



STAGE 1 PRELIMINARY SITE INVESTIGATION (PSI)

**365 MARSHALL MOUNT ROAD
LOT 8 DEPOSITED PLAN 626078
MARSHALL MOUNT, NSW, 2530**

Prepared For: **Maker ENG**
Project Number: **ENRS1826**
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EXECUTIVE SUMMARY

Environment & Natural Resource Solutions (ENRS Pty Ltd) were commissioned as independent environmental consultants in April 2021 by *Maker ENG* (the client) to conduct a Stage 1 Preliminary Site Investigation (PSI) to assess the premises located at 365 Marshall Mount Road, Marshall Mount, NSW, 2530 (*herein referred to as the Site*).

ENRS understands the Site proposal includes a multi-lot Torrens title sub-division of a rural property into **R1** General Residential Lots. Given the change in land use sensitivity, this PSI is required for due diligence purposes to assess the potential for ground contamination and document the Site suitability for the future residential land use consistent with NSW State Environmental Planning Policy No. 55 (SEPP55).

This report documents the results of Site inspection and desktop study of available Site historical records in general accordance with National Environment Protection (Assessment of Site Contamination) Amendment Measure 2013 (No. 1), and the guidelines made and approved under Section 105 of the *Contaminated Land Management Act 1997* (the Act), namely the Guidelines for Consultants Reporting on Contaminated Sites (NSW EPA;2020); and the Guidelines for the Assessment and Management of Groundwater contamination (DEC;2007).

The aim of the project was to collate and review historical records of the Site to assess if the Site will pose no unacceptable risk to human health or to the environment. This information has been used to outline recommendations for further investigations, if any, and provide a statement regarding the suitability of the Site for the proposed future residential land use to address Development Approval (DA) conditions issued by *Wollongong City Council* (Council).

The scope of work for the project comprised the following tasks:

- Review available Site history records incorporating previous investigation reports (where available), proposed development plans, publicly available data (including aerial photographs, geological maps, topographical maps, and registered groundwater bore database) to identify any past or present potentially contaminating activities and or any potential Areas of Environmental Concern (AECs);
- Site inspection to investigate for potential sources of contamination or uncontrolled Fill (17/05/2021); and
- Document investigation results and prepare a PSI report with a statement of Site condition, suitability and recommendations for additional investigation works or ongoing environmental management, if required.

Based on the available information reviewed during the scope of works the following conclusions and recommendations are provided.

- The Site history records indicated that the Site had been used for rural and agricultural purposes for an extended period of time;
- The Site inspection was conducted on the **17th May 2021** and confirmed the Site condition was consistent with the documented history and land use;
- The Areas of Environmental Concern (AECs) identified during this preliminary Site investigation included;

- AEC01 – Entry roadway;
 - AEC02 – House area;
 - AEC03 – Outbuildings / sheds;
 - AEC04 – Cattle yards;
 - AEC05 – Farm dams;
 - AEC06 – Unknown stockpile
 - AEC07 – General site area
- No evidence of a former Underground Petroleum Storage System (UPSS) was identified through the review of available records and during the Site inspection; and
- Review of available online acid sulphate soil datasets identified that the Site presents a *low* risk of potential acid sulphate soils.
- It is recommended that the identified Areas of Environmental Concern are assessed in accordance with the Guidelines for Consultants Reporting on Contaminated Sites (NSW EPA;2020);
- Buildings within AEC02 and AEC03 should be subject to a standalone Hazardous Materials (HAZMAT) Survey prior to their demolition;
- If future Site works are to include earthworks, soil materials within low lying areas, specifically adjacent to Marshall Mount Creek, should be subject to visual screening for PASS indicators including grey mottled soils, rotten egg smell and oxidising soils or field testing conducted by a suitably qualified person in accordance with NSW Acid Sulphate Soils Management Advisory Committee (ASSMAC;1998) guidelines and with consideration of the NSW RTA (2005) Guidelines for the Management of Acid Sulphate Materials;
- Given the relatively undisturbed nature of the Site, ENRS considered that the Site was generally considered suitable or capable of being made suitable for the proposed land use pending the assessment of the identified AECs in accordance with NSW State Environmental Planning Policy No. 55 (SEPP55);
- Should any change in Site conditions, proposed land use or incident occur which causes a potential environmental impact, a suitable environmental professional should be engaged to further assess the Site and consider requirements for any additional assessment; and
- This report must be read in conjunction with the attached Statement of Limitations.

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1.0 INTRODUCTION

Environment & Natural Resource Solutions (ENRS Pty Ltd) were commissioned as independent environmental consultants in April 2021 by *Maker ENG* (the client) to conduct a Stage 1 Preliminary Site Investigation (PSI) to assess the premises located at 365 Marshall Mount Road, Marshall Mount, NSW, 2530 (*herein referred to as the Site*).

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1.1 OBJECTIVES

The aim of the project was to collate and review historical records of the Site to assess if the Site will pose no unacceptable risk to human health or to the environment. This information has been used to outline recommendations for further investigations, **if any, and provide a statement regarding the suitability of the Site for the proposed future residential land use to address Development Approval (DA) conditions issued by Wollongong City Council (Council).**

1.2 SCOPE OF WORK

The scope of work for the project comprised the following tasks:

- Review available Site history records incorporating previous investigation reports (where available), proposed development plans, publicly available data (including aerial photographs, geological maps, topographical maps, and registered groundwater bore database) to identify any past or present potentially contaminating activities and or any potential Areas of Environmental Concern (AECs);
- Site inspection to investigate for potential sources of contamination or uncontrolled Fill (17/05/2021); and
- Document investigation results and prepare a PSI report with a statement of Site condition, suitability and recommendations for additional investigation works or ongoing environmental management, if required.

2.0 SITE DESCRIPTION

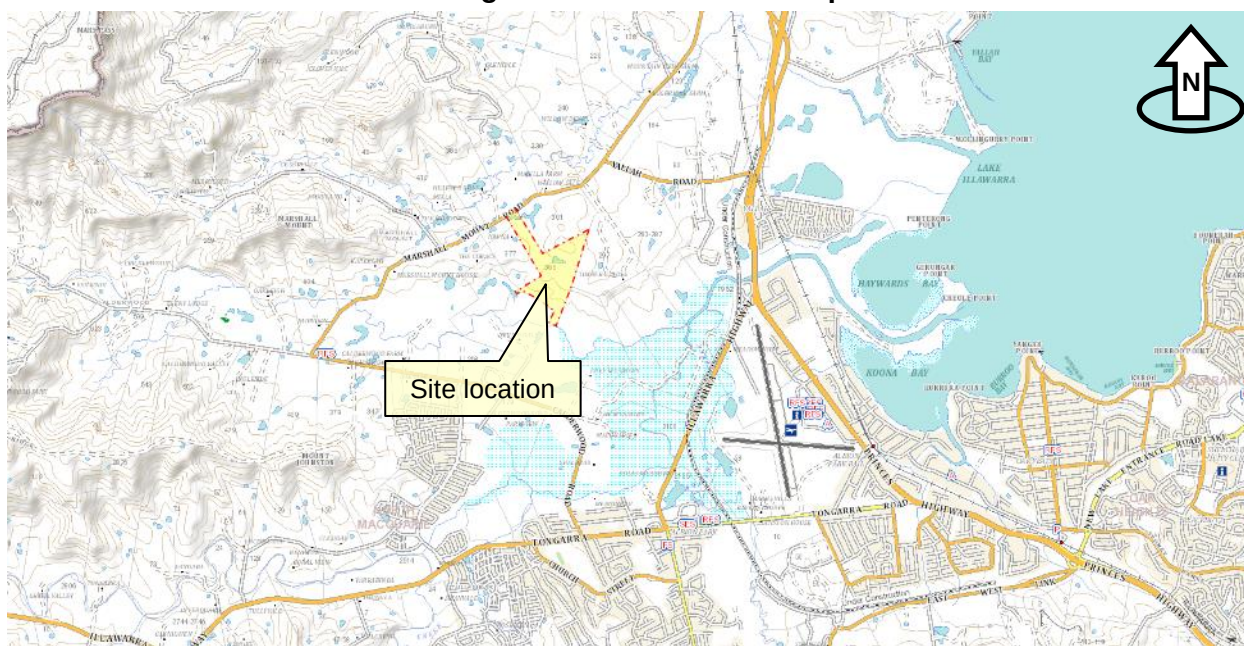
2.1 SITE IDENTIFICATION

The Site is located on the southern side of Marshall Mount Road, approximately 2.45 kilometres west of the Princes Highway, as shown in **Figure 1**. The key features required to identify the Site are presented in **Table 1** below.

