






PRELIMINARY ASSESSMENT: Acid Sulfate

For New House and Pool at **1005-1009 Barrenjoey Road, Palm Beach**

<i>Class of land as shown on Acid Sulfate Soils Planning Maps</i>		<i>Type of Works</i>
	1	Any works
	2	Works below the natural ground surface. Works by which the water table is likely to be lowered.
	3	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.
	4	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.
	5	Works on land below 5m AHD and within 500m of adjacent Class 1, 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 structures on site, and construct a new house and outbuilding requiring minor leveling.
- 1.2** Install a pool in the S corner of the property by excavating to a maximum depth of ~1.8m.
- 1.3** Various other minor internal and external additions and alterations.
- 1.4** Details of the proposed development are shown on 18 drawings prepared by Kennon, project number 2424, drawings numbered DA000 to 002, DA050, DA099 to 102, DA200 to 201, DA300 to 301, DA500 to 504, and DA600. All revision D, all dated 05/05/25.

2. Site Description

The site was inspected on the 20th March, 2025.

This large residential property is accessed via a shared driveway in the road reserve, that runs parallel and at a lower level to the main roadway of Barrenjoey Road and has a SW aspect. It is located on the gentle to near level lower reaches of a hillslope and backs onto sandy beach. The surface varies between RL1.5 and RL4.3. The Sydney 1:100 000 Geological Sheet indicates the contact of modern marine and estuarine beach sands (Qhb), medium to fine marine sand (Qhf) of the foredune, and Narrabeen Group Rocks all underlie the property. The Narrabeen Group of Rocks are expected to underlie the E corner of the property and are expected to get progressively deeper to the W. The majority of the property is interpreted to be underlain by deep sediments over the Narrabeen Group.

The NSW Environment and Heritage mapping program (eSpade) maps the soil landscape of the property as 'Woy Woy'. The ground tests indicate that fill to a height of ~0.4m has been laid across the property. Below the fill up to ~1.1m depth is a dark brown loose loamy sand (ww1). These are underlain by grey loose sand (ww2).

Ground testing indicates that sand sediments extend to a depth of at least ~2.1m. The sand sediments are Holocene in age (spanning in time from present to ~10 000 years ago). No visible signs of acid sulfate soils such as bare low-lying areas, 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 ~1.8m will be required for the proposed pool. It will cover an area of ~46m². Additional earthworks include minor leveling and footing excavations for the proposed house. The excavations are only a risk in regards to potential acid sulfate soils while they are open. On completion of the excavations, they will be sealed with the pool structure or concrete, preventing access of oxygen to the soil and therefore greatly reducing the potential for acid generation.

4. Water table

The water table was encountered at depths of between ~1.3m and ~1.6m below the current surface (~RL0.3 - ~0.6). However, it should be noted that the water table 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_{FOX} test is shown in Appendix 1.

AUGER HOLE 1 (~RL1.6) – AH1 (Photo 1)

Depth (m)	Material Encountered
0.0 to 0.2	TOPSOIL , silty sandy soil, brown, Dense, dry, fine to medium grained.
0.2 to 1.2	MARINE SEDIMENT , clean quartz sand, yellow, Medium Dense to Dense, dry to damp, medium grained, shell fragments throughout.
1.2 to 1.9	MARINE SEDIMENT , clean quartz sand, grey, Medium Dense, wet, medium to coarse grained, shell fragments throughout.

End of hole @ 1.9m in marine sediment. Hole collapsing due to presence of water. Water table encountered at ~1.3m.

TEST: AH1	FIELD pH & PEROXIDE RESULTS				
Sample depth (m)	pH _F	30% Peroxide reaction	pH _{FOX}	pH _F - pH _{FOX}	SS=Shell J=Jarosite R=Roots
0.1	7.7	M	7.5	0.2	<5% R
0.6	8.0	M	7.8	0.2	<5% SS
1.1	7.9	H	7.6	0.3	<5% SS
1.6	7.7	H	7.4	0.3	<5% SS
1.9	7.5	H	7.3	0.2	<5% SS

AUGER HOLE 2 (~RL1.9) – AH2 (Photo 2)

Depth (m)	Material Encountered
0.0 to 0.2	FILL , sandy fill, dark brown, Medium Dense, dry, medium grained.
0.2 to 0.6	TOPSOIL , silty sandy soil, brown, Medium Dense, dry, fine to medium grained.
0.6 to 1.0	MARINE SEDIMENT , clean quartz sand, yellow, Medium Dense, dry, medium grained, shell fragments throughout.

End of Hole @ 1.0m in Marine sediment (sand). No water table encountered.

