Wallaroo (Harlequin Dimension Stone) Quarry

Extractive Minerals Lease 5793 and Miscellaneous Purposes Licence 109

Program for Environment Protection and Rehabilitation

July 2023

AustralAsian Granite

Prepared by
Macro Environmental Solutions
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MACRO ENVIRONMENTAL SOLUTIONS

REVISION HISTORY

Version	Prepared By	Completion Date	Description
1.0	Macro Environmental Solutions	14 February 2023	Updated draft revised PEPR under MD026 and incorporating DEM comments on withdrawn draft. Submitted to Client for review.
1.1	Macro Environmental Solutions	3 March 2023	Updated following Client review.
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Macro Environmental Solutions (Macro) is an Adelaide based company and the field work for this report was undertaken near Wallaroo on the Yorke Peninsula of South Australia.

Macro and Australasian Granite Pty Ltd therefore wish to acknowledge the custodians of the land this work was undertaken on, the Kaurna and Narungga people, and their Elders past, present and emerging. Macro acknowledges and respects their continuing culture and the contribution they make to the life of these regions.

MACRO ENVIRONMENTAL SOLUTIONS

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SITE SUMMARY

Operation name	**Wallaroo (Harlequin Dimension Stone) Quarry**
Tenement numbers	Extractive Minerals Lease 5793 and Miscellaneous Purposes Licence 109
Tenement holder	Australasian Granite Pty Ltd
Tenement holder contact	Seppo Karvonen, seppo@aagranite.com.au
Tenement operators	Australasian Granite Pty Ltd (Dimension Stone) Lucas Total Contract Solutions Pty Ltd (Armour Rock) YP Mini Diggers (Limestone)

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Declaration of Accuracy

This declaration is made pursuant to Regulation 84 (c) of the *Mining Regulations 2020*.

I, Seppo Karvonen, Director of Australasian Granite Pty Ltd (ACN 050 516 455), the holder of Extractive Minerals Lease 5793 and Miscellaneous Purposes Licence 109, have taken the following steps to review the information and to ensure its accuracy.

- Engaged Macro Environmental Solutions to prepare the document and discussed the required content in detail.
- Undertook a detailed review of the contents prepared by Macro Environmental Solutions.
- Reviewed and signed off all Figures provided within the document prepared by Macro Environmental Solutions.

Name: Seppo Karvonen

Position: Director, Australasian Granite Pty Ltd

Signature:

Date: 14 JULY, 2023

1 INTRODUCTION

1.1 Operational background

The Wallaroo Quarry, also known as the Harlequin Dimension Stone Quarry, consists of Extractive Minerals Lease (EML) 5793 and Miscellaneous Purposes Licence (MPL) 109 and are held by Australasian Granite Pty Ltd (AAG).

EML 5793 and MPL are currently operated under Approved Development Program (ADP) 2000/073, which was granted prior to 2011 and is not considered to comply with part 10A of the *Mining Act 1971*. Therefore, this revised Program for Environment and Rehabilitation (PEPR) has been developed in accordance with the Terms of Reference (ToR) 026 to comply with the transitional provision in schedule 5, clause 7 of the *Mining Regulations 2020*.

Resources on EML 5793 include limestone extractives minerals located near the surface, and granite from below the limestone that is extracted for armour rock and dimension stone.

Historically, prior to quarrying activities, the property was used for broad-acre agricultural purposes ceasing around the early 1970's. EML 5793 was initially granted for the extraction of surface calcrete as a source of rubble for local road construction. EML 5793 was granted on 27 March 1992. An underlying granite-like (discussed hereon as granite) deposit was discovered below the calcrete cap-rock in the early 2000's, which was found to be suitable for the production of sawn dimensional stone.

EML 5793 consists of an established granite quarry pit which covers the majority of the lease area. The lease is surrounded by MPL 109 on the western, southern, and eastern sides, and these areas are used for the stockpiling of dimension stone product, dimension stone waste rock (which is utilised as sea wall/armour rock), limestone processing and stockpiling.

The southern and eastern portion of MPL 109 is elevated above the natural surface level due to the stockpiling of waste soils generated from the excavations of the inland Wallaroo Marine development approximately 1,000 metres (m) south-west of the Site. Commencement of the deposition of waste soils on the property commenced prior to the establishment of MPL 109, and these activities are not associated with the quarrying activities of EML 5793. However, waste-derived fill (WDF) discussed herein as 'waste soils' present on MPL 109, have been analysed and a significant amount is suitable for use in the rehabilitation of the quarry pit in accordance with the EPA *Standard for the Production and Use of Waste Derived Fill* (WDF Standard).

Copper slag is present at the Site but is not associated with the mining activities on EML 5793. Most of the slag is stored in a main stockpiling area on MPL 109, and another stockpile is present near the EML 5793 eastern boundary. The material has also been utilised for dust suppression by being spread over the surface of the internal haul roads. The material is understood to have been received on the property in the 1980's or 1990's and is not associated with mining operations on the Site.

1.2 Site location

Wallaroo Quarry is located 1,250m from the outskirts of the Wallaroo Township on the upper Yorke Peninsula, approximately 140 kilometres (km) from Adelaide (refer **Drawing 1**).

Wallaroo has an industrial background with evidence of the previous metallurgical processing and port facilities visible around the town.

Due to the town's coastal location, Wallaroo is currently undergoing tourism and residential development within the township area.

1.3 Land ownership

EML 5793 and MPL 109 are located on freehold land parcel CT 6233/860, owned by Shane Dunstan.

Landowner, Shane Dunstan, is the owner of YP Mini Diggers (ABN 22 716 724 946) and has commenced as the operator of the limestone/calcrete material at the Site.

2 DESCRIPTION OF THE EXISTING ENVIRONMENT

2.1 Topography and landscape

A map displaying the topography surrounding the Site is provided in **Drawing 2**.

Wallaroo Quarry is located on the northern edge of an East-West orientated open valley of low-lying land which extends inland for approximately 3.5km from Wallaroo Bay and the Spencer Gulf coast which is less than 1.5km away. The low-lying land comprises samphire swamp lands at an elevation of approximately four metres to six metres Australian Height Datum (AHD) and is subject to periodic flooding following rainfall events.

The land rises gradually to the north and east with the quarry being located on the lower slopes of the plain adjacent to the swamp lands at an average natural surface level at approximately 12m AHD. The quarry is excavated down from the average plain level with the deepest point of the current quarry floor at an elevation of one metre AHD.

In the mid to late 1990's a former landowner accepted large quantities of waste soils that had been excavated from the Copper Cove Marina development. The imported waste soils were deposited along the southern and eastern part of EML 5793 and extends across the MPL 109 area. The deposited waste soils have effectively elevated much of the eastern half of the property by three to five metres in an effort to convert the low-lying samphire swamp for agricultural land use areas.

The waste soil deposition areas have been mostly graded to form a flat-topped platform. These areas are utilised on MPL 109 for waste dimension stone/armour rock stockpiling and for dimension stone product stockpiling. The areas that are not utilised for stockpiling are regenerating native vegetation.

2.2 Climate

Wallaroo has a Mediterranean climate with hot dry summers, and cool wet winters.

The nearest Bureau of Meteorology (BoM) weather station to the site is located in Kadina approximately 9km south-east of the Site. Kadina AWS (BoM Station 022050) commenced temperature and rain measurements in 2005 and continues to the present day. This station appears to have superseded the Kadina Station (BoM Station 022006) which collected rainfall data from 1876 and commenced measuring temperature, wind, and relative humidity in 1952, and ceased all measurements in 2005.

Tabulated temperature and rainfall averages from 2005 to 2022 are provided in **Figure 1**, and tabulated temperature, rainfall, wind, and relative humidity average are provided in **Figure 2**.

In summary:

- The hottest three months are December to February, with January being the hottest month with an average maximum temperature of 31.9°c (2005 – 2022) and 30.5°c (1952 – 2005).
- December to February are also the months with the lowest average relative humidity being less than 40% (at 3pm), January being the lowest at 36% (1952 – 2005).
- The wettest months are from May to September with each month averaging more than 30mm of rain, the highest average being June with 39.4mm (2005 – 2022) and 51.8mm (1876 – 2005).

- The driest months are January and February with each month averaging less than 20mm of rain, the lowest average being February with 13.8mm (2005 – 2022), or historically, January with an average rainfall of 14.9mm (1876 – 2005).
- Average wind speeds are lowest in late autumn and early winter with May having the lowest 9am (7.5km/h) and 3pm average (11.5km/h) (1957 – 2005). The highest average wind speeds are in spring with October having the lowest 9am (12.9km/h) and November having the highest 3pm average (16.3km/h) (1957 – 2005).

Statistics	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual	Years	
Temperature															
Mean maximum temperature (°C)	31.9	30.5	28.2	24.1	19.4	16.1	15.6	17.0	20.2	24.2	27.4	29.4	23.7	17	2005 2022
Mean minimum temperature (°C)	15.7	15.1	13.6	10.5	8.3	6.0	5.3	5.0	6.1	8.4	11.3	13.5	9.9	17	2005 2022
Rainfall															
Mean rainfall (mm)	19.7	13.8	26.2	24.6	38.1	39.4	30.4	32.0	32.7	22.3	18.4	26.6	316.1	16	2005 2022
Decile 5 (median) rainfall (mm)	14.8	8.6	12.8	25.0	40.0	37.4	32.1	38.4	21.7	17.2	13.2	14.4	287.2	17	2005 2022
Mean number of days of rain ≥ 1 mm	2.5	1.8	3.0	4.1	5.9	7.8	7.9	7.6	5.4	4.6	3.2	3.2	57.0	17	2005 2022

Figure 1 - Average temperature and rainfall from BoM Station 022050 (Kadina AWS) from 2005 to 2022

Statistics	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual	Years	
Temperature															
Mean maximum temperature (°C)	30.5	30.1	27.4	23.8	19.3	16.6	15.5	16.6	19.5	22.8	25.8	27.7	23.0	28	1952 2005
Mean minimum temperature (°C)	15.7	15.8	13.8	11.3	8.5	7.1	5.7	6.0	7.4	9.4	11.9	13.8	10.5	28	1952 2005
Rainfall															
Mean rainfall (mm)	14.9	18.2	19.1	32.5	45.8	51.8	48.5	45.3	38.9	33.2	22.5	17.8	388.5	128	1876 2005
Decile 5 (median) rainfall (mm)	9.4	9.6	13.6	26.3	41.4	46.8	47.4	44.6	38.5	29.1	19.2	12.5	376.5	122	1876 2005
Mean number of days of rain ≥ 1 mm	2.1	2.1	2.6	4.5	7.1	8.4	8.9	8.4	6.7	5.5	3.7	2.9	62.9	120	1878 2005
Other daily elements															
Mean daily sunshine (hours)															
Mean number of clear days	14.1	13.4	13.3	10.2	7.7	7.4	8.0	8.7	8.8	9.3	10.1	11.3	122.3	48	1957 2005
Mean number of cloudy days	5.5	5.5	6.5	9.0	11.0	10.8	10.9	9.3	9.1	9.2	8.2	7.6	102.6	48	1957 2005
9 am conditions															
Mean 9am temperature (°C)	23.5	22.8	20.0	17.2	12.9	10.2	9.0	10.5	13.7	17.0	19.4	21.5	16.5	28	1952 2005
Mean 9am relative humidity (%)	51	54	61	67	80	84	87	82	72	60	54	52	67	18	1952 2005
Mean 9am wind speed (km/h)	11.5	10.5	9.8	8.3	7.5	7.5	8.3	9.4	11.6	12.9	12.7	12.2	10.2	48	1957 2005
9am wind speed vs direction plot															
3 pm conditions															
Mean 3pm temperature (°C)	29.1	29.0	26.1	22.8	18.2	15.7	14.6	15.5	18.3	21.5	24.1	26.3	21.8	28	1952 2005
Mean 3pm relative humidity (%)	36	37	40	47	59	63	65	60	53	44	40	38	49	18	1952 2005
Mean 3pm wind speed (km/h)	15.6	14.5	14.3	12.0	11.5	11.8	12.5	13.7	15.1	15.3	16.3	16.2	14.1	47	1957 2005
3pm wind speed vs direction plot															

Figure 2 - Climate averages from BoM Station 022006 (Kadina) from 1876 to 2005

Wind roses generated from the Kadina Station (022006) based on the 3pm measurements from 1957 to 2005 are provided in **Attachment 1**.

In summary,

- The total average observations show that the predominant wind direction is from the south-west with 25 – 30% of all measurements being from this direction and the highest amount of wind speed observations greater than 30km/h.
- When wind observations are reviewed by month, the predominant south-westerly can be seen to occur from September through to January. The winds tend more southerly and south-westerly in

February and March before tending to include more observations of north-westerly and northerly winds from April through to August.

2.3 Topsoil and subsoil

The locations of topsoil stockpiles at the Site are provided in **Drawing 3**.

The topsoil layer has been stripped from the EML 5793 area and stockpiled along the northern boundary of EML 5793 adjacent to Chatties Lane, along the north-western corner of the quarry pit, and in another area near the EML 5793 south-east boundary.

The northern topsoil windrows are approximately 1.5 metres in height and are mixed with calcrete and other weather rocks (overburden). These stockpiles may be screened to remove the calcrete for use as extractive minerals and create a higher quality topsoil.

The south-east topsoil stockpile appears darker and appears to have less calcrete and overburden mixing.

No subsoil is present on the Site as topsoil sits directly over the calcrete.

Waste soils from the Wallaroo Marina that were historically deposited on the property have been rigorously sampled and a significant amount of this material is classified as acceptable waste-derived fill. While the deposition of the waste soils was not related to the mining operation, an opportunity exists to utilise this material in the relation to the quarry pit.

Following above average rainfalls in 2022, the waste soil landform on MPL 109 has successfully generated native vegetation (refer **Plate 1** and **Plate 2**) which suggests it will be suitable for use as a topsoil in rehabilitation.

Plate 1 – Vegetation growth on the MPL 109 waste soils landform

Plate 2 – Vegetation growth over non-compacted areas on the MPL 109 waste soils landform

2.4 Geological environment

A map of the geological resources within EML 5793 is provided in **Drawing 3**.

Acknowledgement: The following geological description is based upon a Mining and Rehabilitation Program (MARP) for the Wallaroo Granite Quarry prepared by Johnson Geological Services Pty Ltd, dated 22 August 2007.

Thin brown silty calcareous topsoil overlies calcrete and calcareous marls to an average depth of 1.0m – 1.5m.

Underlying this thin surface overburden is up to one metre of weathered bedrock, then fresh bedrock (i.e. the 'granite'), which has been defined by Conor 1999, as Oorlano Metasomatite of Palaeoproterozoic age (~1740 Ma). This rock is not true granite, but rather a metamorphic rock which has been further altered by fluids from a nearby granite. Consequently, this rock retains metamorphic banding and orientation, but contains minerals which are uncommon in metamorphic rocks. Both the metamorphic banding (foliation) and underlying outcrop strike NE with the dip being vertical to steeply SE. The major joint direction is NW, with vertical or 85° NE dips. The other major parting is along the foliation direction which strikes NE and dips vertically. These two natural rock partings are clearly illustrated by the face directions on the lower bench. Although these partings are widely spaced, they occasionally do impact on block size and cause some breakage during blasting. The other major joint is almost horizontal and dips at 2.5° northwards. The quarry benches follow this joint.

2.5 Geohazards

In a geological site survey conducted in March 2007 by Peter Johnson, Geologist, Johnson Geological Services Pty Ltd, no geohazards were identified which might affect this site.

The thin calcareous layer above the granite does not show any signs of karst features.

The lower granite geology is consolidated, and bench heights are low enough not to represent geohazards.

The northern side of the quarry pit is within five metres of the northern EML 5793 boundary and Chatties Lane. While the rock within the northern pit face is consolidated, no further mining is planned for this area to maintain the existing buffer to Chatties Lane and ensure there is no risk to the stability of the road.

2.6 Groundwater

2.6.1 Groundwater overview

The Wallaroo Quarry is not located within a prescribed wells area. A review of Groundwater wells displayed on *Water Connect* (2022) found that no local groundwater wells provided sufficient information to determine an estimation of the ground water levels at the Site.

As shown in **Drawing 4**, the topography surrounding the Site is complex with the Site being perched on the south facing slope of the elevated area above a depression area on the northern side of the Wallaroo Township. Due to the complexity of topography and geology in the area an attempt to utilise the available groundwater data to predict a groundwater level within the Site area has not been made as it is unlikely to be accurate.

Furthermore, a groundwater test hole was drilled 14m into the pit floor and did not intercept groundwater. This suggests that the aquifer where groundwater wells 6430-0087 and 6430-1248 are located may not be the same as the aquifer within the granite geology that the Site is located within.

The other conclusion from the test hole, when considered with the highly consolidated rock layers present in the lower bench, is that groundwater transmissivity within the aquifer is low due to limited fractures within the geology.

While the area is not a prescribed wells area under the *Landscape South Australia Act 2019*, high potential groundwater dependent ecosystems (GDEs) are located to the west and south of the Site (refer **Drawing 5**). As the surface water that enters the pit pond comes into contact with copper slag, the surface water mixing with groundwater may create a potential pathway between the copper slag that covers the road surface and the GDEs.

The lowest elevation point at the Site is within the granite pit. The bottom of the pit is estimated to be between 0.5m AHD and 1.0m AHD but is difficult to determine as the bottom of the pit is usually submerged. Although the pit floor captures surface water from the pit sub-catchment area, it is expected that the pit has intercepted groundwater within a fractured rock aquifer within the granite. As a groundwater reading from an established bore within the fractured rock aquifer is not available, an assessment of the potential for groundwater interception has been provided in Section 2.6.2.

2.6.2 Groundwater environmental value

The local groundwater has high salinity and no wells for the purpose of human consumption or agriculture are present on neighbouring properties. As discussed in Section 9.1 of the Preliminary Site Investigation undertaken by Greencap (2021), the Environment Protection (Water Quality) Policy 2015 (WQEPP) outlines environmental values of water based on the Total Dissolved Solids (TDS) levels within the water. The upper limit for any human consumption or agricultural uses is 13,000 mg/L. The TDS present in the groundwater measured at 6430-087 and 6430-1248 are both over 26,000 mg/L, more than double the upper limit.

High potential aquatic and terrestrial groundwater dependent ecosystems (GDEs) are present directly west and south of the Site (refer **Drawing 5**). These areas are also considered as potential inflow dependent ecosystems (Bureau of Meteorology GDE Atlas, 2022). As the GDEs adjacent to the Site appear highly disturbed systems due to altered surface water inflows, grazing, vehicle movements and dust fallout from copper smelting and other industrial works.

Despite the apparent disturbance, the key environmental value for local groundwater is therefore to ensure the supply of groundwater to the adjacent high potential GDEs.

2.6.3 Groundwater elevation and interception assessment

In lieu of being able to measure the groundwater, the following review was undertaken to determine the likelihood that groundwater had been intercepted at the Site.

2.6.3.1 Time series aerial imagery

A review of twelve (12) images from April 2010 to November 2021 showed that water appears to be a permanent feature at the bottom of the pit (refer **Attachment 2**). The water level in the pit appears to have seasonal fluctuation due to surface water inputs but there is a constant presence of water even at the end of the drier months.

A comparison of the pit water level from Unmanned Aerial Vehicle (UAV) imagery taken on 8 September 2022 to the time-series imagery in **Attachment 2** shows levels from the 8 September 2022 are slightly above average, which is expected given the imagery was taken near the end of winter. The pit water level on 8 September 2022 is estimated at two metres AHD.

2.6.3.2 Quarry pit floor and groundwater elevation

A review of one metre resolution digital elevation model data was obtained and used to compare the depth of the dimension stone pit to the adjacent GDEs. The lowest point of the pit was 0.40m AHD, and the lowest point of the adjacent GDEs being around 3.5m AHD, confirming that the pit floor is below the floor of the GDEs (noting that the digital elevation model data appears to represent the quarry pit and GDE land surface and not the water surface).

The inland marina is 1.4km from the Site. The digital elevation model value at the water's edge as shown on Google Imagery is around 0.2m – 0.4m. This water is connected to the ocean and the level will be influenced by the tide.

The elevation is at the bottom of the quarry pit therefore appears to be equal to, or slightly above, the seawater level at the coast.

2.6.3.3 Available groundwater wells data

Groundwater well 6430-087 (the Kooagnie Mine Shaft) has a recorded historical reading of a reduced water level of -2.85m AHD. The water is also very saline with Total Dissolves Solids (TDS) of 26,903 mg/L (similar to sea water). It should be noted that this measurement was in 1937 and it is not stated how the measurement was taken and analysed.

Groundwater well 6430-1248 is located approximately 2.3km east of the Site and has several measurements between 2006 and 2019. The average RSWL from these measurements is 11.71m AHD. The water is also very saline with Total Dissolves Solids (TDS) of 27,940 mg/L (similar to well 6430-087).

Groundwater well 6430-897 is located just south of the inland marina. The RSWL measured in 2002 (prior to the marina being established) was -0.29m AHD.

2.6.3.4 Water quality sampling

A water sample was taken from the quarry pit water on 8 September 2022 and delivered to EnviroLab Services Pty Ltd (NATA Accreditation Number 2901) to be analysed for:

- Salinity,
- Acidity / alkalinity (pH), and
- Heavy metals.

The results from the water quality analysis are shown in **Table 1** and the analysis report is provided in **Attachment 3**. Heavy metal levels from the pit water sampled were compared to the reference levels from the *Australian and New Zealand Guidelines for Fresh and Marine Water Quality* (ANZ Water Quality Guidelines). The GDEs adjacent to the Site were compared to the 'Freshwater' species protection value due to Marine and Estuarine ecosystems not being included in the GDE Atlas (BoM, 2022b). Where a 'Freshwater' species protection value was not available, the 'Marine' protection level value was used.

As the GDEs adjacent to the Site appear highly disturbed systems, an 80% species protection value has been applied in accordance with the ANZ Water Quality Guidelines (Commonwealth of Australia, 2020).

Table 1 – Results from the pit water quality analysis from the sample taken on 8 September 2022

Component	Units	Result	Reference level	Reference level description
Salinity (TDS)	mg/L	11,000	<20	Rainwater (WateReuse Foundation, 2007).
			27,940	Groundwater well 6430-1248.
Acidity / Alkalinity (pH)	pH units	9.6	0 - 14	pH scale from 0 (acidic) to 7 (neutral) to 14 (alkaline) (US Geological Survey, 2019).
Arsenic	µg/L	3	360	80% level of species protection trigger value for freshwater for AsIII. (Commonwealth of Australia, 2019).
			140	80% level of species protection trigger value for freshwater for AsV. (Commonwealth of Australia, 2019).
Cadmium	µg/L	<0.2	0.8	80% level of species protection trigger value for freshwater. (Commonwealth of Australia, 2019).
Chromium	µg/L	<2	91	80% level of species protection trigger value for marine water for CrIII. (Commonwealth of Australia, 2019).
			40	80% level of species protection trigger value for freshwater for CrVI. (Commonwealth of Australia, 2019).
Copper	µg/L	49	2.5	80% level of species protection trigger value for freshwater. (Commonwealth of Australia, 2019).
Lead	µg/L	<2	9.4	80% level of species protection trigger value for freshwater. (Commonwealth of Australia, 2019).
Mercury	µg/L	<0.05	5.4	80% level of species protection trigger value for freshwater. (Commonwealth of Australia, 2019).
Nickel	µg/L	<2	17	80% level of species protection trigger value for freshwater. (Commonwealth of Australia, 2019).
Zinc	µg/L	<20	31	80% level of species protection trigger value for freshwater. (Commonwealth of Australia, 2019).

Noteworthy is the TDS levels within the pit water were measured at 11,000 mg/L. If all the water within the pit was surface water the TDS would be expected to be much lower. The water therefore appears to be mixed with saline groundwater.

The above is also supported by the alkaline pH level in the pit water at 9.6. If all the water within the pit was surface water the pH level would be expected to be near neutral (7.0).

2.6.3.5 Groundwater interception assessment summary

It is concluded that the groundwater has been intercepted at the bottom of the pit.

The basis for the conclusions is as follows:

- Time-series aerial imagery shows that the bottom of the pit appears to permanently hold water
- Elevation measurements show the bottom of the pit is at or near sea level
- Water quality testing shows that the pit water has a salinity well above what would be expected if all the water was surface water.

2.6.4 Groundwater contamination potential

As shown in **Table 1**, the copper levels within the water at the bottom of the pit exceed the 80% level of species protection trigger value for freshwater from the ANZ Water Quality Guidelines. The exceedance is caused by the presence of copper slag over the surfaces within the pit floor catchment area. No other contaminants other than copper were measured at levels above the reference levels in **Table 1**.

The granite geology can be observed within the lower bench of the quarry to be highly competent (hence it's suitability as dimension stone) and the hydraulic conductivity through the geology is expected to be low. While the connectivity between the pit floor and the adjacent GDEs is not well understood, it is acknowledged that a pathway between the copper concentrations in the pit water (source) and the GDEs (receptor) may be present.

2.7 Surface water

A review of the South Australian Resources Information Gateway (SARIG) (Government of South Australia, 2022) shows that no drainage lines exists nearby or through the Site and no local water resources are prescribed under the Landscape South Australia Act 2019. The Site is also not located within a water protection area.

Drawing 2 shows that the Site is on the southern fringe of an elevated land area. Samphire shrubland are located adjacent to the southern and western boundary of the mining tenements at lower elevations. The BoM GDE Atlas shows that the samphire shrublands are also Inflow Dependent Ecosystems and local surface water flows from most directions appear to flow into the low-lying areas.

As shown in **Drawing 6**, the majority of water runoff from the disturbed area drains internally within EML 5793 and MPL 109. A review of a digital elevation model created using UAV imagery found that no significant discharge points are present that transport waterflows off the Site. This is largely due to the artificial waste soils landform being relatively level and being raised above the elevation of the disturbed areas and therefore preventing the flow of water to the east.

During inspections at the Site on 8 September 2022 and 24 October 2022, no surface water runoff or obvious discharge points were observed leaving the areas disturbed by mining.

Drawing 6 shows the approximate quarry pit sub-catchment area. As the pit expands with the proposed mining operations, this catchment area will increase in size and will direct additional water into the pit floor.

A dividing line has been provided in **Drawing 6** to highlight the waste soils deposition area where no mining related disturbance has occurred. While the landform is artificial, as no mining has been undertaken in these areas, and surface water flows within this area can be considered 'natural' and not managed as part of the mining operations.

Drawing 6a has been provided to show a detailed view of the surface water channels over the primary copper slag stockpiling area derived from the SAGA Channel Network and Drainage Basins tool on QGIS (Conrad, 2003). The map shows that the stockpiles are situated on a flat area with water running off the stockpiles generally flowing back into the low points within the area. The channel layer, which is built from a digital elevation model developed from UAV imagery taken on 8 August 2022, does not show any higher order surface flows from the copper slag stockpiling area leading off the Site.

2.8 Vegetation, weeds and plant pathogens

2.8.1 Native vegetation

The entire EML 5793 area, and the area of MPL 109 utilised for ancillary mining operations, are completely cleared of native vegetation and therefore, no remnant vegetation clearance is required for mining activities.

Chenopods, such as saltbush, and samphire are present on the samphire shrubland to the south and west of the Site (refer **Plate 3**). Saltbush and other native plant species have been planted on the northern boundary of the marine waste soil landform and are successfully colonising that area (refer **Plate 4**). This demonstrates that the waste soils from the marina development will provide an effective growing medium for rehabilitation.

Plate 3 – The chenopods and samphire vegetation located in the nearby samphire shrubland

Plate 4 – Planted native vegetation present on marina waste soil landform

2.8.2 Weeds

Environmental weeds previously reported to be present at the site include African boxthorn (*Lycium ferocissimum*), Onion weed (*Asphodelus fistulosus*), Rice Millet (*Piptatherum milliaceum*) and Soursob (*Oxalis pes-caprae*).

During an inspection of the Site conducted on 8 September 2022, Onion weed was observed in abundance over the disturbed areas around the southern crest of the granite pit (refer **Plate 5**).

Infrequent occurrences of African boxthorn were also observed above the northern pit wall and on the eastern side of the granite pit (refer **Plate 7**).

Plate 5 – Onion weed (white flowers) observed during an inspection conducted on 8 September 2022

Plate 6 – African boxthorn observed during an inspection conducted on 8 September 2022

2.8.3 Pathogens

As Wallaroo receives less than 400mm of rainfall and the Site has low levels of vegetation, the Site is considered to be a low risk for a *Phytophthora cinnamon*i infestation (Department for Infrastructure and Transport, 2022).

No snails have been observed on the property and are not expected to occur as cropping is not undertaken on the property.

2.9 Fauna

An EPBC Act Protected Matters search was undertaken for the Site on 13 November 2022 (refer **Attachment 4**). The report found that no critical habitats exist within the Site but identified 23 listed marine species. Of the 23 listed species, seven are listed as endangered or critically endangered:

- Red Knot (*Calidris canutus*) – may occur within area
- Curlew Sandpiper (*Calidris ferruginea)* – may occur within area
- Orange-bellied Parrot (*Neophema chrysogaster)* – may occur within area
- Eastern Curlew *Numenius (madagascariensis)* – may occur within area
- Plains-wanderer *(Pedionomus torquatus*) – may occur within area
- Night Parrot (*Pezoporus occidentalis*) – may occur within area
- Australian Painted Snipe (*Rostratula australis*) – likely to occur within the area.

The Biological Database of South Australia was accessed through the Nature Maps platform (Government of South Australia, 2023a). A list of sighted fauna was created from the areas within approximately 5km of the Site. The sighted species recorded on Nature Maps included 19 species of birds, two species of reptiles and one mammal species (Short-beaked echidna).

The sighted species list was cross referenced against the Protected Matters Search list and none of the species listed in the Protected Matters Search have been recorded on Nature Maps.

Other than infrequent anecdotal kangaroo sightings, no obvious signs of native or introduced fauna presence have been observed at the Site. As the vegetation across the marina waste soils landform increases, birds and other fauna are expected to return to the area. As these areas do not interact with mining operations, mining is not expected to impact on native fauna.

2.10 Caves

As the site only has a thin layer of limestone caprock over the underlying granite, no karst systems are expected to occur at the Site.

An internet search for caves on the Yorke Peninsula did not identify any known caves near the Wallaroo area.

2.11 Land use

2.11.1 Historical land use

Historically, the southern side of the property that EML 5793 and MPL 109 is located on (CT6233/860) was covered by the samphire shrubland that is currently present on the southern and western boundaries. It is expected that the northern section of the property not covered by the samphire shrubland was utilised for cropping and/or grazing purposes (Attachment 5, page 9).

EML 5793 was approved on 27 March 1992 for the purpose of extracting surface calcrete cap-rock as a source of rubble for local road construction. Following the discovery of the granite resource below the cap-rock, dimension stone mining was introduced to the tenement from 2002 onwards.

MPL 109 was approved on 19 June 2008 for ancillary mining operations (the storage of dimension stone product and waste rock). Ancillary mining operations are based on the western side of MPL 109 in the areas immediately surrounding EML 5793.

The MPL 109 area extends to the eastern boundary of the property, and the entire eastern side of MPL 109 is covered in approximately three to five metres of waste soils sourced from the nearby Copper Cove Marina development. It should be noted that the deposition of the waste soils on the property predated the establishment of MPL 109 and these activities are not associated with mining operations on EML 5793.

In addition to the receipt of the Copper Cove Marina waste soils, the previous landholder also authorised the receipt of copper slag produced as a biproduct from the Wallaroo Copper Smelter Plant, which operated between 1861 and 1926 (Bell & McCarthy, 2008). As shown in **Attachment 6**, copper slag was deposited across the Wallaroo area during the operational period of the smelter, and it is understood that the copper slag deposited on the EML 5793 and MPL 109 areas was sourced from near the Copper Cove Marina area.

The majority of the copper slag was stockpiled on the western side of the quarry pit and has been relocated to a primary stockpiling area along the northern boundary of MPL 109 (refer **Plate 7** and **Drawing 9**).

A secondary stockpiling area is located on the eastern side of the quarry pit within EML 5793. The copper slag has also been utilised to stabilise internal road surfaces on the Site.

Plate 7 – Primary copper slag stockpiling area on MPL 109

2.11.2 Local land use and zoning

A variety of land uses are present around the Site. The South Australian Generalised Land Use spatial layer from 2020 is featured in **Drawing 7** and shows the following:

- Neighbouring properties to the north and east are used for agriculture.
- A rural residential property is located on Jones Road to the west of the Site.
- The full CT 6233/860 area is zoned for mining.
- Areas further south and west are zoned as vacant or as a reserve.

A review of the Planning and Design Code Conservation Zones on SARIG shows that areas to the South containing the samphire shrubland appear to have been rezoned for conservation (refer **Attachment 7**).

2.11.3 Other Mining Act approvals over the area

Exploration licence 5984 is held by Peninsula Resources Limited and covers 819km^2 of the Wallaroo, Moonta and Kadina areas. EL 5984 was approved on 12 April 2017 after the approvals of EML 5793 and MPL 109.

Petroleum Exploration Licence Application (PELA) 688 was submitted on 12 May 2021 by Byrock Resources Pty Ltd and covers 9952km^2 of the northern Yorke Peninsula from Arthurton in the south and extending as far north as Crystal Brook.

2.11.4 Proposed future land use

The proposed post-mining land use is to return the land to grazing purposes and to create amenity areas.

It is intended that the vegetation will continue to be established across the eastern side of MPL 109 where mining operations do not occur.

The areas around the current granite quarry pit are intended to be converted to an amenity area. The area would be landscaped with gardens and protective fencing to allow the vertical granite faces on the northern side of the pit to remain. The exposed granite faces will provide a site of interests for geology hobbyists and a potential location for wedding photos or potentially ceremonies.

