

## **PRELIMINARY ASSESSMENT: Acid Sulfate**

New Semi-detached Houses and Pools at **103 Ocean Street, North Narrabeen**

<i><b>Class of land as shown on Acid Sulfate Soils Planning Maps</b></i>		<i><b>Type of Works</b></i>
<input type="checkbox"/>	<b>1</b>	Any works
<input type="checkbox"/>	<b>2</b>	Works below the natural ground surface. 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. Works by which the water table is likely to be lowered beyond 1m below the natural ground surface.
<input checked="" type="checkbox"/>	<b>4</b>	Works beyond 2m below the natural ground surface. Works by which the water table is likely to be lowered beyond 2m below the natural ground surface.
<input 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 two new semi-detached houses.
- 1.2** Install two pools on the E side of the property by excavating to a maximum depth of ~1.5m.
- 1.3** Details of the proposed development are shown on 11 drawings prepared by DesignOC, drawing numbered DA-00 to DA-10, dated 7.2.25.

### **2. Site Description**

The site was inspected on the 28<sup>th</sup> January, 2025.

This residential property is on the E side of the road and is located on the near-level to gentle terrain on the W side of Narrabeen Beach. The surface varies between RL9.0 and RL9.4. The Sydney 1:100 000 Geological Sheet indicates the site is underlain by Medium to fine “marine” sand (Qhf) of the foredune.

The NSW Environment and Heritage mapping program (eSpade) maps the soil landscape of the property as 'Narrabeen'. The ground tests indicate the upper ~1.2m of the soil is a dull yellowish-brown quartz sand (na2). These are underlain by loose orange shelly beach sand (na1). Their documentation indicates these soils range in pH from 6.5 to 9.0.

Ground testing indicates that sand sediments extend to a depth of at least ~5.0m. The sediments are Holocene in age (spanning in time from present to ~10 000 years ago).

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 ~1.5m is required to construct the pools for the two houses. This excavation will cover a total area of ~20m<sup>2</sup>.

The excavation is only a risk in regards to potential acid sulfate soils while they are open. On completion of the footings, they will be sealed with the foundation, preventing access of oxygen to the soil and therefore greatly reducing the potential for acid generation.

### **4. Watertable**

The watertable was not encountered in the lowest elevation ground test that reached a maximum depth of ~5.0m (~RL4.0) below the current surface.

The proposed excavation will not exceed a depth of ~1.5m (~RL7.5). It is expected that the water table will not be impacted. The watertable is expected in the vicinity of RL0.0 to RL2.0.

It should be noted the watertable fluctuates with the tide and climatic changes.

### **5. Field Testing**

Four hand Auger Holes (AH) were put down in the locations 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. The soil reaction rating scale for the pH<sub>FOX</sub> test is shown in Appendix 1.

## AUGER HOLE 1 (~RL9.3) – AH1 (Photo 1)

Depth (m)	Material Encountered
0.0 to 0.4	<b>SAND</b> , brown, fine to coarse grained, dry.
0.4 to 0.8	<b>SAND</b> , light brown, medium grained, dry.
0.8 to 1.2	<b>SAND</b> , yellow, medium grained, dry.
1.2 to 2.5	<b>SAND</b> , orange, medium grained, dry.
2.5 to 5.0	<b>SAND</b> , yellow and orange, medium grained, dry.

End of Hole @ 5.0m in sand. No water table 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 J=Jarosite R=Roots
0.5	7.4	-	7.4	0.0	-
1.0	7.6	L	7.8	-0.2	-
2.0	7.9	-	7.9	0.0	-
3.0	7.9	L	7.5	0.4	-
4.0	8.2	L	8.0	0.2	-
5.0	7.7	L	8.0	-0.3	-

## AUGER HOLE 2 (~RL9.3) – AH2 (Photo 2)

Depth (m)	Material Encountered
0.0 to 0.4	<b>SAND</b> , brown, fine to coarse grained, dry.
0.4 to 0.8	<b>SAND</b> , light brown, medium grained, dry.
0.8 to 2.0	<b>SAND</b> , yellow, medium grained, dry.

End of Hole @ 2.0m in sand. No water table 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 J=Jarosite R=Roots
0.5	7.1	-	7.5	-0.4	-
1.0	8.2	-	7.9	-0.3	-
2.0	8.1	-	7.5	0.0	-

### AUGER HOLE 3 (~RL9.5) – AH3 (Photo 3)

0.0 to 0.7	<b>SAND</b> , brown, fine to coarse grained, dry.
0.7 to 1.4	<b>SAND</b> , light brown, medium grained, dry.
1.4 to 2.0	<b>SAND</b> , yellow, medium grained, dry.