TEST: AH2	FIELD pH & PEROXIDE RESULTS				
Sample depth (m)	pH _F	30% Peroxide reaction	pH _{FOX}	pH _F - pH _{FOX}	SS=Shell J=Jarosite R=Roots
0.2	7.6	M	7.5	0.1	<5% R
0.5	7.9	M	7.9	0	-
1.0	8.3	H	8.1	0.2	<5% SS

AUGER HOLE 3 (~RL2.2) – AH3 (Photo 3)

Depth (m)	Material Encountered
0.0 to 0.2	FILL , sandy fill, dark brown, Very Dense, dry, medium grained.
0.2 to 0.6	TOPSOIL , sandy, dark brown, Dense, dry, fine to medium grained.
0.6 to 1.0	SANDY LOAM , dark brown, Dense, dry, fine to coarse grained.

End of Hole @ 1.0m in sandy loam. No water table encountered.

TEST: AH3	FIELD pH & PEROXIDE RESULTS				
Sample depth (m)	pH _F	30% Peroxide reaction	pH _{FOX}	pH _F - pH _{FOX}	SS=Shell J=Jarosite R=Roots
0.5	7.6	M	7.5	0.1	<5% R
1.0	7.8	M	7.5	0.3	-

AUGER HOLE 4 (~RL2.2) – AH4 (Photo 4)

Depth (m)	Material Encountered
0.0 to 0.4	FILL , sandy fill, dark brown, Very Dense, dry, medium grained.
0.4 to 0.7	TOPSOIL , sandy, dark brown, Medium Dense to Dense, dry, fine to medium grained.
0.7 to 1.1	SANDY LOAM , dark brown, Medium Dense, dry, fine to coarse grained.
1.1 to 2.1	MARINE SEDIMENT , clean quartz sand, grey to orange, Medium Dense, dry to wet, medium to coarse grained, shell fragments throughout, maroon clay flecks at base of auger.

End of Hole @ 2.1m in marine sediment. Hole collapsing due to presence of water. Water table encountered at ~1.6m.

TEST: AH4	FIELD pH & PEROXIDE RESULTS				
Sample depth (m)	pH _F	30% Peroxide reaction	pH _{FOX}	pH _F - pH _{FOX}	SS=Shell J=Jarosite R=Roots
0.2	7.1	L	7.0	0.1	<5% R
0.6	7.3	L	7.2	0.1	-
0.8	7.1	M	6.9	0.2	-
1.3	6.9	M	6.8	0.1	<5% SS
1.7	6.9	M	6.7	0.2	<5% SS
2.1	6.5	M	6.5	0	<5% SS

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_F levels tested in all Auger Holes did not fall lower than 6.5. This is above a PH of 4 that is an indicator of acid sulfate soils. No Potential Acid Sulfate Soils were identified in the test holes. The measured pH_F Levels varied up to 0.3 from the measured pH_{FOX} levels. A movement of 1 unit or more is an indicator of potential acid sulfate soils. In addition, the measured pH_{FOX} did not fall lower than 6.5. A pH_{FOX}

<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 reactions to peroxide testing were due to inclusions in the soil other than sulphides as, where the reaction was strongest, pH_{FOX} changed little from pH_F 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 2: AH2 – Downhole is from top to bottom



Photo 3: AH3 – Downhole is from top to bottom



Photo 4: AH4 – Downhole is from top to bottom

SITE PLAN – showing test locations

The site plan illustrates the layout of the subject site at 1005-1009 Barrenjoey Rd. Key features include:

- Subject Site:** 1005-1009 BARRENJOEY RD SUBJECT SITE
- Internal Features:** LAWN, GRASS COURT, and a central building footprint.
- Test Locations:** Marked with red crosshair symbols:
 - AH1: Located near the bottom left corner of the subject site.
 - AH2: Located near the top left corner of the subject site.
 - AH3: Located near the top right corner of the subject site.
 - AH4: Located near the bottom right corner of the subject site.
- Surrounding Context:**
 - Roads:** 1013 BARRENJOEY RD (top), 1001 BARRENJOEY RD (bottom), and BARRENJOEY RD (right).
 - Boundaries:** TIMBER PALING FENCE TO BE RETAINED (top and bottom right), PROPOSED 1.8M RENDERED BLOCKWORK FENCE TO NORTHERN BOUNDARY (right).
 - Other Features:** BUSH FIRE PRONE AREA (top left), PROPOSED CROSSOVER (top right), PEDESTRIAN ENTRY (right), DENSE PLANTING BUFFER (right), UNPAVED LANE (right), and various setbacks (e.g., 10.1M, 10.0M, 10.0M).

GROSS FLOOR AREA	
Level	Area
GROUND FLOOR	638 m ²
FIRST FLOOR	426 m ²
1064 m ²	

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