2.12 Proximity to infrastructure and housing

The locations of residences and human infrastructure in the local area are shown in **Drawing 8**.

2.12.1 Local infrastructure

A review of spatial layers on the SARIG platform found that no powerlines, underground infrastructure, or easements are located within the tenement boundary.

The Site is bordered by Chatties Lane to the north. The quarry pit comes to within approximately 15m of the road but as the geology is consolidated granite, no geotechnical risk to the road is anticipated. No cracking or slumping at the surface was observed during an inspection of the Site on 8 September 2022.

The Site Access point is located on Wallaroo Plains Road. The primary transport route is to head south along Wallaroo Plains Road to North Beach Road. South along North Beach Road to Pommern Way and then a short distance to the south-east to connect with the Spencer Highway.

Sheds are located on MPL 109 and are used as a workshop for the landholders earthmoving business.

2.12.2 Local housing

The nearest residence to the Site is located on Jones Road approximately 600m to the nearest operational area.

The next closest residence is located on Wallaroo Plains Road approximately 1,180m from the northern boundary of the Site. The landholder of the property is also the tenement holder of EML 6155 located to the north of the Site.

The nearest houses in the Wallaroo Township, which were established as part of the Copper Cove Marina development in the early 2000s onwards, are located approximately 1,250m south-west of the Site.

2.13 Exempt land

The landholder operates an earthmoving business out of the property and utilises a large shed as a workshop. Other portable offices and worker facilities are located along the western edge of MPL 109 and are used for both the earthmoving business and have also been utilised during mining campaigns. As the landholder's earthmoving business is an operator at the Site (limestone extraction) the areas within 150m of the shed and facilities are not considered to be exempt from mining.

No other exempt land is understood to be present over the operating areas on the Site (refer **Drawing 8**).

2.14 Amenity

The area surrounding the Site consists of another quarry to the north, stockpiled mounds of waste soils from the Copper Cove Marina on the property to the east, and a samphire shrubland / swamp to the south and west, that may hold some ecological value, but to most would not be considered as an aesthetically pleasing environment.

The Wallaroo Township itself has an industrial heritage and is dominated by remnant industrial and agricultural infrastructure. The area appears to be modernising and increasingly becoming seen as an attractive holiday location given its beach side location and reasonably short drive from Adelaide but at present the visual amenity of the area surrounding the quarry is not considered to be of significant value.

2.15 Air quality

Due to the low production levels at the Site, existing operations produce negligible amounts of dust. The majority of recent operations are for the reclamation of waste-rock for utilisation as 'armour rock' for the T-Ports project. As this material is large granite boulders, minimal dust is created from the loading of the rocks into trucks for transport.

Where dimension stone operations take place, drills and cutting saws are equipped with water sprayers to control dust for worker hygiene which then reduces the risk of any offsite dust impacts. Blasting is also conducted in consideration of the weather conditions as per AS 2187.2-2006.

Limestone cap-rock operations are undertaken on a campaign basis and can therefore be avoided during adverse weather where dust generation may cause offsite impacts.

As the predominant wind direction in the area is from the south-west, the nearest receptor on Jones Road is located upwind of the Site the majority of the time.

The local air quality is generally good in the wetter months. During an inspection of the site on 8 September 2022, no local air quality impacts from the use of domestic combustion heaters or burn-offs were observed but could potentially occur from time to time if the new houses are being fitting with combustion heaters.

The area may occasionally be subjected to localised dust impacts in the drier months from vehicle traffic on unsealed roads and driveways and from agricultural activities such as grazing herds and bare cropping paddocks that are exposed to wind erosion prior to seeding.

The area may be subjected to poor air quality in the drier months due to bushfire smoke.

2.16 Noise

Due to the low production levels at the Site, low levels of noise are expected to be observable outside of the Site boundary.

Potential noise sources from the Site include load and haul activities, drilling for blasting, dimension stone cutting, cap-rock extraction, crushing and screening and rehabilitation earthworks.

Operations are proposed to occur within daylight hours (7:00am to 5:00pm), which are within the 'day' period as defined in the South Australian *Environment Protection (Noise) Policy 2007* (EPA Noise Policy).

A review of the South Australian Property and Planning Atlas (SAPPA) identified that the property and neighbouring properties are categorised as 'Rural' and/or 'Conservation' (Government of South Australia, 2023b). The appropriate land use category under the EPA Noise Policy is 'Rural industry' and the applicable Indicative noise factor is an LAeq of 57dB(A) when measured over a 15-minute period.

Non-mining related noise sources include traffic noise from the nearby Spencer Highway, and infrequent noise from agricultural activities, activities on the neighbouring mining lease and from the landholder's activities within and outside of the workshop.

During an inspection conducted on 8 August 2022, no noise from the Site was audible from the nearest residence located on Jones Road. Waste rock reclamation activities were occurring at the time of inspection.

As the predominant wind direction in the area is from the south-west, the nearest receptor on Jones Road is located upwind of the Site the majority of the time.

2.17 Heritage (Aboriginal, European, geological)

A review of registered heritage sites was undertaken on the *Location SA Map Viewer* (Government of South Australia, 2022). Local heritage sites are located within the Wallaroo Township area. The closest listed heritage site is the Wallaroo Smelters, which is approximately 2.5km from Wallaroo Quarry.

A review of the Aboriginal Heritage Site Register was undertaken on 10 November 2022. No aboriginal heritage sites are registered within 500m of the Site (refer **Attachment 8**).

The total area of EML 5793 and MPL 109 are heavily disturbed by mining and waste soil deposition. No heritage sites or objects are expected to be encountered during the proposed mining operations.

2.18 Proximity to conservation areas

As discussed in Section 2.17, Wallaroo has several registered heritage areas within the township. The closest is the Wallaroo Smelters located approximately 2.5km from the Site.

A review of spatial layers on the SARIG platform found that the closest conservation area is the Bird Island Conservation Park which is located approximately 14.3km south-west of the Site (refer **Attachment 9**).

The Coastal Protection zone is located approximately 1,050m west of the Site (refer **Attachment 9**).

2.19 Pre-existing site contamination and previous disturbance

2.19.1 Pre-existing disturbance

The entire EML 5793 and MPL 109 area has been disturbed by anthropogenic activities. As shown in **Drawing 9**, the entire EML 5793 area is utilised for mining operations, and the majority of the western portion of MPL 109 area is used for ancillary mining operations and also for the landholder's business operations.

Drawing 9 also shows the area on the property where waste soils from the Copper Cove Marina development and areas on the site where copper slag is present.

2.19.2 Preliminary site investigation

Following advice from the Environment Protection Authority (EPA) a Preliminary Site Investigation (PSI) was undertaken on behalf of AAG by consultancy Greencap (2020). The PSI report is provided as **Attachment 5**.

The PSI was prepared with reference to the following industry standards and guidelines:

- The National Environment Protection (Assessment of Site Contamination) Measure 1999 (as amended 2013) (NEPM)
- SA EPA publication 'Guidelines for the assessment and remediation of site contamination', July 2018 (as updated October 2019)
- Australian Standard "Guide to the investigation and sampling of potentially contaminated soil": AS4482.1-2005.

The PSI included the following details/activities:

- A review of the Site history and regional setting
- A review of previous investigations relevant to the PSI including a report by MUD Environmental (refer **Attachment 10**) that included a detailed investigation into the Copper Cove Marina waste soils.
- A site inspection
- A summary of potentially contaminating activities
- A soil investigation, and
- A preliminary risk assessment for impacts from contamination at the Site.

The potentially contaminating activities that were identified in the PSI were as follows:

- Historical placement of copper slag
- Historical importation of Copper Cove Marina waste soils
- The use and storage of pesticides, insecticides, herbicides, or other agricultural related chemicals.
- Historical use of fill from unknown sources utilised across the property.

The soil investigation undertaken focused on potential contamination levels within the copper slag stockpiling area and the Copper Cove Marina waste soil deposition areas. Three soil samples were taken from the primary copper slag stockpiling area on MPL 109, three soil samples were taken from the waste soil deposition area on the western side of MPL 109, and one soil sample was taken near the south-west corner of MPL 109 in an area that no copper slag or waste soils had been deposited.

Results from the sampling were compared to the criteria specified in the National Environment Protection (Assessment of Site Contamination) Measure 1999 (as amended 2013) (NEPM) for the following investigation exposure settings:

- Ecological Investigation Levels (EILs) for commercial / industrial.
- EILs for areas of ecological significance.
- Ecological Screening Levels (ESLs) for commercial / industrial.
- ESLs for areas of ecological significance.
- Health Investigation Levels (HIL D) for commercial / industrial land use.

The results from the soil investigation were as follows:

- Copper slag stockpiling area – all samples exceeded the adopted criteria for copper and zinc, and SLAG 1 also exceeded the criteria for nickel.
- Waste soil deposition area – Sample MS2 recorded an elevated total recoverable hydrocarbon (RH) level, which may be due to the high amount of organic content within the sample.
- Background sample – The background sample taken exceeded the adopted criteria for copper.

The following conclusions were drawn from the PSI:

- The copper slag material presents a potential future risk to groundwater, and Greencap recommended that a Remediation Action Plan (RAP) be developed for the Site. The RAP should include a means to remove the contamination pathway that exists between the stockpiled slag material and groundwater dependent ecosystems in proximity of the Site.
- Assessment of the marina spoil undertaken by Greencap and previously MUD Environmental identify the material is classified generally as being suitable as Waste Fill.

2.19.3 MUD Environmental Soil Classification Report

MUD Environmental undertook a soil classification project on behalf of the Monopoly Property Group to determine if the waste soils on MPL 109 are suitable for use as fill for the Wallaroo Shores redevelopment. The objective of the project was to classify up to 10,000m^3 of waste soils for potential removal from the Site and to make a log of the materials encountered to assess the physical nature of the materials.

A total of 135 representative samples of stockpiled soil materials were collected from 32 individual test pits located on the western side of MPL 109 on 6-7 May 2020. Maps showing the locations of the sampling area are provided in Figure 1 and Figure 2 of the Soil Classification Report (refer **Attachment 10**).

A total of 52 primary soil samples selected for laboratory analyses for a range of chemical substances common in imported fill and natural soils in South Australia. All soil analytical results were reported below the Waste Fill criteria in all samples except for:

- Concentrations of copper in four samples collected from the FILL 3 clay layer (TP7_0.3-0.4, TP8_0.2-0.3, TP17_0.2-0.3 and TP28_0.7-0.8), all of which were above Waste Fill criteria but below the Intermediate criteria.

- Concentrations of zinc in one sample collected from the FILL 3 clay layer (TP8_0.2-0.3 and FILL 3 clay layer) which was above Waste Fill criteria but below the Intermediate criteria.

Although several soil samples did not meet the waste fill criteria due to rocks existing in the soil and trace levels of copper slag causing potential aesthetic concerns, the waste soils do not pose a contamination risk and would be suitable for use as a rehabilitation material.

3 DESCRIPTION OF MINING OPERATIONS

3.1 General description and maps/plans of operations

The proposed continuation of mining operations at Wallaroo Quarry can be summarised as follows:

- Dimension stone mining on the lower granite layer.
- Armour rock extraction from the upper granite layer and armour rock reclamation from dimension stone waste rock.
- Limestone capstone (calcrete) extraction along the southern side of the quarry pit.
- Progressive rehabilitation of the quarry pit towards achieving the final closure land use.

The following Drawings have been provided to support the description of mining operations:

- Drawing 10 – Site layout map
- Drawing 11 – Stage 1 mining and rehabilitation
- Drawing 12 – Stage 2 mining and rehabilitation
- Drawing 13 – Stage 3 mining and rehabilitation
- Drawing 14 – Stage 4 mining and rehabilitation.
- Drawing 15 – Concept final landform map
- Drawing 16 – Concept final landform cross-sections

3.2 Resources and products

3.2.1 Resource

A map of the target resources on the Site is provided in **Drawing 3** and representative cross-sectional profiles of the remaining resources are provided in **Figure 3**. The image in **Figure 3** is a representative example of the resource profile, and the resource profile varies in depth across the Site and the limestone caprock is only present in a band along the southern flank of the existing pit.

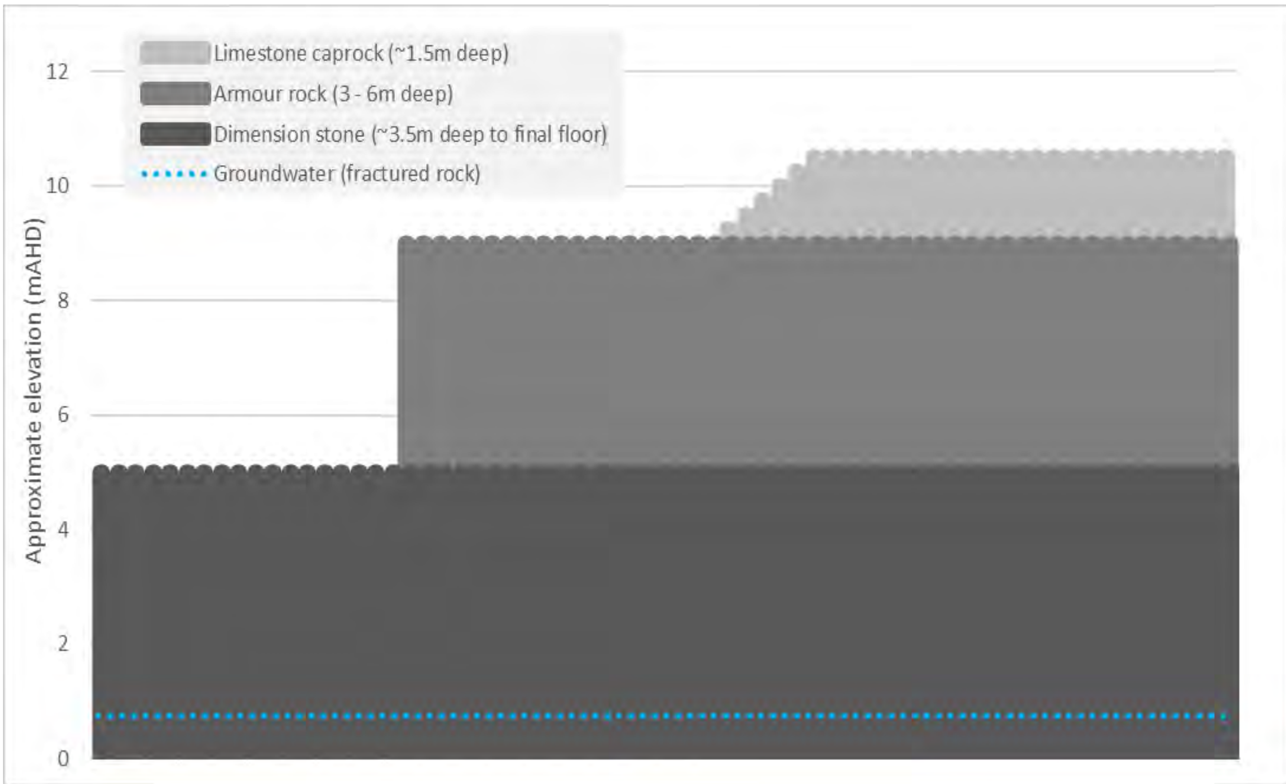

Figure 3 – Representative cross-section of target resources

A summary of the estimated remaining resources at the Site is provided in **Table 2**. The basis for the calculations is provided in the following sub-sections and has been appropriately identified based on aerial imagery measurements and the knowledge of the resource from 20+ years of mining.

Table 2 – Estimated remaining resources within the proposed mining plans

Target resource	Estimated resource (tonnes)
Dimension stone	88,300
Armour rock	293,100
Limestone caprock	14,000

3.2.1.1 Dimension stone mining

The primary target resource at the Site is the dimension stone. The fresh bedrock extracted to produce dimension stone is defined as Oorlano Metasomatite approximately 1,740 million years old. Johnson Geological Services (2007) stated that 'this rock is not a true granite, but rather a metamorphic rock altered by fluids from nearby granite'. However, the dimension stone resource will be discussed as a granite throughout this PEPR for simplicity.

Dimension stone mining has not been undertaken for several years. Despite this the resource is considered economically viable, and the mine plan has been developed to allow for the progression of dimension stone operations, but achievement of the final landform is not contingent upon the continuation of dimension stone operations should they not recommence.

The proposed dimension stone resource (refer **Drawing 3**) covers an area of 11,500m^2. At an average depth of four metres and an accepted volume to mass ratio of 2.96 tonnes/m3, the estimated dimension stone resource within the proposed mining area is 136,000 tonnes (t). At an average dimension stone product recovery of 65% (accounting for cracked stone to be discarded) the estimated dimension stone resource within the proposed mining area is approximately 88,000t.

3.2.1.2 Armour rock extraction

The demand for armour rock along South Australia's coastlines has been noted over previous years with the development of new marinas, but also with coastal protection works required due to rising sea-levels. Prior to 2022, a large waste-rock stockpile was present on the southern side of the Site. This 'waste-rock' was identified for suitability for use in the T-Ports Wallaroo Port development, and as of November 2022, the entire waste-rock stockpile has been reclaimed.

The upper layer of the granite resource is cracked and not considered suitable for dimension stone production. This is due to the natural weathering of the rock, and potentially also due to previous blasting undertaken at the Site causing cracks throughout the layer. As recommencement of dimension stone extraction is not planned for the immediate future (and therefore no further oversized waste-rock is to be produced), drill and blasting operations to extract oversized armour rock to supply the T-Ports project has commenced in accordance with the existing approvals under ADP 2000/073 and following an interim Blast Management Plan.

The future mine plans for the Site will look to continue the extraction of armour rock to ensure a local supply is present for future developments or coastal protection requirements, but also exposed additional areas of consolidated bedrock suitable for dimension stone mining. Furthermore, the extraction of the upper granite layer creates an opportunity for pit development towards a final design that will achieve the closure outcomes for the Site.

The weather granite layer has an average depth of approximately four metres and the proposed armour rock extraction area (refer **Drawing 3**) is approximately 20,750m^2. At an accepted volume to mass ratio of 2.96 tonnes/m^3, the estimated armour rock resource within the proposed mining area is 246,000t.

Should the dimension stone mining be completed to the full extent of the proposed plans, an additional 47,500t of armour rock could be available from dimension stone waste-rock.

3.2.1.3 Limestone caprock extraction

The layer of limestone caprock approximately one to two metres is present above the granite. The approximate proposed limestone extraction area (refer **Drawing 3**) is approximately 6,800m^2. At an average depth of 1.5 metres and an estimated volume to mass ratio of 1.4 tonnes/m^3, the estimated limestone resource within the proposed mining area is 14,000t.

3.2.2 Production rate and products

A summary of the estimated production rates and remaining life of mining is provided in **Table 3**.

Table 3 – Estimated production rates and remaining life of mine

Target resource	Estimated production rate (tonnes)	Estimate remaining mining
Dimension stone	2,000	70 years
Armour rock	30,000 in 2023 then 5,000	70 years (60 years for targeted extraction)
Limestone caprock	2,000	7 years

3.2.2.1 Dimension stone mining

Harlequin Stone products have been exported across the world to Taiwan, China, and Italy for processing before being on-sold to Europe and the United States of America (USA) as polished slabs tiles, paving and benchtops.

Mining for dimension stone is presently on hold while new customers are identified for the stone products. When operational, dimension stone mining production was at a rate of 1,500 – 1,800 tonnes (t) a year. Cut granite blocks ranging from three to nine m^3 are stockpiled at the Site, with some being pre-sold and others available for sale. No further mining will be required until the existing stockpiles are sold.

Should a new market be identified in the near future and sales return to 1,500t a year (2,000t total production allowing for discarded waste rock), the remaining life of the dimension stone aspects of the quarry is approximately 70 years.

3.2.2.2 Armour rock extraction

Armour rock extraction / reclamation at the Site provides several beneficial uses as follows:

- the removal of waste-rock from the Site rather than requiring the formation of a waste-rock dump
- the removal of the fractured upper granite layer to expose the consolidated granite layer beneath that is suitable for dimension stone mining
- provision of oversized rocks suitable for marine infrastructure projects and coastal protection works
- expansion of the quarry pit to allow for the formation of shallow batters on pit walls and the planned development of a final landform.

Targeted armour rock extraction from the pit will occur on a campaign basis as required by marine based projects with approximately 30,000t expected to be extracted in 2023. Armour rock stockpiles will also form progressively with discarded waste from dimension stone mining at an estimated rate of 500t a year.

At an estimated average rate of sales of 5,000t a year, and assuming a dimension stone production rate of 2,000t a year, the remaining life of the armour rock resource is approximately 70 years (with the targeted extraction completed after approximately 60 years).

3.2.2.3 Limestone caprock extraction

Limestone rubble produced from caprock extraction is sold for local road surfacing projects and other miscellaneous earthmoving projects. The removal of the limestone will expose additional weathered granite suitable for armour rock extraction and will allow for a gentle batter to be formed on the southern side of the pit to improve the final landform.

Production is estimated to occur at a rate of 2,000t a year with the resource being exhausted in approximately seven years.

3.3 Quarrying activities

3.3.1 Type or types of quarry operation to be carried out

The general layout of the Site is provided in **Drawing 10**.

A range of quarrying methods will be undertaken at the Site due to the three different target resources. The activities for each of the resources is described in the sections below.

Each part of the operation has been designed to occur in a sequence to progress the quarry development towards an oval shaped pit with sloped batters (maximum slope angle of 1v:3h) to the east, south and west, and a steeper batter on the upper bench along the northern boundary (approx. 1v:1h) and a vertical face on the northern and eastern section of the lower bench displaying the smooth granite surfaces from the cut dimension stone.

The total area of the pit will be approximately 2.7 hectares. Two operational benches will be formed. Sections of both benches will then be backfilled with waste-derived fill (WDF) from the MPL 109, and it is proposed that the Site be approved to receive other clean WDF material, particularly topsoil, sourced from future developments in the local area to increase the volume of topsoil available for rehabilitation and to provide a local waste soil disposal site for local developments (refer **Section 3.8**).

3.3.1.1 Dimension stone mining

The method used to extract granite blocks of dimension stone begins with a vertical drill hole being located at the far corner of the block and connected to two open faces by horizontal holes. These holes are lightly blasted to break the block free (refer Plate 8). Depending on its size, the block may be further cut within the pit access for the diamond wire saws which cut the blocks free on the vertical planes. A row of very closely spaced horizontal holes (e.g. 75mm diameter holes at 150mm spacing) are drilled at the base of the block.

Plate 8 – Annotated image of dimension stone mining method from ADP 2000/073

Cut stone blocks are removed from the quarry by a front-end loader (FEL) with fork attachments to the product stockpile areas, shown in **Drawing 10**, from there they are loaded onto a flat-topped semi-trailer for sale and dispatch. The blocks are usually transported to Port Adelaide where they are transferred into shipping containers destined for further processing overseas.

The current lowest point within the pit is approximately 0.5 metres AHD. The pit appears to have intercepted groundwater within the fractured rock aquifer within the granite. No further water is seeping through the pit walls, so it is proposed to expand the dimension stone pit at an elevation of approximately 1.5 metres AHD. At this level, future mining is anticipated to remain above the aquifer and will create a lower bench at approximately five metres high. The current low point in the pit will not be backfilled as the landholder wishes to leave the pond in place to add to the amenity of the final landform.

Dimension stone blocks are required to meet strict specifications. Where extracted blocks display signs of weathering and cracking they are deemed unsuitable for dimension stone and considered as ‘waste rock’ (approximately 35% of all dimension stone extracted). ‘Waste rock’ is stored in the designated stockpiling area shown in **Drawing 10**.

3.3.1.2 Armour rock extraction

Armour rock (large rocks of blocks of granite suitable for coastal protection works) is produced from the Site in two ways. Firstly, ‘waste rock’ from the dimension stone mining is suitable for use as armour rock. The waste rock is stockpiled ready for transport in the designated area shown in **Drawing 10**. Where rocks are too large for transport, they are split using a rock breaker attachment on an excavator.

Secondly, armour rock will be directly targeted by quarrying at the Site. The upper granite layer around the Site is generally weathered and cracked and therefore not suitable for dimension stone mining. A mixture of drill and blast, and/or rock breaker activities are required to further break apart the upper granite layer so it can be sorted and loaded into haul trucks and utilised for coastal protection works.

The extraction of the upper weathered layer will expose the consolidated lower layer of granite that can then be mined for dimension stone. The pit will therefore be mined with two benches with the upper armour rock bench at an average height of approximately five metres. The expansion of the upper layer of the pit will reduce the pit wall slope angles and will allow for the development of more gentle batter slopes in the final landform.

3.3.1.3 Limestone caprock extraction

A band of limestone caprock suitable for road-base sits above the upper granite layer along the southern side of the current pit area (refer **Drawing 3**). The limestone is extracted using an excavator and transported to the processing and stockpiling area shown in **Drawing 10**. The raw material will be fed through a mobile crushing and screening plant on a campaign basis and utilised by the landholder / limestone operator for local projects.

As the limestone layer is less than two metres thick, where the terminal mining boundary is reached, earthmoving equipment will be used to form a batter of 1v:3h or less to grade the natural land surface gently onto the crest of the upper granite bench (see **Section 3.8**).

3.3.1.4 Rehabilitation

Achievement of the final landform will require backfilling with waste soils reclaimed from the MPL 109 area. It is also proposed that additional WDF that is suitable for top dressing rehabilitation areas could be received at the Site from local developments to enhance the rehabilitated landform.

Backfilling activities will occur over all sections of the upper bench and in part of the lower bench.

The upper bench has a perimeter at the crest of approximately 635m. The volume of material required to achieve the proposed final landform are as follows:

- northern side (batter slope angle 1v:1h) – approximately 185m long at 5m high and requiring approximately 2,313m^3 of material for backfilling ((5m x 5m / 2) x 185m).
- Eastern, southern and western sides (minimum batter slope angle 1v:3h) – approximately 450m long at 5m high and requiring approximately 16,875m^3 of material for backfilling ((5m x 15m / 2) x 450m).

The lower bench has a total perimeter of approximately 538m and includes a ramp into the bottom of the pit. The lower bench is proposed to include backfilled sections and the volume of material required to achieve the proposed final landform is as follows:

- Backfilled sections of the lower bench (batter slope angle 1v:3h) – approximately 300m long at 3.5m high and requiring approximately 5,513m^3 of material for backfilling ((3.5m x 10.5m / 2) x 300m).

The estimated total amount of material required to achieve the maximum rehabilitation batter angles for the proposed final landform is approximately:

- Upper bench – 2,313m^3 + 16,875m^3 = 19,188m3
- Lower bench – 5,513m^3
- Combined – 24,701m^3. This number is to be rounded up to 25,000m^3 for ease of discussion and to be conservatively high with the estimated material requirements.

As reported in the Mud Environmental (2020) soil classification study, some sections of the waste soils have larger rocks that will need to be sorted out of material required for the top 200mm of the rehabilitated landform, but this can be achieved passively using a sieve bucket on an excavator.

Monitoring during waste soil reclamation will need to be undertaken to ensure that if any patches of copper slag are encountered, that these are stockpiled separately and managed in accordance with the EPA WDF Standard.

3.3.1.4.1 Rehabilitation backfill material balance

A soil classification project was undertaken by Mud Environmental (2020) (**Attachment 10**) which included an assessment of the western and central-western sections of the waste soils stockpiled on the property from the Copper Cove Marina development. A total area of 16,000m^2 was included in the assessment that involved the excavation of pits to two metres deep (refer **Figure 4**). Most, if not all, of this material is suitable for rehabilitation and the volume of the soil assessed was 32,000m^3.

As shown in **Figure 4**, sampling sites were colour coded based on their suitability for use as fill in a housing development where the green is suitable, and red is not suitable. The majority of unsuitable material was based on the presence of coarse rocks greater than 100mm and poor aesthetics due to trace presence of copper slag and other industrial residues. These aspects of the soils are manageable in a rehabilitation context as they can be separated and used for backfilling to create the final landform batters.

As the filled area is generally deeper than two metres and covers more than double the area that was sampled, it is expected that well over 100,000m^3 of material is available for use on rehabilitation if required. This volume exceeds what is required to achieve the final landform.

Where waste soils are reclaimed from the property, the final batters will be formed with batters no steeper than 1v:3h in the areas show in **Figure 4** below.

Figure 4 – Soil classification assessment area (Mud Environmental, 2020)

3.3.2 Sequence of quarrying and progressive rehabilitation

The sequence of mining and progressive rehabilitation is provided in the following drawings:

- **Drawing 11** – Stage 1 mining and rehabilitation
- **Drawing 12** – Stage 2 mining and rehabilitation
- **Drawing 13** – Stage 3 mining and rehabilitation
- **Drawing 14** – Stage 4 mining and rehabilitation.

The following staged mining and rehabilitation plans have been designed to allow the extraction of the three separate target resources to occur independently of each other where possible. Later stages of armour rock extraction will be contingent on limestone extraction being completed, and later stages of dimension stone extraction will be contingent on the armour rock extraction being completed.

The staged mine plans allow for the limestone and armour rock operations to reach the later stages of operations while dimension stone mining may remain in the early stages. Due to the present low demand for the dimension stone products, a lag between the stages of dimension stone mining compared to armour rock and limestone extraction is anticipated.

Please note that internal abandonment bunds required for operator and public safety will generally not be shown in the staged mining and rehabilitation plans (Drawing 11 – 14) but these will be present during the operational stages as required under the *Work Health and Safety Act (2012)*.

The rehabilitation plans are not contingent on any stage of mining being completed (i.e. the current dimension stone pit is already suitable for the concept final land use). However, the proposed mining is intended to complement the final landform by opening the pit and allowing for gentler batters to be formed that are likely to achieve the closure outcomes for the Site and enhance the amenity of the final landform.

Following consultation with the landowner (**Section 4**), the concept final landform design includes three separate final land uses, which are as follows:

- a shed and yard for the landholders contracting business in the western and south-western sections of the Site,
- an amenity area with a pond with exposed granite faces within the mining pit, and
- all other areas will be seeded and/or planted with native vegetation species to achieve a landform capable of sustaining light intensity grazing.

A post mining land use plan is included in the staged mining and rehabilitation plans outlined below to outline the rehabilitation milestones for each stage and describe how the milestones link into the final landform. The plan will also outline the process for review and engagement over the post mining land use throughout the life of the operation to account potential opportunities and the needs of the local community.

3.3.2.1 Stage 1 operations

3.3.2.1.1 Limestone caprock

Limestone caprock extraction will commence from the EML 5980 western boundary in an easterly direction over an area of approximately 0.3ha. At the completion of the shallow limestone works a batter of approximately 1v:1h will be formed along the outer (southern) edge of the pit and a shallower ramp will be left to allow for heavy vehicle access into the pit.

No topsoil or overburden is present in the Stage 1 limestone area.

3.3.2.1.2 Armour rock

Armour rock extraction will extend the pit eastwards over an area of approximately 1.0ha. Mining will occur over the northern side of the Stage 1 area from west to east, and then over the southern side of Stage 1 from north to south.

The mining will create a neat bench approximately 4m high along the northern and eastern final edge of the quarry pit and a level area that can be utilised for future dimension stone product stockpiling to reduce the footprint of the disturbed area.

Any finer materials generated from the targeted armour rock mining or interburden (i.e. clay seams that may be encountered within the granite) will be stockpiled in the limestone stockpiling area to be either processed into extractive products or stockpiled within the pit ready for rehabilitation of the upper bench.

Copper slag stockpiles and surfaces covered with copper slag will be collected and relocated to the primary copper slag stockpile prior to the commencement of mining.

3.3.2.1.3 Dimension stone

Recommencement of dimension stone mining will first occur along the existing prepared surface directly west of the current lower bench. Upon reaching the proposed westerly extent of the lower bench, dimension stone extraction will then occur along the northern and eastern sides of the pit to expand the final pit floor eastwards. The total expansion of the dimension stone area within Stage 1 is approximately 0.3ha.

A minimum bench width of 8m will be maintained on the northern side and 18m on the western side to allow adequate area to establish a batter and an abandonment bund (on the western side only).

The mining depth of the dimension stone will be raised to approximately 1.5m AHD to ensure that the expansion of the pit floor avoids intercepting of groundwater within the granite.

The mining will create vertical granite faces along the lower bench and a neat pit floor that complement the proposed final land use (development of an amenity area).

Copper slag covering the surfaces will be collected and relocated to the primary copper slag stockpiling area.

3.3.2.1.4 Progressive rehabilitation

The primary copper slag stockpiling area covers an area of approximately 1.3ha along the northern boundary of the Site. Although the acceptance of copper slag to the property by the previous landholder is not related to the operations on EML 5793 or MPL 109, the management of the material is relevant to achievement of the final land use of the tenements and has been included in the environmental management and rehabilitation plans within this program.

As discussed in the Remediation Action Plan (refer **Attachment 11**), copper slag has beneficial reuses and the copper slag present at the Site is proposed to be consolidated into the primary copper slag stockpiling area where it will either be processed into a saleable product (subject to the relevant planning and environmental approvals) or relocated to an approved facility where it can be converted to a useful product.

Soil testing of the surface below the primary stockpiling area will be undertaken to determine the copper contamination present. Management of any contaminated soils will be undertaken in accordance with the EPA WDF Standard. The sampling will allow for the underlying soil to be determined into three-categories that will be managed as follows:

- Low-risk: suitable for use in any area of rehabilitation or to remain in situ.
- Intermediate: a site-specific risk-based approach to be applied to intermediate soils whereby the soils will either remain in situ, be suitable for use as below the surface backfill in pit rehabilitation, requires ex situ treatment on the Site or is required to be removed from the Site to an EPA licenced facility.
- High-risk: material that will not be permitted for use in the rehabilitation of the Site without ex situ treatment or may be required to be removed from the Site to an EPA licenced facility.