Table 1: Site Identification

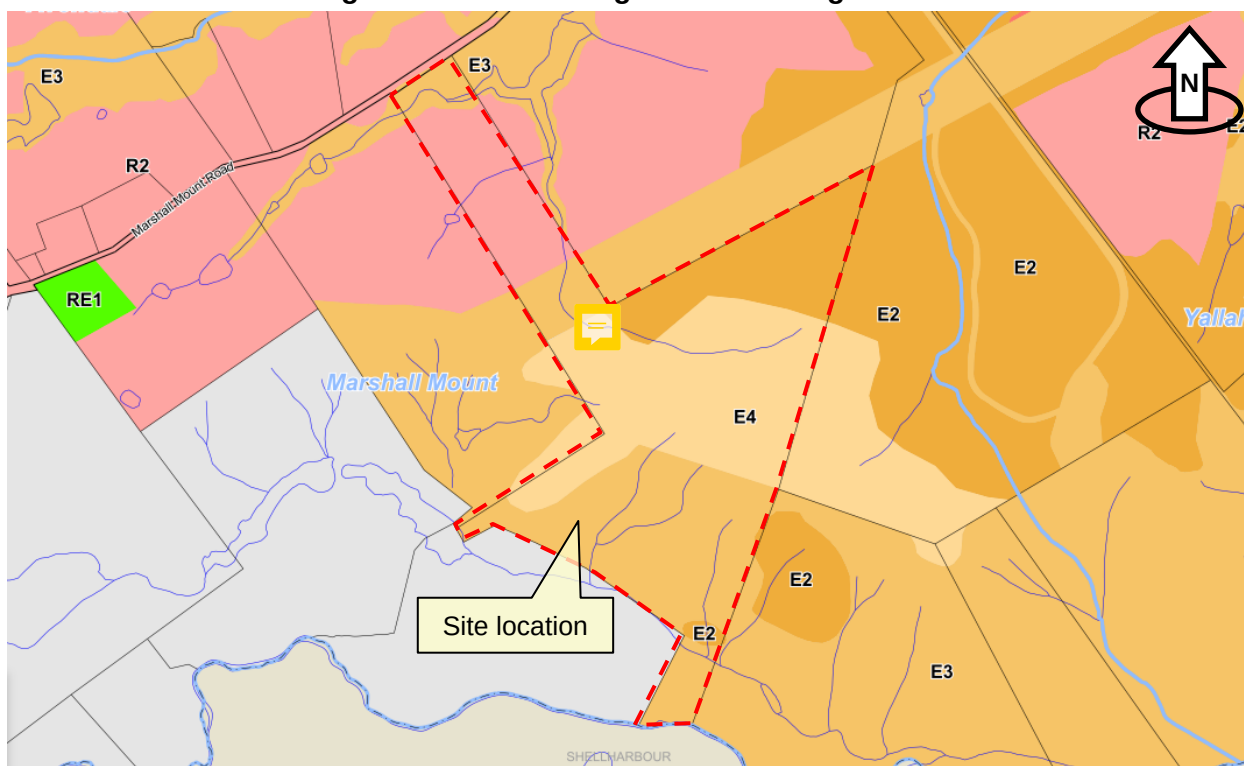
SITE	DESCRIPTION
Street Address	365 Marshall Mount Road, Marshall Mount, NSW, 2530
Lot / Deposited Plan	8 / 626078
Property Description	-
Current Certificates of Title	-
Easting / Northing	294246 / 6175487 (main residence)
Current Owners	Keith S. Johnson & Kerrie A. Johnson
Current Occupiers	Keith S. Johnson & Kerrie A. Johnson
Site Area & Perimeter	~36.2 Ha or ~361,879 m ²
Current Zoning	R2 Low Density Residential, E2 Environmental Conservation, E3 Environmental Conservation & E4 Environmental Living
Local Government Area	Wollongong City Council
Locality Map	Albion Park 9028-1N
Trigger for Assessment	CLM Act 1997 and change in land use sensitivity from rural to residential in accordance with the <i>NSW State Environmental Planning Policy No. 55 (SEPP55)</i> .
Local Council Statutory Controls (if any)	Wollongong City Council Local Environment Plans (LEPs) (2009), associated Development Control Plans (DCPs) and SEPP55.
Legal permissions to Access the Site obtained or required	Works commissioned by <i>Maker ENG</i> as project managers on behalf of the landowner.
Consent of adjoining land owners and/or occupiers to access land (if required)	Not required.

Figure 1: Site Location Map



Source: www.maps.six.nsw.gov.au (cited 11/05/2021)

Figure 2: Land Zoning & Surrounding Land Use



Source: <https://wollongong.nsw.gov.au/development/maps> (cited 11/05/2021)

2.2 SITE LAYOUT

The following points outline the Site layout and activities identified at the time of this investigation. A Site layout plan is provided in **Figure 6** with a photographic record of Site conditions tabled in **Appendix C**. In general, the Site was characterised by a rural landscape serviced by a single residential dwelling and associated sheds. The following points summarise the features present at the property:

- A single residential dwelling was situated in the north of the Site, fronting Marshall Mount Road;
- Two (2) farming sheds and one (1) cattle yard were present to the south-east of the residential dwelling;
- Some minor topographical non-conformities were present in the area surrounding structures on the Site.
- Five (5) smaller farm dams were scattered across the Site. Two (2) large dams were also present, one (1) located in the far north and one (1) located in the centre of the Site.
- One (1) levelled area, presumed to be the result of historical and localised quarrying operations, was present on the eastern boundary of the Site. One (1) raised bund/stockpile was also present nearby the levelled pad.
- The remained of the Site consisted primarily of open grassed agricultural land. Some scattered trees/shrubs were present throughout the Site, primarily along boundary fences and steep southern gullies.
- Two (2) high-voltage powerlines and two (2) low voltage powerlines intersected the Site.

2.3 SURROUNDING ENVIRONMENT

The Site was composed of R2 Low Density Residential, E2 and E3 Environmental Conservation and E4 Environmental Living zoned land. The following adjacent uses have been identified during site inspections and review of aerial photography:

Table 2: Surrounding Land Use

North:	Marshall Mount Road, onto grassed agricultural land (zoned R2 and E3).
East:	Primarily grassed rural-residential land (zoned R2, E2 and E3) onto the Yallah Industrial Estate and Princes Highway.
South:	Marshall Mount Creek, onto grassed rural-residential land. Further onto Macquarie Rivulet and Albion Park.
West:	Primarily grassed agricultural land , further onto Marshall Mount Road.

2.3.1 Sensitive Receptors

The nearest sensitive receptors include:

- Site users;
- Adjacent waterways (Marshall Mount Creek, to the south of the Site);
- Neighbouring properties; and
- Shallow groundwater aquifers within the underlying unconsolidated sediments.

2.4 TOPOGRAPHY

A review of the Site topography was conducted with reference to the current series topographic map sheets (Albion Park 9028-1N) supported by Site inspections.

Site topography is characterised by a localised high point (60m AHD) located in the centre of the Site. South of the high point, the Site slopes steadily to the south-west towards Marshall Mount Creek. North of the high point, the Site dips to the east towards a drainage channel which feeds the farm dams located on the Site's northern boundary.

The regional gradient was observed to dip south towards Marshall Mount Creek with a series of localised undulations. Surface runoff (if any) is expected to be captured by localised drainage channels throughout the Site which are directed towards on-Site water storage dams or Marshall Mount Creek.

2.5 GEOLOGY

A review of the geological setting was conducted with reference to the site LotSearch (LS020271_EL). The mapped geology shows the Site is primarily underlain by Palaeozoic aged Berry Siltstone (Psb) comprising bluish grey to light grey siltstone, shaly in part with bands of silty sandstone. The southern and south-western extremities of the Site are mapped as underlain by Cainozoic alluvium (Qa) consisting of sand, silt and gravel.

2.6 SOIL LANDSCAPE

A review of the soil landscape setting was conducted with reference to the site LotSearch (LS020271_EL). The mapped soil landscape shows the Site is underlain by Dermosol soils, comprising:

- Steep hilly to mountainous with incised stream valleys: steep but more or less rounded hill slopes of brown friable earths (Gn3.21 and Gn3.22) and possibly some (Gn4) soils.

In association with;

- At the higher altitudes, steep hill slopes of sandy soils (Uc4.2), loamy soils having an A2 horizon (Um4.2) with yellow-brown earths (Gn2.44), and possibly (Uc6.11) and (Um5.41) soils;
- At the lower altitudes, moderate to steep slopes of hard acidic yellow mottled soils (Dy3 21 and Dy3.41), hard acidic red soils (Dr2.21), and yellow leached friable earths (Gn3.54); and narrow incised stream valleys of various soils including (Um6.11) and (Dy) soils.

2.7 HYDROGEOLOGY

Based on the Site geology groundwater in the area is expected to be associated with the following aquifer systems;

- *Shallow unconfined* systems hosted in the unconsolidated soil, clay and sand, often ephemeral associated with rainfall recharge, with elevated salinity, and a shallow groundwater table generally less than 5 metres within low lying areas; and
- *Deep dual porosity aquifer (fractured and porous rock)* systems hosted in the underlying rock sequences with low to moderate yields, elevated salinity and standing water levels generally deeper than 10 metres

Review of registered bore database identified eleven (11) groundwater bore within a two (2) kilometre radius of the Site as shown in **Figure 3** below. The bores were registered for domestic, irrigation and stock purposes. Surrounding groundwater bores were located either up-gradient of the Site, separated from the Site by a hydraulic barrier, or at a sufficient distance from the Site so that they were not inferred to be hydraulically connected. Hence, Site activities were considered unlikely to impact existing groundwater users in the area.

Figure 3: LotSearch Summary of Registered Bores



GW No.	Licence No	Work Type	Owner Type	Authorised Purpose	Intended Purpose	Name	Complete Date	Final Depth (m)	Drilled Depth (m)	Salinity (mg/L)	SWL (m bgl)	Yield (L/s)	Elev (AHD)	Dist	Dir
GW105700	10BL161971, 10WA106376	Bore	Private	Domestic	Domestic		12/02/2004	72.00	72.00		43.00	0.200		320m	North West
GW022780		Bore	Private		Not Known		01/01/1961	8.20	8.20					799m	South West
GW053056	10BL117208	Bore	Private	Domestic, Irrigation, Stock	Irrigation		01/12/1980	60.00	68.00					822m	South West
GW031515	10BL023229, 10WA105927	Bore open thru rock	Private	Farming, Stock	Stock		01/12/1966	30.40	30.50	Salty				966m	South
GW031499	10BL023339	Excavation	Private	Irrigation	Irrigation			6.40						1037m	South
GW072936		Bore	Private		Domestic, Stock		01/01/1992	60.00	60.00					1090m	West
GW033073	10BL023895	Bore	Private	Not Known	Irrigation			60.90	61.00					1109m	West
GW111018	10BL165494, 10BL601379, 10CA106736	Bore	Private	Domestic, Irrigation, Stock	Irrigation		01/01/2004	66.00	66.00	530	5.00	0.550		1645m	South
GW102352	10BL158778, 10BL603186, 10WA106544	Bore		Domestic, Industrial, Irrigation, Stock	Domestic, Stock		01/01/1940	60.00			5.00	0.667		1710m	West
21410002					UNK								13.94	1785m	South
GW007261	10BL009382, 10WA105874	Bore open thru rock	Private	Domestic, Stock	Domestic, Stock		01/05/1959	30.10	30.20	Good				1910m	North West

Source: LotSearch LS0202771_EL(cited 11/05/2021)

2.8 POTENTIAL ACID SULPHATE SOILS ASSESSMENT (PASSA)

A desktop assessment was conducted for Potential Acid Sulphate in Soil (PASS) with reference to the eSPADE online Acid Sulphate Soil Risk maps; NSW Gov. SEED datasets; and the Wollongong City Council PASSA resources.

