

## **PRELIMINARY ASSESSMENT: Acid Sulfate**

New House, Pool and Boatshed at **1744 Pittwater Road, Bayview**

| <b><i>Class of land as shown on Acid Sulfate Soils Planning Maps</i></b>  |          | <b><i>Type of Works</i></b>  |
|---|----------|--|
| <input type="checkbox"/>  | <b>1</b> | Any works  |
| <input checked="" type="checkbox"/>   | <b>2</b> | Works below the natural ground surface.<br>Works by which the water table is likely to be lowered.   |
| <input type="checkbox"/>  | <b>3</b> | Works beyond 1m below the natural ground surface.<br>Works by which the water table is likely to be lowered beyond 1m below the natural ground surface.                  |
| <input type="checkbox"/>  | <b>4</b> | Works beyond 2m below the natural ground surface.<br>Works by which the water table is likely to be lowered beyond 2m below the natural ground surface.                  |
| <input checked="" type="checkbox"/>   | <b>5</b> | Works on land below 5m AHD and within 500m of adjacent Class1, 2, 3 or 4 land which are likely to lower the watertable below 1m AHD on adjacent Class 1, 2, 3 or 4 land. |
| <i>The class of the site is highlighted in red, it should be noted that the classification does not mean acid sulfate soils are present on site but that there is a risk they could be present.</i> |          |  |

### **1. Proposed Development**

- 1.1** Demolish the existing house and construct a new part three-storey house by excavating to a maximum depth of ~3.2m into the slope.
- 1.2** Install a new pool on the downhill side of the property by excavating to a maximum depth of ~3.0m.
- 1.3** Construct a new boatshed on the downhill side of the property by excavating to a maximum depth of ~2.5m.
- 1.4** Details of the proposed development are shown on 25 drawings prepared by Giles Tribe Architects, Job number 21091, drawings numbered DA00 to DA21 and SD01 to SD03, Revision A, dated 21/2/22.

### **2. Site Description**

The site was inspected on the 1<sup>st</sup> April, 2022 and previously on the 1<sup>st</sup> November, 2021.

The block encompasses the steep bank that rises from that waterfront at Pittwater and the gentle slope that rises above that to the road. The Sydney 1:100 000 Geological sheet indicates the site is underlain by the Newport Formation of the Narrabeen Group. This is described as interbedded laminite, shale and quartz to lithic quartz sandstone. This ground material was encountered during testing.

The NSW Environment and Heritage mapping program (eSpade) maps the soil landscape of the property as 'Erina'. The ground tests indicate the upper ~1.0m is a yellowish-brown sandy clay (er3). This is underlain by reddish brown (er4) and dull yellow-orange mottled clays (er5) that merge into the underlying weathered shale of the Narrabeen Group. Their documentation indicates these soils range in pH from 4.0 to 7.0.

The Narrabeen Group of Rocks are Middle Triassic in age (~250 million years).

No visible signs of acid sulfate soils such as corrosion on man-made surfaces, or unusually clear, milky, or iron-stained surface water were observed on the property.

### **3. Earthworks**

An excavation to a maximum depth of ~3.2m will be required to construct the proposed House and pool and an excavation to a maximum depth of ~2.5m is required to construct the proposed boatshed. The excavations will cover an area of ~450m<sup>2</sup>. The excavations are entirely through the rising slope at the waterfront that consists of the Narrabeen Group Rocks that do not generate acid sulfate conditions.

### **4. Watertable**

The watertable was not encountered during testing. The base of the excavation for the boatshed is at RL2.8m and will be above the watertable.

## 5. Field Testing

Three hand auger holes were put down in the location shown on the site plan attached. Field pH and peroxide testing was carried out on samples taken from the auger holes at regular intervals. The logs of the auger holes and the test results are as follows.

### AUGER HOLE 1 (~RL7.5) – AH1

| Depth (m)  | Material Encountered  |
|------------|---|
| 0.0 to 0.2 | <b>CLAYEY SOIL</b> , dark brown to black, loose, damp, fine to medium grained with fine trace organic matter. |
| 0.2 to 0.8 | <b>CLAY</b> , yellow, brown, fine grained, dry.   |
| 0.9 to 1.8 | <b>CLAY</b> , orange, red, mottled clay, derived from Extremely Low Strength Shale, damp.                     |

End of Test @ 1.8m in clay. No watertable encountered.

| TEST: AH1        | FIELD pH & PEROXIDE RESULTS |                       |                   |                                     |                                   |
|------------------|-----------------------------|-----------------------|-------------------|-------------------------------------|-----------------------------------|
| Sample depth (m) | pH <sub>F</sub>             | 30% Peroxide reaction | pH <sub>FOX</sub> | pH <sub>F</sub> - pH <sub>FOX</sub> | SS=Shell<br>J=Jarosite<br>R=Roots |
| 0.3              | 5.6                         | -                     | 5.9               | -0.3                                | R                                 |
| 0.8              | 5.9                         | -                     | 5.5               | 0.4                                 | -                                 |
| 1.3              | 5.5                         | -                     | 5.9               | -0.4                                | -                                 |
| 1.8              | 4.9                         | -                     | 4.8               | 0.1                                 | -                                 |