Following the assessment of the soils within the copper slag stockpiling area, and rehabilitation program will be prepared and executed. The final surface will be graded if required to smooth any areas where soil has been removed. The final surface will be lightly ripped and seeded or directly planted with native shrubs (e.g. chenopods, acacias etc.) and grasses in late autumn or winter.

Stage 1 rehabilitation will be initiated upon approval of the revised PEPR and is expected to occur over a period of three years

3.3.2.1.5 Post mining land use plan

Operations in Stage 1 include the expansion of the pit to the south and east. This expansion aligns with the final land use by providing more area to create final batters with a lower gradient. This will improve the likelihood of successfully revegetation and reduce the likelihood of erosion issues on the batter.

The limestone operations on the southern side of the pit will allow for additional water to drain internally and prevent water pooling over the landholder’s yard area. The additional water to the pit floor will assist in the establishment of a permanent pond in the pit, which aligns with the proposed final land use (amenity area).

The progressive rehabilitation of the primary copper slag stockpile area along the northern boundary of the operation discussed in Section 3.3.2.1.4 aligns with the proposed final land use of light intensity grazing.

At the completion of Stage 1, the following post mining land use plan review will be undertaken:

- The tenement holder will conduct a Strengths, Weaknesses, Opportunity, Threat (SWOT) analysis (or another appropriate alternative evaluation tool) to determine the success of the Stage 1 mining and rehabilitation operations in progressing towards the proposed final land uses.
- The analysis will include engagement with the landowner in relation to the proposed final land uses.
- A process for identifying other interested stakeholders will be undertaken and each identified stakeholder will be engaged to discuss the proposed final land uses for the Site.
- At the completion of the review, a report will be prepared outlining the results, opinions of the landowner and other stakeholders (if relevant), proposed updates to the post mining land use plan to be formalised through a revision of this PEPR and will confirm the review process to be undertaken at the completion of Stage 2.

3.3.2.2 Stage 2 operations

3.3.2.2.1 Limestone caprock

Limestone caprock extraction will continue along the southern extent of the quarry pit in an easterly direction over an area of approximately 0.3ha. At the completion of the shallow limestone works a batter of approximately 1v:1h will be extended along the outer (southern) edge of the pit.

No topsoil or overburden is present in the Stage 2 limestone area.

3.3.2.2.2 Armour rock

Armour rock extraction will continue in a westerly direction from the southern side of Stage 1 into Stage 2 over an area of 0.3ha.

The mining will continue a neat bench approximately 4m high along a southern operational pit face. Although armour rock extraction is proposed to continue in a southward direction in Stage 4, the Stage 3 bench will be formed in consideration of rehabilitation completion requirements to ensure that the final land use will be achieved in the scenario that armour rock mining does not continue passed Stage 3.

Any finer materials generated from the targeted armour rock mining or interburden (i.e. clay seams that may be encountered within the granite) will be stockpiled in the limestone stockpiling area to be either processed into extractive products or stockpiled within the pit ready for rehabilitation of the upper bench.

3.3.2.2.3 Dimension stone

Upon completion of Stage 1 mining, dimension stone mining will continue in an easterly direction to the final proposed extent of the lower bench. The total expansion of the dimension stone area within Stage 3 is approximately 0.3ha at the final pit floor level of approximately 1.5m AHD.

The mining will create vertical granite faces along the northern and eastern faces of the lower bench. The northern face will be final to compliment the proposed final land use (development of an amenity area), and the eastern face is proposed to be backfilled to create a batter.

3.3.2.2.4 Progressive rehabilitation

Stage 2 rehabilitation is proposed in two sections as shown in **Drawing 12**.

The first section is an approximately 0.2ha area located directly south of the primary copper slag stockpiling area that is proposed to be rehabilitated in Stage 1. Product slabs of dimension stone will be either sold or relocated within the EML 5793 boundary to make the area available for rehabilitation.

The surface may be slightly compacted from hosting the dimension blocks so will be lightly ripped and seeded or directly planted with native shrubs (e.g. chenopods, acacias etc.) and grasses in late autumn or winter.

The second section is an approximately 0.2ha area along the north-western section of the quarry pit. Backfilling will occur against the final extent of the upper bench to form the final rehabilitation batters that will be hand seeded or planted with native vegetation species.

3.3.2.2.5 Post mining land use plan

Operations in Stage 2 include the continued expansion of the pit to the south to join with the eastern edge of the pit to form the final pit boundary. As for Stage 1, this expansion aligns with the final land use by providing more area to create final batters with a lower gradient. This will improve the likelihood of successfully revegetation and reduce the likelihood of erosion issues on the batter.

The limestone operations on the southern side of the pit will allow for additional water to drain internally and prevent water pooling over the landholder's yard area. The limestone mining will also remove a ridge presently running through the centre of the property and will create a safer operating area for vehicle operators in the Site and aligns with the final land use by enhancing the yard created for the landowner's business operations.

The progressive rehabilitation south of the primary copper slag stockpile area outside of the eastern boundary of EML 5793 discussed in Section 3.3.2.2.4 aligns with the proposed final land use of light intensity grazing.

The progressive rehabilitation along the upper batter in the north-west corner of the pit will stabilise the terminal faces and represent the commencement of the amenity area development.

At the completion of Stage 2, the same review process that occurred in Stage 1 will be undertaken unless alternations to the process are made during the Stage 1 review process.

3.3.2.3 Stage 3 operations

3.3.2.3.1 Armour rock

Armour rock will continue subject to demand over an area of approximately 0.6ha along the southern section of the quarry pit where limestone caprock extraction has been completed. Mining may occur in lateral strips along the Stage 4 area, or in blocks from one side to the other establishing the final southern extent of the pit in sections.

Any finer materials generated from the targeted armour rock mining or interburden (i.e. clay seams that may be encountered within the granite) will be stockpiled in the limestone stockpiling area to be either processed into extractive products or stockpiled within the pit ready for rehabilitation of the upper bench.

3.3.2.3.2 Dimension stone

The dimension stone pit will continue in a southerly direction over an area of approximately 0.3ha until reaching the final extent of the lower bench. This will form neat approximately 3.5m high vertical faces along the south-eastern section of the lower bench.

A vertical face will also be formed against the armour rock Stage 2 mining boundary. Should dimension stone not continue into Stage 4, an alternative final landform design will include a ramp running down the eastern side of the vertical face into the pit and will complement the final land use for the Site.

3.3.2.3.3 Progressive rehabilitation

Rehabilitation in Stage 3 will include the extension of the rehabilitated batter along the north-eastern section of the upper bench over an area of approximately 0.2ha.

The batters will be prepared with a maximum slope of 1v:3h and will be hand seeded and/or planted with native vegetation species.

3.3.2.3.4 Post mining land use plan

Operations in Stage 3 include the continuation of mining the upper granite section for armour rock to the south and the expansion of the dimension stone mining to the east.

The armour rock mining will form an upper bench with a large footprint that will provide sufficient area to form final rehabilitated batters of 1v:3h or less. The armour rock mining has a direct positive impact on resource optimisation at the Site but also exposes additional areas of consolidated rock suitable for use as dimension stone to ensure optimal resource extraction is achieved.

The dimension stone mining will create a larger amenity area within the pit that increase the opportunities for the functions that the amenity area can provide (e.g. recreation or event venue).

The progressive rehabilitation along the upper batter in the northern and eastern boundary of the pit will continue to stabilise the terminal faces and continue the amenity area development.

At the completion of Stage 3, the same review process that occurred in Stage 1 will be undertaken unless alternations to the process are made during the Stage 1 or Stage 2 review process.

At the completion of Stage 3 a revised PEPR with greater detail on the closure of the Site will be developed.

3.3.2.4 Stage 4 operations

3.3.2.4.1 Dimension stone

The final stage of dimension stone mining will commence upon completion of the Stage 3 mining and will see the lower bench mined in a westerly direction over an area of 0.3ha.

The Stage 4 mining will create the final vertical wall along the southern section of the lower bench. This area is intended to be backfilled and a final ramp will be created to allow access to the pit.

Approximately 4,000m^3 of waste rock will be produced during the Stage 4 dimension stone mining but will be stored within the quarry pit or adjacent to the pit in the current product stockpiling area to allow for the rehabilitation of the waste rock storage area.

3.3.2.4.2 Progressive rehabilitation

Stage 4 rehabilitation is proposed in two sections as shown in **Drawing 14**.

The first section is an approximately 1.4ha area covering the waste rock / armour rock stockpiling area.

The surface may be slightly compacted from hosting the stockpiling area so will be lightly ripped and seeded or directly planted with native shrubs (e.g. chenopods, acacias etc.) and grasses in late autumn or winter. If the soil in the area is highly compacted and unlikely to support vegetation growth, materials from the waste soils deposited on the property may be reclaimed to create a growing medium at approximately 200mm depth.

The second section is an approximately 0.2ha area along the southern section of the quarry pit. Backfilling will occur against the final extent of the upper bench to form the final rehabilitation batters that will be hand seeded or planted with native vegetation species.

At the end of Stage 4, 3.3ha or progressive rehabilitation is planned to be undertaken. This will reduce the existing disturbance area from 7.5ha to 4.2ha.

3.3.2.4.3 Post mining land use plan - final rehabilitation

The remaining 4.2ha of disturbed area will be rehabilitated in a final rehabilitation campaign that will follow the closure plan set out in a revised PEPR prepared at the completion of Stage 3. The final rehabilitation will include the following activities to achieve the proposed final landform presented in **Drawing 15** and **Drawing 16** (or an updated final landform design based on the Stage 3 final land use plan review process):

- Sale of all remaining rock products at the Site or use of remaining rock products in final landscaping.
- Removal of any infrastructure no longer required by the landowner for the final land use (e.g. explosives magazine).
- Backfilling of the southern and eastern sections of the lower bench to create the permanent access ramp and batters.

- Backfilling of the south-west section of the upper bench to create the final batters and access paths and tracks.
- Topsoiling of the lower bench flat areas.
- Establishment of abandonment bunds along the western crest of the lower bench and a small section of the crest on the north-east corner of the lower bench.
- Establishment of a water feature and vegetated areas within the final pit floor area to create an amenity area.
- Revegetation works on the final batters, the lower bench flat areas and the abandonment bunds.
- Light ripping of internal access roads and general disturbance areas, followed by seeding and / or planting of native vegetation species.

The final rehabilitation is to achieve a final landform that supports the current proposed final land uses at the Site without limiting the potential for future opportunities for beneficial land uses of the Site to be achieved.

3.3.3 Stockpiles

3.3.3.1 Topsoil and subsoil stockpiles

Topsoil present on the Site is limited to what is included in the approximately 250m abandonment bund along the northern boundary of the Site (refer **Drawing 10**). As the abandonment bund provides an important safety feature to the traffic along Chatties Lane, and reduces visibility into the Site, the abandonment bund is proposed to remain in situ, and an alternative source of topsoil for rehabilitation is proposed.

As discussed in Section 3.2, waste soils that are suitable for rehabilitation were deposited on the property prior to the establishment of MPL 109. The volume of waste soils, which were excavated in the development of the nearby Copper Cove Marine, far exceeds what is required to backfill and topsoil the quarry pit to create the proposed final rehabilitated landform.

Detailed discussion regarding the waste soils is provided in the Mud Environmental (2020) report (refer **Attachment 10**.

3.3.3.2 Product stockpile

3.3.3.2.1 Limestone caprock

Limestone product stockpiles will be developed in the crushing and screening area south of the quarry pit (refer **Drawing 10**). The product stockpiles will be generated on a campaign basis and will not exceed 4m in height.

3.3.3.2.2 Armour rock

Where targeted armour rock mining is undertaken, rock will generally be sorted within the pit area and loaded directly from the mining area to haul rocks to be transported off the Site.

Where armour rock is produced as a by-product of dimension stone mining, the rock will be neatly stockpiled in the waste rock storage area shown in **Drawing 10** and within the MPL 109 boundary. Over the remaining life-of-mine it is estimated that 50,000t of waste rock will be produced as a by-product of dimension stone mining (should all four stages be mined). Any dimension stone waste rock available will be utilised for armour rock sales before any armour rock extraction occurs from the pit to ensure that stockpiles are kept as low as possible (it is also more economical to reclaim waste rock when compared to mining armour rock from the pit).

There is presently no waste rock in the stockpiling area, and it is anticipated that demand for coastal protection armour rock will be sustained. The maximum amount of waste rock stockpiled on the Site is unlikely to exceed 10,000t at any one time (approximately 3,400m^3). The waste rock stockpiling area has approximately 8,000m^2 of area available for stockpiling, and stockpiles are not expected to exceed 5m in height.

3.3.3.2.3 Dimension stone

The primary dimension stone stockpiling area is located on the eastern side of EML 5793 and extends into MPL 109 (refer **Drawing 10**).

A secondary stockpile is located at the MPL 109 north-western boundary. The secondary stockpile extends outside of the MPL 109 as it is used as a barrier to unauthorised access to the property from Chatties Lane Road. An upgrade to the fence-line along Chatties Lane is underway, which will allow for the relocation of the product blocks to the primary stockpiling area in Stage 1 of mining.

Dimension stone is neatly placed in both stockpiling areas. The product granite blocks are all unstacked and are therefore at low elevation and are not causing any visual amenity impacts off the Site.

It is proposed that as mining progresses that dimension stockpiles will be relocated to within the EML 5793 area to allow for progressive rehabilitation of the stockpiling area on MPL 109 (refer **Drawing 12**).

3.3.4 Use of explosives

3.3.4.1 Dimension stone mining

Blasting is required for dimension stone mining.

During mining campaigns blasts of vertical sections using approximately 40kg of K-pipe powder explosives (K-pipe) are estimated to occur on a fortnightly basis. The dimension stone is cut to the required block size in situ, and smaller blasts of horizontal sections below the block using approximately 0.5kg of K-pipe are estimated to occur daily during mining campaigns.

Dimension stone blasting will be undertaken in accordance with *Australian Standard 2187.2-2006 – Part 2: Use of Explosives*, and is generally undertaken by qualified AAG staff, or where required, a qualified contractor. All vertical blasts will be undertaken in accordance with the Blast Management Plan (refer **Attachment 12**). As the horizontal blasts below individual stone blocks are too small to cause any offsite impacts, these blasts will not be subject to the Blast Management Plan

K-pipe explosives will be stored onsite in the magazine (refer **Plate 9**), which is inspected and approved by Safework SA under Explosives Magazine Licence 75340 (refer **Attachment 13**). The precise location of the magazine will not be provided on a map with this publicly available program for security reasons, but a separate map will be provided to the lead regulating agency showing the location of the magazine.

Plate 9 – Explosives magazine located on EML 5793

3.3.4.2 Armour rock mining

The top bench of the hard rock deposit will require blasting using Ammonium Nitrate Fuel Oil (ANFO), or other explosive types if deemed for suitable, to crack the rock into manageable size for extraction and use as seawall/groyne armour rock. The top bench is approximate four metres deep and is too fractured for use as dimension stone, but suitable for other extractives purposes.

Armour rock blasting will be campaign based and dependent on demand for the product. During mining campaigns, it is estimated that blasts ranging from 5,000 – 15,000 tonnes in size will be undertaken on a monthly basis.

Blasts will be undertaken in accordance with *Australian Standard 2187.2-2006 – Part 2: Use of Explosives* by a qualified contractor. Each blast will also follow the Blast Management Plan (refer **Attachment 12**) and will be designed in consideration of the mining and closure plans for the Site.

3.3.5 Modes and hours of operation

Mining operations at the Site will be undertaken on both a campaign basis (limestone and armour rock extraction) or continuous basis (dimension stone). All mining operations and ancillary operations at the Site will occur during 7:00am to 5:00pm Monday to Saturday with no mining operations proposed for Sundays and public holidays.

Machinery maintenance and property management activities (e.g. fence repairs) may occur on any day and time.

Application will be made to the Mining Regulator should a temporary extension of the operating hours be required to meet the demands requirements of a project.

3.4 Crushing, processing and product transport

3.4.1 Fixed plant

No fixed crushing or screening plant is proposed to be established at the Site.

Dimension stone will be drilled, blasted, and cut within the main quarry pit before being transported to product stockpile areas.

Armour rock will be drilled and blasted with the intent of producing fit-for-purpose sized rocks. Rocks too large for transport will be reduced in size using a rock breaker. The rock breaker will also be used to win rock directly from the pit where possible to limit the amount of blasting required.

Limestone caprock will be crushed and screened using mobile plant on a campaign basis in the area near the EML 5783 southern boundary / MPL 109 northern boundary.

A weighbridge and double skinned fuel tank are located near the south-west corner of EML 5793 (refer **Drawing 10**).

3.4.2 Hours of operation

Refer Section 3.3.5 – Modes and hours of operation

3.4.3 Processing wastes

Approximately 35% of the rock extracted for dimension stone production was previously considered as a waste but is now seen as a valuable armour rock product. A large waste-rock stockpile that was present on MPL 109 for several years has been completely reclaimed and it is anticipated that armour rock demand is likely to continue for coastal protection works and marine infrastructure projects. There are therefore no processing wastes generated from mining activities at the Site.

Discarded rock from dimension stone mining will be neatly stored on the southern area of MPL 109 (refer **Drawing 10**) ready for sale and transport.

3.4.4 Industrial and domestic wastes

Minor mobile equipment maintenance occurs at the site. All major servicing and maintenance of mobile equipment is carried out off-site. Any wastes generated by minor servicing will be temporarily stored on site in a 200-litre drum which will be regularly emptied and taken to the EPA approved Wallaroo Waste Disposal facility located just 1.5km south of the quarry site.

Diesel is stored within a concrete bunded area with any waste oil drums, oil filters and rags in accordance with the EPA Bunding and spill management guidelines (2016).

Any minor spills will be treated with absorbent sand and contaminated material removed from the Site to an EPA licenced facility.

General waste produced from the Site is separated for recycling (e.g. cans and bottles) and is collected by Council waste collection.

No sewage treatment occurs within the tenement areas. The toilets that service the Site are located on the western side of the main shed and outside of the MPL 109 boundary.

EPA waste tracking slips to be retained on site for the life of the operations as per legislative requirements.

It is proposed that the Site be approved to receive WDF (waste soils for direct reuse, refer **Section 5.1** of the EPA WDF Standard) for use in rehabilitation from local developments in accordance with the required control strategies and testing requirements featured in the WDF Standard.

A WDF Management Plan has been developed to ensure that the WDF activities at the Site are undertaken in accordance with the EPA WDF Standard and enhance the rehabilitation outcomes for the operation.

3.5 Supporting surface infrastructure

3.5.1 Access and roads

The Site Access Point is shown in **Drawing 10**.

The majority of traffic to and from the quarry will used North Beach Road (sealed) to access Wallaroo Plains Road from the Spencer Highway. Some light vehicles will access the Site by travelling from Spencer Highway by travelling along Chatties Lane (unsealed) and turning onto North Beach Road and into the Site Access Point. A map including the road names mentioned above is provided in **Drawing 1**.

The main access track extends from the south-west corner of EML 5793, across the property outside of the EML 5793 and MPL 109 areas to Wallaroo Plains Road. The access track has been coated with copper slag which effectively controls vehicle generated dust along the track.

The Site Access Point is guarded by a lockable gate recessed back from the Wallaroo Plains Road and the intersection has good visibility in both directions for traffic leaving the property. The current access and road network is adequate for proposed operations and no further upgrades are required.

A secondary access gate is present on the MPL 109 northern boundary allowing access to the primary copper slag stockpiling area from Chatties Lane.

As Wallaroo Plains Road is unsealed, noticeable drag out from the Site is only likely to occur from chunks of mud should they become attached to the truck tyres while on the Site. Machinery and haul trucks use well defined access tracks and consolidated hard stand areas which reduces the likelihood of material sticking to the tyres and being dragged out from the Site onto Wallaroo Plains Road, so impacts from drag out are unlikely.

For the majority of the time, production levels at the Site will be low and truck movements related to operations are likely to be limited to less than five per day. During armour rock extraction campaigns, production levels will temporarily increase to approximately 500 tonnes per day which will equate to approximately 15 loaded trucks leaving the Site per day.

3.5.2 Accommodation and offices

The following buildings and structures were identified during the site inspection:

- A large shed (main shed) is located in the north-western portion of the Site is used as a workshop and for storage purposes of the landowner’s landscaping business related equipment and materials. The shed contains a concrete-lined maintenance pit.
- A carpark used for both the landowner’s business and visitors to the quarry is located adjacent to the shed on the southern side.

- Five shipping containers are located directly south of the large shed. These contains various machinery and quarrying equipment.
- Two small demountable buildings are located directly west of the of the large shed and are used intermittently as a mess and an ablutions block.
- A concrete bund, approximately 5m in length, 3m in width and 0.5m in depth is located approximately 50m south-east of the main shed. The bund is currently used to store scrap metal, metal pipes and wooden beams related to the landowner's business.
- A small shed located approximately 50m east of the concrete bund contains fencing wire.

There is no accommodation or residences at the Site.

3.5.3 Public services and utilities used by the operation

The Site is accessible from the Site Access Point on Wallaroo Plains Road (unsealed) and from a secondary access point on Chatties Lane (unsealed) (refer **Drawing 10**). As discussed in **Section 3.5.1**, the majority of traffic to and from the quarry will used North Beach Road (sealed) to access Wallaroo Plains Road.

Electricity is connected to the site with existing power lines entering from the west and connecting to a transformer located near the north-east corner of the large maintenance shed/site office. The power line does not traverse any areas associated with the mining operations.

A telephone service is connected to the Site and the Site has mobile phone coverage.

Mains water is connected at the north-western corner of the large maintenance shed/site office and does not traverse any areas associated with the mining operations. The water supply has been used to irrigate native vegetation screens planted around the western and northern boundaries of the quarry.

Rainfall run-off collected in the quarry pit is used to lubricate the diamond wire saw.

Within the quarry pit a 10,000-litre poly water tank is fed by a water pipeline which is used to lubricate the diamond saw when water in the in-pit water storage area is depleted.

3.5.4 Visual screening

The landscape surrounding the Site comprises a gently undulating calcrete plain with coastal dunes, salt lakes and tidal flats. Adjacent properties comprise some sown pastures and cereal crops, salt pans, samphire low shrubland and another quarry situated on the northern side of Chatties Lane.

The Wallaroo Township has a rich industrial history and coastal location that attracts tourists. However, the local area is not renowned for highly valued natural aesthetics.

The large maintenance shed/site office at the western end of the quarry is the most prominent visual component of the Site (refer **Plate 10**). The shed has been painted a beige colour to help it blend unobtrusively with the surrounding and is primarily used for the landowner's business (refer **Plate 11**).

Proposed future mining operations at the Site will generally occur below natural surface level and therefore have no impact on the visual amenity when viewed from surrounding areas.

Native trees and shrubs planted around parts of the western and northern boundaries of the quarry together with low screening mounds of soil and overburden placed along the northern boundary adjacent to Chatties Lane create a visual screen from the north.

While the current view of the quarry from outside of the Site is considered acceptable within the context of the area, further plantings of native trees and shrubs along both the western and northern boundaries are planned to continue to improve the visual amenity of the Site.

Plate 10 – The view into the Site from Jones Road to the west (adjacent to the nearest receptor)

Plate 11 – The main beige shed visible from the Wallaroo Township

3.5.5 Fuel and chemical storage

A 5,000-litre diesel tank and refuelling pump and hose (refer **Plate 12**) is located in a concrete bund adjacent to the Site weighbridge (refer **Drawing 10**).

Any waste oils produced from vehicle maintenance conducted at the Site (for both mining related machinery and machinery associated with the landowner's business) is stored in drums within the concrete bund with the diesel tank before being removed from the Site (refer **Plate 12**).

Plate 12 – The fuel and waste oil concrete bunded storage area

3.5.6 Site security

The Site is fully fenced, and the main entrance gate is kept locked when the site is not staffed.

Signage is present at the Site Access point warning of the deep excavation and notifying that security cameras are in use (refer **Plate 13**).

A motion activated remote camera is located along the main access track to photograph any vehicles entering the Site.

Fencing along the northern boundary (Chatties Lane) has been increased in height and a topsoil/overburden abandonment bund is also present along the northern boundary above the northern pit face. Further installation of cyclone fencing and 'private property' signage along the northern boundary is underway to further improve site safety (refer **Plate 14**).

Sections of Chatties Lane and Wallaroo Plains Road are closed in consultation with the Council when blasting is in progress to ensure public safety.

Several blocks of granite product have been relocated to section of the northern property boundary just outside of the mining lease to help prevent vehicles from accessing the Site from Chatties Lane to illegally dump at the Site (refer **Plate 15**).

Plate 13 – Signage present at the Site Access Point

Plate 14 – Cyclone fencing installed along Chatties Lane

Plate 15 – Granite product located along Chatties Lane as an additional security measure

3.5.7 Erosion, sediment and silt control

Surface water runoff is shown in **Drawing 6** and **Drawing 6a**.

The Site has several sub-catchments for surface water runoff at the Site. Drawing 6 shows the sub-catchment around the granite quarry pit. All water within this sub-catchment flows back into the bottom of the pit.

Surface water from the disturbed area south of the granite pit flows into the waste rock stockpiling area which acts as a sump and prevents water leaving the MPL 109 area.

Surface water that falls over the carpark and weighbridge area runs towards the Site Access Point. This is a small sub-catchment and water generally does not flow in this area.

The primary copper slag stockpile area is located on a flat area that does not promote surface water runoff from the area (refer **Drawing 6a**).

As surface water is not flowing from the mining areas, no sediment and erosion control structures are currently present at the Site.

As the marina waste soils were reportedly deposited on the property in the 1990's (Mud Environmental, 2020) prior to the establishment of MPL 109 in 2008, the marina waste soils are not considered to be part of the mining operations and are the pre-existing environment. **Drawing 6** provides a 'no mining activity divide' whereby the areas on the eastern side of the divide have not been disturbed by ancillary mining operation, and the surface water is therefore not managed in this area.

3.6 Vegetation clearance

No remnant native vegetation is present within the EML 5793 and MPL 109 area and therefore native vegetation clearance is required at the Site.

Plantings of native trees and shrubs around parts of the western and northern boundaries of the site to provide vegetative screening have been established and further plantings will continue through the progressive rehabilitation of the disturbed areas.

3.7 Site Water Management

The Site is supplied by mains water to the main shed and admin area. The granite pit maintains a near permanent body of water at the bottom which acts as a secondary water supply.

Water outputs for the Site are as follows:

- Domestic uses for the landowner’s business and for personal hygiene and toilets for quarry staff.
- Lubrication and dust suppression for diamond cutting and drilling into the granite.
- Dust suppression.

As the Site is supplied by mains water, a water balance for the Site is not required.

3.8 Description of quarry site at completion

A conceptual final landform map for the Site is provided in **Drawing 15** and associated cross-sections of the final landform are provided in **Drawing 16**.

The final landform at the Site will support a range of land uses as follows:

- Workshop and yard for the landowner’s business,
- Light intensity grazing area supported by drought tolerant native species (e.g. blue bush, salt bush and acacias), and
- An amenity area with exposed granite faces and water feature that can be visited by the public.

The only quarry infrastructure to remain on the Site will be what is required for the landowner’s business. This includes the main shed, power and water supply, car park, portable buildings and ablutions blocks, storage containers, diesel tank and the hydrocarbon storage bund.

The final pit design will maintain smooth vertical quarry faces on the lower bench and the bottom of the pit will be accessible to vehicles and foot traffic by the ramp into the pit. Water will be retained in the bottom of the pit to incorporated into a water feature where a waterfall is developed down one of the granite pit faces by pumping water from the bottom of the pit to the top. No other surface water infrastructure will be required.

The second / upper bench will be backfilled using marina waste soils reclaimed from the MPL 109 area. The majority of the backfilled landform will have maximum slope gradients of 1 vertical to 3 horizontal (1v:3h) to reduce potential erosion control and allow for vegetation to establish. The northern side of the upper bench will have steeper batters due to insufficient room being available to achieve the 1v:3h angle. Additional erosion and stability controls for this batter will be considered when the rehabilitation is undertaken to ensure compliance with the closure outcomes for the Site.

The backfilled upper benches will create a smooth topographical landform on the outer rim of the pit that adds to the amenity of the final landform.

The areas outside of the pit not used for the landowner’s business or amenity area will conform with the wider landscape and is intended to have a native vegetation cover to support livestock grazing.

3.8.1 Transfer of responsibility

The responsibility for the disturbed areas on EML 5793 and MPL 109 will be transferred to the landowner at the time of surrender. Surrender will follow the required regulatory processes at the time of application and will be deemed acceptable if the closure outcomes featured in **Section 5** can be demonstrated as being achieved.

4 CONSULTATION

4.1 South Australian Environment Protection Authority (EPA)

On 22 May 2020, the EPA were consulted in relation to historical deposits of waste copper blast furnace slag and a large area of waste soils sourced from the nearby Wallaroo Marina development.

On 12 June 2020, EPA provided advice based on contamination reports relating to nearby properties, that the copper slag present at the Site posed risks of contaminating soil and water. EPA also advised that the use of dredge spoil in rehabilitation could also be a potentially contaminating activity. EPA requested that a Preliminary site investigation (PSI) be undertaken in accordance with the *National Environment Protection (Assessment of Site Contamination) Measure 2013* to identify if imported materials have caused contamination at the Site.

As requested, a PSI was undertaken by consultant 'Greencap' and a report was provided to Australasian Granite on 26 October 2021 (refer **Attachment 5**). The findings from the Greencap (2021) report and the associated Mud Environmental Report (refer **Attachment 10**) are discussed in **Section 2.19**. Furthermore, the environmental controls and management for potentially contaminated material is assessed in **Sections 5.17** and **Section 5.18** and the Remediation Action Plan featured in **Attachment 11**.

4.2 Mining lease 6155 and 6277 tenement holder

On 24 October 2022, the neighbouring tenement holder was consulted over proposed blasting at Wallaroo Quarry. The consultation was undertaken by Lucas Total Contract Solutions (TCS) on behalf of Australasian Granite.

The tenement holder did not have any concerns relating to blasting at the Site but requested that vibration monitoring be undertaken at the residence on the property.

Blasting was undertaken on 28 November 2022 and 9 December 2022 and monitoring was undertaken at the neighbouring tenement holder's residence on both occasions. Neither blast triggered air blast overpressure or vibration at the locations and no complaints were received or concerns raised.

4.3 Jones Road residents

On 30 October 2022, the nearest residents to the Wallaroo Quarry were consulted over proposed blasting activities at the Site. The consultation was undertaken by the landowner / limestone operator on behalf of Australasian Granite.

The residents did not have raise any concerns providing that there was no damage to their property.

Blasting was undertaken on 28 November 2022 and 9 December 2022 and no damage occurred to the Jones Road property and no complaints or further concerns relating to quarrying operations were received.

4.4 Copper Coast Council

On 1 November 2022, Lucas TCS contacted the Copper Coast Council to request permission to temporarily close Chatties Lane, Wallaroo Plain Road and Jones Road for blasting operations at Wallaroo Quarry.

On 15 November 2022, the Copper Coast Council notified Lucas TCS that approval for the temporary road closures had been granted subject to the following:

- A public notice be placed in the Yorke Peninsula Times newspaper.
- The nearest residents be notified of the activities.

A notice was placed in the Yorke Peninsula Times on 22 November 2022 and the nearest neighbours had already been consulted over the blasts.

4.5 Landowner

On 8 September 2022, a site meeting was held to discuss the development of the PEPR and was attended by the following:

- the Australasian Granite Site Manager
- Macro Environmental Solutions
- the DEM compliance officer
- the landowner / limestone extraction operator.

During the meeting the landholder advised of an ambition to create an amenity area within the mining pit as a final land use. It was proposed that the pit area could include a water feature, exposed smooth granite walls and gardens that could be used for weddings, events, or visited by geology enthusiasts. The remainder of the Site was proposed to be revegetated and utilised for light intensity grazing.

It was discussed that by expanding the upper benches of the pit, gentle batters could be created on the western, southern and eastern sides, with the granite walls on the northern side of the pit being left exposed to display the geology.

Potential plans and uses for the copper slag and waste soils were also discussed with the landowner. This included the potential sale of the copper slag for use on golfing 'greens' or for use in sand blasting.

The use of marina waste soils in the rehabilitation of the Site was discussed following the findings from the Mud Environmental (2021) report that the majority of the material would be suitable for rehabilitation.

Further consultation occurred during a phone call with the landholder on 22 January 2023.

Concerns relating to the mining operations on the property raised by the landowner are as follows:

- Blasting – the landowner was concerned that flyrock from the blasting could potentially damage the shed on the Site. The landowner observed both blasts undertaken in 2022 in the presence of the blasting contractors. No damage occurred to the shed or any other property.

  Potential impacts from blasting to the shed (and other property) on the Site are assessed and control strategies discussed in **Section 5.2**.

- Rehabilitation – the landowner has requested that the mining be undertaken in consideration of a proposed final landform that includes an amenity area in the bottom of the pit surrounded by native vegetation areas.

  Rehabilitation is discussed in **Section 3.3** and rehabilitation completion is discussed in **Section 3.8**.

Ongoing consultation with the landowner will continue on a regular basis throughout the life of the Site.

5 ENVIRONMENTAL OUTCOMES, STRATEGIES, CRITERIA AND MONITORING

An assessment for the source-pathway-receptor (SPR) relationship has been undertaken for each potential impact event in alignment with DEM *Minerals Regulatory Guideline MG2A*.

A pre-control risk assessment and post-control residual risk assessment has also been provided for each impact event. The risk assessment follows a conventional risk assessment process using the matrix shown in **Figure 5**.