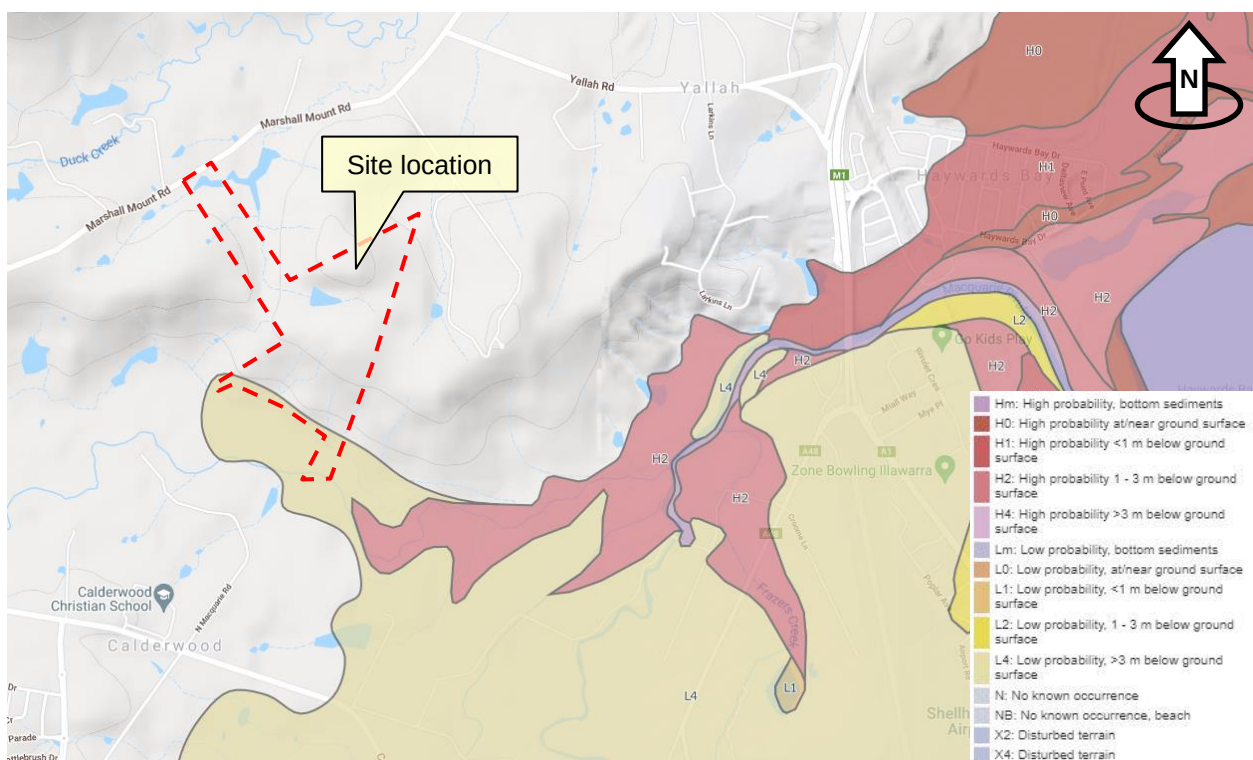
2.8.1 eSPADE online Acid Sulphate & SEED Soil Risk Maps

The majority of the Site is mapped in an area classed as 'Not Assessed'. Isolated southern extremities of the Site adjacent to Marshall Mount Creek were mapped as 'L4 low probability >3m below ground surface' as shown in **Figure 4** below.

2.8.1 Shoalhaven City Council PASSA Resources

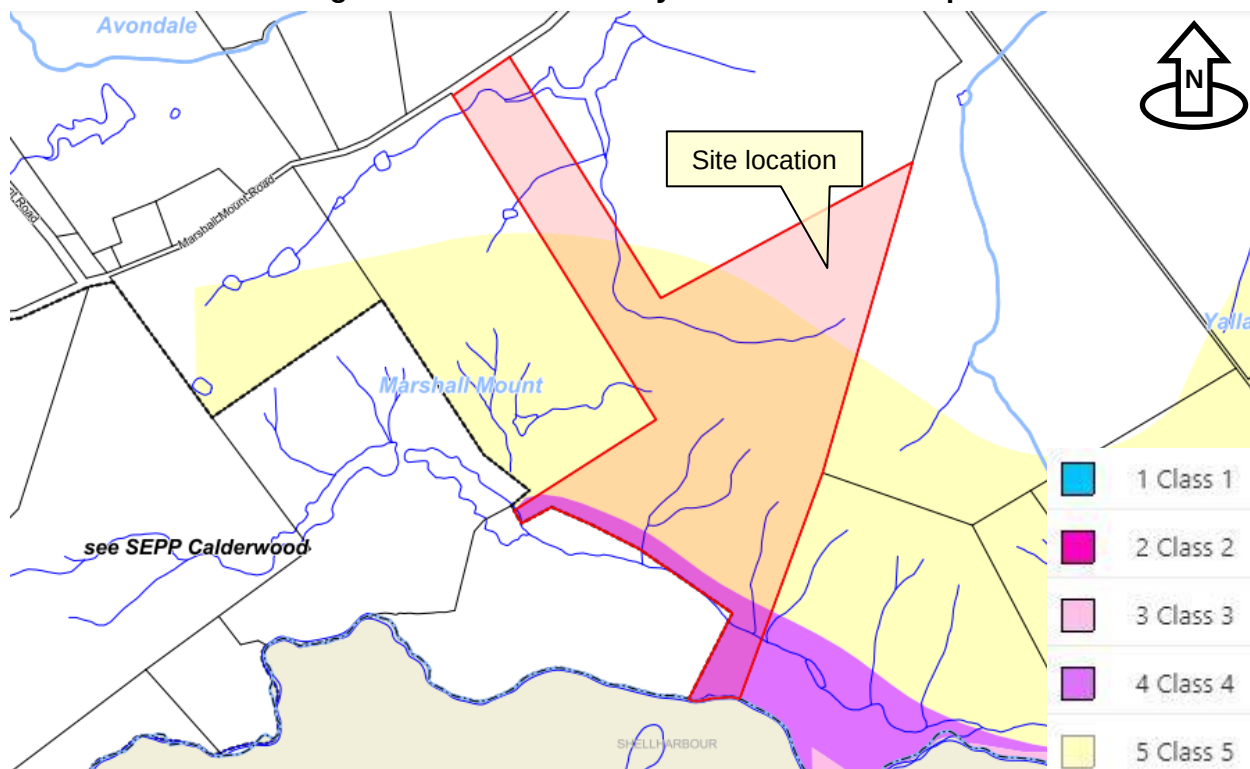
Review of Wollongong City Council online resources listed a portion of the Site as existing within a Class 4 and Class 5 risk area for Acid Sulphate Soils. Class 4 indicates that acid sulphate soils may be encountered by works more than 2 metres below the natural ground surface. The mapped areas were limited to the southern extremities of the Site adjacent to Marshall Mount Creek. Class 5 indicates that the area is within 500m of adjacent Class 1, 2, 3 or 4 soil. Acid Sulphate Soils are not typically encountered within Class 5 areas. The northern portions of the Site were not mapped within a known acid sulphate soil risk area as shown in **Figure 5** below.

Figure 4: eSPADE/SEED Potential Acid Sulphate Soil Map



Source: environment.nsw.gov.au/eSpade2WebApp (cited 11/05/2021)

Figure 5: Shoalhaven City Council PASSA Map



Source: <https://wollongong.nsw.gov.au/development/maps> (cited 11/05/2021)

2.8.2 Potential Acid Sulphate Soil Risk Assessment

Based on the mapped surrounding areas, the Site is considered to present a low risk for PASS. The existence of Marshall Mount Creek bordering the southern extremity of the Site may present a localised risk of PASS. If further proposals are to include earthworks, soil materials should be subject to visual screening for PASS indicators including grey mottled soils, rotten egg smell and oxidising soils or field testing conducted by a suitably qualified person in accordance with NSW Acid Sulphate Soils Management Advisory Committee (ASSMAC;1998) guidelines and with consideration of the NSW RTA (2005) Guidelines for the Management of Acid Sulphate Materials.

3.0 SITE CONDITION & SURROUNDING ENVIRONMENT

The following **Table 3** outline the observed Site conditions and surrounding environment at the time of this investigation based on the requirements of the ASC NEPM Field Checklist for 'Site Information'. A Site layout plan is provided in **Figure 6** with a photographic record of Site conditions tabled in **Appendix C**.

Table 3: Summary of observed Site Conditions & Surrounding Environment

ITEM	DESCRIPTION
1. Site inspection (date, by whom)	Site works completed by Christopher Allen (LAA001457) & Taite Beeston (LAA001484) on 17/05/2021
2. Topography of site and in relation to surrounding land	The Site primarily conformed with the surrounding topography and a localised high point bisected the Site. South of the high point, the area sloped steadily to the south-west towards Marshall Mount Creek. North of the high point, the area sloped to the east towards a localised drainage channel. Some minor topographic unconformities related to the construction of a dams, spillways and building footprints were present.
3. Elevation	Review of the topographic maps indicates the site elevation generally ranges between ~5 and ~60 m Australian Height Datum (AHD).
4. Position on slope (e.g. Crest, upper slope, mid slope, lower slope, flat), including direction	The Site is bisected by a localised high point with steadily sloping gradients to the north and south.
5. Quantification of slope (if required) as percentage slope	~10% average, 20-25% in steep gullies.
6. Summary of local meteorology - nearby weather stations (e.g. Annual range in monthly temperature, precipitation, seasonal variations)	Based off data obtained through BOM climate statistics for Albion Park (Shellharbour Airport, Station ID 068241) for the period of 1999 to 2021, the mean maximum temperature is 27°C (January) and the mean minimum temperature is 6.3°C (July). Mean maximum rain fall is 142.7mm (February) and mean minimum rainfall is 41.8mm (September) with an annual rainfall of 911.7mm.
7. Climatic conditions	The site was dry at the time of inspection with no heavy rainfall within 24 hrs.

ITEM	DESCRIPTION
8. Current land use	Generally open, grassed agricultural land being used for cattle grazing and rural-residential purposes.
9. Surrounding land uses (north, south, east, west) noting apparent condition.	North: Marshall Mount Road, onto grassed agricultural land (zoned R2 and E3).
	East: Primarily grassed rural-residential land (zoned R2, E2 and E3) onto the Yallah Industrial Estate and Princes Highway.
	South: Marshall Mount Creek, onto grassed rural-residential land. Further onto Macquarie Rivulet and Albion Park.
	West: Primarily grassed agricultural land, further onto Marshall Mount Road.
10. Density of residential use in surrounding area	Low to moderate
11. Boundary conditions	Site was clearly delineated with boundary fencing.
12. Location and conditions of all visible features, including current buildings and surface structures, roads, foundations, positions of former buildings, tanks, pits, wells, drains and bores	➤ Site access road (driveway) exited south off Marshall Mount Road. ➤ One (1) residential dwelling and two (2) detached sheds/outbuildings. ➤ One (1) cattle yards were also present on the Site. ➤ No USTs or AGSTs were present within the Site. One underground water/septic tank was present north-east of the residential dwelling.
13. Site building information:	
➤ Occupancy and use of buildings	Residential and rural/agricultural (outbuildings/sheds) were in use.
➤ Age of buildings	Residential dwelling and outbuildings constructed post-1978.
➤ Construction of buildings including materials (e.g. Wood frame), openings (e.g. Windows, doors), and height (e.g. One storey, multistorey)	Single storey weatherboard & corrugated iron. Windows present.
➤ Number of storeys	All buildings single storey.
➤ Height of storeys	Standard single storey height.
➤ Foundation type (e.g. Basement, crawlspace, slab on ground), if combination then percentage	Slab on ground.