**AUGER 2 ON THE NEXT PAGE**

## AUGER HOLE 2 (~RL5.0) – AH2

| Depth (m)  | Material Encountered   |
|------------|--|
| 0.0 to 0.4 | <b>FILL</b> , brown, red, yellow, sand and clay intermixed, loose, damp, fine to coarse grained. |
| 0.4 to 0.6 | <b>CLAY</b> , maroon, yellow, laminate fragments.  |
| 0.6 to 0.9 | <b>CLAY</b> , yellow, brown, fine grained, dry.  |
| 0.9 to 1.4 | <b>CLAY</b> , white, grey, red, dry, fine to medium grained.                                     |
| 1.4 to 1.7 | <b>CLAY</b> , orange, red, mottled clay, derived from Extremely Low Strength Shale, damp.        |

End of Test @ 1.7m in clay. No watertable encountered.

| TEST: AH2        | FIELD pH & PEROXIDE RESULTS |                       |                   |                                     |                                   |
|------------------|-----------------------------|-----------------------|-------------------|-------------------------------------|-----------------------------------|
| Sample depth (m) | pH <sub>F</sub>             | 30% Peroxide reaction | pH <sub>FOX</sub> | pH <sub>F</sub> - pH <sub>FOX</sub> | SS=Shell<br>J=Jarosite<br>R=Roots |
| 0.3              | 6.8                         | -                     | 6.5               | 0.3                                 | R                                 |
| 0.8              | 7.6                         | -                     | 7.3               | 0.3                                 | -                                 |
| 1.4              | 7.6                         | -                     | 7.6               | 0.0                                 | -                                 |
| 1.7              | 7.7                         | -                     | 7.5               | 0.2                                 | -                                 |

## AUGER HOLE 3 (~RL3.5) – AH3

| Depth (m)  | Material Encountered   |
|------------|--|
| 0.0 to 0.1 | <b>TOPSOIL</b> , sandy clay, light brown, fine to medium grained, damp.                      |
| 0.1 to 0.4 | <b>SAND</b> , clayey, yellow, medium grained, damp.  |
| 0.4 to 0.6 | <b>CLAY</b> , yellow, orange, fine grained, dry.   |
| 0.6 to 1.3 | <b>CLAY</b> , maroon, brown, orange, yellow, damp, fine grained.                             |
| 1.3 to 1.5 | <b>CLAY</b> , white, fine grained, damp.   |
| 1.5 to 1.6 | <b>CLAY</b> , red and yellow, mottled clay, derived from Extremely Low Strength Shale, damp. |

End of Test @ 1.6m in clay. No watertable encountered.

| TEST: AH3        | FIELD pH & PEROXIDE RESULTS |                       |                   |                                     |                                   |
|------------------|-----------------------------|-----------------------|-------------------|-------------------------------------|-----------------------------------|
| Sample depth (m) | pH <sub>F</sub>             | 30% Peroxide reaction | pH <sub>FOX</sub> | pH <sub>F</sub> - pH <sub>FOX</sub> | SS=Shell<br>J=Jarosite<br>R=Roots |
| 0.3              | 7.6                         | -                     | 7.6               | 0.0                                 | R                                 |
| 0.8              | 7.9                         | -                     | 7.8               | 0.1                                 | -                                 |
| 1.3              | 7.8                         | L                     | 7.7               | 0.1                                 | -                                 |
| 1.8              | 7.7                         | -                     | 7.7               | 0.0                                 | -                                 |

## 6. Conclusions

This report was carried out in accordance with the Field pH and Peroxide Test guidelines (ASSMAC, 1998).

No Acid Sulfate Soils were identified in the test holes. The pH<sub>F</sub> levels tested in all auger holes did not fall lower than 4.9. This is above a PH of 4.0 that is an indicator of acid sulfate soils. No Potential Acid Sulfate Soils were identified in the test holes. The measured pH<sub>F</sub> levels varied up to 0.4 from the measured pH<sub>FOX</sub> levels. A movement of 1 unit or more is an indicator of potential acid sulfate soils. In addition, the measured pH<sub>FOX</sub> for all tests did not fall lower than 4.8. A pH<sub>FOX</sub> <3 is a strong indicator of potential acid sulfate soils. No observable colour change or sulphurous odours were identified during the peroxide testing. No reactions to peroxide testing were observed. It is likely the varying weak reactions to peroxide testing were due to inclusions in the soil other than sulphides as, where the reaction was strongest, pH<sub>FOX</sub> changed little from pH<sub>F</sub> as it did in most tests.

This preliminary assessment indicates that an Acid Sulfate Soils management plan is not required for the proposed works.

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## Appendix 1: Soil Reaction Rating Scale

| Rate of Reaction | Reaction Scale |
|------------------|----------------|
| Low              | L              |
| Medium           | M              |
| High             | H              |
| Extreme          | X              |
| Volcanic         | V              |

Source: DER (2015a)





Photo 1: AH1 – Downhole is from top to bottom.





Photo 1: AH2 – Downhole is from top to bottom.





Photo 3: AH3 – Downhole is from top to bottom.