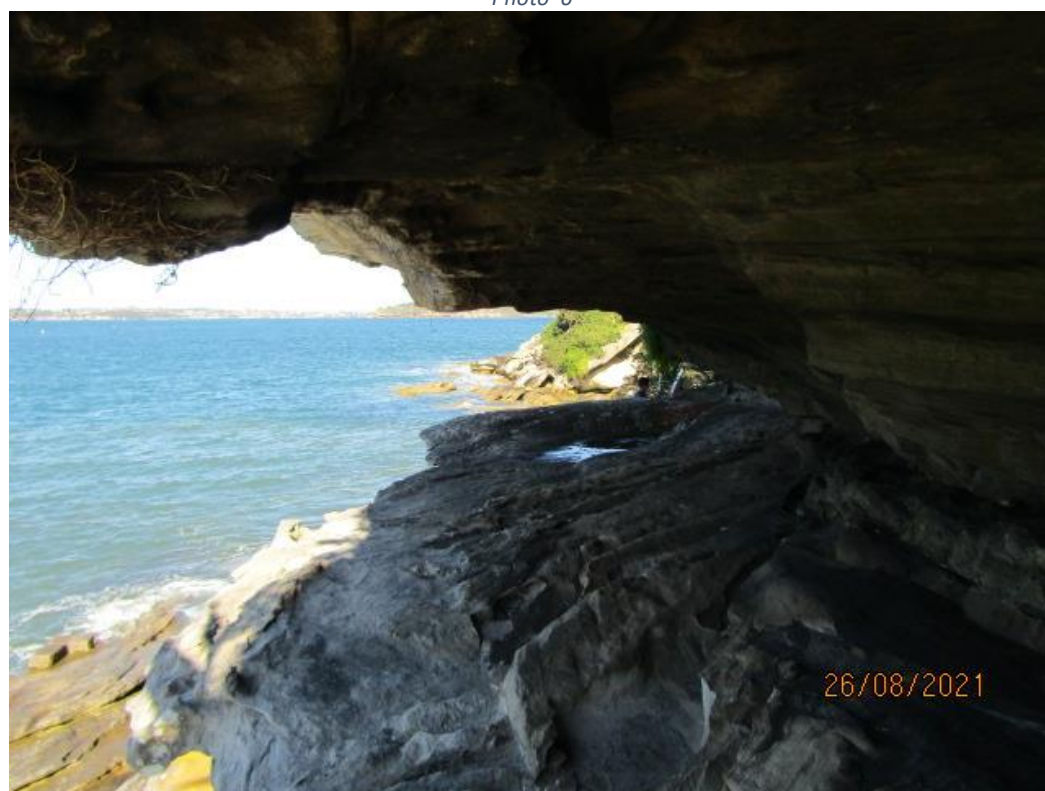


Photo 7

Discussion

Natural variability in the rock occurs as a result of the deposition of the original sediment that forms the rock. Regional stresses that have occurred over geological time have left planes of weakness. Water percolating through the rock structure has chemically altered the rock deleting some areas of certain elements while concentrating them in others. This natural variability makes it very difficult to predict when undercut rock will fail. The owners wish to reduce the geological risk on the site, particularly around the areas that are commonly frequented by residents and guests. With this in mind see the following recommendations:

Recommendations

Failures in the rock face are most likely to occur during heavy prolonged rainfall or in the days immediately after, while the slope is draining and drying out. As such, no one is to walk under the rock formations during these times. Additionally sensible practice is to spend as little time under overhanging rock as reasonably possible.

Summary of Recommended Heavy Support

1. Access path under over hanging rock (Photo 1). Support with single blade wall.
2. Undercut below access path (Photo 2 & 3). Support with two blade walls.
3. Long thin overhang over watercraft storage (Photo 4 & 6). Break down over hanging rock with rock saw.
4. Waterfrontage upper rock face overhang (Photo 6 & 7). Support with multiple blade walls.

Blade walls are to be a minimum of 0.5m wide and are to run at 90° (perpendicular) to the rock face. They are to be supported on foundations taken to bedrock. No blade walls are to be supported on undercut rock. The top of the blade walls are to be in full contact with the underside of the undercut rock so non-shrink grout will be required to achieve this or dry pack rammed grout where necessary. Where there will be multiple blade walls (see 4. above) they are to be spaced at not more than 3.0m centres. All steel reinforcing is to be galvanised. A minimum of 50mm cover of concrete is required.

Any breaking down of overhanging rock is to be carried out with a rock saw (see 2. Above). We envisage a low scaffold will be required. The rock is to be broken down into small manageable pieces. Alternatively, the area can be cleared and cordoned off and expanding agent put into drill holes along the extent of the undercutting. No one must enter the area until the rock has broken, this can take up to 48hrs depending on the product. Once the overhanging rock has collapsed onto the rock platform it can be broken down and removed.

Inspections

If geotechnical certification is required the following inspections are mandatory:

- When the Builder is setting out the blade wall locations the Geotechnical Consultant is to be onsite to assist and approve the locations.
- All finished blade walls are to be assessed and approved by the Geotechnical Consultant.

White Geotechnical Group Pty Ltd.



Ben White M.Sc. Geol.,
AusIMM., CP GEOL.
No. 222757
Engineering Geologist.