ITEM	DESCRIPTION
➤ Depth below grade to base of foundation	Unknown.
➤ Foundation construction for both floor and subsurface walls (e.g. Poured concrete, concrete block, brick, timber)	Unknown.
➤ General condition of foundation (cracks, openings)	Unknown, presumed fair-good condition.
➤ Elevator shafts	N/A
➤ Sub-slab ventilation systems or moisture vapour barriers below buildings	Unknown.
➤ Sumps or drains or wells inside buildings	Unknown, presumed associated with standard residential plumbing.
➤ Attached garage	Yes.
➤ Below building parking	No.
➤ Chemical use and storage	Standard rural residential. No evidence of gross chemical storage.
➤ Type of cooling and heating systems (e.g. Natural gas, oil, radiant, steam, electrical)	Unknown.
➤ Equipment location (e.g. Basement, crawl space, roof)	Unknown.
➤ Air intake and exhaust units	Unknown.
➤ Source of return air (e.g. Inside air, outside air, combination)	Unknown.
➤ System design consideration relation to indoor air pressure (e.g. Positive pressure is often the case for commercial buildings)	Unknown.
14. Condition and type of surface cover e.g. Bare ground, asphalt, concrete, gravel etc and estimate of percentage of site occupied by buildings, landscaped areas, paved or non-paved areas	Predominantly grassed with some areas of gravel and dirt (excluding the driveway and building footprints).
15. Chemical storage and transfer areas, including the presence of waste or chemical containers	Non observed in immediate proximity.

ITEM	DESCRIPTION
16. Details of above ground and underground storage systems and associated infrastructure (number, location, capacities, contents, age, construction, condition, bunding & spill control)	None observed or previously licensed.
17. Underground storage tanks (USTs)- product stored, volume, direct or remote fill points, dispenser bowsers, contained or uncontained fill points, underground piping and ventilation points, dip stick volume gauge, age of tank, records of spills or stock loss	None observed or previously licensed.
18. Above ground storage tanks (ASTs)- product stored, volume, remote fill, bunded or unbunded containment area, staining within bund, staining outside bund, bund plug in place, staining around bund plug, nearby drains, record of spills or stock losses	None observed or previously licensed.
19. Evidence of debris, waste disposal, lagoons, drums, chemical storage or other indicators of potential contamination sources	None observed.
20. Locations of settlement ponds	None observed.
21. Description and location of services and utilities including on-site septic systems	Optus service identified to intersect the centre of the Site via a Dial Before You Dig online search.
22. Identification of electrical transformers/substation/capacitors	No transformers/substations/capacitors. Two (2) high voltage and two (2) low voltage powerlines intersect the Site.
23. Odours	None observed.
24. Visible signs of contamination such as discolouration or staining on the surface of soil or water, bare soil patches - on-site and at site boundaries	No visual or olfactory evidence of chemical or hydrocarbon contamination identified across the Site.

ITEM	DESCRIPTION
25. Presence of any <u>stockpiled</u> material, imported soil or fill material as well as any signs of settlement, subsidence or disturbed ground	One levelled area located on the eastern boundary of the Site, presumed to be the result of on-Site “quarrying” or material generation operations.
26. Vegetation type and extent of cover (e.g. Scattered, sparse, dense, absent, invasive, native)	Predominantly grassed with scattered trees (medium to large, predominantly Eucalyptus).
27. Condition of vegetation (noting visibly distressed, disturbed or dead vegetation)	No major vegetation stress observed.
28. Assessment of soil loss or deposition that has occurred in the past and evaluation of the future erosion potential	Soil deposition assessed to be intentional in filled areas.
29. Visible signs of erosion (on and off-site)	Some erosion observed within/surrounding drainage features throughout Site. More-so within steep southern gullies.
30. Surface water bodies (e.g. Lakes, rivers, streams, wetlands), fresh/marine and distance from site	Yes. Five (5) small dams and two (2) large dams. Associated drainage channels present.
31. Surface water drainage (e.g. Drainage bores, soak wells, sumps) and run-off and identification of ponding areas (and potential for flooding)	Surface water drainage expected to be captured by on-Site water bodies or directed towards Marshall Mount Creek adjacent the Sites southern boundary.
32. Direction of flow of water runoff from the site and adjacent properties	As above.
33. Depth of any standing water, the direction and rate of flow of rivers, streams or canals, together with their flood levels and any tidal inundations	Unknown.
34. Surface water and groundwater use on site including rate and location of abstractions (current and historical)	None observed.
35. Evidence of possible naturally occurring contaminants	None observed
36. Identification of environmentally sensitive or significant features or habitats	Site users, adjacent waterways (Marshall Mount Creek).

ITEM	DESCRIPTION
37. Evidence chemical substances have migrated or are likely to have migrated to a neighbouring site and is or is likely to be causing contamination of the neighbouring property	Non observed
38. Photographs of site and surrounding adjacent land, showing significant features, topography, nature of surface and existing structures)	Refer to photographic log or Site conditions attached.
39. Differences between current site condition and site history	Comparison of the historic aerial imagery and current Site conditions include the removal of some vegetation and construction of structures and dams.

4.0 SITE HISTORY

4.1 PREVIOUS REPORTS

ENRS understands the Site has not previously been the subject of any environmental or geotechnical assessments. Hence, no former reports were reviewed as part of this PSI.

4.2 HISTORICAL TITLES

A search of prior and cancelled land titles was undertaken to document the timeline of previous landowners and their occupation which provides an indication of potential contaminating activities associated with previous land use.

Available prior & cancelled land titles were limited for the Site with available records online not displaying information regarding prior occupation of Site owners of historical land use. The review of the historical imagery and Site inspections was considered adequate to determine any partially contaminated land. Available cancelled titles are summarised in **Table 4** below with copies of cancelled titles provided in **Appendix A**.

Table 4: Summary of Cancelled Titles

Date	365 Marshall Mount Road, Marshall Mount
24/01/1817	Estate in Fee Simple in Lot 8 in Deposited Plan 626078 at Yallah in the City of Wollongong Parish of Calderwood and County of Camden being part of Portion 11 granted to George Johnston Senior.
Unknown	Monica Mary Jones and George Adam Heining as Joint Tenants.
13/04/1984	Alexander Wilson and Aileen Adell Wilson as joint tenants in ½ share and William Paul Wilson in ½ share as tenants in common by Transfer V65310/ Registered 13.4.1984.
28/05/1985	V717806 Mortgage to Westpac Banking Corporation. Registered 28-5-1985.

4.3 HISTORICAL AERIAL IMAGERY

Historical aerial photographs of the Site area were reviewed to identify potential contaminating land use and relevant changes in Site conditions. Copies of the imagery are provided in **Appendix B**. The key observations made from the review of aerial photography are summarised in **Table 5**.

Table 5: Summary of Historical Aerial Photography

Year	Description of Site condition and surrounding land use
1948-51	Site comprised primarily cleared agricultural land. Scattered vegetation along fences and the eastern portion of the Site.
1961	Site appeared largely unchanged from 1948-51 Aerial Imagery. Powerline easement has been cleared and intersects the centre of the Site.

Year	Description of Site condition and surrounding land use
1977-78	Site appeared relatively unchanged from 1961 imagery. No structures present.
2006	Residential structure and two (2) sheds have been constructed in the north of the Site. Raised access road to the site has been constructed through the water body in the Sites north. Additional dams, including the large dam in the centre of the Site have been constructed.

4.4 UPSS RECORDS

The site inspection conducted by ENRS on the **17th May 2021** did not detect any evidence of UPSS infrastructure at the Site. Given that the Site does not have a history of commercial/industrial land use further investigation into UPSS records was not conducted.

4.5 NSW EPA RECORDS

A search of the NSW EPA Contaminated Land register was conducted to assess the potential for contaminated land in the area. The search did not identify records within a 5km radius of the Site. The search results are provided below.

Your search for: Suburb: MARSHALL MOUNT
Notice Type: Declaration of Significantly Contaminated Land

did not find any records in our database.

If a site does not appear on the record it may still be affected by contamination. For example:

- Contamination may be present but the site has not been regulated by the EPA under the Contaminated Land Management Act 1997 or the Environmentally Hazardous Chemicals Act 1985.
- The EPA may be regulating contamination at the site through a licence or notice under the Protection of the Environment Operations Act 1997 (POEO Act).
- Contamination at the site may be being managed under the [planning process](#).

4.6 SAFEWORK NSW DANGEROUS GOODS RECORDS

A registered search of SafeWork NSW records for licences to keep dangerous goods was not conducted as part of this report as the Site has no documented history of commercial/industrial land use. Review of historical information and Site inspection was considered adequate to identify any potential contaminated land.

4.7 FORMER LICENSED ACTIVITIES UNDER POEO ACT 1997

A review of former licenced activities under the POEO Act 1997 was conducted from available records. A summary is provided in **Table 6** below.

Table 6: Former Licenced Activities Under POEO Act 1997

Licence No	Organisation	Location	Status	Issued Date	Activity	Loc Conf	Distance	Direction
4653	LUHRMANN ENVIRONMENT MANAGEMENT PTY LTD	WATERWAYS THROUGHOUT NSW	Surrendered	06/09/2000	Other Activities / Non Scheduled Activity - Application of Herbicides	Network of Features	0m	Onsite
4838	Robert Orchard	Various Waterways throughout New South Wales - SYDNEY NSW 2000	Surrendered	07/09/2000	Other Activities / Non Scheduled Activity - Application of Herbicides	Network of Features	0m	Onsite
6630	SYDNEY WEED & PEST MANAGEMENT PTY LTD	WATERWAYS THROUGHOUT NSW - PROSPECT, NSW, 2148	Surrendered	09/11/2000	Other Activities / Non Scheduled Activity - Application of Herbicides	Network of Features	0m	Onsite

Source: LotSearch LS020271_EL(cited 11/05/2021)

4.8 HISTORICAL BUSINESS DIRECTORIES

A review of historical business directories from 1950-1991 mapped to a premises or road intersection within/surrounding the Site was conducted from available records. No business directory records were identified as shown in **Table 7** below.

Table 7: Historical Business Directories

Map Id	Business Activity	Premise	Ref No.	Year	Location Confidence	Distance to Property Boundary or Road Intersection	Direction
	No records in buffer						

Source: LotSearch LS020271_EL(cited 11/05/2021)

4.9 PFAS INVESTIGATION AND MANAGEMENT PROGRAMS

A review of PFAS investigation and management programs was conducted from available records. No records were identified from the EPA PFAS Investigation Program, Defence PFAS Investigation, Defence PFAS Management Program or Aircservices Australia National PFAS Management Program as shown below in **Table 8**.