End of Hole @ 2.0m in sand. No water table 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 J=Jarosite R=Roots
0.5	8.2	L	8.0	0.2	-
1.2	8.2	-	7.9	0.3	-
2.0	8.1	-	8.0	0.1	-

### AUGER HOLE 4 (~RL9.5) – AH4 (Photo 4)

Depth (m)	Material Encountered
0.0 to 0.3	<b>TOPSOIL</b> , dark brown, sandy, dry, fine to medium grained.
0.3 to 2.0	<b>SAND</b> , orange, dry, fine to medium grained.

End of hole @ 2.0m in sand. No water table encountered.

TEST: AH4	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 J=Jarosite R=Roots
0.5	8.3	M	8.2	0.1	-
1.2	8.3	L	8.0	0.3	-
2.0	8.4	L	8.1	0.3	-

## 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 7.1. 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 0.6 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 7.4. 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. 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 all tests.

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

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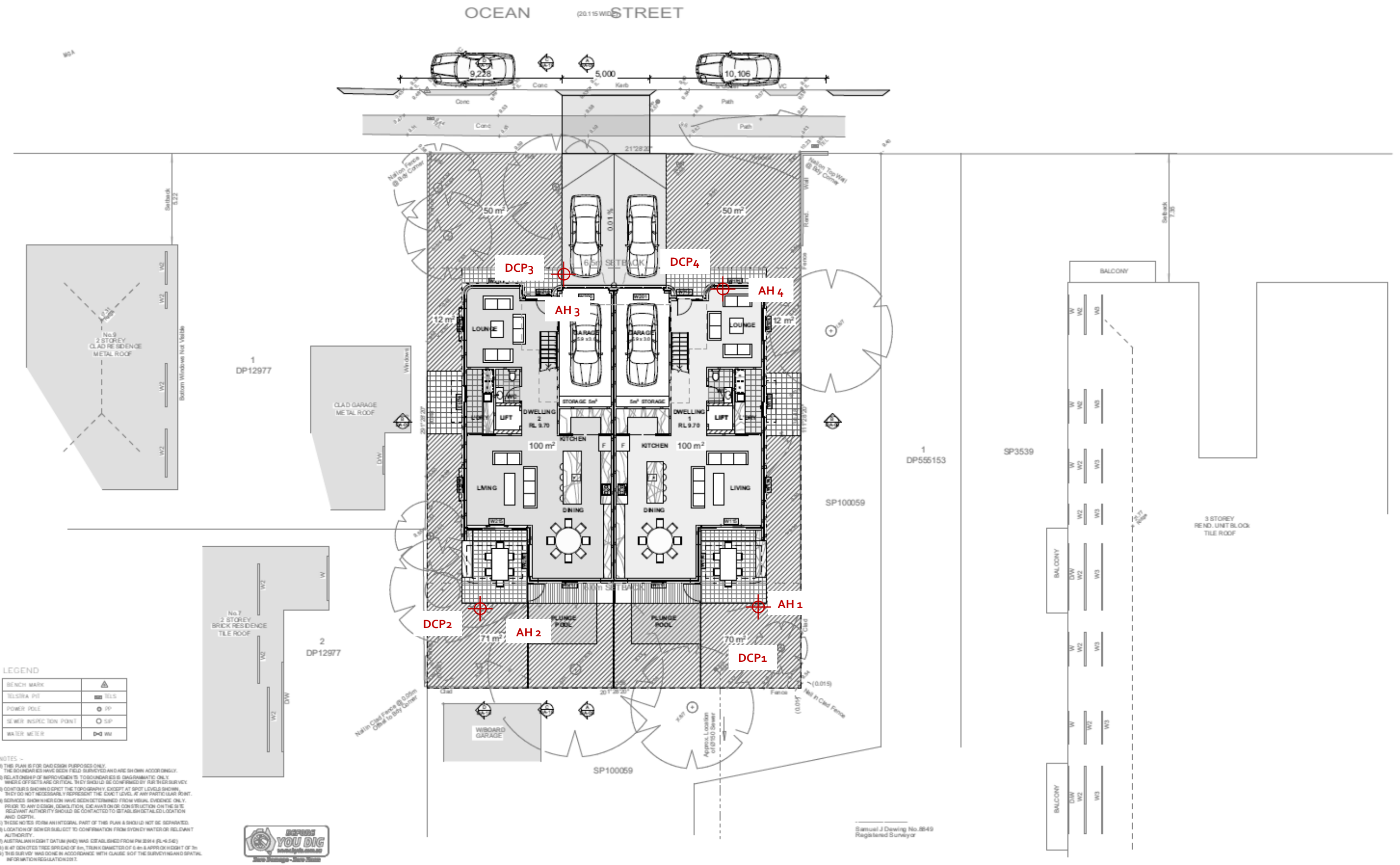
## Appendix 1: Soil Reaction Rating Scale

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

Source: DER (2015a)



SITE PLAN – showing test locations and minimum extent of required shoring



TYPE SECTION – Diagrammatical Interpretation of expected Ground Materials