	Consequence (c)				
Likelihood (L)	Trivial (1)	Minor (2)	Moderate (3)	Significant (4)	Severe (5)
Very Likely (5)	Medium	High	High	Extreme	Extreme
Likely (4)	Low	Medium	High	High	Extreme
Possible (3)	Very Low	Low	Medium	High	High
Unlikely (2)	Very Low	Very Low	Low	Medium	High
Very unlikely (1)	Very Low	Very Low	Very Low	Low	Medium

Figure 5 – Risk assessment matrix used for the potential impact assessments

The definitions displayed in Table 4 were used to assist in undertaking the risk assessment for each potential impact event.

Table 4 – Risk assessment matrix definitions

Likelihood	Definition	Consequence	Definition
Very Likely	It is expected to occur on several occasions	Severe	Would cause irreversible environmental damage and/or an extreme level of environmental or social harm.
Likely	It is expected to occur at some point in the future	Significant	Would cause extensive environmental damage requiring significant resources and/or time to rectify and/or a high level of environmental or social harm.
Possible	It is a possibility and would not be totally unexpected	Moderate	Would cause some environmental damage requiring moderate resources and/or time to rectify and/or a moderate level of environmental or social harm.
Unlikely	It is not expected to occur but could potentially occur	Minor	Would cause minor environmental damage requiring some or no resources and/or time to rectify and/or a minor level of environmental or social harm.
Very unlikely	Has never occurred previously but is not impossible	Trivial	Would cause negligible environmental damage requiring no resources and/or time to rectify and/or a negligible level of environmental or social harm

5.1 Air quality

5.1.1 Context

A diverse range of land uses exist around the Site, and are described as follows:

- Cropping and grazing areas to the west, north and east
- Quarrying activities to the north
- Wetland areas to the south and west
- Agricultural homesteads to the west and north
- The Wallaroo township to the south-west
- Shipping and grain silo facilities within the Township.

Non-mining related local dust sources in the area will generally be from agricultural activities (e.g. soil tilling, or grazing herd movements over dry soil) or from product loading and unloading at the local industrial areas.

Air quality in the area is also infrequently impacted by dust storms from the arid areas to the north and west.

Due to the Mediterranean climate of the area, background dust levels, and potential dust generation from the Site is more likely during the warmer and drier summer months.

The wind roses shown in Attachment 1 highlight that the predominant wind direction from October to April is from the south-west.

The nearest sensitive receptor is located approximately 600m to the west, and highest concentration of receptors are located in the Wallaroo Township, with the edge of the Township being approximately 1,250m from the Site.

The Site is required to ensure that dust emissions from the Site do not cause ground level concentrations of particulate matter at receptor locations to exceed the maximum concentrations provided in Schedule 2 of the SA Environment Protection (Air Quality) Policy 2016.

5.1.2 Potential impact events

A property with a residence is located approximately 600m from the Site. On days with high easterly winds, which as shown in **Attachment 1** are rare, dust may be generated from operations, stockpiles or truck movements which have the potential to blow towards the nearest receptor on Jones Road.

All other receptors are located over 1000m from the Site and due to the relative low levels of production, risks from potential dust impacts cause by operations at the Site are low.

Identified source, pathway and receptors are provided in Table 8. Potential impact events for Air quality are provided in **Table 5** and **Table 6** and supported by the discussion in **Section 2.15**.

Table 5 – Air quality source, pathway, and receptor identification during operations

Potential Impact Event – Air quality operational 1 (AQO1): Nuisance dust impacts on nearby residences				
Source	**Pathway**	**Receptor**	**Confirmation of SPR**	**Pre-control Risk Assessment**
Dust from cutting, extraction, drilling, vehicle movements, loading, screening and wind erosion.	Transport of dust through the air.	Nearby residences.	Yes	L = 2 C = 3 Risk = Low
Uncertainty and Assumptions	No recent complaints have been registered or concerns raised during consultation with the nearest neighbour. Therefore, it is assumed that future impacts are unlikely.			
Sensitivity to Change	Low, as mining activities are not expected to generate more dust.			
Justification for the SPR confirmation/non confirmation	The source, pathway and receptor have been confirmed following an inspection of the Site and review of aerial imagery.			

Table 6 – Air quality source, pathway, and receptor identification post-completion

Potential Impact Event – Air quality closure 1 (AQC1): Nuisance dust impacts on nearby residences				
Source	**Pathway**	**Receptor**	**Confirmation of SPR**	**Pre-control Risk Assessment**
Dust from wind erosion.	Transport of dust through the air.	Nearby residences.	Yes	L = 1 C = 2 Risk = Very low
Uncertainty and Assumptions	Rehabilitation will successfully establish enough vegetation cover to prevent significant wind erosion at the Site.			
Sensitivity to Change	No change to the rehabilitation plan is anticipated.			
Justification for the SPR confirmation/ non-confirmation	The source, pathway and receptor have been confirmed following an inspection of the Site and review of aerial imagery.			

5.1.3 Control and management strategies

The control and management strategies to mitigate potential impacts or to reduce impacts to acceptable levels are listed in Table 7.

Table 7 – Control and management strategies for air quality

Control and management strategy	Impact event	Uncertainty and assumptions
Minimise the disturbance footprint to what is required for current mining.	AQO1	High certainty to reduce wind erosion surface.
Undertake progressive rehabilitation in accordance with the mine plans.	AQO1 & AQC1	High certainty to reduce wind erosion surface.
Water sprayers will be used during cutting and drilling operations to suppress dust.	AQO1	High certainty to reduce dust emissions from cutting and drilling operations.
Operations will be modified or ceased under windy conditions (>40kmh) on dry days, or where dust is observed to be leaving the Site with the potential to cause an offsite impact.	AQO1	Modifying or ceasing activities to reduce dust generation is a proven control measure.
Seeding and/or tree planting will be undertaken across the rehabilitated area where natural germination of native vegetation has not occurred.	AQC1	Seeding and/or tree planting to be undertaken prior to, or at the commencement of winter to improve the likelihood of vegetation establishment. It is assumed that winter will have the greatest rainfall.
Post-control risk assessment		
AQO1 – Nuisance	L2, C1 = Very low	
Description of the likely impact	No noticeable dust deposition impacts from the Site at the nearest receptor location during the operational phase. As control strategies are required to reduce the risk level from *Low* to *Very low*, the inclusion of an environmental outcome and measurement criteria is deemed appropriate.	
AQC1 – Nuisance	L1, C1 = Very low	
Description of the likely impact	No noticeable dust deposition impacts as a result of wind erosion from the Site post-closure are anticipated. As the risk of impact is expected to be *Very Low* before the implementation of control strategies, the inclusion of an environmental outcome and measurement criteria is not considered necessary.	

5.1.4 Outcome and measurement criteria

The operational environmental outcome and measurement criteria for Air quality is provided in **Table 8**.

Table 8 – Operational air quality environmental outcome and measurement criteria

Environmental outcome	Measurement criteria (outcome achievement)			
The Tenement Holder must ensure there are no public nuisance impacts from dust generated by mining operations.	Site records will demonstrate that any air quality related complaints are acknowledged within 48 hours and investigated within seven days. Should the complaint be deemed valid, control and management strategies will be reviewed and updated as required and Site records will show the updates were provided to the complainant. Should complaints continue, air quality monitoring is to occur at locations, and using methods, as agreed with the regulating agency, to demonstrate: • That mining operations do not cause dust deposition (ash content) to exceed 4g/m^2/month (rolling annual average), when monitored in accordance with Australian Standard AS 3580.10.1 Methods for sampling and analysis of ambient air – Determination of particulates – Deposited matter – Gravimetric method.			
Potential impact	**Measurement type and form**	**Locations**	**Frequency**	**Control or baseline data**
AQO1 - Nuisance	Complaint records.	Electronically filed.	Ongoing.	Not applicable.
	Dust deposition monitoring.	Representative of complainant location (refer local dwelling location in **Drawing 8**) as agreed with the lead regulating agency.	Monthly sampling (+/- 2 days)	Background dust deposition levels.

5.2 Blasting

5.2.1 Context

Blasting has been undertaken over several decades on EML 5793 using a range of methods and without complaint or incident. Dimension stone blasting using K-Pipe produce small-scale explosions and is not expected to cause any offsite impacts. However, to achieve the batter angles required for the proposed final landform, an increase in the use of ANFO blasting is proposed to extract the top layer of fractured hard rock from within the quarry pit. To ensure these activities are undertaken in compliance with the environmental outcome for blasting (refer Section 5.2.4) a Blast Management Plan has been developed for the Site (refer **Attachment 12**).

The nearest sensitive receptor (residence) is located approximately 605m to the west of the proposed final pit extent. The next closest sensitive receptor (residence) is approximately 1,200m north of the proposed final pit extend.

Where required, a blast exclusion zone may be established as a flyrock contingency control and may cover areas of public road, the adjacent mining tenement and neighbouring private property. The communication protocol and control strategies featured with the Blast Management Plan (refer **Attachment 12**) will be followed to ensure these areas are vacant when a blast is undertaken.

As stated in Section 3.3.4, all blasting will be undertaken by qualified staff and/or contractors in accordance with *Australian Standard 2187.2-2006 – Part 2: Use of Explosives.*

5.2.2 Potential impact events

The potential impact events in **Table 9**, **Table 10** and **Table 11** are based on the blasting operations as discussed in Section 3.3.4.

Table 9 – Blasting source, pathway and receptor identification for vibration

Potential Impact Event – Blasting operational 1 (BO1): Unacceptable vibrational impact to a receptor from blasting undertaken on EML 5793				
Source	**Pathway**	**Receptor**	**Confirmation of SPR**	**Pre-control Risk Assessment**
Blasting activities on EML 5793.	Movement of vibration through the ground.	Nearby residents.	Yes.	L = 3 C = 2 Risk = Low
Uncertainty and Assumptions	It is uncertain how strong the pathway between the blast locations in the pit and the nearest receptor location is as this can be determined by the geology. It has been assumed that the pathway exists in accordance with the precautionary principle, but due to the relatively small blast sizes and the distance being greater than 500m, the vibration levels at the nearest receptor is expected to be within the measurement criteria.			
Sensitivity to Change	No change to the pathway or receptor locations is anticipated and the blasting methods can be adapted to manage any impacts in the unlikely event they occur.			
Justification for the SPR confirmation/ non-confirmation	The source, pathway and receptor have been confirmed following an inspection of the Site and review of aerial imagery.			

Table 10 – Blasting source, pathway and receptor identification for airblast overpressure

Potential Impact Event – Blasting operational 2 (BO2): Unacceptable airblast overpressure impact to a receptor from blasting undertaken on EML 5793				
Source	**Pathway**	**Receptor**	**Confirmation of SPR**	**Pre-control Risk Assessment**
Blasting activities on EML 5793.	Movement of blast sound through the air.	Nearby residents.	Yes.	L = 3 C = 2 Risk = Very low
Uncertainty and Assumptions	The distance between the blast location and receptor can be accurately measured therefore no uncertainty or assumptions exist.			
Sensitivity to Change	No change to the pathway or receptor locations is anticipated and the blasting methods can be adapted to manage any impacts in the unlikely event they occur.			
Justification for the SPR confirmation/ non-confirmation	The source, pathway and receptor have been confirmed following an inspection of the Site and review of aerial imagery.			

Table 11 – Blasting source, pathway and receptor identification for flyrock

Potential Impact Event – Blasting operational 3 (BO3): Flyrock from blasting undertaken on EML 5793 leaves the mining area with the potential to injure people or animals or damage property				
Source	**Pathway**	**Receptor**	**Confirmation of SPR**	**Pre-control Risk Assessment**
Blasting activities on EML 5793.	Movement of flyrock through the air.	Nearby residents, road users, property owners.	Yes.	L = 2 C = 5 Risk = High
Uncertainty and Assumptions	The distance between the blast location and the identified receptors can be accurately measured therefore no uncertainty or assumptions exist. All blasts will be designed to minimise the likelihood of flyrock.			
Sensitivity to Change	No change to the pathway or receptor locations is anticipated and the blasting methods can be adapted to manage any impacts in the unlikely event they occur.			
Justification for the SPR confirmation/ non-confirmation	The source, pathway and receptor have been confirmed following an inspection of the Site.			

5.2.3 Control and management strategies

The control and management strategies to mitigate potential impacts or to reduce impacts to acceptable levels are listed in **Table 12**.

Table 12 – Control and management strategies for blasting

Control and management strategy	Impact event	Uncertainty and assumptions
Blasting activities will be undertaken in accordance with the Blast Management Plan (refer **Attachment 12**). Trial blasting for armour rock has been undertaken under existing approvals using the control strategies below and learnings have been incorporated into the Blast Management Plan.	BO1, BO2, BO3	Uncertainty reduced by conducting a smaller trial blast to confirm controls.
All blasting to be undertaken by licenced staff and/or contractors and in accordance with Australian Standard (AS 2187.2).	BO1, BO2, BO3	This control has a high certainty of being effective.
All blasts are to be recorded in Site Records, detailing timing, size, number of blast holes, quantity and type of explosives used.	BO1, BO2, BO3	Not applicable.
Blasting will be undertaken on weekdays with blasts initiated within normal working hours (8:00am to 5:00pm).	BO1, BO2	It is assumed that blasting during business hours would reduce the likelihood of potential impacts.
Neighbours will be notified by telephone 24 hours before the scheduled day and time of armour rock or vertical dimension stone blasts.	BO1, BO2	Not applicable.
Dimension stone explosives will be stored in accordance with the Safework SA Magazine Licence 75340 and no ANFO will be stored onsite.	BO1, BO2, BO3	This control has a high certainty of being effective.
Blast exclusion zones will be established for all armour rock blasts and where relevant, a permit to temporarily close Council roads will be obtained from the Copper Coast Council.	BO3	This control has a high certainty of being effective.
Blast Monitoring will be undertaken near the closest residents for initial blasts to ensure vibration and airblast overpressure levels	BO1, BO2	It is assumed that the monitoring locations are representative of receptor locations.
Efficient, effective, and safe blasting technology will be used in accordance with AS 2187.2.	BO1, BO2, BO3	This control has a high certainty of being effective.
Post-control risk assessment		
BO11 – Vibration	L2, C1 = Very low	
Description of the likely impact	Potentially noticeable Vibration causing no adverse impacts from blasting. As control strategies are required to reduce the risk level from *Low* to *Very low*, the inclusion of an environmental outcome and measurement criteria is deemed appropriate.	

BO2 – Airblast overpressure	L2, C1 = Very low
Description of the likely impact	Potentially noticeable Airblast overpressure causing no adverse impacts from blasting. As control strategies are required to reduce the risk level from *Low* to *Very low*, the inclusion of an environmental outcome and measurement criteria is deemed appropriate.
BO3 – Flyrock	L2, C2 = Very low
Description of the likely impact	No Flyrock is expected to leave the mining area from blasting. As control strategies are required to reduce the risk level from *High* to *Very low*, the inclusion of an environmental outcome and measurement criteria is deemed appropriate.

5.2.4 Outcome and measurement criteria

The environmental outcome and measurement criteria for Blasting is provided in **Table 13**.

Table 13 – Blasting environmental outcome and measurement criteria

Environmental outcome	Measurement criteria (outcome achievement)
The tenement holder must ensure that there are no adverse impacts from airblast overpressure, flyrock or vibration to public safety, human comfort, livestock and/or third-party property, caused by blasting on the tenement.	(1) Site records will demonstrate that any blasting related complaints regarding vibration and/or airblast overpressure are acknowledged within 48 hours with the complaint investigated within seven days. Should the complaint be deemed valid, control and management strategies will be reviewed and updated as required and Site records will show the updates were provided to the complainant. Should complaints continue, monitoring will be undertaken near the receptor location to demonstrate that peak sound pressure (overpressure) is less than 115 dB(A), and ground vibration is less than 5 mm/s. (2) No evidence of flyrock observed outside of the EML 5793 or MPL 109 area during post-blasting inspections.

Potential impact	Measurement type and form	Locations	Frequency	Control or baseline data
BO1 & BO2 – Vibration and airblast overpressure	Complaint records.	Electronically filed.	Ongoing.	Not applicable.
	Records from vibration and airblast overpressure monitoring.	Nearby the complainant's location as agreed with DEM (refer **Drawing 17**).	Each blast until three consecutive blasts less than 105dB(A)	Not applicable.
BO3 - Flyrock	Records from post-blast inspections.	Outside of the EML 5793 boundary (refer **Drawing 17**).	Following each blast.	Not applicable.

5.3 Caves

5.3.1 Context

As discussed in **Section 2.10**, no caves are known to occur in the area and no evidence of karst features have been observed within the thin limestone caprock layer. An impact assessment was not considered necessary for Caves.

5.3.2 Potential impact events

As no caves (receptor) exist on the Site, an SPR relationship does not exist, and no further impact assessment is considered necessary.

5.4 Drag out

5.4.1 Context

As discussed in **Section 3.5.1**, mining related traffic leaving the property enter the unsealed Wallaroo Plains Road.

Machinery and haul trucks use well defined access tracks and consolidated hard stand areas which reduces the likelihood of material sticking to the tyres and being dragged out as clods of mud from the Site onto Wallaroo Plains Road.

Vehicles travel along a 350m internal access track before entering the public road intersection. The journey along the access track allows for any clods of muds to fall from the tyres prior to reaching the public road.

5.4.2 Potential impact events

Potential impact events for drag out are provided in **Table 14** and supported by the discussion in **Section 3.5.1**.

Table 14 – Drag out source, pathway and receptor identification during operations

Potential Impact Event – Drag out operational 1 (DOO1): Drag out impacts on public road users				
Source	**Pathway**	**Receptor**	**Confirmation of SPR**	**Pre-control Risk Assessment**
Increased safety risk to public road users due to drag out from the Site.	Vehicles travelling from Site to the public roads.	Public road users.	Yes	L = 1 C = 3 Risk = Very low
Uncertainty and Assumptions	It is assumed that drag out from the Site may be possible under some situations although this is not known to have occurred previously.			
Sensitivity to Change	Low, as surface and road conditions are unlikely to change.			
Justification for the SPR confirmation/ non-confirmation	The source, pathway and receptor have been confirmed following an inspection of the Site.			

5.4.3 Control and management strategies

The control and management strategies to mitigate potential impacts or to reduce impacts to acceptable levels are listed in **Table 15**.

Table 15 – Control and management strategies for drag out

Control and management strategy	Impact event	Uncertainty and assumptions
Haul trucks and light vehicles use well defined access tracks when on the Site.	DOO1	High certainty to prevent mud from sticking on tyres.
All vehicles travel along a 350m internal access road before entering the public road.	DOO1	It is assumed that clods of mud present will be dislodged during the journey along the access track.
Post-control risk assessment		
DOO1 – Drag out	L1, C1 = Very low	
Description of the likely impact	No noticeable drag out from the Site during the operational phase are anticipated. As control strategies are not required to reduce the risk level to *Very low*, the inclusion of an environmental outcome and measurement criteria is not considered necessary.	

5.5 Fire

5.5.1 Context

As discussed in **Section 2.8.1**, the entire EML 5793 area, and the area of MPL 109 utilised for ancillary mining operations, are completely cleared of native vegetation.

The eastern side of MPL 109 has generated some grasses and shrubs which could act as a fire fuel source.

The property boundaries are generally bordered by properties with low fuel sources. This includes the neighbouring quarry to the north, the wetlands to the west and south and the marina waste soil stockpiles to the east.

Any potential ignition sources associated with mining operations (e.g. a vehicle fire caused by a mechanical fault) can only occur within the mining area away from potential fire fuel sources.

5.5.2 Potential impact events

Potential impact events for Fire are provided in **Table 16** and supported by the discussion in **Section 2.8.1**.

Table 16 – Fire source, pathway and receptor identification during operations

Potential Impact Event – Fire operational 1 (FO1): Fire caused by operations spreads from the Site and causes damage to third-party property and/or injury to the public				
Source	**Pathway**	**Receptor**	**Confirmation of SPR**	**Pre-control Risk Assessment**
Fire caused by sparks from hot works or accidental vehicle fire.	Airborne embers or fire spread through grasses outside of the mining areas.	Neighbouring property owners.	Yes.	L = 2 C = 3 Risk = Low
Uncertainty and Assumptions	It is assumed that even under high-risk weather conditions that sparks, or an accidental vehicle fire would be able to spread to areas outside of the mining area.			
Sensitivity to Change	As progressive rehabilitation commences, some vegetation will exist closer to the mining areas and may increase the pathway and change the risk of a fire.			
Justification for the SPR confirmation/ non-confirmation	The source, pathway and receptor have not been confirmed following an inspection of the Site and review of aerial imagery.			

5.5.3 Control and management strategies

The control and management strategies to mitigate potential impacts or to reduce impacts to acceptable levels are listed in **Table 17**.

Table 17 – Control and management strategies for fire

Control and management strategy	**Impact event**	**Uncertainty and assumptions**
Machinery operation and any hot works are not undertaken near vegetated areas.	FO1	High certainty to prevent accidental fires from spreading.
Fuel and waste oil is stored in a concrete bund and is protected from vehicle collision.	FO1	High certainty to prevent accidental fires occurring from collisions with flammable liquids.
Machinery is well maintained and fitted with fire extinguishers.	FO1	High certainty to prevent accidental fires from spreading.
Operations follow the warning and advice issued by the Country Fire Service (CFS)	FO1	High certainty to ensure Site activities are undertaken in consideration of fire dangers.
Post-control risk assessment		
DOO1 – Drag out	L1, C1 = Very low	
Description of the likely impact	Any incidents of accidental fire will be controlled to prevent the fire leaving the Site. As control strategies are required to reduce the risk level from *Low* to *Very low*, the inclusion of an environmental outcome and measurement criteria is deemed appropriate.	

5.5.4 Outcome and measurement criteria

The environmental outcome and measurement criteria for Fire is provided in **Table 18**.

Table 18 – Fire environmental outcome and measurement criteria

Environmental outcome	Measurement criteria (outcome achievement)
The tenement holder must, during construction and operation, ensure there are no public injuries and or deaths, no adverse impacts to adjacent land use and no unauthorised damage to public or third-party private property and infrastructure as a result of fires caused by mining operations that could have been reasonably prevented.	An investigation by a suitably qualified person into a fire that starts on the tenements that result in public injuries and or deaths, adverse impacts to adjacent land use, or unauthorised damage to public or third-party private property and infrastructure demonstrates that the tenement holder could not have reasonably prevented the incident from occurring.

Potential impact	Measurement type and form	Locations	Frequency	Control or baseline data
FO1 – Fire incident	All fires ignited within the tenement boundaries are recorded. Any fire that ignited within the tenement boundaries that spreads outside the tenement boundary with be notifiable as an incident and will be investigated by a suitably qualified person to determine if the fire could have been reasonably prevented by the tenement holder.	Fire ignition location on EML 5793 or MPL 109 and surrounding areas.	Following a fire. An investigation report to be provided to the lead regulating agency within 30 days of the incident (unless otherwise agreed with the lead regulating agency).	Not applicable.

5.6 Groundwater

5.6.1 Context

An overview of the Groundwater conditions relevant to the Site is discussed in **Section 2.6**.

While the area is not a prescribed wells area, high potential groundwater dependent ecosystems (GDEs) are located to the west and south of the Site (refer Drawing 5).

Water is present at the base of the quarry pit, and an investigation was undertaken to determine if the mining operation has intersected groundwater. The following items were considered in the investigation:

- Time-series aerial imagery
- Pit floor elevation assessment, and

- Pit water salinity levels.

It was concluded that the groundwater has been intercepted at the bottom of the pit based on the following findings:

- Time-series aerial imagery shows that the bottom of the pit appears to permanently hold water
- Elevation measurements show the bottom of the pit is at or near sea level, and
- Water quality testing shows that the pit water has a salinity well above what would be expected if all the water was surface water.

Surface water that enters the pit pond comes into contact with copper slag spread over the internal road surfaces within the pit catchment area and sitting on the pit floor, and water sampled from the pit floor was found to exceed the species protection trigger for copper from the ANZ Water Quality Guidelines.

The granite geology can be observed within the lower bench of the quarry to be highly competent and the hydraulic conductivity through the geology is expected to be low (which would lead to low quantities of water from the pit moving through the aquifer towards potential receptors). While the connectivity between the pit floor and the adjacent GDEs is not well understood, it is acknowledged that a pathway between the copper concentrations in the pit water (source) and the GDEs (receptor) may be present.

The GDEs present to the south and west and are considered highly disturbed due to industrial and farming activities in the area and alterations to the surface water channels that supply them.

The local groundwater has high salinity (TDS >25,000 mg/L) and is not suitable for human consumption or agriculture.

Copper slag has been historically deposited over vast areas of the Wallaroo Township to the west and south-west of the Site, and the receiving environment is already impacted by copper contamination (refer **Attachment 5** and **Attachment 6**).

A variety of land uses are present around the Site. The South Australian Generalised Land Use spatial layer from 2020 is featured in **Drawing 7** and shows the following:

- Neighbouring properties to the north and east are used for agriculture.
- A rural residential property is located on Jones Road to the west of the Site.
- The full CT 6233/860 area is zoned for mining.
- Areas further south and west are zoned as vacant or reserve.

A review of the Planning and Design Code Conservation Zones on SARIG shows that areas to the South containing the samphire shrubland appear to have been rezoned for conservation (refer **Attachment 7**).

5.6.2 Potential impact events

Potential impact events for Groundwater are provided in **Table 19** and **Table 20** and supported by the discussion in **Section 2.6**.

Table 19 – Groundwater quality source, pathway and receptor identification during operations

Potential Impact Event – Groundwater operational 1 (GWO1) and Groundwater closure 1 (GWC1): Impact on nearby GDEs due to groundwater contamination.				
Source	**Pathway**	**Receptor**	**Confirmation of SPR**	**Pre-control Risk Assessment**
Groundwater contaminated by mixing with surface water with elevated copper levels in the bottom of the pit.	Transmission through the fractured rock aquifer.	Nearby GDEs.	Yes	L = 3 C = 3 Risk = Medium
Uncertainty and Assumptions	It is assumed that groundwater that enters the quarry pit is potentially upstream of flows that are available to the GDEs, however it is uncertain if the GDEs are in contact with the same aquifer as the quarry due to the complex geology.			
Sensitivity to Change	It is unlikely that the pathway between the quarry pit and the nearby GDEs will be further investigated and therefore the assumption that a pathway exists will be maintained.			
Justification for the SPR confirmation/ non-confirmation	The source, pathway and receptor have been confirmed following an inspection of the Site, a review of aerial imagery and analysis of remote sensing data.			

Table 20 – Groundwater quantity source, pathway and receptor identification during operations and closure

Potential Impact Event – Groundwater operational 1 (GWO2): Impact on nearby GDEs due to poor groundwater quantity				
Source	**Pathway**	**Receptor**	**Confirmation of SPR**	**Pre-control Risk Assessment**
Groundwater evaporation from the pit floor reduces available groundwater to GDEs.	Evaporation from exposure to the atmosphere.	Nearby GDEs.	Yes	L = 2 C = 1 Risk = Very low
Uncertainty and Assumptions	It is assumed that groundwater that enters the quarry pit is potentially upstream of flows that are available to the GDEs, however it is uncertain if the GDEs are in contact with the same aquifer as the quarry due to the complex geology. It is assumed that due to the small area of water exposed to the atmosphere, combined with the high proportion of surface water in the water at the bottom of the pit is unlikely to cause a cone of depression around the Site that will cause adverse impacts to local GDEs.			
Sensitivity to Change	No changes to the pit floor to reduce the area of the pit water are planned, and this water is intended to be a feature of the final landform.			
Justification for the SPR confirmation/ non-confirmation	The source, pathway and receptor have been confirmed following an inspection of the Site, a review of aerial imagery and analysis of remote sensing data.			

5.6.3 Control and management strategies

The control and management strategies to mitigate potential impacts or to reduce impacts to acceptable levels are listed in **Table 21**.

Table 21 – Control and management strategies for groundwater

Control and management strategy	Impact event	Uncertainty and assumptions
Increase the level of future expansion of the pit floor to approximately 1.5m AHD.	GWO1, GWC1, GWO2	High certainty to reduce the likelihood of further groundwater interception.
Implementation of the Remediation Action plan (refer **Attachment 11**).	GWO1, GWC1	High certainty to reduce contamination sources at the Site.
Post-control risk assessment		
GWO1 & GWC1 – Groundwater quality	L1, C1 = Very low	
Description of the likely impact	As the source of the contamination (copper slag present on the surfaces within the pit catchment) will be removed, copper levels within the pit water are expected to decrease below contamination thresholds and significantly decrease the likelihood and severity of any impacts to the nearby GDEs during operations and post-closure. As control strategies are required to reduce the risk level from *Medium* to *Very low*, the inclusion of an environmental outcome and measurement criteria is deemed appropriate.	
GWO2 – Groundwater quantity	L1, C1 = Very low	
Description of the likely impact	No adverse impacts to local GDEs are expected due to a reduction in available groundwater due to mining operations at the Site. As the risk of impact is expected to be *Very Low* before the implementation of control strategies, the inclusion of an environmental outcome and measurement criteria is not considered necessary.	

5.6.4 Outcome and measurement criteria

The environmental outcome and measurement criteria for Groundwater quality is provided in **Table 22**.

Table 22 – Groundwater environmental outcome and measurement criteria

Environmental outcome	Measurement criteria (outcome achievement)			
The tenement holder must ensure there is no adverse impact to groundwater dependent ecosystems or adverse change to the environmental values of water within the aquifers inside or outside of the land as a result of mining operations.	Annual compliance reporting demonstrates that the Remediation Action Plan (RAP) has been implemented as proposed. Within 24-months of the completion of the RAP, heavy metal concentrations within the pit water do not exceed the 80% level of species protection trigger value for freshwater in the ANZ water quality guidelines.			
Potential impact	**Measurement type and form**	**Locations**	**Frequency**	**Control or baseline data**
GWO1, GWC1	Annual compliance reports demonstrate that the RAP has been implemented as planned.	EML 5793, MPL 109	Annually	Not applicable.
GWO1, GWC1	Annual water quality sampling and testing at a NATA accredited laboratory.	EML 5793 pit floor (refer **Drawing 17**).	Annually, and prior to surrender application.	**Table 1, Section 2.6.3.4**

5.7 Heritage

5.7.1 Context

Cultural heritage is regulated under the *Aboriginal Heritage Act, 1988* and *Heritage Places Act 1993*. Geological heritage falls under the *Mining Act, 1971*.

As discussed in **Section 2.17**, local heritage sites are located within the Wallaroo Township area. The closest listed heritage site is the Wallaroo Smelters, which is approximately 2.5km from Wallaroo Quarry.

No aboriginal heritage sites feature on the heritage register within 500m of the Site.

The total EML 5793 and MPL 109 are heavily disturbed by mining and waste soil deposition.

5.7.2 Potential impact events

Potential impact events for Groundwater are provided in **Table 23** and supported by the discussion in **Section 2.17**.

Table 23 – Heritage source, pathway and receptor identification during operations

Potential Impact Event – Heritage operational 1 (HO1): Aboriginal heritage sites or objects are damaged by mining operations				
Source	**Pathway**	**Receptor**	**Confirmation of SPR**	**Pre-control Risk Assessment**
Unknown presence of aboriginal heritage Sites and/or objects in the proposed disturbance areas.	Mining operations.	Local indigenous people.	Yes	L = 1 C = 4 Risk = Low
Uncertainty and Assumptions	As no new disturbance to the land is proposed, it is not anticipated that aboriginal artefacts will be encountered at the surface.			
Sensitivity to Change	Low, as the site is covered in caprock, no sub-surface artefacts are expected to be encountered.			
Justification for the SPR confirmation/non confirmation	The source, pathway and receptor have been confirmed following an inspection of the Site.			

5.7.3 Control and management strategies

The control and management strategies to mitigate potential impacts or to reduce impacts to acceptable levels are listed in **Table 24**.

Table 24 – Control and management strategies for heritage

Control and management strategy	Impact event	Uncertainty and assumptions
All employees and contractors working at the Site are advised of the significance of Aboriginal heritage and culture and are to take due care to preserve all Aboriginal Sites and Objects as defined by the *Aboriginal Heritage Act, 1988*.	HO1	High certainty to ensure appropriate management of identified Aboriginal heritage Sites and Objects.
Proposed mining to be limited within the current disturbance area.	HO1	High certainty to reduce the likelihood of encountering Aboriginal heritage artefacts.
Post-control risk assessment		
WO1 – Heritage Site or Object discovery.	L1, C2 = Very low	
Description of the likely impact	In the unlikely event that Aboriginal or non-aboriginal sites or objects are encountered during mining operations, no impacts occur as work will cease in the area and the appropriate authorities were identified. As control strategies are required to reduce the risk level from *Low* to *Very low*, the inclusion of an environmental outcome and measurement criteria is deemed appropriate.	

5.7.4 Outcome and measurement criteria

The operational environmental outcome and measurement criteria for Heritage is provided in **Table 25**.

Table 25 – Operational Heritage environmental outcome and measurement criteria

<table>
<tr><th colspan="2">Environmental outcome</th><th colspan="3">Measurement criteria (outcome achievement)</th></tr>
<tr><td colspan="2">The tenement holder must, during construction and operation, ensure there is no damage, disturbance or interference to Aboriginal and non-Aboriginal heritage sites, objects or remains as a result of mining operations unless it is authorised under the relevant legislation.</td><td colspan="3">Site records demonstrate that works ceased immediately following identification of a potential cultural heritage Sites or Objects and that the Aboriginal Affairs and Reconciliation Division (and/or other relevant authority) and the lead regulating agency were notified within 24 hours.
Site records show that works in the vicinity of the discovery did not recommence until agreed with the appropriate authorities.</td></tr>
<tr><th>Potential impact</th><th>Measurement type and form</th><th>Locations</th><th>Frequency</th><th>Control or baseline data</th></tr>
<tr><td>HO1 – Cultural heritage disturbance</td><td>Records of actions and communications following the discovery of a cultural heritage Site / Object.</td><td>Investigation on EML 5793 and MPL 109.
Electronically filed.</td><td>Following discovery.</td><td>Not applicable.</td></tr>
</table>

5.8 Land use and third-party property

5.8.1 Context

During consultation, the landowner raised some concerns in relation to flyrock from blasting potentially damaging the shed on the Site. Potential impacts from flyrock are managed through the implementation of the Blast Management Plan for the Site (refer **Attachment 12**).