Table 8: PFAS Investigation and Management Programs

Id	Site	Address	Loc Conf	Dist	Dir
N/A	No records in buffer				

Source: LotSearch LS020271_EL(cited 11/05/2021)

4.10 UNDERGROUND SERVICE PLANS

The location of underground services can provide conduits and preferential pathways for contaminant migration into or from a Site. Service excavations and trenches may also comprise historical Fill which may require management as waste.

A Dial Before You Dig (DBYD) search was undertaken to compile underground service plans. One (1) underground service was identified to intersect the centre of the Site, running north-east

to south-west. Consideration should be given to the underground service acting as a preferential pathway should contamination be encountered at the Site.

4.11 SITE HISTORY SUMMARY

Review of the available records and available historical data indicates the Site has been used for rural/agricultural purposes for an extended period of time. No UPSS was identified during the Site inspection. The Site is also considered unlikely to be impacted by any surrounding potentially contaminating activities. The primary Areas of Environmental Concern (AECs) identified in the Stage 1 PSI and this supplementary Site history review are:

- **AEC01** – Entry roadway;
- **AEC02** – House area;
- **AEC03** – Outbuildings/sheds;
- **AEC04** – Cattle yards;
- **AEC05** – Farm dams;
- **AEC06** – Unknown stockpile; and
- **AEC07** – General site area.

5.0 SITE CHARACTERISATION (SUMMARY)

At the time of this investigation the Site was still being utilised for residential purposes and agricultural use. One (1) residential dwelling, two (2) outbuildings/sheds and one (1) cattle yard were present at the Site. Two (2) high-voltage and two (2) low voltage powerlines intersected the Site and seven (7) farm dams were scattered throughout. The majority of the Site comprised grassed agricultural land with scattered trees in the eastern and southern portions.

A review of historical records indicated that the Site has been used for residential and agricultural purposes for an extended time period. Based on the surrounding topography, the area is expected to present a moderate hydraulic gradient to the south towards Marhsall Mount Creek and Macquarie Rivulet.

6.0 CONCEPTUAL SITE MODEL

The NSW EPA contaminated sites guidelines reference the *National Environment Protection (Assessment of Site Contamination) Amendment Measure 2013 (No. 1)*. The ASC NEPM (2013) recommends a tiered approach to risk assessment of ground contamination and the development of an appropriate Conceptual Site Model (CSM). The CSM describes the source(s) of contamination, the pathway(s) by which contaminants may migrate through the various environmental media, and the populations (receptors, human or ecological) that may potentially be exposed. The following sub-sections outlines the key elements of the **CSM** subject of this assessment.

6.1 SOURCES / POTENTIAL CONTAMINANTS

Based on the review of the documented Site history and Site inspection the Contaminants of Potential Concern (CoPC) are outlined in **Table 9**.

Table 9: AECs & Contaminants of Potential Concern (CoPC)

Areas of Environmental Concern (AEC)	Historical Activities	CoPC
AEC01 – Entry Roadway	• Fill used within roadway construction	➤ Total Recoverable Hydrocarbon (TRH C6-C40) ➤ Polyaromatic Hydrocarbons (PAHs). ➤ Benzene, Toluene, EthylBenzene, and Xylenes (BTEX). ➤ 8 Heavy Metals (Arsenic, Cadmium Chromium, Lead Mercury, Nickel, Zinc) ➤ Pesticides (OCPs, OPPs, PCBs) ➤ Asbestos.
AEC02 – House Area	• Cut / fill activities	
AEC03 – Outbuildings / Sheds	• Weather of potential heavy metal-based paints and asbestos materials • Storage of chemicals	
AEC04 – Cattle Yards	• Agricultural land use	
AEC05 – Farm Dams	• Cut / fill activities	➤ 8HM, OCPs, OPPS, insecticides, herbicides, fungicides, pathogens
AEC06 – Unknown Stockpile	• Material of unknown origin	➤ TRH, PAH, BTEX, 8HM, Pesticides, Asbestos
AEC07 – General Site Area	• Agriculture, application of pesticides/herbicides	➤ TRH, PAH, BTEX, 8HM, Pesticides/herbicides.

Source: based on Table J1, Appendix J, in AS4482.1 (2005).

6.2 PATHWAYS

Given the primary source of potential contamination is associated with shallow soils and the rural/agricultural land use, the primary contaminant migration and exposure pathways comprise:

- Dermal exposure to surface and near surface contaminants;
- Inhalation and/ or ingestion of dust or air bound contaminants for surface soils;
- Leaching and migration of contaminants through the vadose zone; and
- Migration in shallow groundwater – characterised by a low hydraulic gradient in unconfined alluvial sediments.

6.3 RECEPTORS

The receptors comprise:

- Human health – dermal / ingestion / inhalation - excavations, dust, fibres and soil gas / vapour) – commercial workers; and
- Shallow soil, stormwater and groundwater – vertical and lateral migration of contaminants (if any) and connectivity with the drainage waterways.

7.0 DATA GAP ASSESSMENT

Areas of Environmental Concern identified by this PSI are based on the Site conditions and information available at the time of this assessment. No hazardous materials (HAZMAT) surveys were conducted on buildings or structures located within the Site as part of this assessment.

8.0 ENVIRONMENTAL SITE ASSESSMENT

Ground conditions across the majority of the Site conformed with the surrounding landscape and no visual or olfactory indicators of gross ground contamination were observed. Areas of Environmental Concern identified by this PSI were not considered representative of broader ground conditions at the Site. Given the relatively undisturbed nature of the Site, ENRS recommend ***the Site was generally considered suitable or capable of being made suitable for the proposed land use pending the assessment of the identified AECs in accordance with NSW State Environmental Planning Policy No. 55 (SEPP55).***

9.0 CONCLUSIONS & RECOMMENDATIONS

Based on the available information reviewed during the scope of works the following conclusions and recommendations are provided.

9.1 CONCLUSIONS

- The Site history records indicated that the Site had been used for rural and agricultural purposes for an extended period of time;
- The Site inspection was conducted on the **17th May 2021** and confirmed the Site condition was consistent with the documented history and land use;
- The Areas of Environmental Concern (AECs) identified during this preliminary Site investigation included;
 - AEC01 – Entry roadway;
 - AEC02 – House area;
 - AEC03 – Outbuildings / sheds;

- AEC04 – Cattle yards;
 - AEC05 – Farm dams;
 - AEC06 – Unknown stockpile
 - AEC07 – General site area
- No evidence of a former Underground Petroleum Storage System (UPSS) was identified through the review of available records and during the Site inspection; and
- Review of available online acid sulphate soil datasets identified that the Site presents a *low* risk of potential acid sulphate soils.

9.2 RECOMMENDATIONS

- It is recommended that the identified Areas of Environmental Concern are assessed in accordance with the Guidelines for Consultants Reporting on Contaminated Sites (NSW EPA;2020);
- Buildings within AEC02 and AEC03 should be subject to a standalone Hazardous Materials (HAZMAT) Survey prior to their demolition;
- If future Site works are to include earthworks, soil materials within low lying areas, specifically adjacent to Marshall Mount Creek, should be subject to visual screening for PASS indicators including grey mottled soils, rotten egg smell and oxidising soils or field testing conducted by a suitably qualified person in accordance with NSW Acid Sulphate Soils Management Advisory Committee (ASSMAC;1998) guidelines and with consideration of the NSW RTA (2005) Guidelines for the Management of Acid Sulphate Materials;
- Given the relatively undisturbed nature of the Site, ENRS considered that the Site was generally considered suitable or capable of being made suitable for the proposed land use pending the assessment of the identified AECs in accordance with NSW State Environmental Planning Policy No. 55 (SEPP55);
- Should any change in Site conditions, proposed land use or incident occur which causes a potential environmental impact, a suitable environmental professional should be engaged to further assess the Site and consider requirements for any additional assessment; and
- This report must be read in conjunction with the attached Statement of Limitations.

10.0 REFERENCES

- Australian Standard (1999) AS4482.2–1999: Guide to the investigation and sampling of sites with potentially contaminated soil – Volatile substances.
- Australian Standard (2005) AS4482.1–2005: Guide to the investigation and sampling of sites with potentially contaminated soil – Non-volatile and semi-volatile compounds.
- ANZECC and ARMCANZ, 2000. Australian and New Zealand Guidelines for Fresh and Marine Water Quality, Artarmon: Australian Water Association.
- ANZG, 2018. Australian and New Zealand Guidelines for Fresh and Marine Water Quality
- NEPC (2013). National Environment Protection (Assessment of Site Contamination) Measure.
- NSW Department of Environment and Conservation (2017). Guidelines for the NSW Site Auditor Scheme, 3rd ed.
- NSW Department of Environment and Conservation (1997). Guidelines for the Assessment and Management of Groundwater Contamination.
- NSW EPA (2020). Contaminated Land Guidelines: Consultants reporting on contaminated land
- NSW EPA (2015). Guidelines on the Duty to Report Contamination under the Contaminated Land Management Act 1997
- NSW EPA (2014). Waste Classification Guidelines.
- NSW EPA (2014). *Landfarming: Best practice note.*
- NSW EPA (1995) Sampling Design Guidelines. ISBN 0-7310-3756-1.
- NSW Government (2019). *How to Manage and Control Asbestos in the Workplace Code of Practice.*
- NSW Government (2019). *How to Safely Remove Asbestos Code of Practice.*
- Safe Work Australia (2020). Excavation Work Code of Practice.
- Safe Work Australia (2019). How to Manage and Control Asbestos in the Workplace Code of Practice (version 3).
- Safe Work Australia (2019). How to Safely Remove Asbestos Code of Practice (version 2).
- W.A. Government (2009). Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia, May 2009

11.0 LIMITATIONS

This report and the associated services performed by ENRS are in accordance with the scope of services set out in the contract between ENRS and the Client. The scope of services was defined by the requests of the Client, by the time and budgetary constraints imposed by the Client, and by the availability of access to Site.

ENRS derived the data in this report primarily from visual inspections, and, limited sample collection and analysis made on the dates indicated. In preparing this report, ENRS has relied upon, and presumed accurate, certain information provided by government authorities, the Client and others identified herein. The report has been prepared on the basis that while ENRS believes all the information in it is deemed reliable and accurate at the time of preparing the report, it does not warrant its accuracy or completeness and to the full extent allowed by law excludes liability in contract, tort or otherwise, for any loss or damage sustained by the Client arising from or in connection with the supply or use of the whole or any part of the information in the report through any cause whatsoever.

Limitations also apply to analytical methods used in the identification of substances (or parameters). These limitations may be due to non-homogenous material being sampled (i.e. the sample to be analysed may not be representative), low concentrations, the presence of 'masking' agents and the restrictions of the approved analytical technique. As such, non-statistically significant sampling results can only be interpreted as 'indicative' and not used for quantitative assessments.

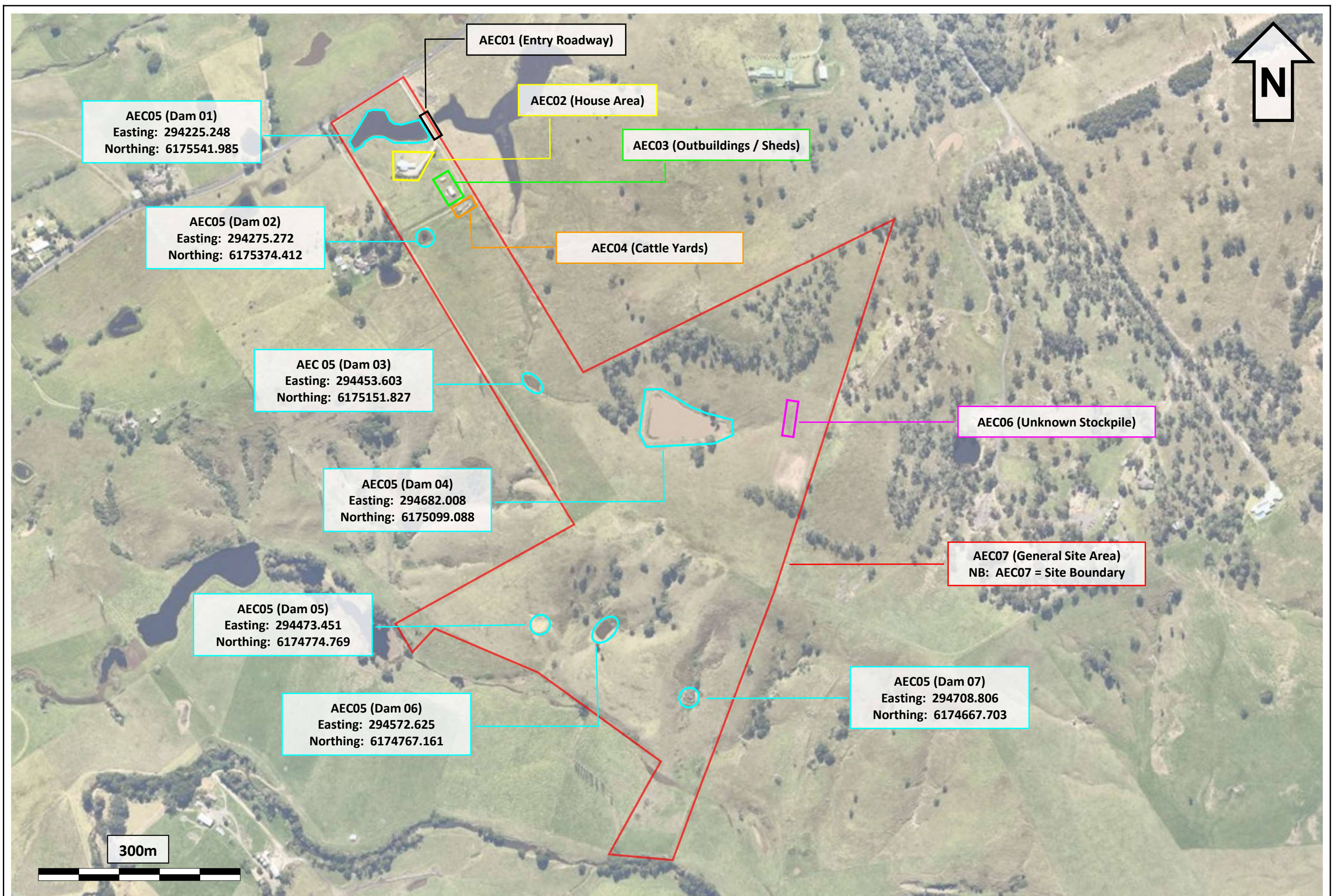
The data, findings, observations, conclusions and recommendations in the report are based solely upon the state of Site at the time of the investigation. The passage of time, manifestation of latent conditions or impacts of future events (e.g. changes in legislation, scientific knowledge, land uses, etc) may render the report inaccurate. In those circumstances, ENRS shall not be liable for any loss or damage that may be occasioned directly or indirectly through the use of, or reliance on, the contents of the report.

This report has been prepared on behalf of and for the exclusive use of the Client, and is subject to and issued in connection with the provisions of the agreement between ENRS and the Client. ENRS accepts no liability or responsibility whatsoever and expressly disclaims any responsibility for or in respect of any use of or reliance upon this report by any third party or parties.

This report is to be independently reviewed by NSW Site Auditor Brad May of *Epic Environmental* prior to issuing to the local authority.

It is the responsibility of the Client to accept if the Client so chooses any recommendations contained within and implement them in an appropriate, suitable and timely manner.

Figures



APPENDICES

Appendix A

Torrens Title Search Results

CERTIFICATE ORDER SUMMARY

Transaction Details

Date: 11/05/2021 14:55

Order No. 68014844

Certificate No: 103505287

Your Reference: ENRS1826

Certificate Ordered: NSW LRS - Copy of Cancelled Title - Cancelled Title CT14859-126

Available: Y

Size (KB): 69

Number of Pages: 2

Scan Date and Time: 19/01/2011 15:00

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SAI Global Property Division an approved NSW Information Broker hereby certifies that the information contained in this document has been provided electronically by the Registrar General in accordance with section 96B(2) of the Real Property Act 1900.

NEW SOUTH WALES



CERTIFICATE OF TITLE

REAL PROPERTY ACT, 1900



14859126

Appln. No.23545

Prior Title Vol.6589 Fol.175

Vol. 14859 Fol. 126

EDITION ISSUED

CANCELLED



I certify that the person described in the First Schedule is the registered proprietor of the undermentioned estate in the land within described subject nevertheless to such exceptions encumbrances and interests as are shown in the Second Schedule.

SEE AUTO FOLIO

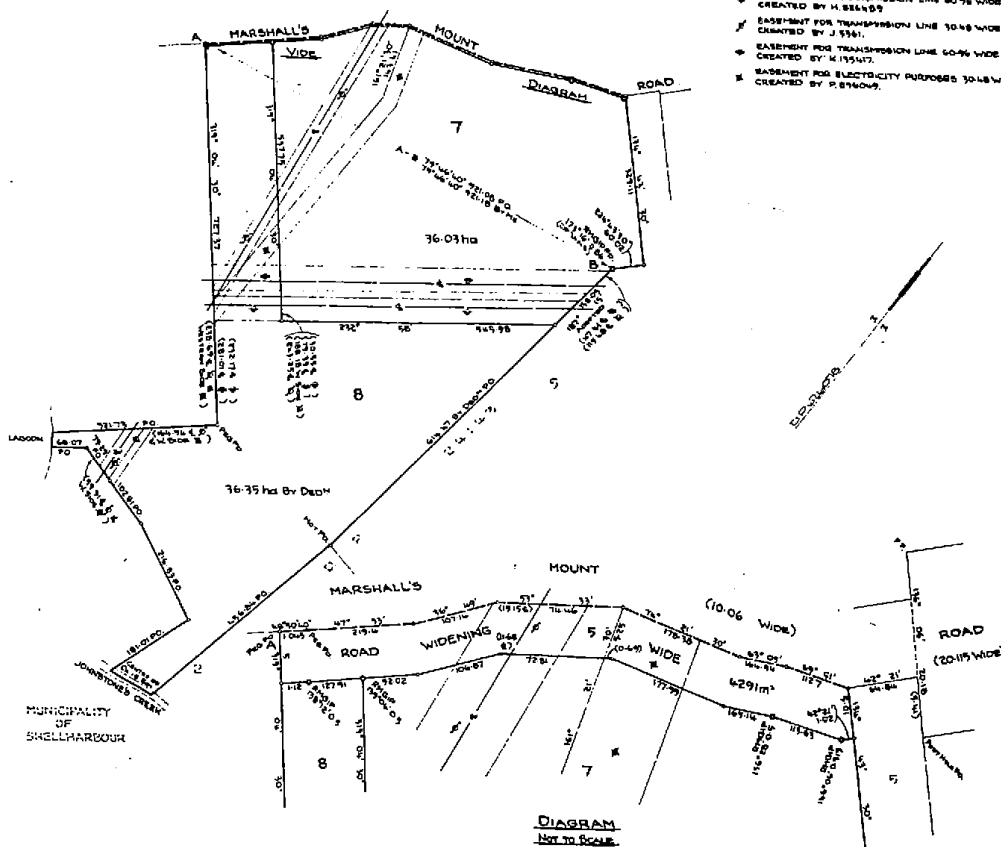
[Signature]

Registrar General.



PLAN SHOWING LOCATION OF LAND

LENGTHS ARE IN METRES



ESTATE AND LAND REFERRED TO

Estate in Fee Simple in Lot 8 in Deposited Plan 626078 at Yallah in the City of Wollongong Parish of Calderwood and County of Camden being part of Portion 11 granted to George Johnston, Senior on 24-1-1817.

FIRST SCHEDULE

~~MONICA MARY JONES and GEORGE ADAM HEININGER as Joint Tenants.~~

GRY

SECOND SCHEDULE

1. Reservations and conditions, if any, contained in the Crown Grant above referred to.
2. H826489^P Easement for transmission line affecting the part of the land above described shown so burdened in Deposited Plan 626078.
3. J5361^P Easement for transmission line affecting the part of the land above described shown so burdened in Deposited Plan 626078.
4. K135417^P Easement for transmission line affecting the part of the land above described shown so burdened in Deposited Plan 626078.
5. L262414^P Caveat by the Registrar General V65310.
6. P896049^P Easement for electricity purposes affecting the part of the land above described shown so burdened in Deposited Plan 626078.