In addition to the shed, other buildings and infrastructure used for the landowner's earthmoving business are present at the Site.

A review of spatial layers on the SARIG platform found that no powerlines, underground public infrastructure, or easements are located within the tenement boundary.

The Site is bordered by Chatties Lane to the north. The quarry pit comes to within approximately 15m of the road but as the geology is consolidated granite, no geotechnical risk to the road is anticipated.

An electricity transmission line enters the property from the northern boundary and runs approximately 20m from the MPL 109 north-west boundary and approximately 50m from proposed operations.

Mains water is connected at the north-western corner of the large maintenance shed/site office and does not traverse any areas associated with the mining operations.

A range of land uses surround the Site and nearby third-party property includes the following:

- Agricultural crops
- Electricity transmission line

- Mains water lines
- Property fencing
- Mining and farming equipment.

The nearest dwelling is approximately 600m from the western boundary of the Site.

As discussed in **Section 3.8**, A conceptual final landform design is provided in **Drawing 15** and **Drawing 16** and aims to support the following land uses:

- Workshop and yard for the landowner's business,
- Light intensity grazing area supported by drought tolerant native species (e.g. blue bush, salt bush and acacias), and
- An amenity area with exposed granite faces and water feature that can be visited by the public.

5.8.2 Potential impact events

Potential impact events for Land use and third-party property (LTPP) are provided in **Table 26**, **Table 27** and **Table 28**, and supported by the discussion in **Sections 2.11 and 3.5**.

Table 26 – Land use and third-party property source, pathway and receptor identification during operations (1 of 2)

Potential Impact Event – Land use and third-party property operational 1 (LTPPO1): Damage to Chatties Lane from geotechnical failure of northern pit wall				
Source	**Pathway**	**Receptor**	**Confirmation of SPR**	**Pre-control Risk Assessment**
Erosion or failure of northern pit wall	Geology between the pit and road	Chatties Lane	Yes	L = 1 C = 3 Risk = Very low
Uncertainty and Assumptions	No signs of erosion or failure has been observed in the northern wall, and the granite geology is assumed to be competent between the pit wall and the road edge.			
Sensitivity to Change	Mining will not reduce the distance to the road so no changes to the risk of impact are expected.			
Justification for the SPR confirmation/ non-confirmation	The source, pathway and receptor have been confirmed following an inspection of the Site and review of aerial imagery.			

Table 27 – Land use and third-party property source, pathway and receptor identification during operations (2 of 2)

Potential Impact Event – Land use and third-party property operational 1 (LTPPO2): Final landform does not support the proposed final land use				
Source	**Pathway**	**Receptor**	**Confirmation of SPR**	**Pre-control Risk Assessment**
Mining operations (e.g. heavy vehicles)	Physical collisions	Adjacent land users and local infrastructure	Yes	L = 2 C = 3 Risk = Low
Uncertainty and Assumptions	The location of third-party property has been determined and no assumptions or uncertainty exist.			
Sensitivity to Change	No changes to the location or types of third-party property that increase the likelihood of impacts from mining are expected.			
Justification for the SPR confirmation/ non-confirmation	The source, pathway and receptor have been confirmed following an inspection of the Site and review of aerial imagery.			

Table 28 – Land use and third-party property source, pathway and receptor identification at closure

Potential Impact Event – Land use and third-party property operational 1 (LTPPC1): Final landform does not support the proposed final land use				
Source	**Pathway**	**Receptor**	**Confirmation of SPR**	**Pre-control Risk Assessment**
Rehabilitated landform not constructed as proposed.	Erosion, failure to establish vegetation, unstable landform, failure to conform with the local topography and drainage system.	Landowner.	Yes	L = 3 C = 3 Risk = Medium
Uncertainty and Assumptions	The rehabilitation risks are well understood.			
Sensitivity to Change	No changes to the proposed final landform are likely to alter the risk of failed rehabilitation.			
Justification for the SPR confirmation/ non-confirmation	The source, pathway and receptor have been confirmed following an inspection of the Site.			

5.8.3 Control and management strategies

The control and management strategies to mitigate potential impacts or to reduce impacts to acceptable levels are listed in **Table 29**.

Table 29 – Control and management strategies for Land use and third-party property

Control and management strategy	Impact event	Uncertainty and assumptions
Conduct mining operations in accordance with the proposed Staged mine plans	LTPPO1, LTPPO2	It is assumed that mining within the proposed areas will prevent LTPP impacts.
Blasting to be undertaken in accordance with the Blast Management Plan.	LTPPO1, LTPPO2	It is assumed that if blasting achieves the human comfort standards at nearby residences that no geotechnical damage will occur to Chatties Lane.
Annual visual inspections of the northern pit wall and local infrastructure and third-party property to be undertaken.	LTPPO1, LTPPO2	High certainty to identify potential LTPP impacts so they may be proactively addressed.
Vehicles to use well defined internal access tracks and operators and contractors are aware of the location of local infrastructure.	LTPPO2	High certainty of preventing collision with third-party property.
No rocks used within the rehabilitated landform that are greater than 300mm and backfilled areas are compacted every 0.5m to prevent the formation of voids.	LTPPC1	High certainty to improve stability of the rehabilitated landform.
The maximum batter angles in the rehabilitated landform is 1v:3h (with the exception of the northern batter and proposed vertical granite faces).	LTPPC1	High certainty to improve stability of the rehabilitated landform.
Rehabilitation of vegetation species are tolerant to low-rainfall and limited soil quality, are endemic to the region, and are sown / planted in late autumn or early winter.	LTPPC1	High certainty to improve vegetation establishment on the rehabilitated landform.
The rehabilitated landform is top-dressed with a minimum of 100mm of suitable soils (e.g. free of rocks and has no visible signs of contamination).	LTPPC1	High certainty to improve vegetation establishment on the rehabilitated landform.
Progressive rehabilitation areas are inspected annually for erosion, instability, vegetation establishment and conformance to the local topography and drainage system.	LTPPC1	High certainty to identify and address rehabilitation issues.
Post-control risk assessment		
LTPPO1 – Geotechnical failure of northern wall	L1, C3 = Very low	
Description of the likely impact	No impact to Chatties Lane as the northern pit wall is competent and does not show signs of erosion of failure. As the risk of impact is expected to be *Very low* before the implementation of control strategies, the inclusion	

	of an environmental outcome and measurement criteria is not considered necessary.
LTPPO2 – Mining impacts to LTPP	L1, C1 = Very low
Description of the likely impact	Minimal likelihood of impacts to offsite land uses and Third-party property caused by mining operations. As control strategies are required to reduce the risk level from Low to Very low, the inclusion of an environmental outcome and measurement criteria is deemed appropriate.
	L2, C3 = Low
Description of the likely impact	The rehabilitated landform successfully supports the proposed final land use and does not cause negative impacts to the landowner. As control strategies are required to reduce the risk level from *Medium* to *Low*, the inclusion of an environmental outcome and measurement criteria is deemed appropriate.

5.8.4 Outcome and measurement criteria

The environmental outcome and measurement criteria for Land use and third-party property is provided in **Table 30** and **Table 31**.

Table 30 – Land use and third-party property environmental outcome and measurement criteria (operational)

Environmental outcome	**Measurement criteria (outcome achievement)**			
The tenement holder must, during construction and operation, ensure there are no adverse impacts to third-party land use or property on or off the land as a result of mining operations other than those agreed between the tenement holder and the affected user or determined by an appropriate court.	Annual inspections of the Site will confirm that mining operations have not caused damage to third-party land uses or property. Site records will demonstrate that any land use and third-party property related complaints are acknowledged within 48 hours. An investigation by a suitably qualified person into a complaint relating to impacts from mining on third-party land use and/or property is completed within 30 days and demonstrates that the tenement holder could not have reasonably prevented the impacts from occurring.			
Potential impact	**Measurement type and form**	**Locations**	**Frequency**	**Control or baseline data**
LTPPO2	Records from annual inspections and post-complaint investigation reports	EML 5793, MPL 109, surrounding areas.	Annual and following a complaint.	Not applicable.

Table 31 – Land use and third-party property environmental outcome and measurement criteria (closure)

Environmental outcome	Measurement criteria (outcome achievement)
The tenement holder must ensure the land is progressively and finally rehabilitated to support the future land use agreed by the Director of Mines or another authorised officer.	Annual inspections will confirm that progressively rehabilitated areas are: • free from major erosion and scouring, • do not show visible signs of instability, • establishing a vegetation cover of native species, and • conforming to the local topography and drainage system. An inspection of the final landform by a suitably qualified third-party will confirm that the final landform will successfully support the proposed final land use.

Potential impact	Measurement type and form	Locations	Frequency	Control or baseline data
LTPPC1	Records from annual inspections of the rehabilitated areas for erosion, signs of instability and vegetation establishment.	Rehabilitated areas on EML 5793, MPL 109.	Annually and prior to surrender.	**Drawing 15** and **Drawing 16**.

5.9 Light spill

5.9.1 Context

As no operations are proposed to occur at night, and therefore no flood lights are required for the conduct of mining operations at the Site, an impact assessment was not considered necessary for Light spill.

5.9.2 Potential impact events

As no bright lighting is required for the Site (source), an SPR relationship does not exist, and no further impact assessment is considered necessary.

5.10 Native fauna

5.10.1 Context

A review of fauna species data from an EPBC Act Protected Matters Search (refer **Attachment 4**) and the Biological Database of South Australia (BDBSA) through the Nature Maps web platform (Government of South Australia, 2023a) identified that seven endangered or critically endangered species may or are likely to exist in the area, but that no official recordings of these species had been made within approximately 5km of the Site.

Fauna surveys conducted within approximately 5km of the Site registered on the BDBSA recorded 19 species of birds, two species of reptiles and one mammal species (Short-beaked echidna).

The quarry pit at the Site has an access ramp allowing fauna egress and the steeper northern pit face is protected by an abandonment bund and high fence to prevent larger fauna species from potentially falling into the pit.

5.10.2 Potential impact events

Potential impact events for Native fauna are provided in **Table 32** and supported by the discussion in **Section 2.9**.

Table 32 – Native fauna source, pathway and receptor identification during operations

Potential Impact Event – Native fauna operational 1 (NFO1): Injury or fatality of wildlife due to vehicle collision				
Source	**Pathway**	**Receptor**	**Confirmation of SPR**	**Pre-control Risk Assessment**
Mining equipment and vehicles	Collision on Site	Native fauna	Yes	L = 1 C = 3 Risk = Very low
Uncertainty and Assumptions	Assumes that it is possible that an animal (e.g. an echidna or snake) could enter the operational areas of the Site.			
Sensitivity to Change	An increase in wildlife abundance could increase in the future with progressive rehabilitation adding additional habitat.			
Justification for the SPR confirmation/ non-confirmation	The source, pathway and receptor have been confirmed following an inspection of the Site and review of fauna databases.			

5.10.3 Control and management strategies

The control and management strategies to mitigate potential impacts or to reduce impacts to acceptable levels are listed in **Table 33**.

Table 33 – Control and management strategies for Native Fauna

Control and management strategy	Impact event	Uncertainty and assumptions
Mining equipment and vehicles to use well defined access tracks and stay clear of rehabilitation areas.	NFO1	High certainty to avoid fauna collision
Mining equipment and vehicles will not be used in close proximity of any native fauna species observed on the Site during operations.	NFO1	High certainty to eliminate risk of fauna collision
Quarry pit to always maintain an exit ramp to allow egress to any fauna that enter the pit.	NFO1	High certainty to reduce fauna entrapment risk.
Vehicles to adhere to Site speed limits.	NFO1	High certainty to avoid fauna collision

Post-control risk assessment	
NFO1 – Injury or fatality to native fauna	L1, C3 = Very low
Description of the likely impact	Nil injuries or fatalities to native fauna that enter the Site. As the risk of impact is expected to be *Very Low* before the implementation of control strategies, the inclusion of an environmental outcome and measurement criteria is not considered necessary.

5.11 Native vegetation

5.11.1 Context

As discussed in **Section 2.8.1**, the entire EML 5793 area, and the area of MPL 109 utilised for ancillary mining operations, are completely cleared of native vegetation and therefore, no remnant vegetation clearance is required for mining activities.

Progressive rehabilitation at the Site will include the seeding and/or planting of native vegetation species.

5.11.2 Potential impact events

As no native vegetation (receptor) exists on the Site, an SPR relationship does not exist, and no further impact assessment is considered necessary.

5.12 Noise

5.12.1 Context

As discussed in Section 2.16, due to the low production levels at the Site, operations are expected to be consistent with local background noise levels.

Potential noise sources from the Site include load and haul activities, drilling for blasting, dimension stone cutting, cap-rock extraction, crushing and screening and rehabilitation earthworks.

Non-mining related noise sources include traffic noise from the nearby Spencer Highway, and infrequent noise from agricultural activities, activities on the neighbouring mining lease and from the landholder's activities within and outside of the workshop.

Operations are proposed to occur within the hours of 7:00am and 5:00pm, which are considered as 'day' in accordance with Section 5(2) of the EPA Noise Policy.

The Site property and neighbouring properties are categorised as 'Rural' and/or 'Conservation' (Government of South Australia, 2023b). The appropriate land use category under the EPA Noise Policy is 'Rural industry' and the applicable Indicative noise factor is an LAeq of 57dB(A) when measured over a 15-minute period.

The nearest dwelling is 600m west of the Site and is expected to be the only receptor location where operations at the Site may be audible. The predominant wind direction in the area is from the south-west, the nearest receptor is located upwind of the Site the majority of the time.

5.12.2 Potential impact events

Potential impact events for Noise are provided in **Table 34** and supported by the discussion in **Section 2.16**.

Table 34 – Noise source, pathway and receptor identification during operations

Potential Impact Event – Noise operational 1 (NO1): Nuisance noise impacts on nearby residences				
Source	**Pathway**	**Receptor**	**Confirmation of SPR**	**Pre-control Risk Assessment**
Noise from cutting, extraction, drilling, vehicle movements, loading, screening and wind erosion.	Acoustic waves through the air.	Nearby residence.	Yes	L = 2 C = 3 Risk = Low
Uncertainty and Assumptions	No recent complaints have been registered or concerns raised during consultation with the nearest neighbour. Therefore, it is assumed that future impacts are unlikely.			
Sensitivity to Change	Low, as mining activities are not expected to generate more noise. However, a change of ownership of the nearest dwelling could alter the sensitivity of the receptor.			
Justification for the SPR confirmation/ non-confirmation	The source, pathway and receptor have been confirmed following an inspection of the Site and review of aerial imagery.			

5.12.3 Control and management strategies

The control and management strategies to mitigate potential impacts or to reduce impacts to acceptable levels are listed in **Table 35**.

Table 35 – Control and management strategies for noise

Control and management strategy	Impact event	Uncertainty and assumptions
All equipment used for mining operations is well maintained.	NO1	High certainty to reduce noise generation.
Operations limited to daylight hours.	NO1	High certainty to reduce nuisance noise impacts.
Operators to stay in regular communication with the nearest neighbour to ensure noise impacts are not occurring.	NO1	High certainty to address nuisance noise impacts and reduce the likelihood of complaints.
Post-control risk assessment		
NO1 – Noise nuisance	L1, C2 = Very low	
Description of the likely impact	Operations do not cause unacceptable levels of noise at the nearest receptor location. As control strategies are required to reduce the risk level from *Low* to *Very low*, the inclusion of an environmental outcome and measurement criteria is deemed appropriate.	

5.12.4 Outcome and measurement criteria

The environmental outcome and measurement criteria for Noise is provided in **Table 36**.

Table 36 – Noise environmental outcome and measurement criteria

Environmental outcome	Measurement criteria (outcome achievement)
The tenement holder must, during construction and operation, ensure no public nuisance impacts from noise as a result of mining operations.	Site records will demonstrate that any noise related complaints are acknowledged within 48 hours and investigated within seven days. Should the complaint be deemed valid, control and management strategies will be reviewed and updated as required and Site records will show the updates were provided to the complainant. Should complaints continue, monitoring will be undertaken by a suitably qualified person near the receptor location to demonstrate that noise levels do not exceed the Indicative Noise Levels described in the EPA Noise Policy (LAeq < 57dB(A)).

Potential impact	Measurement type and form	Locations	Frequency	Control or baseline data
NO1	Site complaint records on the complaint register.	Outside of the EML 5793 boundary.	Following a complaint.	Not applicable.
NO1	Noise monitoring (for LAeq) by a suitably qualified person in accordance with the EPA Noise Policy.	At or near the complainant location.	15-minute period when Site is in operation and not upwind.	EPA Noise Policy indicative noise levels, currently 57dB(A).

5.13 Public safety

5.13.1 Context

The Site is located approximately 1,250m from the outskirts of the Wallaroo Township, and is located near any frequently trafficked or visited areas by the public.

The quarry pit does have some steep and vertical faces several metres high and therefore presents a hazard to the public if they access the Site without authorisation.

As discussed in Section 3.5.6, the Site has several control strategies in place to prevent unauthorised access which are discussed in **Table 38**.

5.13.2 Potential impact events

Potential impact events for Public safety are provided in **Table 37** and supported by the discussion in **Section 3.5.6**.

Table 37 – Public safety source, pathway and receptor identification during operations and closure

Potential Impact Event – Public safety operational 1 (PSO1) and Public safety closure 1 (PSC1): Safety incident to the public due to unauthorised access to the Site during operations or post-closure				
Source	**Pathway**	**Receptor**	**Confirmation of SPR**	**Pre-control Risk Assessment**
Unsafe terrain within the mining areas	Unauthorised access to the Site.	The public.	Yes	L = 3 C = 5 Risk = High
Uncertainty and Assumptions	There is a high level of certainty that the quarry pit could be dangerous to unauthorised and unsupervised public access.			
Sensitivity to Change	The likelihood of public access without controls may increase if Wallaroo Township expands closer to the Site.			
Justification for the SPR confirmation/ non-confirmation	The source, pathway and receptor have been confirmed following an inspection of the Site and review of aerial imagery.			

5.13.3 Control and management strategies

The control and management strategies to mitigate potential impacts or to reduce impacts to acceptable levels are listed in **Table 38**.

Table 38 – Control and management strategies for Public safety

Control and management strategy	Impact event	Uncertainty and assumptions
The property is surrounded by fencing, including high cyclone wire fencing along the northern boundary / Chatties Lane (nearly completed) with private property signage.	PSO1, PSC1	High certainty to prevent unauthorised access to the Site.
Both vehicle access points to the Site are covered by gates and padlocked when the Site is not in use.	PSO1, PSC1	High certainty to prevent unauthorised access to the Site.
Signage is present at the Site Access point warning of the deep excavation and notifying that security cameras are in use.	PSO1	Moderate certainty to deter unauthorised access to the Site.
A motion activated remote camera is located along the main access track to photograph any vehicles entering the Site.	PSO1	Moderate certainty to deter unauthorised access to the Site and to identify members of the public accessing the Site without authorisation.
An abandonment bund is present along the northern boundary near the steep and vertical faces of the pit as a secondary barrier to public access. Additional abandonment bunds will be established above the final vertical faces to protect the public	PSO1, PSC1	High certainty to prevent unauthorised access to the Site and/or accidental falls down the vertical faces of the pit.

accessing the Site with or without authorisation post-closure.		
Blocks of granite are located within the northern boundary of the property to the west of the MPL 109 boundary to prevent vehicle access and illegal dumping in the area from Chatties Lane.	PSO1	High certainty to prevent unauthorised access.
The final landform will be designed to have gently sloping batters where possible and vertical granite faces left within the final amenity area will be protected with fencing, abandonment bunds and signage from above the crest of the pit face.	PSC1	High certainty to prevent accidental falls down the vertical faces of the pit.
Post-control risk assessment		
PSO1 – Unauthorised public access during operations	L1, C5 = Medium	
Description of the likely impact	Reasonable and practicable measures are in place to prevent public safety impacts due to unauthorised access to the Site. As the consequence of an incident is potentially fatal, control strategies will be regularly monitored and maintained. As control strategies are required to reduce the risk level from *High* to *Medium*, the inclusion of an environmental outcome and measurement criteria is deemed appropriate.	
PSC1 – Unauthorised public access post-completion	L1, C4 = Low	
Description of the likely impact	Reasonable and practicable measures are in place to prevent public safety impacts due to unauthorised access to the Site. As the consequence of an incident is potentially significant, control strategies will be audited prior to surrender to ensure they will be sustained. As control strategies are required to reduce the risk level from *High* to *Low*, the inclusion of an environmental outcome and measurement criteria is deemed appropriate.	

5.13.4 Outcome and measurement criteria

The environmental outcomes and measurement criteria for Public safety is provided in **Table 39** and **Table 40**.

Table 39 – Public safety environmental outcome and measurement criteria (operational)

Environmental outcome	Measurement criteria (outcome achievement)			
The tenement holder must, during construction and operation, ensure that unauthorised entry to the land does not result in public injuries and or deaths that could have been reasonably prevented.	Site records will demonstrate all public injuries and/or deaths resulting from unauthorised access to the tenement are recorded and an investigation by a suitably qualified independent third-party is completed within 30 days (or other time as agreed with the lead regulating agency). The results of the investigation demonstrate the tenement holder could not have reasonably prevented the incident.			
Potential impact	**Measurement type and form**	**Locations**	**Frequency**	**Control or baseline data**
PSO1	Records from incident register.	EML 5793, MPL 109	Following an incident.	Not applicable.

Table 40 – Public safety environmental outcome and measurement criteria (closure)

Environmental outcome	Measurement criteria (outcome achievement)			
The tenement holder must demonstrate that post completion, the risks to the health and safety of the public so far as they may be affected by mining operations, are as low as reasonably practicable.	A review of the final landform and public safety control strategies present at closure by a suitably qualified person will confirm that the final landform is constructed consistently with the proposed final landform, geotechnically stable and safe to the public as far as reasonably practicable.			
Potential impact	**Measurement type and form**	**Locations**	**Frequency**	**Control or baseline data**
PSC1	Progressive rehabilitation landform slope angles and safety features reported in annual compliance reports.	EML 5793, MPL 109	Annually.	Drawing 15 and Drawing 16.

5.14 Soil

5.14.1 Context

The thin layer of topsoil that was present over the proposed mining area has been stripped and as discussed in **Section 3.3.3.1**, the topsoil present on the Site is limited to what is included in the abandonment bund along the northern boundary of the Site (refer **Drawing 10**). The abandonment bund is proposed to remain in situ, and therefore no topsoil stockpiles are considered to be present on the Site.

As discussed in **Section 3.2**, waste soils that are suitable for rehabilitation were deposited on the property prior to the establishment of MPL 109. Native vegetation has been planted near the north-east corner of the property and is growing successfully. Native vegetation (and colonising weed species) has also commenced naturally regenerating which suggests that the waste soils will provide an adequate growing medium for the rehabilitated landform.

5.14.2 Potential impact events

As no topsoil (receptor) exist on the Site, an SPR relationship does not exist, and no further impact assessment is considered necessary. The growing medium for rehabilitation is proposed to come from the waste soils present on the property, and potentially suitable topsoil from local developments received as Waste-derived fill (discussed in **Section 5.17**).

5.15 Surface water

5.15.1 Context

No drainage lines run through the Site and no local water resources are prescribed under the *Landscape South Australia Act 2019*. The Site is also not located within a water protection area.

The Site is located uphill of a samphire shrubland to the southern and western sides**.** The BoM GDE Atlas shows that the samphire shrublands are also Inflow Dependent Ecosystems and local surface water flows from most directions in the local area appear to flow into the low-lying areas.

Surface water runoff from the disturbed areas on the Site runs into the pit or into the waste rock storage area which acts as a sump.

No surface water runoff or obvious discharge points have been observed leaving the areas disturbed by mining. Only the areas within the area disturbed for mining. As the waste soils landform was constructed prior to, and independently of MPL 109, only the areas on the western side of MPL 109 that are utilised for ancillary mining operations have been considered in the impact assessment and surface water management.

The primary copper slag stockpiling area is situated on a flat area with water running off the stockpiles generally flowing back into the low points without leaving the area.

5.15.2 Potential impact events

Potential impact events for Surface water are provided in **Table 41** and supported by the discussion in **Section 2.7.**

Table 41 – Surface water source, pathway and receptor identification during operations

Potential Impact Event – Surface water operational 1 (SWO1): Sediment laden runoff leaves the operating areas and contaminates samphire shrublands				
Source	**Pathway**	**Receptor**	**Confirmation of SPR**	**Pre-control Risk Assessment**
Sediments and copper contamination from the disturbed surfaces and stockpiles.	Surface water runoff.	Adjacent samphire shrubland.	Yes	L = 2 C = 3 Risk = Low
Uncertainty and Assumptions	The combination of visual inspections and surface water modelling using the digital terrain model for the Site has provided a high level of certainty that higher order drainage lines do not traverse the mining areas.			
Sensitivity to Change	As mining progresses more surface water will flow into the quarry pit. No significant changes to the landform are expected and changes to the current surface water flows are not anticipated.			
Justification for the SPR confirmation/ non-confirmation	The source, pathway and receptor have been confirmed following an inspection of the Site and review of surface water modelling.			

5.15.3 Control and management strategies

The control and management strategies to mitigate potential impacts or to reduce impacts to acceptable levels are listed in **Table 42**.

Table 42 – Control and management strategies for surface water

Control and management strategy	Impact event	Uncertainty and assumptions
Earthworks near the southern and western sides of the disturbance area minimise runoff flows from the disturbance area.	SWO1	High certainty to reduce sediment laden water leaving the Site.
Undertake progressive rehabilitation in accordance with the mine plans.	SWO1	High certainty to stabilise surface and reduce erosion.
Fuels, waste oils and any other chemicals are appropriately stored to ensure spills to do not mix with any surface water flows around the Site.	SWO1	High certainty to reduce potential pollution events.
Copper slag present on the surfaces within the tenement areas will be relocated to the primary slag stockpile area.	SWO1	High certainty to reduce potential pollution events.
Inspections of the disturbance area boundary to be undertaken following heavy rainfall events (50mm within 48 hours) and annually. Remedial earthworks to be undertaken following observations of erosion channels where sediment may be leaving the operating areas.	SWO1	High certainty to identify and address any potential surface water impacts.

Post-control risk assessment	
SWO1 – Sediment laden water leaving disturbed areas	L1, C2 = Very low
Description of the likely impact	Sediment laden surface water will not leave the Site and impact adjacent samphire shrublands during heavy rainfall events. As control strategies are required to reduce the risk level from *Low* to *Very low*, the inclusion of an environmental outcome and measurement criteria is deemed appropriate.

5.15.4 Outcome and measurement criteria

The environmental outcome and measurement criteria for Surface water is provided in **Table 43**.

Table 43 – Surface water environmental outcome and measurement criteria

Environmental outcome	Measurement criteria (outcome achievement)			
The tenement holder must ensure that no surface water contaminated as a result of mining operations leaves the land.	Site records will demonstrate that inspections of the disturbed area boundary and primary copper slag stockpiling area are undertaken annually and following exceptional rainfall events (50mm in 48 hours as measured at Wallaroo BoM Station 22020) and any observed areas of erosion and/or potential sediment runoff from the Site are remediated within 30 days.			
Potential impact	**Measurement type and form**	**Locations**	**Frequency**	**Control or baseline data**
SWO1	Records from erosion and sediment runoff inspections (and remedial actions as required).	Periphery of the disturbed area on the Site and primary slag stockpiling area (refer **Attachment 17**).	Annually and following exceptional rainfall events.	Previous inspection, **Drawing 6** and **Drawing 6a**.

5.16 Traffic

5.16.1 Context

The primary Site Access Point is off Wallaroo Plains Road (refer **Drawing 1** and **Drawing 10**).

As discussed in **Section 3.5.1**, the majority of traffic to and from the quarry will use North Beach Road (sealed) to access Wallaroo Plains Road from the Spencer Highway. Some light vehicles will access the Site by travelling from Spencer Highway by travelling along Chatties Lane (unsealed) and turning onto North Beach Road and into the Site Access Point. A map including the road names mentioned above is provided in **Drawing 1**.

The Site Access Point has good visibility in both directions for traffic leaving the property. The current access and road network is adequate for proposed operations and no further upgrades are required.

A secondary access gate is present on the MPL 109 northern boundary allowing access to the primary copper slag stockpiling area from Chatties Lane. This gate will only be used for activities relating to the management of the Copper Slag or for general property management requirements.

For the majority of the time, production levels at the Site will be low and truck movements related to operations are likely to be limited to five per day (or less). During armour rock extraction campaigns, production levels will temporarily increase to approximately 500 tonnes per day which will equate to approximately 15 loaded trucks leaving the Site per day.

5.16.2 Potential impact events

Potential impact events for Traffic are provided in **Table 44** and supported by the discussion in **Sections 3.5.1** and **Section 3.5.3**.

Table 44 – Traffic source, pathway and receptor identification during operations

Potential Impact Event – Traffic operational 1 (TO1): An accident involving traffic related to the mining operations and the public occurs near the Site Access Point				
Source	**Pathway**	**Receptor**	**Confirmation of SPR**	**Pre-control Risk Assessment**
Traffic related to the mining operation.	Public road network.	Drivers using the public roads near the Site.	Yes	L = 2 C = 5 Risk = High
Uncertainty and Assumptions	Nil as the road layout and access point are well understood.			
Sensitivity to Change	An increase in traffic could potentially increase the likelihood of an accident occurring. However, the available resource and operational footprint would not support a dramatic increase in production levels.			
Justification for the SPR confirmation/ non-confirmation	The source, pathway and receptor have been confirmed following an inspection of the Site and review of aerial imagery.			

5.16.3 Control and management strategies

The control and management strategies to mitigate potential impacts or to reduce impacts to acceptable levels are listed in **Table 45**.

Table 45 – Control and management strategies for blasting

Control and management strategy	Impact event	Uncertainty and assumptions
All transport truck operators accessing the Site are appropriately licenced and inducted on local traffic conditions.	TO1	Moderate certainty to reduce the likelihood of a truck driver causing an accident.
The Site Access Point is free from obstructions and has good visibility of oncoming traffic in both directions.	TO1	High certainty to reduce the likelihood of a traffic incident.
The gate over the Site Access Point is recessed in from North Beach Road and trucks are able to open the gate without obstructing the road if required.	TO1	High certainty to reduce the likelihood of a traffic incident.
Annual monitoring of the Site Access Point will be undertaken to ensure traffic risks are as low as reasonably practicable.	TO1	High certainty to reduce the likelihood of a traffic incident.
Post-control risk assessment		
TO1 – Traffic incidents involving the public	L1, C4 = Low	
Description of the likely impact	An investigation into any incidents involving mining related traffic and the public near the Site will conclude that reasonable and practicable measures were employed by the tenement holder to prevent the incident. As control strategies are required to reduce the risk level from *High* to *Low*, the inclusion of an environmental outcome and measurement criteria is deemed appropriate.	

5.16.4 Outcome and measurement criteria

The environmental outcome and measurement criteria for Traffic is provided in **Table 46**.

Table 46 – Traffic environmental outcome and measurement criteria

Environmental outcome	Measurement criteria (outcome achievement)
The tenement holder must, during construction and operation, ensure there are no traffic accidents involving members of the public and mining related traffic that could have been reasonably prevented by the tenement holder.	Site records will demonstrate that annual monitoring of the Site Access Point is undertaken and that any safety issues observed are addressed within 30 days. Site records demonstrate that all traffic accidents involving the public and mining related traffic are recorded. An investigation of each incident is undertaken by a suitably qualified independent third-party within 14 days (or other time as agreed with the lead regulating agency) and demonstrates the Tenement Holder could not have reasonably prevented the accident from occurring.

Potential impact	Measurement type and form	Locations	Frequency	Control or baseline data
TO1	Site records of annual inspections.	Site access point and section of the road within 50m.	Annually.	Previous annual compliance reports.
TO1	Site records (incident register) and investigation reports.	Site access point and section of the road within 50m.	Within 14 days of a traffic incident.	Not applicable.

5.17 Visual amenity

5.17.1 Context

The landscape surrounding the Site comprises a gently undulating calcrete plain with coastal dunes, salt lakes and tidal flats. Adjacent properties comprise some sown pastures and cereal crops, salt pans, samphire low shrubland and another quarry situated on the northern side of Chatties Lane.

The site is visible from the western and southern aspects with the large maintenance shed/site office at the western end of the quarry, which is primarily utilised for the landowner's business, being the most prominent visual component of the Site. In the context of the industrial appearance of the wider surroundings, the view into the Site is not considered to be offensive.

Proposed future mining operations at the Site will generally occur below natural surface level and therefore have no impact on the visual amenity when viewed from surrounding areas.

Native trees and shrubs planted along the northern boundary adjacent to Chatties Lane create a visual screen from the north and further plantings associated with progressive rehabilitation will improve the amenity of the property.

5.17.2 Potential impact events

Potential impact events for Visual amenity are provided in **Table 47** and **Table 48** and supported by the discussion in **Section 2.1.4** and **Section 3.5.4**.

Table 47 – Visual amenity source, pathway and receptor identification during operations

Potential Impact Event – Visual amenity operational 1 (VAO1): The Site causes visual impacts to the public at nearby dwellings and public areas				
Source	**Pathway**	**Receptor**	**Confirmation of SPR**	**Pre-control Risk Assessment**
The visual characteristics of the Site and active mining operations.	Line of sight from receptor locations.	Nearby dwellings and public places.	Yes	L = 3 C = 2 Risk = Low
Uncertainty and Assumptions	Although the Site has been established for several decades, it is not assumed that it is an accepted part of the visual landscape to new residents in the area and the likelihood of 'possible' was selected.			
Sensitivity to Change	The risk of visual amenity impacts would increase if more development occurred closer to the Site as the visual impacts increase with proximity.			
Justification for the SPR confirmation/ non-confirmation	The source, pathway and receptor have been confirmed following an inspection of the Site and review of aerial imagery.			

Table 48 – Visual amenity source, pathway and receptor identification at closure

Potential Impact Event – Visual amenity closure 1 (VAC1): The final landform does not integrate and harmonise with the surrounding landscape				
Source	**Pathway**	**Receptor**	**Confirmation of SPR**	**Pre-control Risk Assessment**
The visual characteristics of the final landform.	Line of sight from receptor locations.	Nearby dwellings and public places.	Yes	L = 2 C = 3 Risk = Low
Uncertainty and Assumptions	It is assumed that the surrounding landscape will not change significantly prior to the closure of the Site.			
Sensitivity to Change	Changes in atmospheric conditions due to climate change could impact what is achievable for the final land use.			
Justification for the SPR confirmation/ non-confirmation	The source, pathway and receptor have been confirmed following an inspection of the Site and review of aerial imagery.			

5.17.3 Control and management strategies

The control and management strategies to mitigate potential impacts or to reduce impacts to acceptable levels are listed in **Table 49**.

Table 49 – Control and management strategies for Visual amenity

Control and management strategy	Impact event	Uncertainty and assumptions
The large shed at the Site has been painted a beige colour to help it blend in with the surroundings (noting the shed is primarily used for the landowner's business and not related to mining).	VAO1, VC01	Assumed to moderately reduce the visual amenity impacts of the shed in the landscape.
Undertake progressive rehabilitation in accordance with the mine plans and proposed rehabilitation methods.	VAO1, VAC1	High certainty to reduce visual amenity impacts.
Native vegetation seeding and/or planting to be undertaken over the rehabilitation areas.	VAO1, VAC1	High certainty to reduce visual amenity impacts.
Product, waste rock and WDF stockpiles will be limited in height and volume as far as reasonably practicable.	VAO1	High certainty to reduce visual amenity impacts.
Final rehabilitation to be undertaken in accordance with the proposed final landform.	VAC1	High certainty to reduce visual amenity impacts.
All mining related infrastructure not required by the landowner to be removed from the Site prior to closure.	VAC1	High certainty to reduce visual amenity impacts.
Annual visual amenity monitoring to be undertaken from Jones Road and North Beach Road to ensure visual amenity impacts are as low as reasonably practicable.	VAO1, VAC1	High certainty to effectively manage visual amenity impacts during operations and provide an early indication for achievement of the closure outcome for visual amenity.
Post-control risk assessment		
VAO1 – Operational visual amenity impacts to the public	L3, C1 = Very low	
Description of the likely impact	Visual amenity impacts from views into the Site on the western and southern aspects are as low as reasonably practicable and any impacts are trivial. As control strategies are required to reduce the risk level from *Low* to *Very low*, the inclusion of an environmental outcome and measurement criteria is deemed appropriate.	
VAC1 – Closure visual amenity impacts to the public	L1, C1 = Very low	
Description of the likely impact	No visual amenity impacts from views into the Site on the western and southern aspects. As control strategies are required to reduce the risk level from *Low* to *Very low*, the inclusion of an environmental outcome and measurement criteria is deemed appropriate.	

5.17.4 Outcome and measurement criteria

The environmental outcome and measurement criteria for Visual amenity are provided in **Table 50** and **Table 51**.

Table 50 – Visual amenity environmental outcome and measurement criteria (operational)

Environmental outcome	Measurement criteria (outcome achievement)			
The tenement holder must ensure the form, contrasting aspects and reflective aspects of mining operations are visually softened to blend in with the surrounding landscape.	Site records will demonstrate that a visual assessment and photo-point monitoring from Jones Road and North Beach Road is undertaken annually to ensure visual amenity impacts are as low as reasonably practicable and any offensive visible aspects of the mining operations are addressed within 30 days (or other period as approved by the lead regulating agency).			
Potential impact	**Measurement type and form**	**Locations**	**Frequency**	**Control or baseline data**
VAO1	Records from annual inspections and photo-point monitoring (and remedial actions as required).	Jones Road and North Beach Road (refer **Drawing 17**).	Annually.	Previous compliance reports.

Table 51 – Visual amenity environmental outcome and measurement criteria (closure)

Environmental outcome	Measurement criteria (outcome achievement)			
The tenement holder must ensure all rehabilitated landforms integrate and harmonise with the surrounding landscape.	Visual assessment of the Site and surrounds undertaken by a suitably qualified person at closure confirms that the final landform integrates and harmonises with the surrounding landscape and is consistent with the proposed final landform.			
Potential impact	**Measurement type and form**	**Locations**	**Frequency**	**Control or baseline data**
VAC1	Report from visual assessment of the final landform.	Areas outside of the Site where line of sight exists into the Site.	Prior to closure.	**Drawing 15** and **Drawing 16**.

5.18 Waste-derived fill

5.18.1 Context

As discussed in **Section 3.4.3**, it is proposed that the Site receives available WDF (waste soils for direct reuse, refer Section 5.1 of the EPA WDF Standard) for use in rehabilitation from local developments in accordance with the required control strategies and testing requirements featured in the EPA WDF Standard (EPA, 2013).

As the property has adequate waste soils available from the Copper Cove Marina development, the operation can be selective in the receipt of WDF to ensure that only material that has a low risk of contamination is received at the Site.

Receptors potentially impacted by the receipt of contaminated WDF include the owner of the land (rehabilitation failure) and nearby GDEs if contamination were to enter the groundwater or surface water runoff.

As the amount of topsoil is limited at the Site, the option for receiving good quality waste soils from local developments is likely to benefit the rehabilitation outcomes.

The availability of a locally approved WDF disposal location where the material has a beneficial reuse, aligns with the preferred options in the EPA waste management hierarchy (EPA, 2021).

All WDF activities are proposed to be undertaken in accordance with a WDF Management Plan (**Attachment 14**).

5.18.2 Potential impact events

Potential impact events for Waste-derived fill are provided in **Table 52** and supported by the discussion in **Section 3.4.3**.

Table 52 – Waste-derived fill source, pathway and receptor identification during operations

Potential Impact Event – Waste-derived fill operational 1 (WDFO1): WDF received at the Site causes contamination of the land and/or water				
Source	**Pathway**	**Receptor**	**Confirmation of SPR**	**Pre-control Risk Assessment**
WDF contaminated with chemicals and/or heavy metals.	Rehabilitation landform or temporary WDF stockpiles.	Rehabilitation landform and/or GDEs	Yes	L = 3 C = 3 Risk = Medium
Uncertainty and Assumptions	It is assumed that future developments will occur that will need to dispose of waste soils and these soils may potentially be from a Site with historically Potentially Contaminating Activities (PCA site).			
Sensitivity to Change	The risk of receiving WDF to the rehabilitation landform and water is unlikely to vary with environmental or other changes.			
Justification for the SPR confirmation/ non-confirmation	The source, pathway and receptor have been confirmed following an inspection of the Site and review of aerial imagery.			

5.18.3 Control and management strategies

The control and management strategies to mitigate potential impacts or to reduce impacts to acceptable levels are listed in **Table 53**.

Table 53 – Control and management strategies for Waste-derived fill

Control and management strategy	Impact event	Uncertainty and assumptions
The receipt of WDF is undertaken in accordance with the requirements of the EPA WDF Standard	WDFO1	High certainty to reduce potential of receiving contaminated soils.
WDF is stockpiled in the Waste Rock storage area which has a hard stand.	WDFO1	Assumes space will be available due to low dimension stone production. Several alternative stockpiling areas with hard stands are available including with the pit.
All WDF operations are conducted in accordance with the WDF Management Plan for the Site (**Attachment 14**).	WDFO1	High certainty to effectively manage all WDF activities and achieve compliance with the EPA WDF standard and the environmental outcome.
Operators involved in WDF activities at the Site are inducted on the requirements of this WDFMP.	WDF01	High certainty to ensure the WDF Management Plan is effectively implemented.
WDF stockpiles on the Site will not exceed 500m^3 and will be used in rehabilitation within six months of receipt.	WDFO1	High certainty to ensure the continuous flow of direct WDF reuse.
Post-control risk assessment		
WDFO1 – Receipt of contaminated WDF	L2, C2 = Very low	
Description of the likely impact	No contamination of the rehabilitated landform and/or ground and surface water as a result of WDF received at the Site. As control strategies are required to reduce the risk level from *Low* to *Very low*, the inclusion of an environmental outcome and measurement criteria is deemed appropriate.	

5.18.4 Outcome and measurement criteria

The environmental outcome and measurement criteria for Waste-derived fill is provided in **Table 54**.

Table 54 – Waste-derived fill environmental outcome and measurement criteria

Environmental outcome	Measurement criteria (outcome achievement)
The tenement holder must ensure no adverse impacts to the environment from waste-derived fill brought onto the land as a result of mining operations unless otherwise authorised through the relevant legislation.	Site records will demonstrate that: • all WDF received at the Site are registered and consultant soil quality reports have been provided (if required) prior to or at the time of delivery to the Site. • all WDF activities at the Site have been conducted in accordance with the EPA WDF Standard. • no more than $500m^3$ of WDF is stockpiled at the Site.

Potential impact	Measurement type and form	Locations	Frequency	Control or baseline data
WDFO1	Site records (WDF register and consultant soil quality reports).	EML 5793, MPL 109.	Ongoing.	Waste soil quality criteria within the EPA WDF Standard.
WDFO1	Site records of annual visual inspections of WDF stockpiles (surveying will be undertaken if stockpiles estimated to be greater than $400m^3$.	EML 5793, MPL 109 WDF stockpiling areas.	Annually.	Stockpile volume $< 500m^3$.

5.19 Waste disposal

5.19.1 Context

Poor waste management can lead to the contamination of land and water and could cause windblown rubbish to leave the Site and reduce the environmental value of the area.

Due to the relative isolation of the Site, there is low levels of rubbish or visible waste surrounding the Site.

As discussed in **Section 3.4.4**, low levels of waste are produced as a result of mining operations at the Site.

All major servicing and maintenance of mobile equipment is carried out off-site and any wastes generated by minor servicing will be temporarily stored on site in a 200-litre drum in a bunded area before being taken to the EPA approved Wallaroo Waste Disposal facility.

Any minor spills will be treated with absorbent sand and contaminated material removed from the Site to an EPA licenced facility.

General waste produced from the Site is separated for recycling (e.g. cans and bottles) and is collected by Council waste collection.

Diesel is stored within a concrete bund in accordance with the EPA Liquid storage – Bunding and spill management guideline (EPA, 2016) along with any waste oil drums, oil filters and rags.

No sewage treatment occurs within the tenement areas.

Copper slag that was received by the previous landowner is stockpiled on the tenements and has also been spread over surfaces of the disturbed area where it presents a contamination risk to land and water. A Remediation Action Plan (refer **Attachment 11**) has been prepared to appropriately manage the potential contamination risks from the copper slag.

5.19.2 Potential impact events

Potential impact events for Waste disposal are provided in **Table 55** and **Table 56** and supported by the discussion in **Section 3.4.3** and **Section 3.4.4**.

Table 55 – Waste disposal source, pathway and receptor identification during operations

Potential Impact Event – Waste disposal operational 1 (WDO1): Copper slag present at the Site or waste produced by mining contaminates the land or is transported off the Site				
Source	**Pathway**	**Receptor**	**Confirmation of SPR**	**Pre-control Risk Assessment**
Wastes generated by mining operations.	Transported though the soil, water, or air.	Nearby GDEs, landowner, neighbouring landowners.	Yes	L = 3 C = 2 Risk = Low
Uncertainty and Assumptions	Waste streams, pathways and receptors are well understood.			
Sensitivity to Change	Change in environmental factors and neighbouring land uses are unlikely to significantly alter the impact.			
Justification for the SPR confirmation/ non-confirmation	The source, pathway and receptor have been confirmed following an inspection of the Site and review of aerial imagery.			

Table 56 – Waste disposal source, pathway and receptor identification at closure

Potential Impact Event –Waste disposal closure 1 (WDC1): Waste produced by mining remains at the Site post-closure				
Source	**Pathway**	**Receptor**	**Confirmation of SPR**	**Pre-control Risk Assessment**
Wastes generated by mining operations.	Present at the Site.	Landowner.	Yes	L = 3 C = 2 Risk = Low
Uncertainty and Assumptions	Waste streams, pathways and receptors are well understood.			
Sensitivity to Change	Change of proposed final land use is unlikely to significantly alter the impact.			
Justification for the SPR confirmation/ non-confirmation	The source, pathway and receptor have been confirmed following an inspection of the Site and review of aerial imagery.			

5.19.3 Control and management strategies

The control and management strategies to mitigate potential impacts or to reduce impacts to acceptable levels are listed in **Table 57**.

Table 57 – Control and management strategies for Waste disposal

Control and management strategy	Impact event	Uncertainty and assumptions
General waste is neatly stored before being collected from the Site	WDO1	High certainty to reduce pollution from wastes.
Staff and operators to be inducted over good housekeeping and waste reduction practices.	WDO1	High certainty to reduce pollution from wastes.
Major mechanical servicing is undertaken offsite.	WDO1	High certainty to prevent pollution from wastes.
Any liquid wastes are stored within a concrete bund ready for collection in accordance with EPA Bunding and spill management guidelines.	WDO1	High certainty to prevent pollution from wastes.
Receipts from offsite waste disposal and waste oil collection are obtained and kept.	WDO1	High certainty to demonstrate good waste management.
Spill kits will be made available on the Site to clean minor spills.	WDO1	High certainty to prevent pollution from wastes.
Implementation of the Remediation Action plan (refer **Attachment 11**).	WDO1, WDC1	High certainty to reduce contamination sources at the Site.
An inspection of the Site conducted annually (and prior to closure) will ensure that all mining related wastes are appropriately stored or have been removed from the Site.	WDO1, WDC1	High certainty to demonstrate good waste management.
Post-control risk assessment		
AQO1 – Contamination to land or water from mining related waste	L2, C1 = Very low	
Description of the likely impact	Wastes are appropriately disposed of and no evidence of contamination to land and water on and off the Site are observed. As control strategies are required to reduce the risk level from *Low* to *Very low*, the inclusion of an environmental outcome and measurement criteria is deemed appropriate.	
AQC1 – Mining related wastes remain on the Site post-closure	L1, C2 = Very low	
Description of the likely impact	No mining related wastes are present at the Site at closure and no impacts are observed. As control strategies are required to reduce the risk level from *Low* to *Very low*, the inclusion of an environmental outcome and measurement criteria is deemed appropriate.	

5.19.4 Outcome and measurement criteria

The environmental outcome and measurement criteria for Waste disposal is provided in **Table 58** and **Table 59**.

Table 58 – Waste disposal environmental outcome and measurement criteria (operational)

Environmental outcome	Measurement criteria (outcome achievement)			
The tenement holder must ensure no adverse impacts to the environment from commercial or industrial waste, not including tailings and waste rock, produced as a result of mining operations.	Site records will demonstrate that all waste has been stored and disposed of in accordance with EPA standards and guidelines. Annual compliance reporting demonstrates that the Remediation Action Plan (RAP) has been implemented as proposed.			
Potential impact	**Measurement type and form**	**Locations**	**Frequency**	**Control or baseline data**
WDO1	Site records (evidence of appropriate waste disposal).	EML 5793, MPL 109.	Ongoing.	Not applicable.
WDO1	Annual compliance reports demonstrate that the RAP has been implemented as planned.	EML 5793, MPL 109	Annually	Remediation Action Plan (**Attachment 11**).

Table 59 – Waste disposal environmental outcome and measurement criteria (closure)

Environmental outcome	Measurement criteria (outcome achievement)			
The tenement holder must ensure that no mining related wastes are present on the land at the completion of mining activities.	An inspection by a suitably qualified person (third-party) will confirm that all mining related waste has been removed from the final rehabilitated landform.			
Potential impact	**Measurement type and form**	**Locations**	**Frequency**	**Control or baseline data**
WDC1	Report from inspection of the whole final landform area.	EML 5793, MPL 109.	Prior to closure.	Not applicable.

5.20 Weeds, pests, and plant pathogens

5.20.1 Context

As discussed in **Section 2.8**, environmental weeds observed at the site include African boxthorn (*Lycium ferocissimum*), Onion weed (*Asphodelus fistulosus*), Rice Millet (*Piptatherum milliaceum*) and Soursob (*Oxalis* *pes-caprae*). African Boxthorn is the only declared weed species under the *Landscape South Australia Act, 2019* (Department for Environment and Water, 2020).

It is expected that introduced flora species will colonise newly rehabilitated areas. Species that are not considered an ecological threat (e.g. Soursob) will be allowed to grow to improve soil condition and stabilisation to improve the longer-term rehabilitation outcomes.

The Site is a low risk for *Phytophthora cinnamoni* infestation and no other plant pathogens are known to occur within the area.

No snails (biosecurity hazard for crops on the Yorke Peninsula) have been observed on the property and are not expected to occur as cropping is not undertaken on the property.

As discussed in **Section 2.9**, introduced fauna presence has not been observed at the Site.

5.20.2 Potential impact events

Potential impact events for Weeds, pests and plant pathogens are provided in **Table 60** and **Table 61** and supported by the discussion in **Section 2.8**.

Table 60 – Weeds and plant pathogens source, pathway and receptor identification during operations

Potential Impact Event – Weeds, pests and plant pathogens operational 1 (WPPO1): An increased in the abundance or introduction of new weeds to the Site causes weeds to spread outside of the Site.				
Source	**Pathway**	**Receptor**	**Confirmation of SPR**	**Pre-control Risk Assessment**
Existing weeds or weeds and plant pathogens introduced by vehicles or equipment entering the Site.	Seeds transported via wind, biological vectors or vehicles leaving the Site.	Neighbouring property owners.	Yes	L = 3 C = 3 Risk = Medium
Uncertainty and Assumptions	It is assumed that all Declared Species of weeds and plant pathogens are known but others may potentially exist that have not been identified.			
Sensitivity to Change	The likelihood of weeds may increase as progressive rehabilitation creates additional area suitable for vegetation growth.			
Justification for the SPR confirmation/ non-confirmation	The source, pathway and receptor have been confirmed following an inspection of the Site and review of aerial imagery.			

Table 61 – Pests fauna source, pathway and receptor identification during operations

Potential Impact Event – Weeds, pests, and plant pathogens operational 1 (WPPO2): An increase in the abundance pest fauna due to stockpile landforms supporting denning, nesting, or burrows.				
Source	**Pathway**	**Receptor**	**Confirmation of SPR**	**Pre-control Risk Assessment**
Pest animals attracted to the Site by suitable habitat attributes.	Land.	Native fauna.	Yes	L = 3 C = 2 Risk = Low
Uncertainty and Assumptions	Although no official observations have been noted, it is assumed that pest species such as foxes, cats and rabbits are present in the area.			
Sensitivity to Change	An introduction of a new pest fauna species to the landscape could change the level of risk.			
Justification for the SPR confirmation/ non-confirmation	The source, pathway and receptor have been confirmed following an inspection of the Site and review of aerial imagery.			

5.20.3 Control and management strategies

The control and management strategies to mitigate potential impacts or to reduce impacts to acceptable levels are listed in **Table 62**.

Table 62 – Control and management strategies for Weeds, pests and plant pathogens

Control and management strategy	Impact event	Uncertainty and assumptions
Staff and contractors are made fully aware of the requirement to operate in a manner that minimises the potential spread of weeds.	WPPO1	Moderate certainty to reduce the spread of weeds ate the Site.
Vehicles and machinery only travel on well-defined access tracks and operate within well-defined work areas.	WPPO1	High certainty to reduce the likelihood of the introduction of new weeds and pathogens.
Waste rock stockpiles are limited in size and neatly formed to avoid creating animal habitat.	WPPO2	Moderate certainty to reduce the introduction of pest fauna presence.
General waste is covered and disposed of regularly so not to attract vermin.	WPPO2	High certainty to prevent pest fauna being attracted to the Site.
Annual weed and pest fauna inspections are undertaken.	WPPO1	High certainty to identify and address weed, pest or plant pathogen impacts.
Weed and pest fauna management undertaken as required in accordance with advice provided by the Northern and Yorke Landscape Management Board following observation made in annual inspections or ad hoc observations during operations.	WPPO1, WPPO2	High certainty to address weed, pest or plant pathogen impacts.

Post-control risk assessment	
WPPO1 – Spread of weeds and plant pathogens	L2, C3 = Low
Description of the likely impact	Environmental weeds and plant pathogens are prevented from leaving the Site. As control strategies are required to reduce the risk level from *Medium* to *Low*, the inclusion of an environmental outcome and measurement criteria is deemed appropriate.
WPPO2 – Increase in the presence of pest fauna	L2, C2 = Very low
Description of the likely impact	No observed increase in the presence of pest fauna species inhabiting the Site. As control strategies are required to reduce the risk level from *Low* to *Very low*, the inclusion of an environmental outcome and measurement criteria is deemed appropriate.

5.20.4 Outcome and measurement criteria

The environmental outcome and measurement criteria for Blasting is provided in **Table 63**.

Table 63 – Weeds, pest and plant pathogen environmental outcome and measurement criteria

Environmental outcome		Measurement criteria (outcome achievement)		
The tenement holder must, during construction and operation, ensure no introduction of new species of environmental weed, plant pathogens or pests (including feral animals), nor sustained increase in abundance of existing weed or pest species on the land.		Site records will demonstrate that annual inspections are undertaken for new weeds, plant pathogens or pests (including feral animals) and for evidence of increased abundance of existing weeds, plant pathogens and/or pests (including feral animals) and any positive observations were managed in a timely fashion and in accordance with available advice from the Northern and Yorke Landscape Board (NYLB).		
Potential impact	**Measurement type and form**	**Locations**	**Frequency**	**Control or baseline data**
WPPO1	Annual inspections for weeds and plant pathogens and records of follow-up management actions as required.	EML 5793, MPL 109.	Annual inspections and follow-up actions undertaken in the appropriate season as advised by the NYLB.	Previous annual compliance report.
WPPO2	Annual inspections for pest fauna and records of follow-up management actions as required.	EML 5793, MPL 109.	Annual inspections and follow-up actions undertaken in the appropriate season as advised by the NYLB.	Previous annual compliance report.

5.21 Compliance summary and monitoring plan

A summary of the environmental outcomes and measurement criteria derived from the impact assessment above, and a compliance monitoring plan for the Site is provided in **Attachment 15**.

6 OPERATOR CAPABILITY

Seppo Karvonen, Managing Director of Australasian Granite Pty Ltd, has operated the Wallaroo Granite Quarry since 2002 and is an experienced quarry operator with several other active quarries operating in South Australia.

Australasian Granite Pty Ltd are aware of their obligations under the *Mining Act 1971* to operate in accordance with the conditions of EML 5793 and MPL 109, including to implement the commitments included within this PEPR.

In accordance with condition 1 of the Second Schedule of Extractive Minerals Lease 5793, the Operator/Tenement Holder currently maintains adequate risk insurance covering mining operations for the term of the Lease to meet any foreseeable civil and statutory liability that may arise as a result of mining operations and any associated activities conducted on the land.

7 LEASE/LICENCE

All specific lease conditions EML 5793 and licence conditions for MPL 109 that are not environmental outcomes are provided in **Table 64** with references to where each of those conditions have either been addressed in this PEPR or elsewhere.

Table 64 – Specific EML 5793 and MPL 109 condition reference table

Tenement condition	PEPR or other reference
Extractive Minerals Lease 5793	
First schedule, condition 1 – Mining operations may be conducted for the recovery of limestone rubble for construction and granite for dimension stone purposes from the area of the lease.	PEPR Section 3.
First schedule, condition 2 – The Lessee must ensure that mining operations on the land are carried out in an orderly and skilful manner in accordance with a program for mining and rehabilitation of the land approved, from time to time, by the Minister.	This document.
First schedule, condition 3 – The Lessee must submit to the Director, from time to time at the Director's request, a current plan or survey of the land in the form required by the Director.	Annual compliance reports.
First schedule, condition 4 – The Lessee shall ensure that land disturbed by mining is rehabilitated to achieve a regular landform, to minimise erosion and return the land to a grazing after-use.	PEPR Sections 3.3, 3.8 and 5.7.
Second schedule, condition 1 – The Lessee shall ensure that adequate risk insurance cover is obtained for mining operations and maintained current during the term of the Lease to meet any foreseeable civil and statutory liability that may arise as a result of mining operations and any associated activities conducted on the land.	Annual compliance reports.
Second schedule, condition 2 – The Lessee shall ensure that all available topsoil is progressively stripped ahead of mining and shall be temporarily stockpiled, for use in the rehabilitation of land disturbed by mining operations to the satisfaction of the Chief Inspector of Mines.	PEPR Sections 3.3 and 5.13.
Second schedule, condition 3 – The Lessee shall ensure that all terminal faces are formed as part of mining to a gradient not steeper than 1 vertical to 3 horizontal and conform to the local topography and drainage system. *	PEPR Sections 3.3 and 5.13. **A change in operations application will be made to allow for some terminal faces to be steeper than 1v:3h.*
Second schedule, condition 4 – The Lessee shall ensure that all employees and contractors on-site are aware of the requirement to operate in a manner that will minimise environmental impact, including weed control and shall ensure that all operations are carried out in an orderly and skilful manner.	PEPR Section 5.19.

Second schedule, condition 5 – The Lessee shall ensure that mining operations are planned and managed in a manner to minimise loss or damage to areas of natural vegetation occurring on the area of the Lease.	PEPR Section 2.8.1 and 5.10
Second schedule, condition 6 – The Lessee shall ensure that mining is planned and managed in a manner to minimise the visual impact from the adjoining town and public roads from occurring on the area of the Lease.	PEPR Section 2.14 and 5.16.
Second schedule, condition 7 – The Lessee shall submit a brief annual report to the Director of Mines, recording the number of cubic metres and waste added to the waste rock stockpile in the previous 12 months and shall report the surface area of land utilised by the pit and the surface area of land utilised by the waste rock stockpile.	Annual compliance reports.
Second schedule, condition 8 – The Lessee shall ensure all fuel and liquid chemical storage is adequately bunded and lined to capture spillage and to prevent an accidental release of product to the environment	PEPR Section 3.5.5 and 5.18
Second schedule, condition 9 – The Lessee shall ensure that, upon completion of mining operations, the excavation and waste dump shall be rehabilitated by placing all waste stone into the mine excavation and covering the stone with available rubble and topsoil, to the satisfaction of the Chief Inspector of Mines. The top-soiled surface shall be seeded to achieve a vegetated cover, to the satisfaction of the Chief Inspector of Mines.	PEPR Section 3.3 and 3.4.
Second schedule, condition 10 – The Lessee shall ensure that upon completion of mining and before mine close-out, all plant, equipment, materials, and structures shall be removed from the area of the Lease and all land disturbed or compacted by mining activity shall be ripped and sown to achieve a vegetated cover, to the satisfaction of the Chief Inspector of Mines.	PEPR Section 3.8 and 5.19.
Miscellaneous purposes licence 109	
First schedule, condition 1 – The Miscellaneous Purposes Licence (MPL) is granted for the purpose of a workshop building site, cut block granite stockpiles, waste granite stockpiles, specifically for use in association with the mining operation known as Harlequin Granite Quarry.	This document.
First schedule, condition 2 – If in the opinion of the Minister any tenement associated with Harlequin Granite Quarry has been significantly modified, the Minister may review the licence conditions of this MPL, including any bond under this MPL, and impose new licence conditions as necessary.	As required, rehabilitation liability estimate (provided separately to this PEPR).
First schedule, condition 3 – The Licensee must ensure that all employees and contractor on-site are properly advised of the significance of Aboriginal heritage and culture and are to take due care to preserve all Aboriginal Sites and Objects as defined by the *Aboriginal Heritage Act, 1988*.	PEPR Section 2.17 and 5.7.
First schedule, condition 4 – The Licensee must ensure that operations on the land are carried out in an orderly and skilful manner in accordance with a program for mining and rehabilitation of the land or miner operation plan approved, from time to time, by the Minister and ensure the land disturbed by operations conducted under this MPL is rehabilitated to an agreed post activity land use.	This document, PEPR Section 3.3 and 3.8.

First schedule, condition 5 – The Licensee must develop or modify as necessary (to include operations under this MPL) a program for mining and rehabilitation or mine operations plan for Harlequin Granite quarry that must comply with the requirements of guidelines approved by the Chief Inspector of Mines and include environmental objectives and criteria that are developed in consultation with relevant stakeholders.	This document.
First schedule, condition 6 – The program for mining and rehabilitation will at all times be a public document.	This document will be available on the DEM website.
First schedule, condition 7 – The Licensee must provide to PIRSA a Mining and Rehabilitation Compliance Report on activities carried out on the licence and compliance with the Mining and Rehabilitation Program. This must be submitted every year, or another period as agreed with the Chief Inspector of Mines, within 2 months after the anniversary of the date the licence was granted, in accordance with guidelines approved by the Chief Inspector of Mines. The report will be a public document.	Annual compliance report.
First schedule, condition 8 – The Licensee must, prior to commencing operations under this licence and for the duration of the licence, maintain public liability insurance to cover operations under the licence (including sudden and accidental pollution) in the name of the licensee for the sum of no less than $20 million or such greater sum as specified by the Chief Inspector of Mines, and make such amendments to the terms and conditions of the insurance as the Chief Inspector of Mines may require. A copy of the cover note of certificate of currency for the insurance must be provided to the Chief Inspector of Mines upon request. In specifying the level of insurance required, the Chief Inspector of Mines accepts no liability for the completeness, adequacy of the sum insured, the limit of liability, the scoped coverage, the conditions or exclusions of the insurance in respect of how the licensee many or may not respond to any loss, damage or liability.	Annual compliance report.
Second schedule, condition 1 – The Licensee must ensure that all affected topsoil is removed and stockpiled prior to carrying out any activity, and minimising the mixing and erosion of topsoil and overburden stockpiles.	PEPR Sections 3.3 and 5.13.
Second schedule, condition 2 – The Licensee must, before commencing operations under this licence, lodge a bond in accordance with section 62 of the Mining Act 1971, of such an amount of the surety as determined from time to time by the Minister, to cover the full cost of rehabilitation liability assessed by an independent third-party at any time. In requesting a review of the bond, the Minister may request that written quotes from a third-party are obtained by the licensee for the cost of rehabilitating the site to the requirements specified in the approved MARP. The Licensee must meet all the charges and costs in obtaining and maintaining the Bond.	Rehabilitation liability estimate.
Second schedule, condition 3 – The Licensee must ensure that all land disturbed by the activities undertaken on the Licence is progressively rehabilitated when practicable to do so and, in accordance with appropriate seasonal conditions, progressively re-spread with topsoil and re-vegetated to prevent soil erosion to the satisfaction of the Chief Inspector of Mines.	PEPR Section 3.3.

Second schedule, condition 4 – The Licensee must operate in a manner that will minimise the spread of weeds and plant pathogens and ensure that all employees and contractor on-site are fully aware of this requirement.	PEPR Section 2.8.2 and 5.20.
Second schedule, condition 5 – The Licensee must ensure that dust from the operation be effectively controlled and managed.	PEPR Section 2.15 and 5.1.
Second schedule, condition 6 – The Licensee must ensure that all water borne silt (or any other mining related contaminants) be contained on the area of the licence.	PEPR Section 2.7, 3.5 and 5.15.

8 MAPS AND CROSS-SECTIONS

8.1 Description of Environment Maps

Table 65 provides a checklist for items to be included in the maps supporting the description of the environment and reference to the Drawing that each item is located.

Table 65 – Description of environment map reference table

Terms of Reference section	Map item	Featured drawing
7.1.1.1 Topographic	Tenement boundaries.	Drawing 2.
	Existing surface contours.	Drawing 2, Drawing 4, Drawing 5, Drawing 6, Drawing 6a.
	Existing vegetation.	Not applicable.
	Location of watercourses, including ephemeral and permanent rivers, creeks, swamps, streams, wetlands, and any man-made water management structures.	Drawing 5.
	Surface water catchment boundaries.	Drawing 6.
	Direction of drainage and discharge from the application area.	Drawing 6.
	Location and extent of all previously disturbed areas associated with previous mining.	Drawing 9.
	Location and extent of any adjacent conservation reserves, heritage sites or any other significant areas.	Attachment 9.
7.1.1.2 Local geology	Tenement boundaries.	Drawing 3.
	Location and dimensions of the deposit.	Drawing 3.
	Topsoil/subsoil variation if there is a variation in soils over the application area.	Not applicable.
7.1.1.3 Groundwater	Groundwater wells in the surrounding area highlighting those used to determine the groundwater level.	Drawing 4.
7.1.1.4 Land access	Tenement boundaries.	Drawing 7, Drawing 8.
	Proposed tenement boundary if an area smaller than the mineral claim is proposed.	Not applicable.
	Any exempt land.	Drawing 8.
	Location of residences within and near the application area.	Drawing 8.
	Human infrastructure as per clause 1.12.	Drawing 8.
7.1.1.5 Caves map	Not relevant.	

The following is a list of Drawings relating to Section 1 and Section 2 of this PEPR:

- Drawing 1 – Site location map
- Drawing 2 – Local topography map
- Drawing 3 – Resource map
- Drawing 4 – Groundwater map
- Drawing 5 – Groundwater dependent ecosystems (GDE) map
- Drawing 6 – Surface water map
- Drawing 6a – Surface water map (copper slag stockpiling area)
- Drawing 7 – Local land use map
- Drawing 8 – Local housing and infrastructure map
- Drawing 9 – Contamination and disturbance map.