NOTE: ENTRIES RULED THROUGH AND AUTHENTICATED BY THE SEAL OF THE REGISTRAR GENERAL ARE CANCELLED

PERSONS ARE CAUTIONED AGAINST ALTERING OR ADDING TO THIS CERTIFICATE OR ANY NOTIFICATION HEREON

(Page 1) Vol. 14859 Fol. 126

FIRST SCHEDULE (continued)		
REGISTERED PROPRIETOR		Registrar General
Alexander Wilson and Aileen Adell Wilson as joint tenants in $\frac{1}{2}$ share and William Paul Wilson in $\frac{1}{2}$ share as tenants in common by Transfer V65310. Registered 13.4.1984.		<i>[Signature]</i>
CANCELLED SEE AUTO FOLIO		
SECOND SCHEDULE (continued)		
PARTICULARS	Registrar General	CANCELLATION
CV V65310 ^P Covenant. Registered 13.4.1984.	<i>[Signature]</i>	X498745
V65311 Mortgage to Adam Heininger and Monica Mary Jones as joint tenants. Registered 13.4.1984.	<i>[Signature]</i>	
MX V717806 ^P Mortgage to Westpac Banking Corporation. Registered 28-5-1985.	<i>[Signature]</i> 	
NOTATIONS AND UNREGISTERED DEALINGS		
V65310 ^P 13.4.1984 CT 23 NOV 1984 CT 7-3-85 V717806 ^P X498745 6m2		

Appendix B

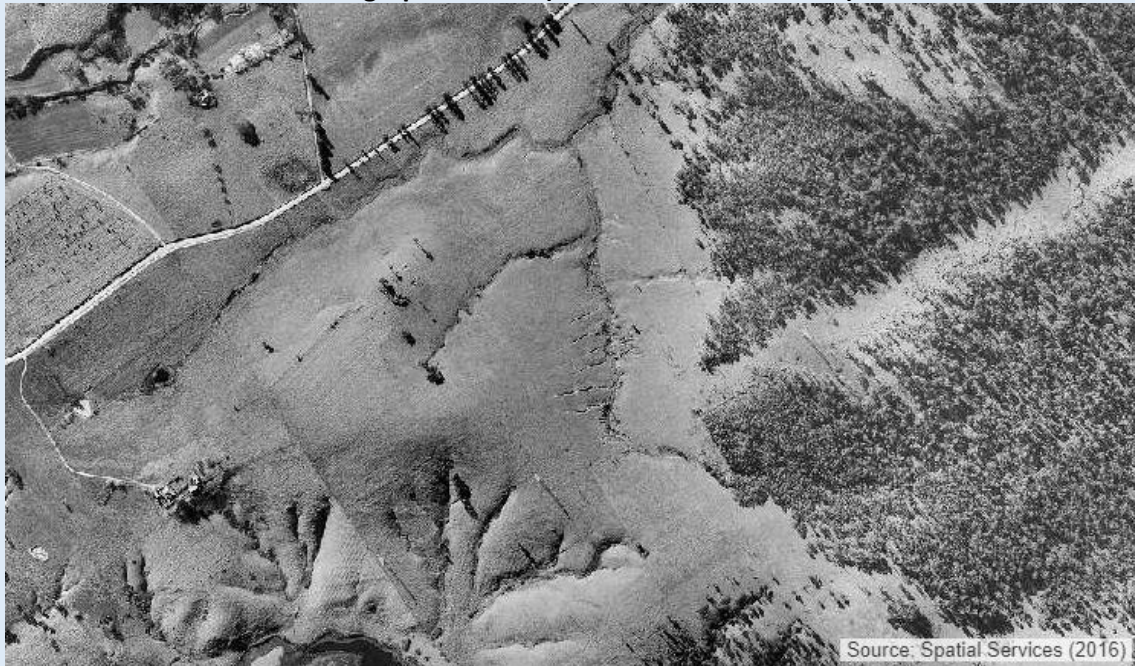
Historical Aerial Imagery

Photograph 1: 1945-51 (Northern Portion of Site)



Source: Spatial Services (2015)

Photograph 2: 1961 (Northern Portion of Site)

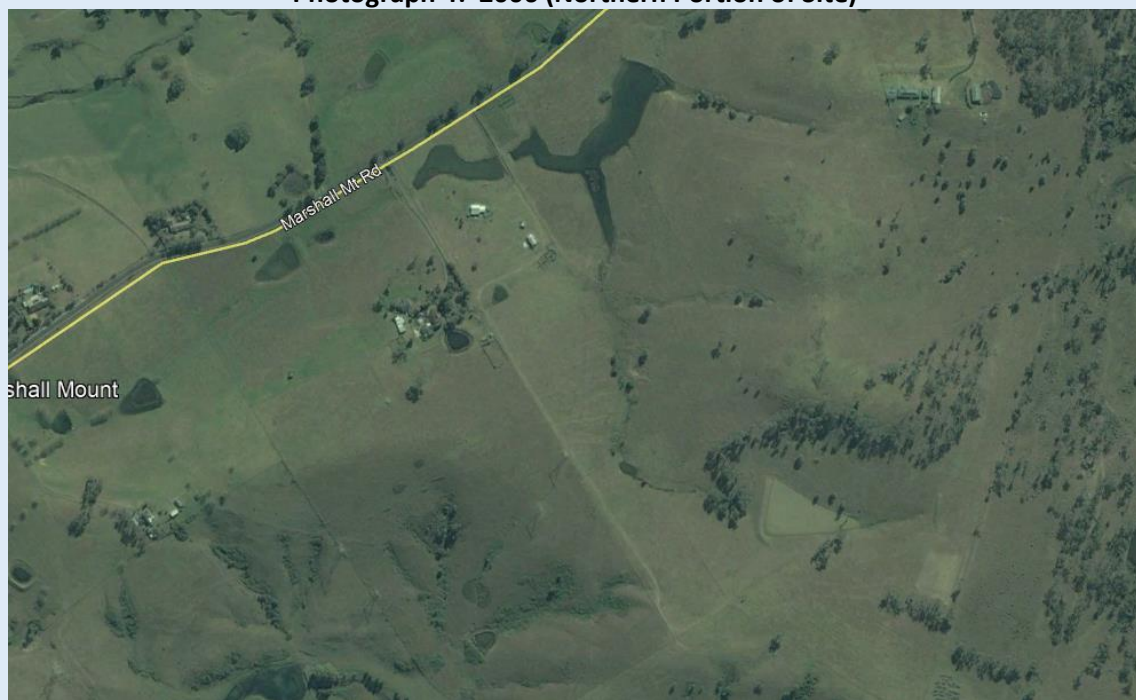


Source: Spatial Services (2016)

Photograph 3: 1977-78 (Northern Portion of Site)



Photograph 4: 2006 (Northern Portion of Site)



Photograph 5: 1948-51 (Full Site)



Photograph 6: 1961 (Full Site)

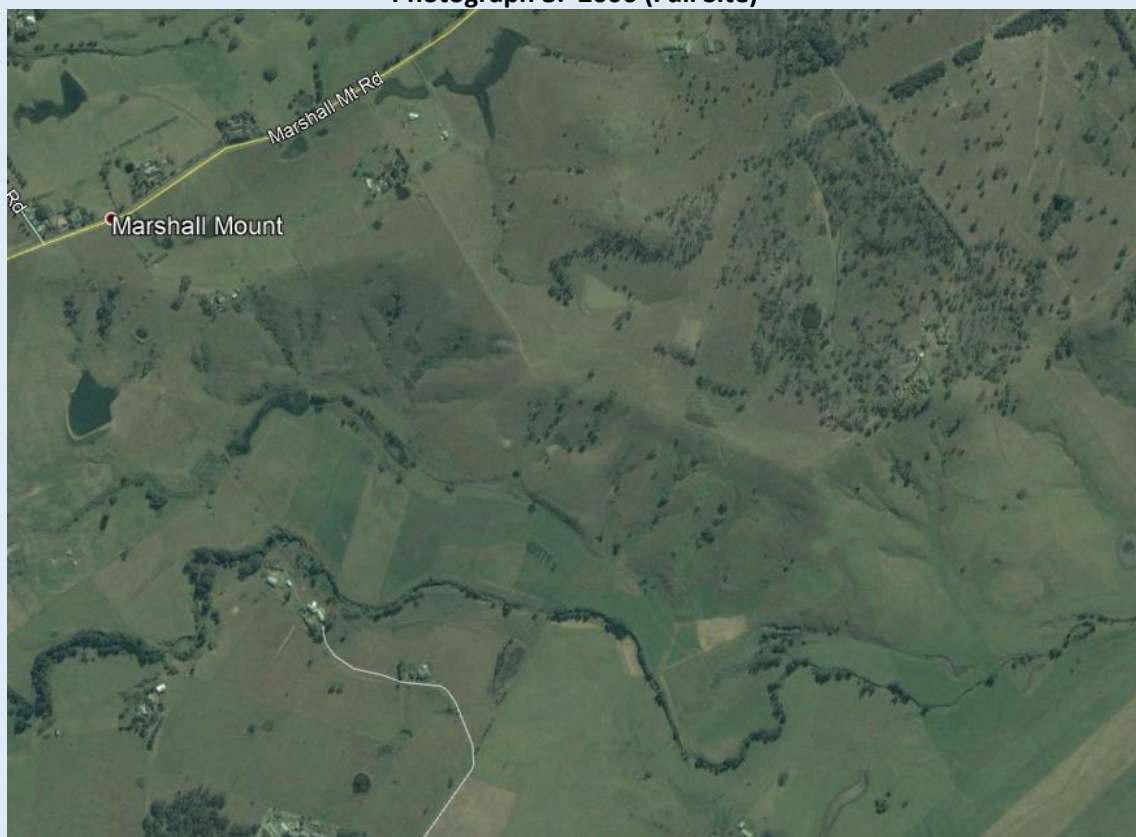


Photograph 7: 1977-78 (Full Site)



1977/1978 - Imagery © AAM Pty Ltd (1977)

Photograph 8: 2006 (Full Site)



Appendix C

Photographic Record of Site Conditions

Photograph 1: AEC01 (Entry Roadway)



Photograph 2: AEC02 (House Area)



Photograph 3: AEC03 (Outbuildings / Sheds)



Photograph 4: AEC03 (Outbuildings / Sheds)



Photograph 5: AEC04 (Cattle Yards)



Photograph 6: AEC05 (Dam 01)



Photograph 7: AEC05 (Dam 02)



Photograph 8: AEC05 (Dam 03)



Photograph 9: AEC05 (Dam 04, Dam Wall)



Photograph 10: AEC05 (Dam 04)



Photograph 11: Southern Portion of Site (AEC05 , Dam 05, 06, 07)



Photograph 12: AEC06 (Unknown Stockpile)



Photograph 13: AEC07 (General Site Area)