8.2 Description of Mining Operations Maps

Table 66 provides a checklist for items to be included in the maps supporting the description of mining operations and reference to the Drawing that each item is located.

- Drawing 10 – Site layout map
- Drawing 11 – Stage 1 mining and rehabilitation
- Drawing 12 – Stage 2 mining and rehabilitation
- Drawing 13 – Stage 3 mining and rehabilitation
- Drawing 14 – Stage 4 mining and rehabilitation.
- Drawing 15 – Concept final landform map
- Drawing 16 – Concept final landform cross-sections

Table 66 – Description of mining operations map reference table

Terms of Reference Section	Map item	Featured drawing
7.1.2.1 Site layout	Tenement boundaries.	Drawing 10.
	Location of sediment management infrastructure.	Not applicable.
	Vegetation screening (both existing and proposed).	Drawing 10.
	Location of fuel and chemical storage areas.	Drawing 10.
	If relevant location of process water dams.	Not applicable.
	Location of haul roads.	Drawing 10.
	If relevant location of fixed plant.	Not applicable.
	Location of mobile plant for stage 1 of mining.	Drawing 10.
	Location and extent of topsoil/subsoil and product stockpiles.	Drawing 10.
7.1.2.2 Sequence of quarrying and progressive rehabilitation	Tenement boundaries	Drawing 10.
	Staging of each progressive mining stage	Drawing 11 – 14.
	Proposed native vegetation clearance; and	Not applicable.
	Staging of each progressive rehabilitation stage.	Drawing 11 – 14.
7.1.2.3 Access route	Access route for heavy vehicles	Drawing 1.
	Exit route for heavy vehicles; and	Drawing 1 and Drawing 10.
	New roads to be constructed if relevant.	Not applicable.
7.1.2.4 Quarry completion	Final landforms (including rehabilitated and non-disturbed areas).	Drawing 15.
	Proposed topographical contours of the entire site (including rehabilitated and non-disturbed areas).	Drawing 15.

8.3 Cross-sections for the description of the existing environment

Table 67 provides a checklist for items to be included in cross-section drawings supporting the description of the existing environment and reference to the Drawing that each item is located.

Table 67 – Cross-section for existing environment map reference table

Terms of Reference Section	Map item	Featured drawing
7.2.1.1 Geological cross-sections	A representation of the geological profile within the application area.	Figure 3.
	Depth of the resource and any overlying overburden.	Figure 3.
7.2.1.2 Groundwater cross-sections	The proposed depth of mining.	Drawing 16.
	The depth to groundwater	Drawing 16.

8.4 Cross-sections for the description of mining operations

Table 68 provides a checklist for items to be included in cross-section drawings supporting the description of mining operations and reference to the Drawing that each item is located.

Table 68 – Cross-section for mining operations map reference table

Terms of Reference Section	Map item	Featured drawing
7.2.2.1 Quarry operation cross-sections	A representation of the geological profile within the application area.	Figure 3.
	Depth of the resource and any overlying overburden.	Figure 3.
7.2.2.2 Quarry completion cross-sections	The proposed depth of mining.	Drawing 16.
	The depth to groundwater	Drawing 16.

8.5 Monitoring locations

Table 69 provides a list of monitoring locations included in a monitoring location map (**Drawing 17**) and reference to the section of this PEPR relevant to the monitoring.

Table 69 – Cross-section for existing environment map reference table

PEPR Section	Monitoring point / area	Approximate coordinates (UTM zone 53H)
Groundwater	Pit floor water quality sampling.	745114mE 6244879mS
Visual amenity	Jones Road visual monitoring point.	744528mE 6244833mS
	North Beach Road visual monitoring point.	744622mE 6243798mS
Blasting	Jones Road residence.	744314mE 6244663mS
	Wallaroo Plains Road residence.	745398mE 6246080mS
Surface water	Disturbance area boundary.	Not applicable (refer path shown in **Drawing 17**)
Public safety	Tenement boundaries.	Not applicable (refer path shown in **Drawing 17**)

9 REFERENCES

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Drawings

Drawing 1 – Site location map

Drawing 2 – Local topography map

Drawing 3 – Resource map

Drawing 4 – Groundwater map

Drawing 5 – Groundwater dependent ecosystems (GDE) map

Drawing 6 – Surface water map

Drawing 6a – Surface water map (copper slag stockpiling area)

Drawing 7 – Local land use map

Drawing 8 – Local housing and infrastructure map

Drawing 9 – Contamination and disturbance map

Drawing 10 – Site layout map

Drawing 11 – Stage 1 mining and rehabilitation

Drawing 12 – Stage 2 mining and rehabilitation

Drawing 13 – Stage 3 mining and rehabilitation

Drawing 14 – Stage 4 mining and rehabilitation.

Drawing 15 – Concept final landform map

Drawing 16 – Concept final landform cross-sections

Drawing 17 – Compliance monitoring locations.

Drawing 1 - Site location map

Wallaroo Quarry - EML 5793 & MPL 109

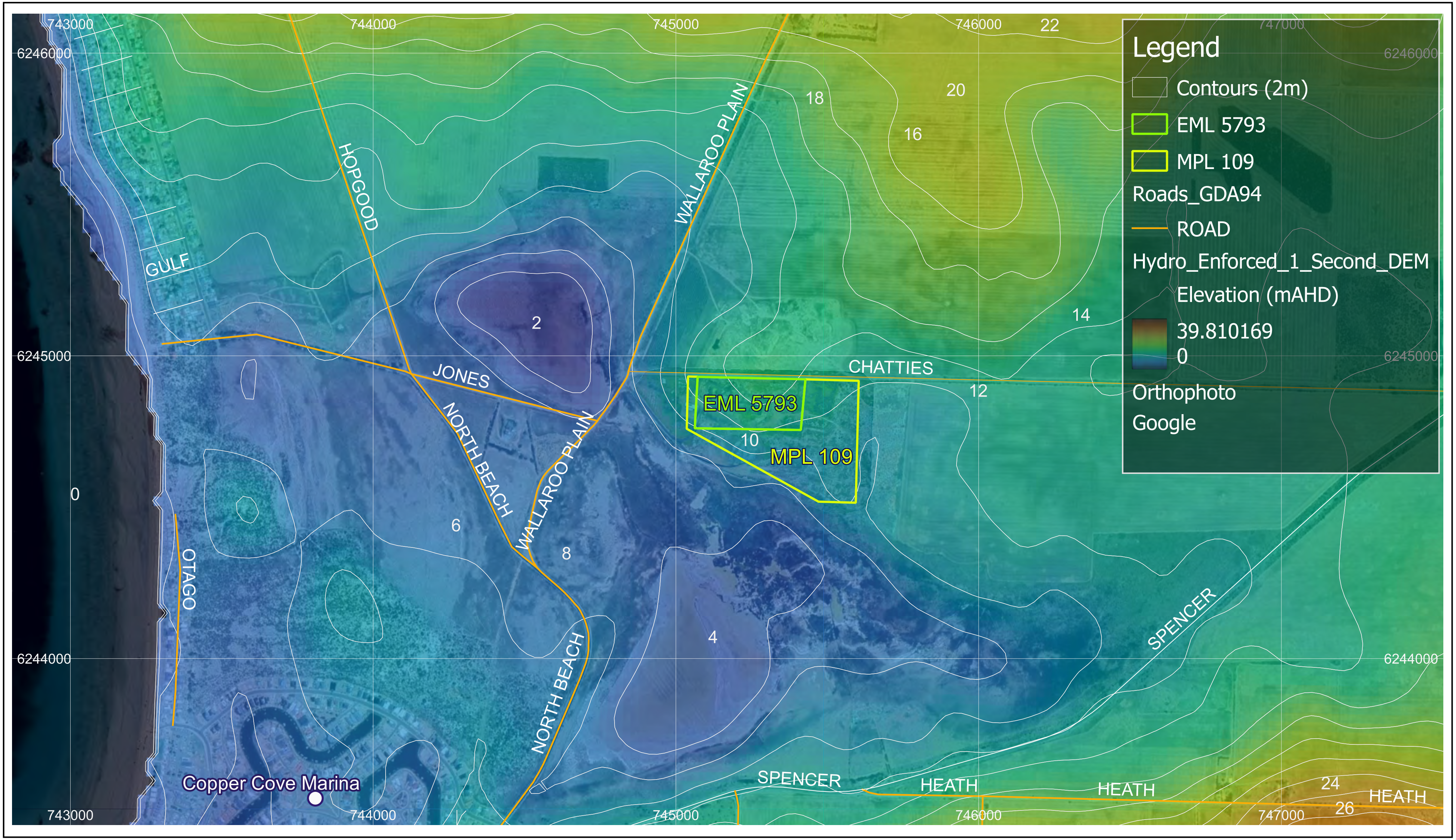
25/11/2022

WGS 84 / UTM zone 53S

0 500 1,000 1,500 2,000 m

AustralAsian Granite

MACRO ENVIRONMENTAL SOLUTIONS



Drawing 2 - Local topography map

Wallaroo Quarry - EML 5793 & MPL 109

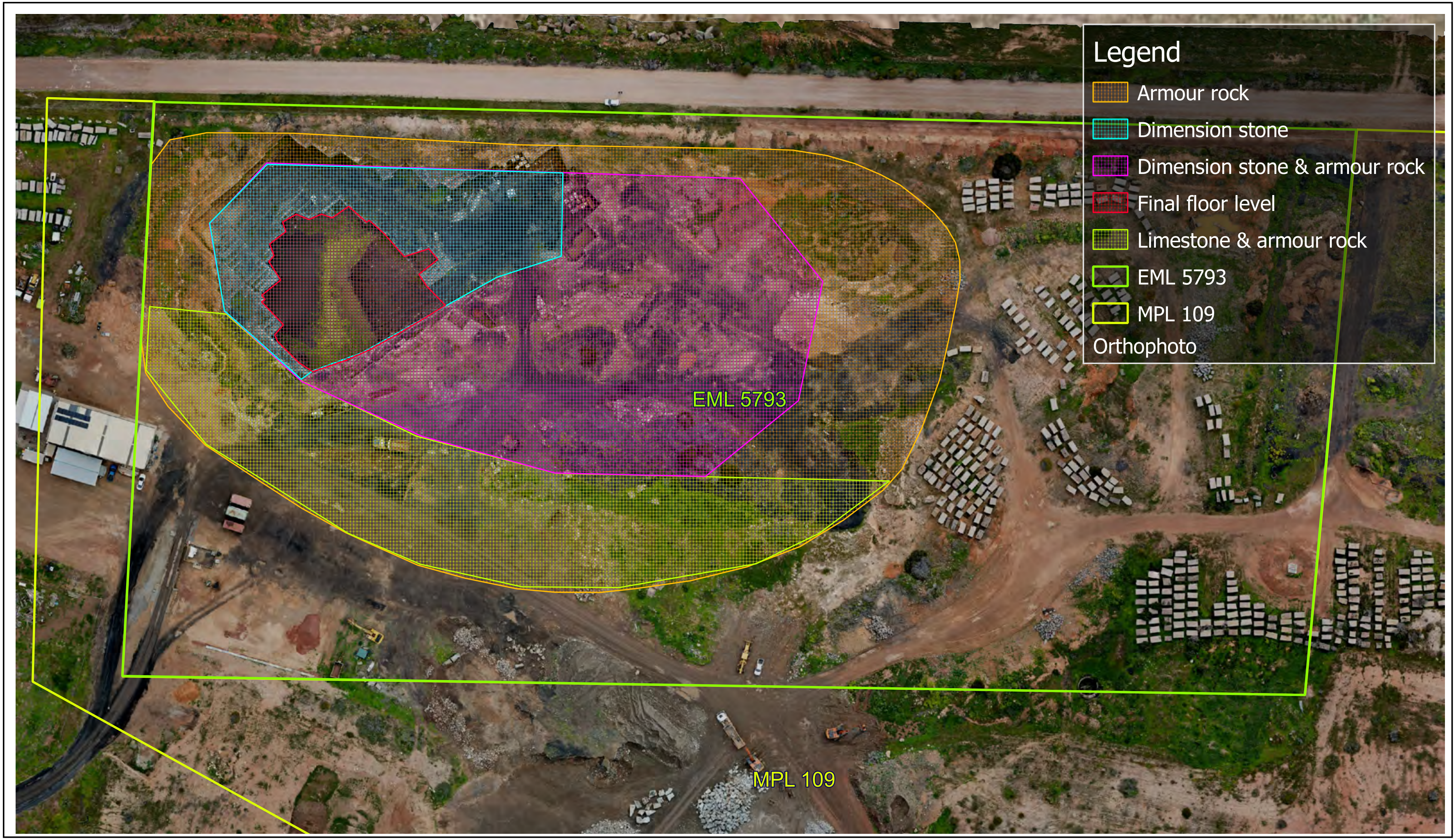
25/11/2022

WGS 84 / UTM zone 53S

0 250 500 750 1,000 m

AustralAsian Granite

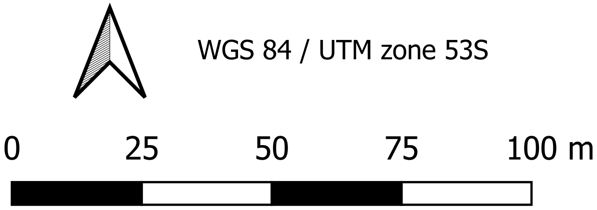
MACRO ENVIRONMENTAL SOLUTIONS



Drawing 3 - Resource map

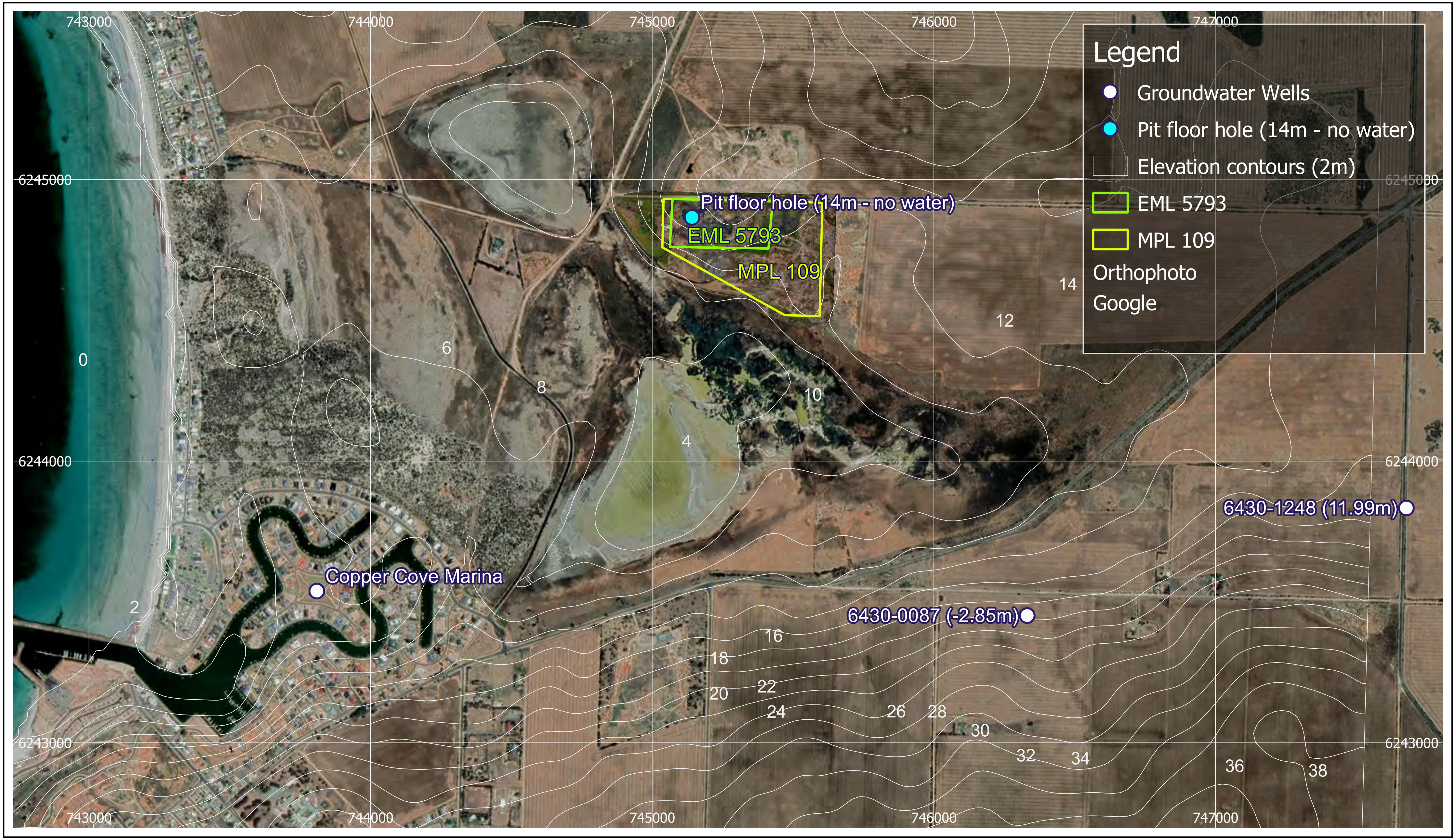
Wallaroo Quarry - EML 5793 & MPL 109

25/11/2022



AustralAsian Granite

MACRO ENVIRONMENTAL SOLUTIONS



Drawing 4 - Groundwater map

Wallaroo Quarry - EML 5793 & MPL 109

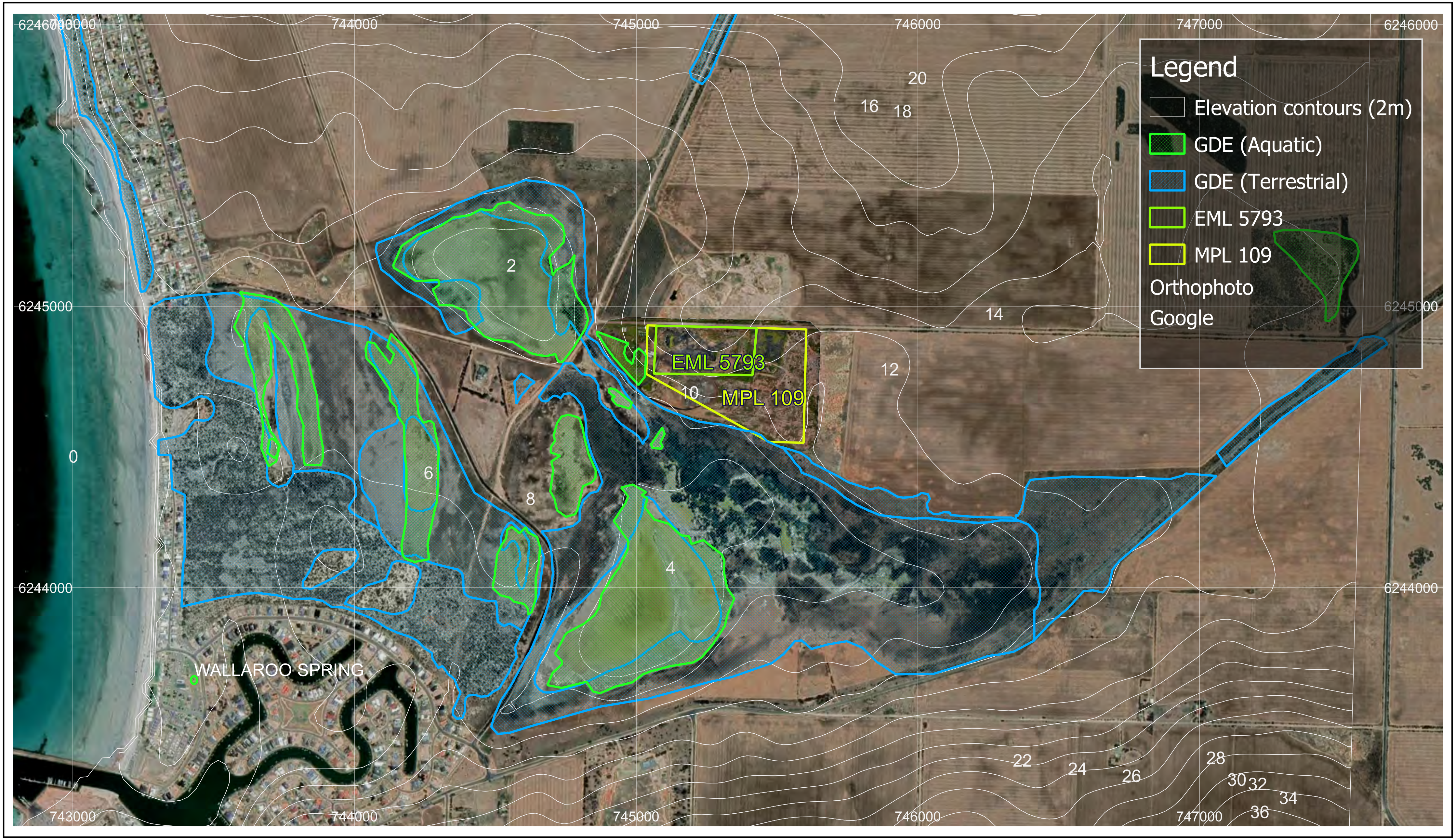
25/11/2022

WGS 84 / UTM zone 53S

0 500 1,000 1,500 m

AustralAsian Granite

MACRO ENVIRONMENTAL SOLUTIONS



Drawing 5 - Groundwater dependent ecosystems (GDE) map

Wallaroo Quarry - EML 5793 & MPL 109

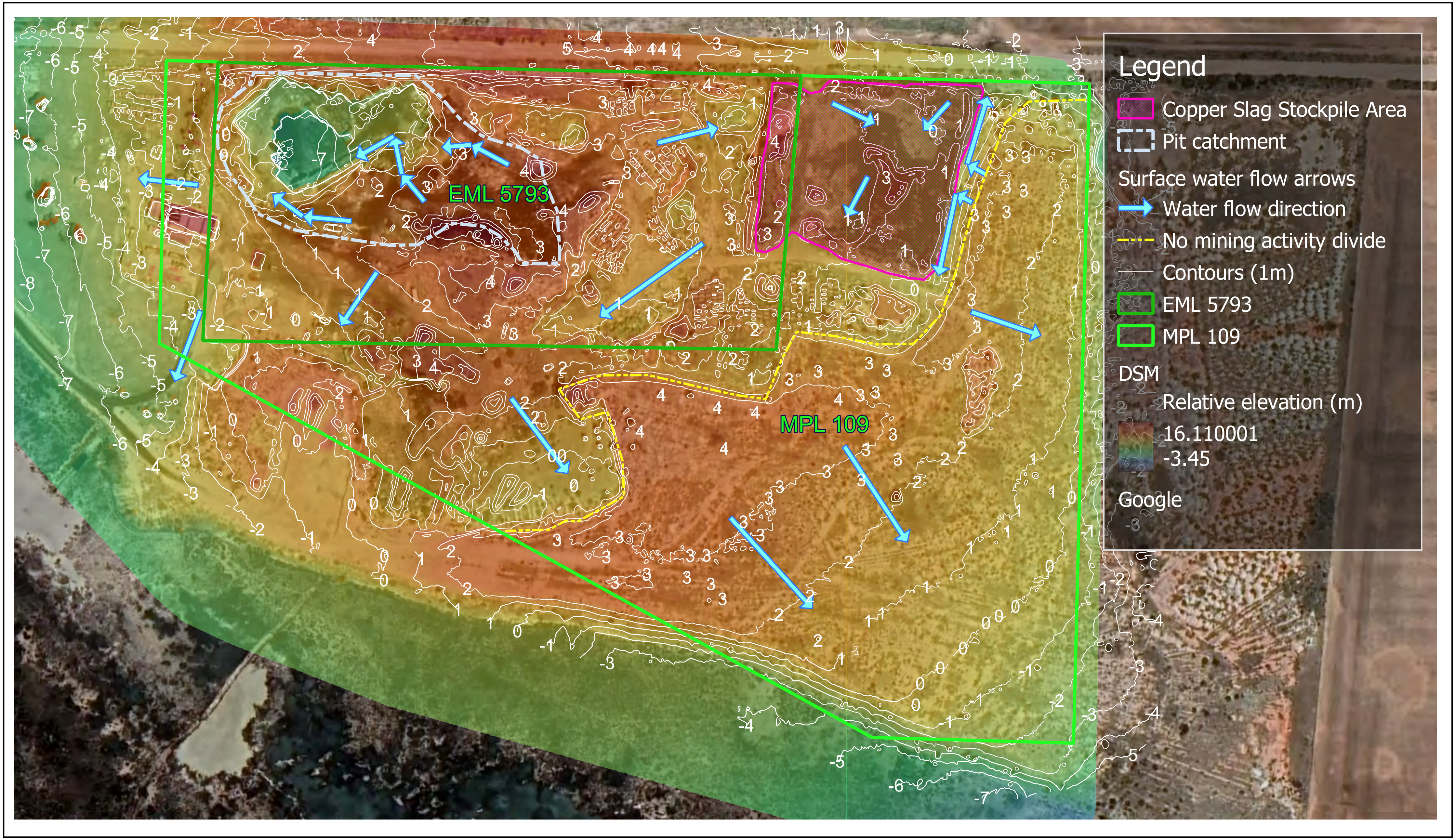
26/11/2022

WGS 84 / UTM zone 53S

0 500 1,000 1,500 m

AustralAsian Granite

MACRO ENVIRONMENTAL SOLUTIONS



Drawing 6 - Surface water map

Wallaroo Quarry - EML 5793 & MPL 109

28/11/2022

WGS 84 / UTM zone 53S

0 75 150 225 m

AustralAsian Granite

MACRO ENVIRONMENTAL SOLUTIONS

Drawing 6a - Surface water map (copper slag stockpiling area)