Photograph 14: Powerline Easements Intersecting Site



Photograph 15: Levelled Pad / Quarried Area

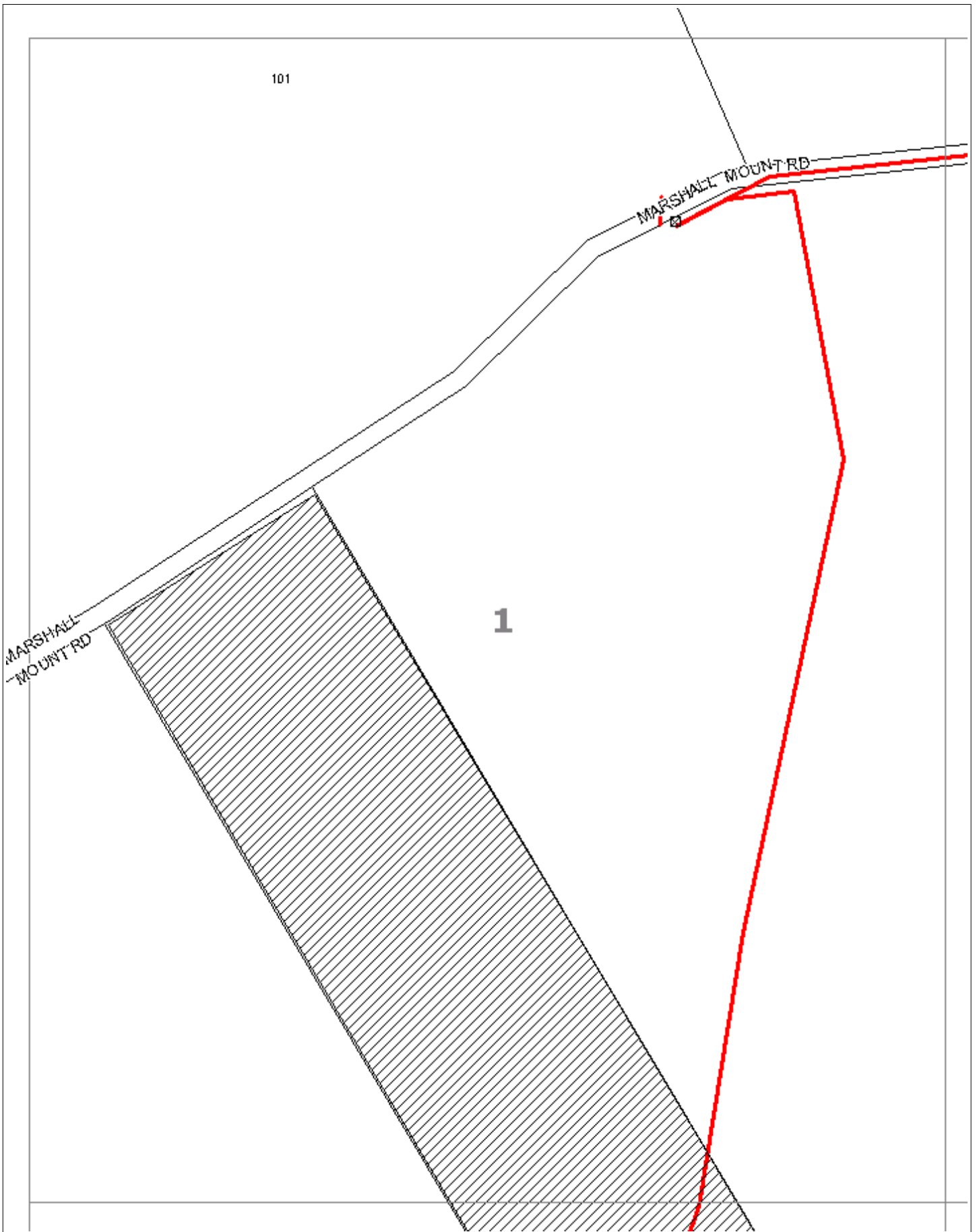


Photograph 16: Stockpiled Natural Material Adjacent Levelled Pad



Appendix D

Dial Before You Dig



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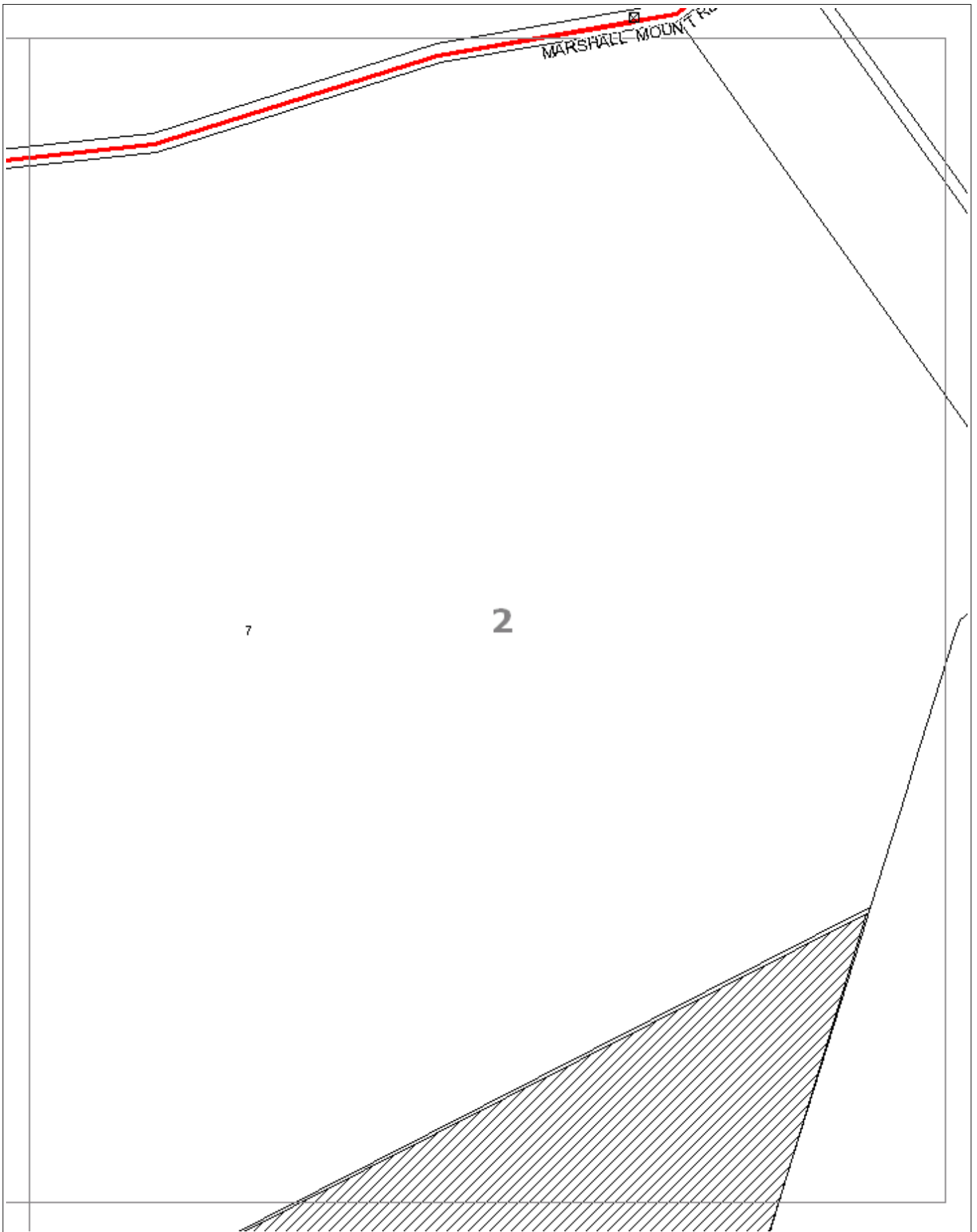
Sequence Number: 109590265

Date Generated: 11/05/2021



For all Optus DBYD plan enquiries –
Email: Fibre.Locations@optus.net.au
For urgent onsite assistance contact 1800 505 777
Optus Limited ACN 052 833 208





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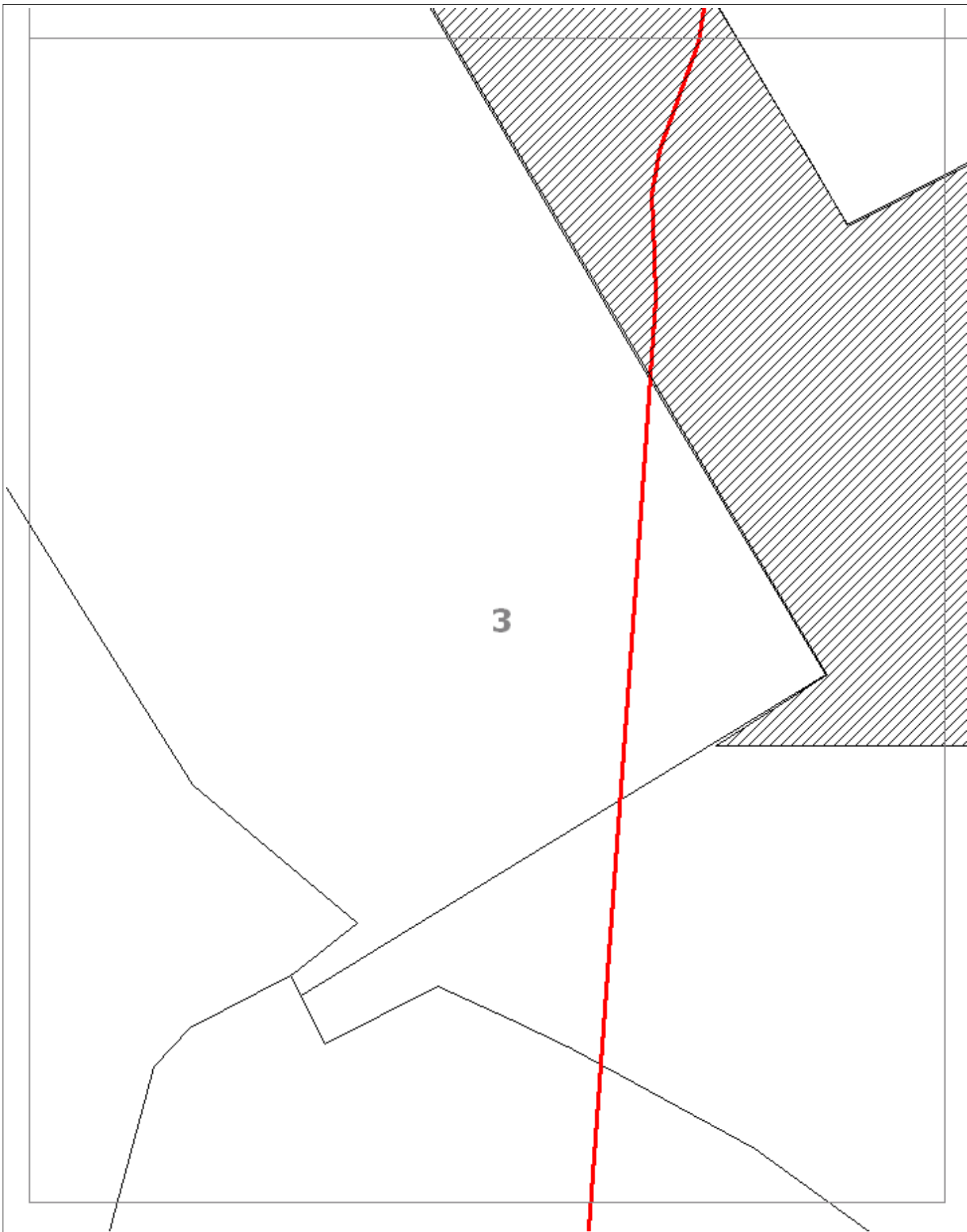
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