Wallaroo Quarry - EML 5793 & MPL 109

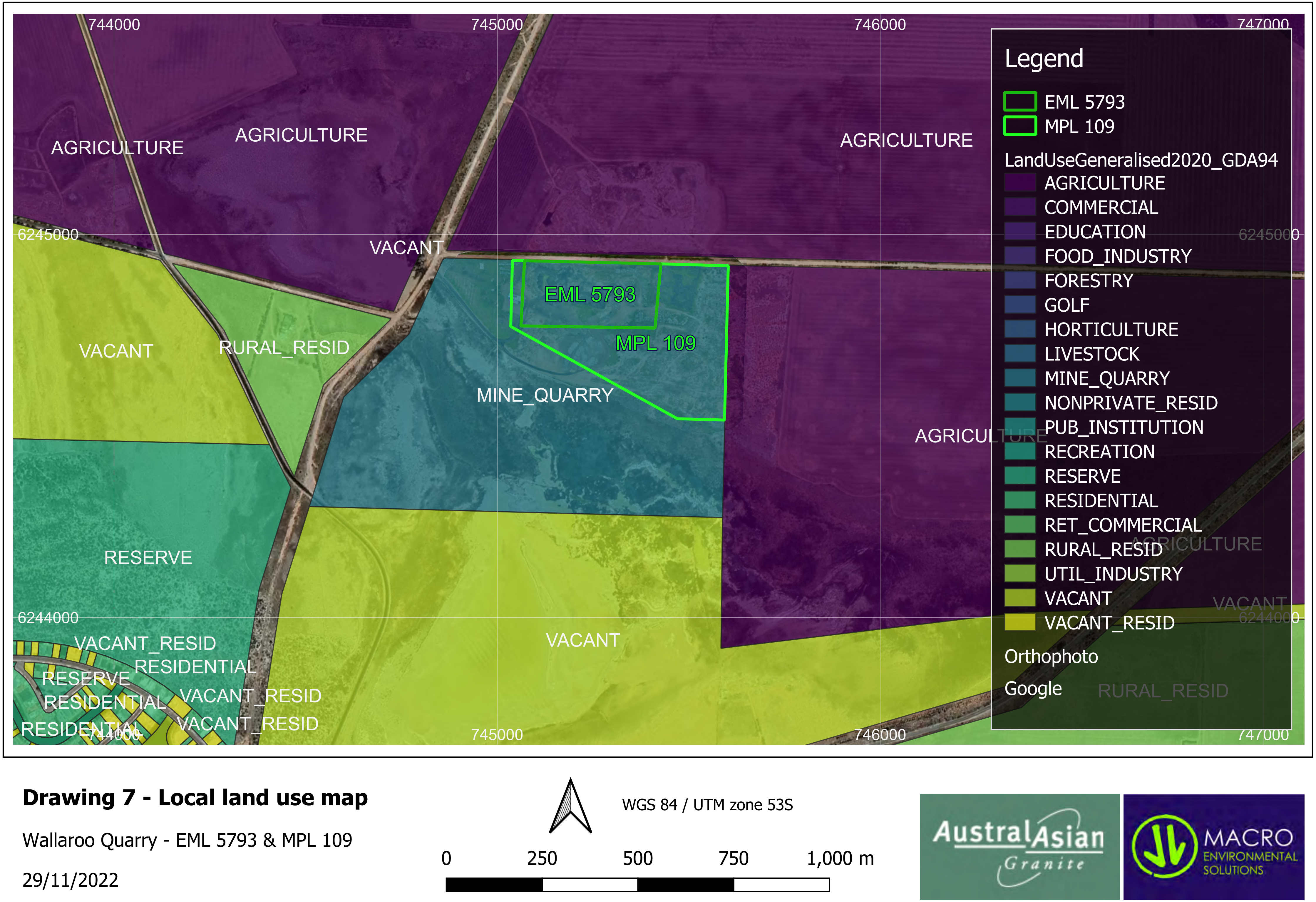
28/11/2022

WGS 84 / UTM zone 53S

0 25 50 75 m

AustralAsian Granite

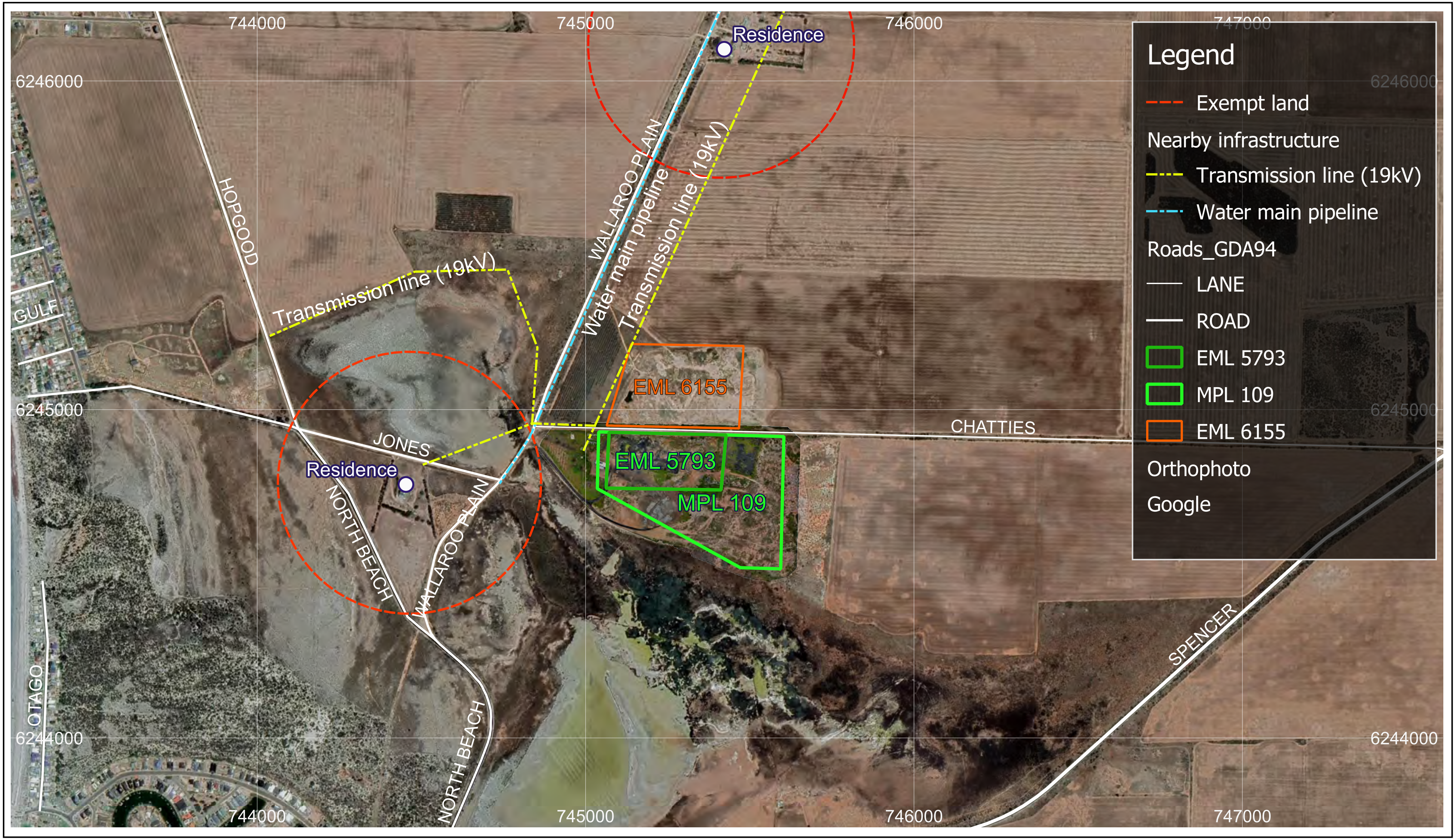
MACRO ENVIRONMENTAL SOLUTIONS



Drawing 7 - Local land use map

Wallaroo Quarry - EML 5793 & MPL 109

29/11/2022



Drawing 8 - Local housing and infrastructure map

Wallaroo Quarry - EML 5793 & MPL 109

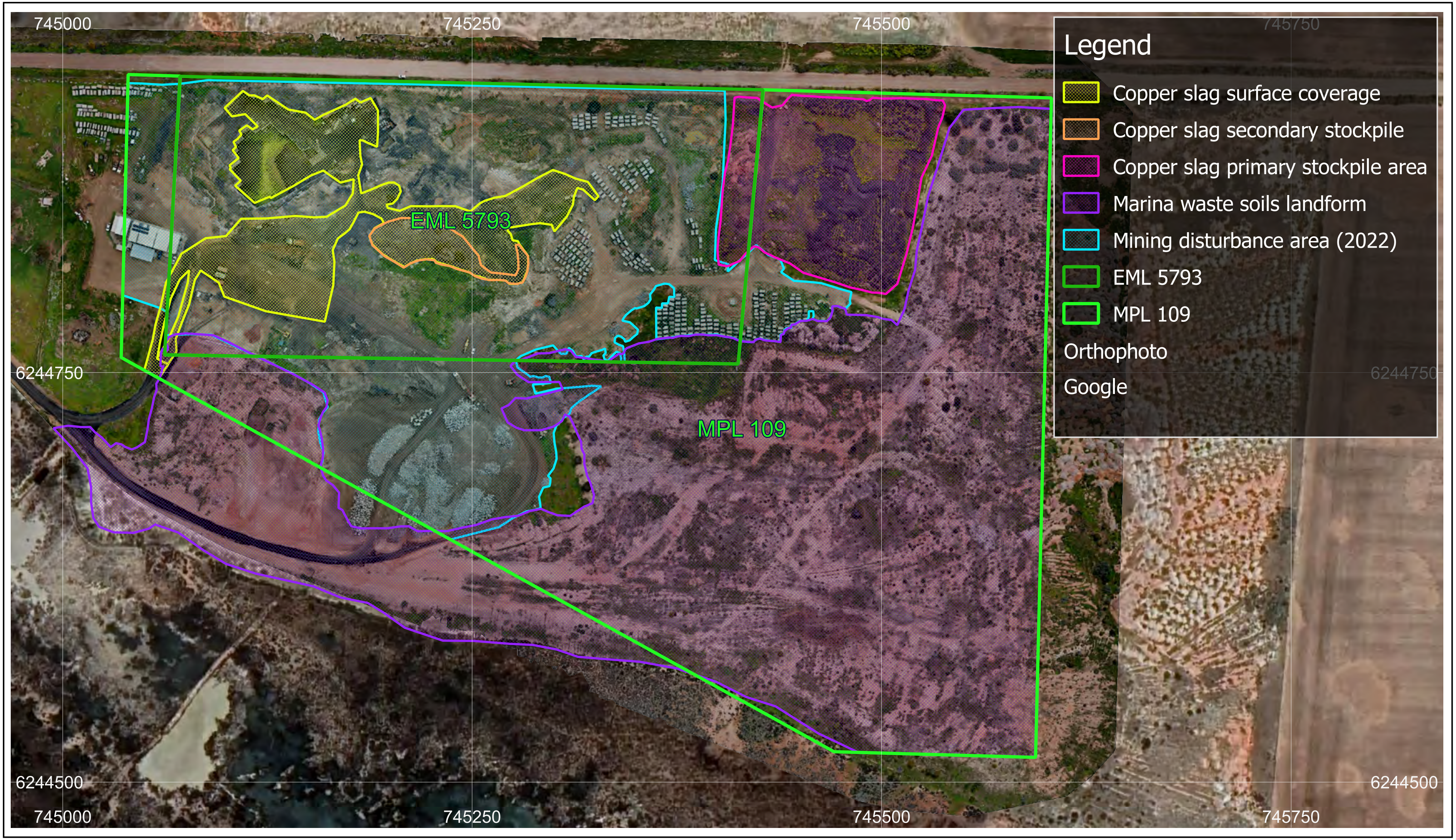
29/11/2022

WGS 84 / UTM zone 53S

0 250 500 750 1,000 m

AustralAsian Granite

MACRO ENVIRONMENTAL SOLUTIONS



Drawing 9 - Contamination and disturbance map

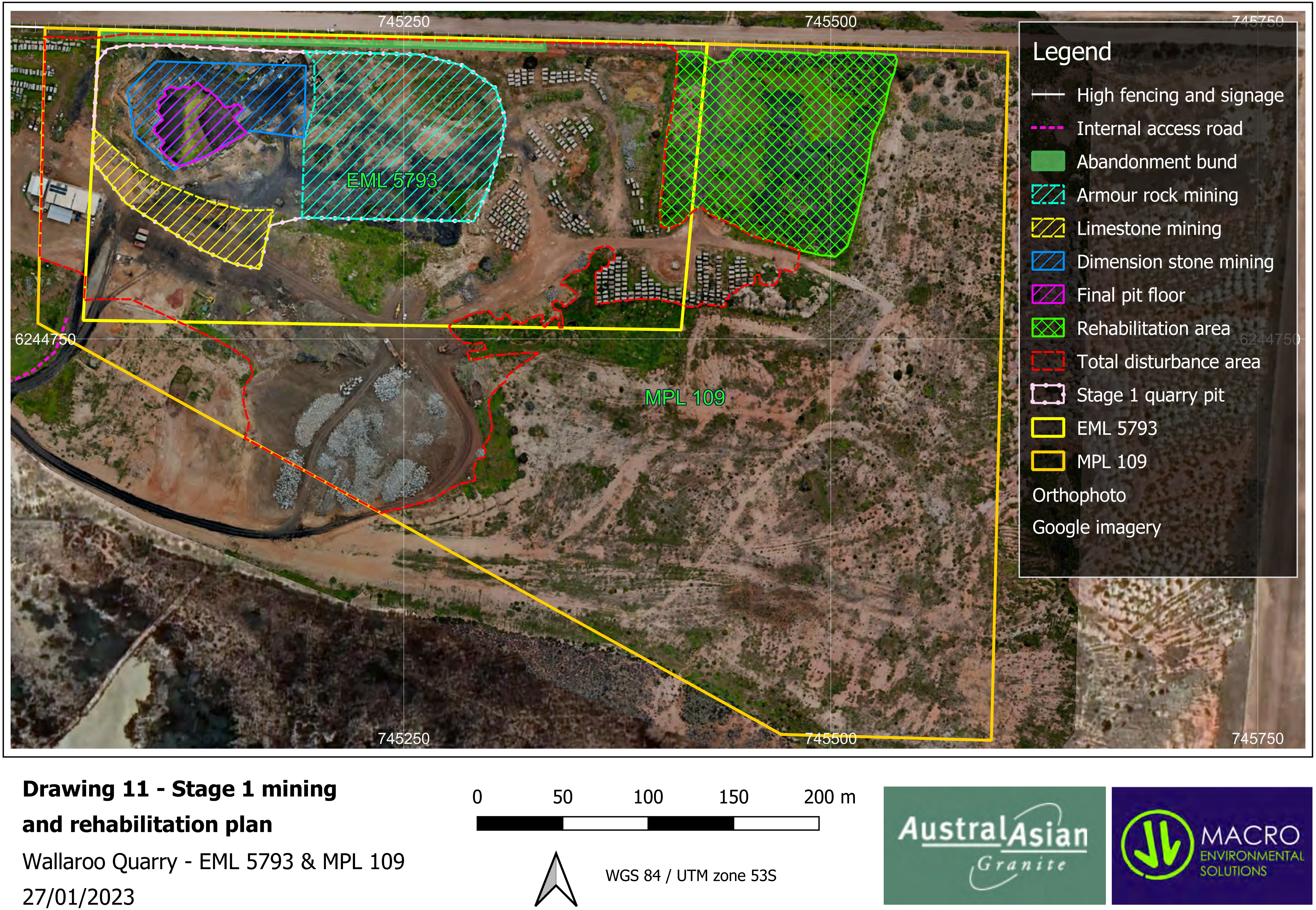
Wallaroo Quarry - EML 5793 & MPL 109

29/11/2022

Drawing 10 - Site layout map

Wallaroo Quarry - EML 5793 & MPL 109

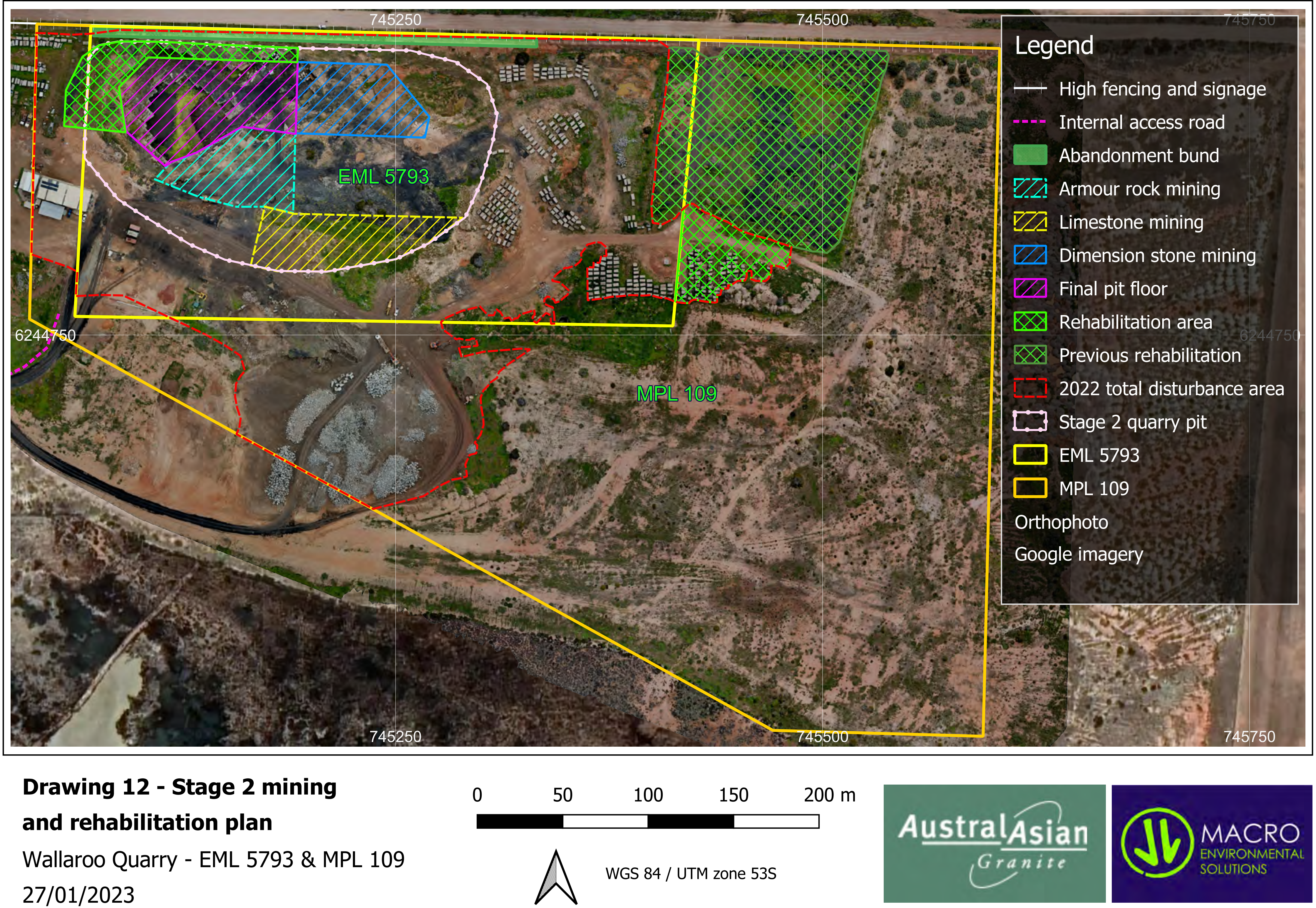
25/01/2023



Drawing 11 - Stage 1 mining and rehabilitation plan

Wallaroo Quarry - EML 5793 & MPL 109

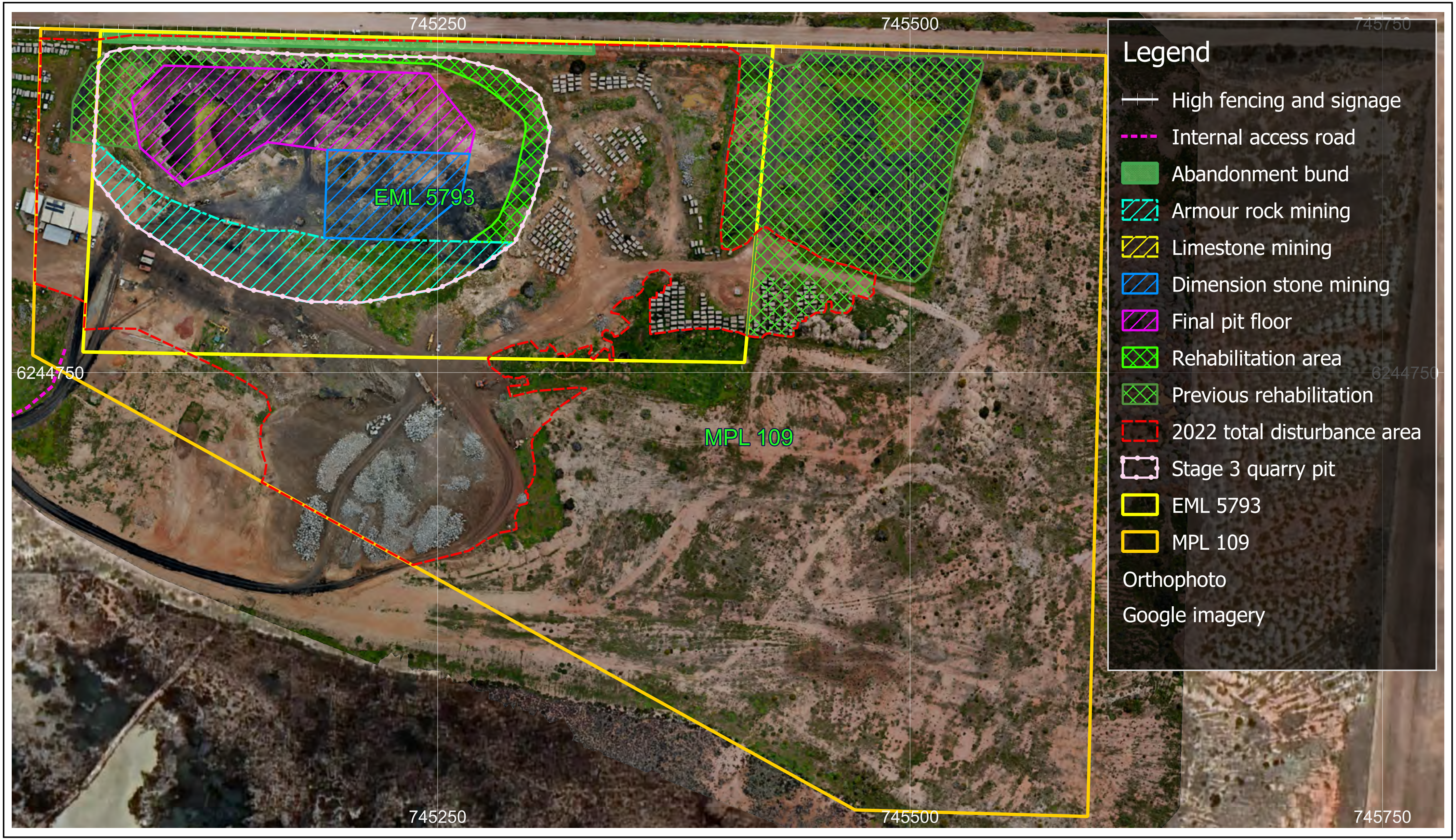
27/01/2023



Drawing 12 - Stage 2 mining and rehabilitation plan

Wallaroo Quarry - EML 5793 & MPL 109

27/01/2023



Drawing 13 - Stage 3 mining and rehabilitation plan

Wallaroo Quarry - EML 5793 & MPL 109

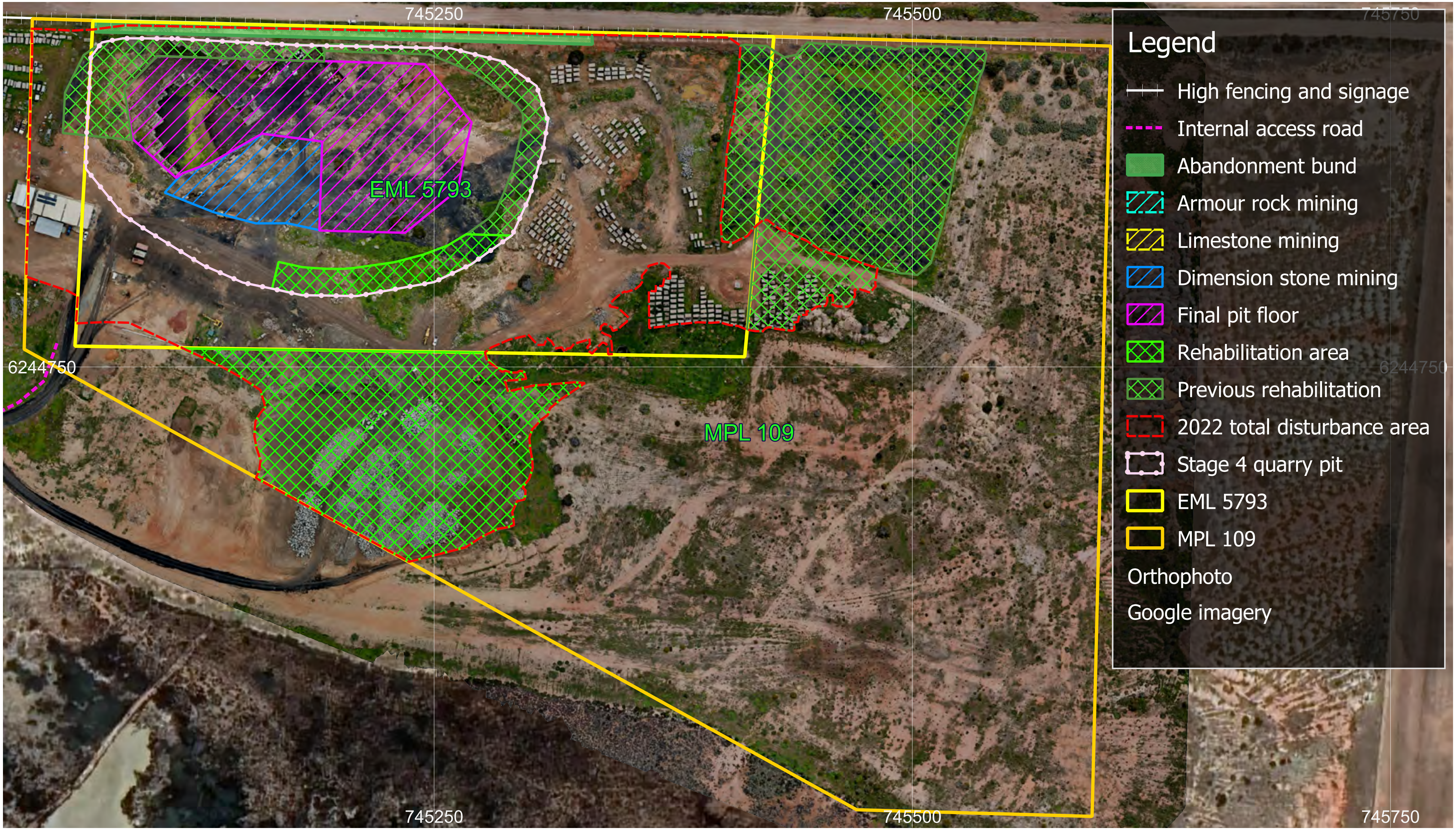
27/01/2023

0 50 100 150 200 m

WGS 84 / UTM zone 53S

AustralAsian Granite

MACRO ENVIRONMENTAL SOLUTIONS



Drawing 14 - Stage 4 mining and rehabilitation plan

Wallaroo Quarry - EML 5793 & MPL 109

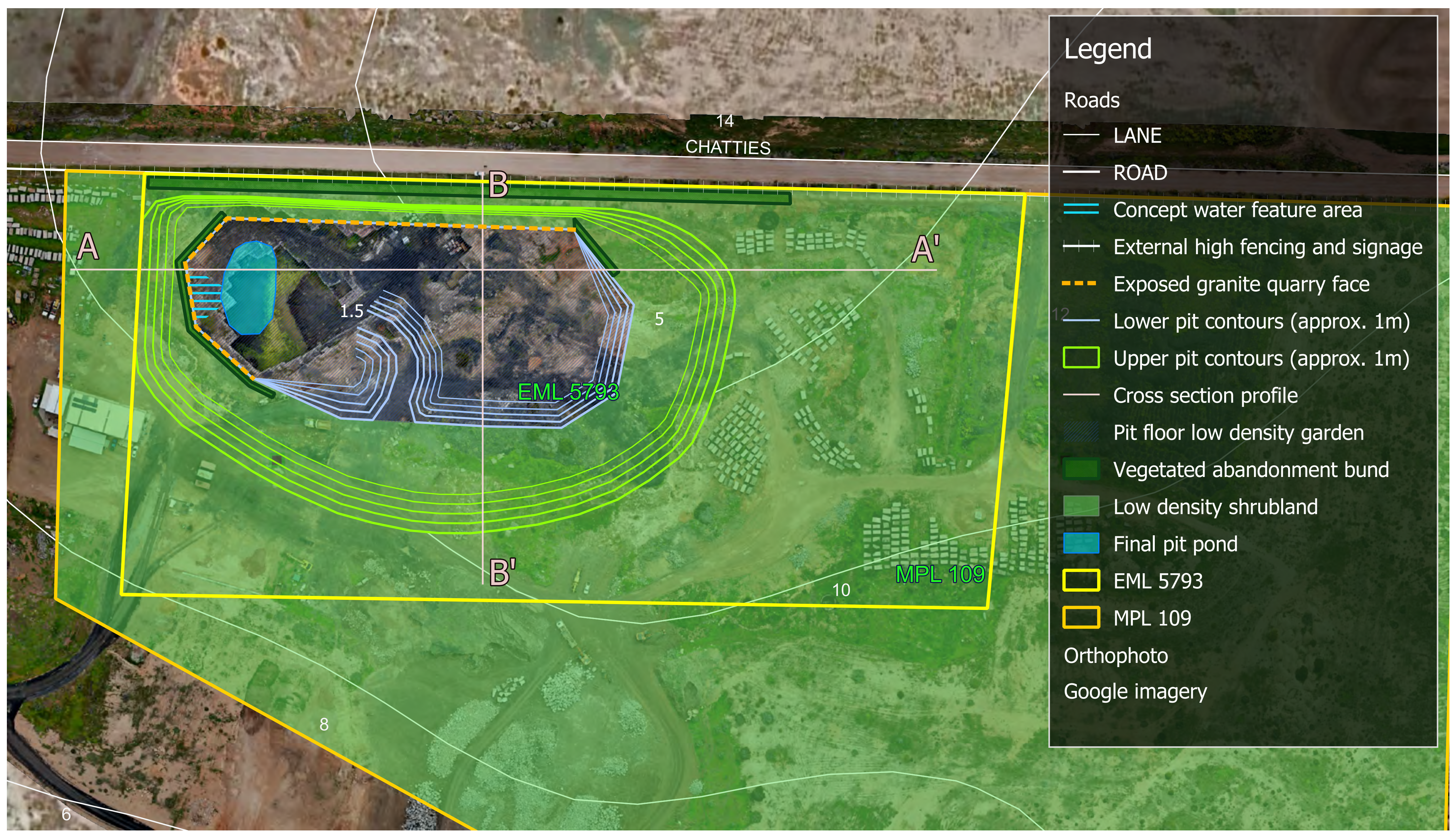
27/01/2023

0 50 100 150 200 m

WGS 84 / UTM zone 53S

AustralAsian Granite

MACRO ENVIRONMENTAL SOLUTIONS



Drawing 15 - Concept final landform map

Wallaroo Quarry - EML 5793 & MPL 109

25/01/2023

WGS 84 / UTM zone 53S

0 50 100 150 m

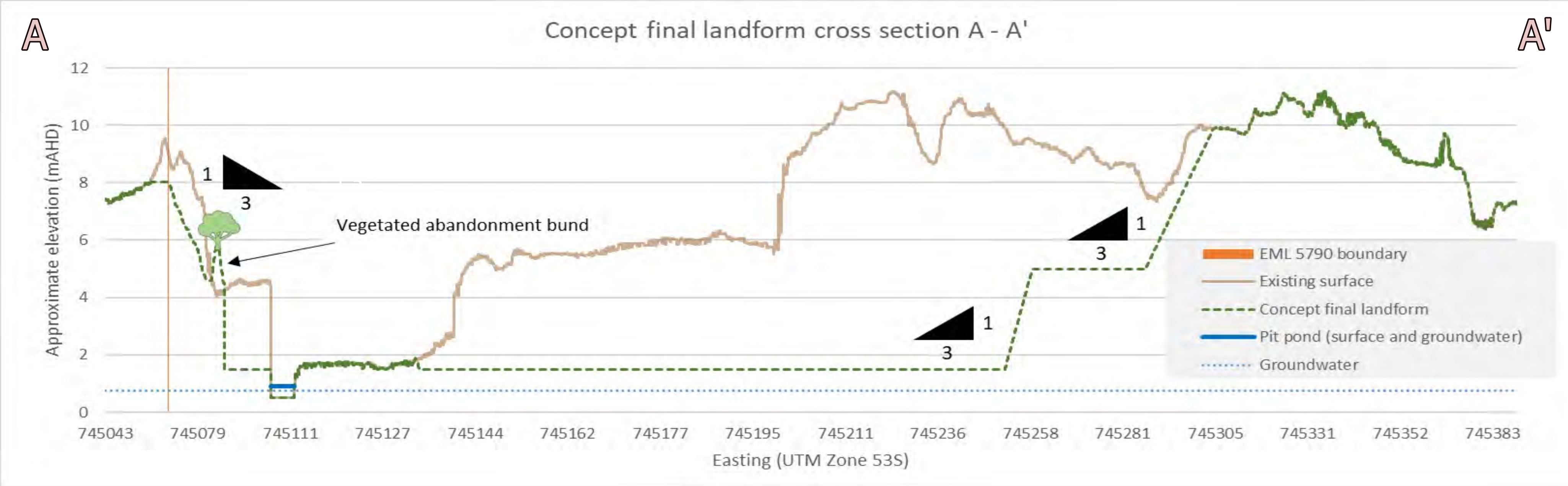
AustralAsian Granite

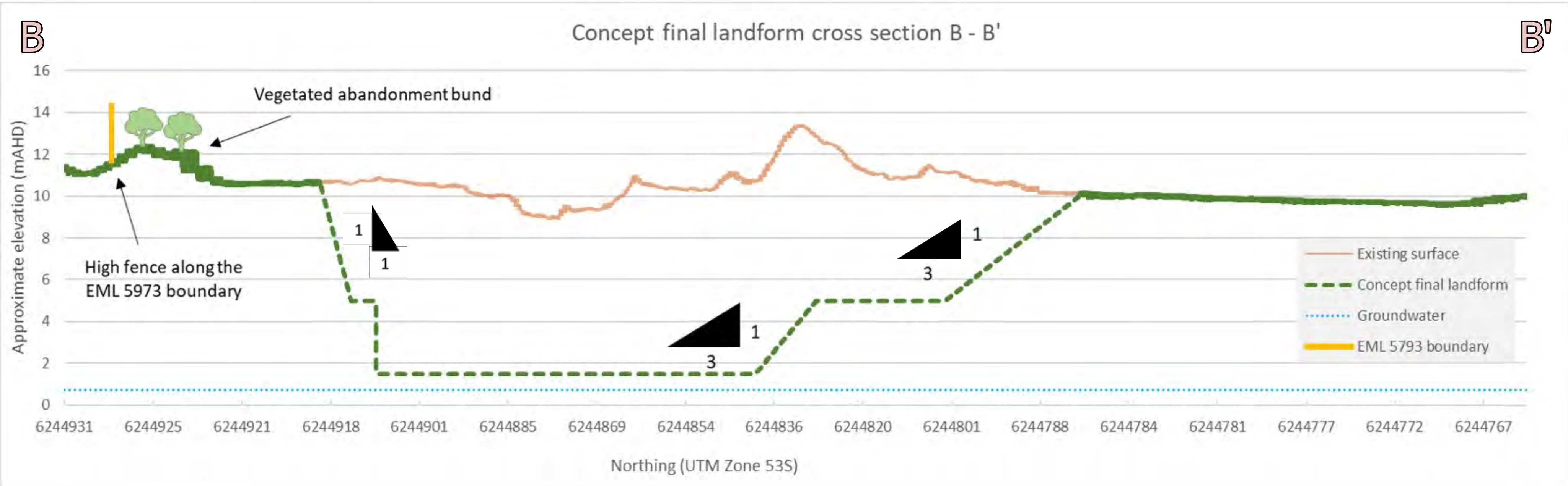
MACRO ENVIRONMENTAL SOLUTIONS

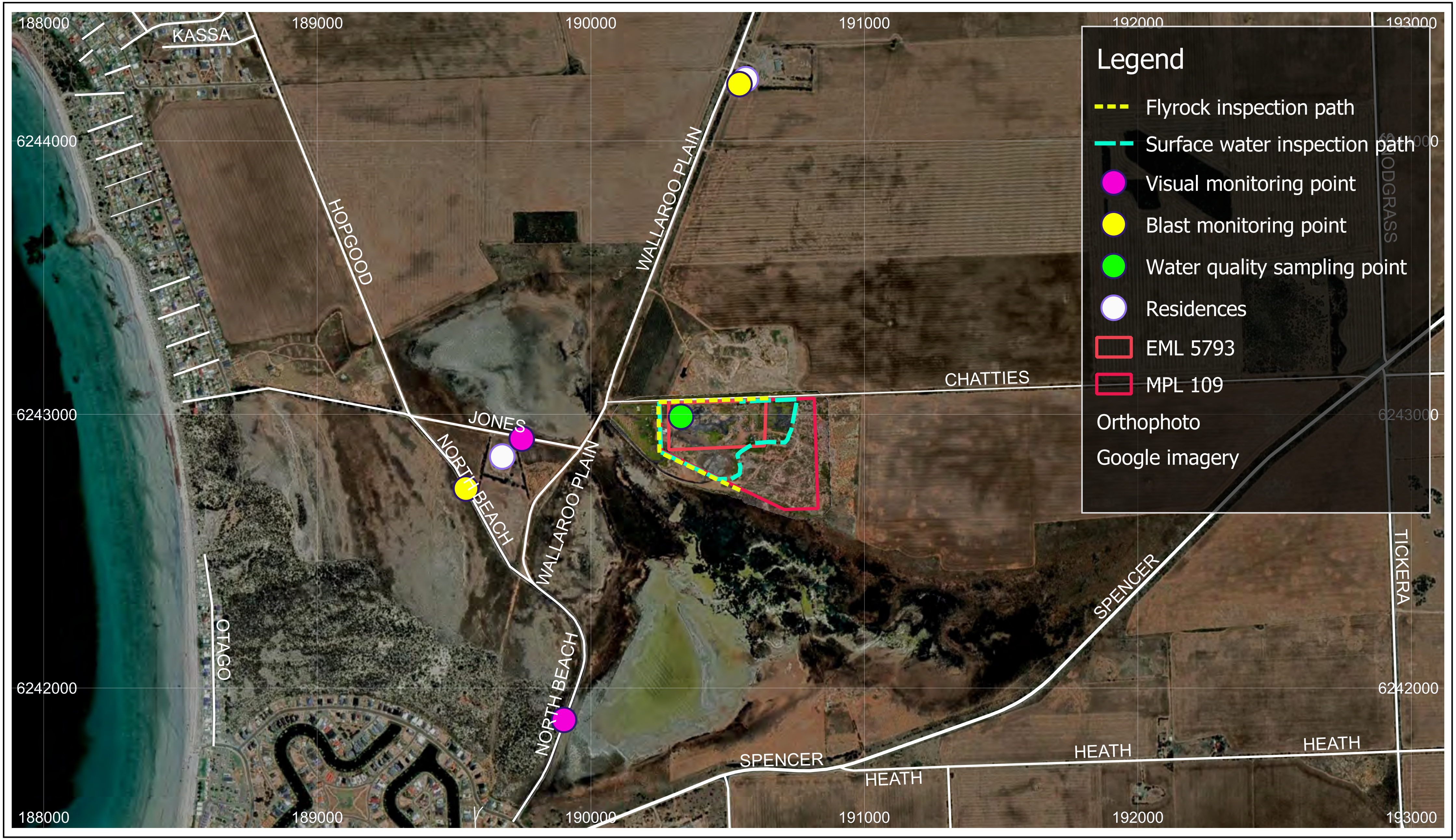
Drawing 16 - Concept final landform cross sections

Wallaroo Quarry - EML 5793 & MPL 109

25/01/2023







Drawing 17 - Compliance monitoring locations

Wallaroo Quarry - EML 5793 & MPL 109

10/02/2023

0 500 1,000 1,500 m

WGS 84 / UTM zone 54S

Attachments

Attachment 1 – Monthly 3pm wind roses

Attachment 2 – Time-series aerial imagery of quarry pit water levels

Attachment 3 – Pit water quality analysis report from 8 September 2022 sample

Attachment 4 – EPBC Act Protected Matters Report

Attachment 5 – Greencap preliminary site investigation (November 2020)

Attachment 6 – Wallaroo Harbor approaches – geological plan 1970

Attachment 7 – Planning and design code conservation map

Attachment 8 – Aboriginal heritage search response letter

Attachment 9 – Local conservation areas and areas restricted from mineral production

Attachment 10 – Mud Environmental soil classification report 2020

Attachment 11 – Remediation Action Plan

Attachment 12 – Blast Management Plan

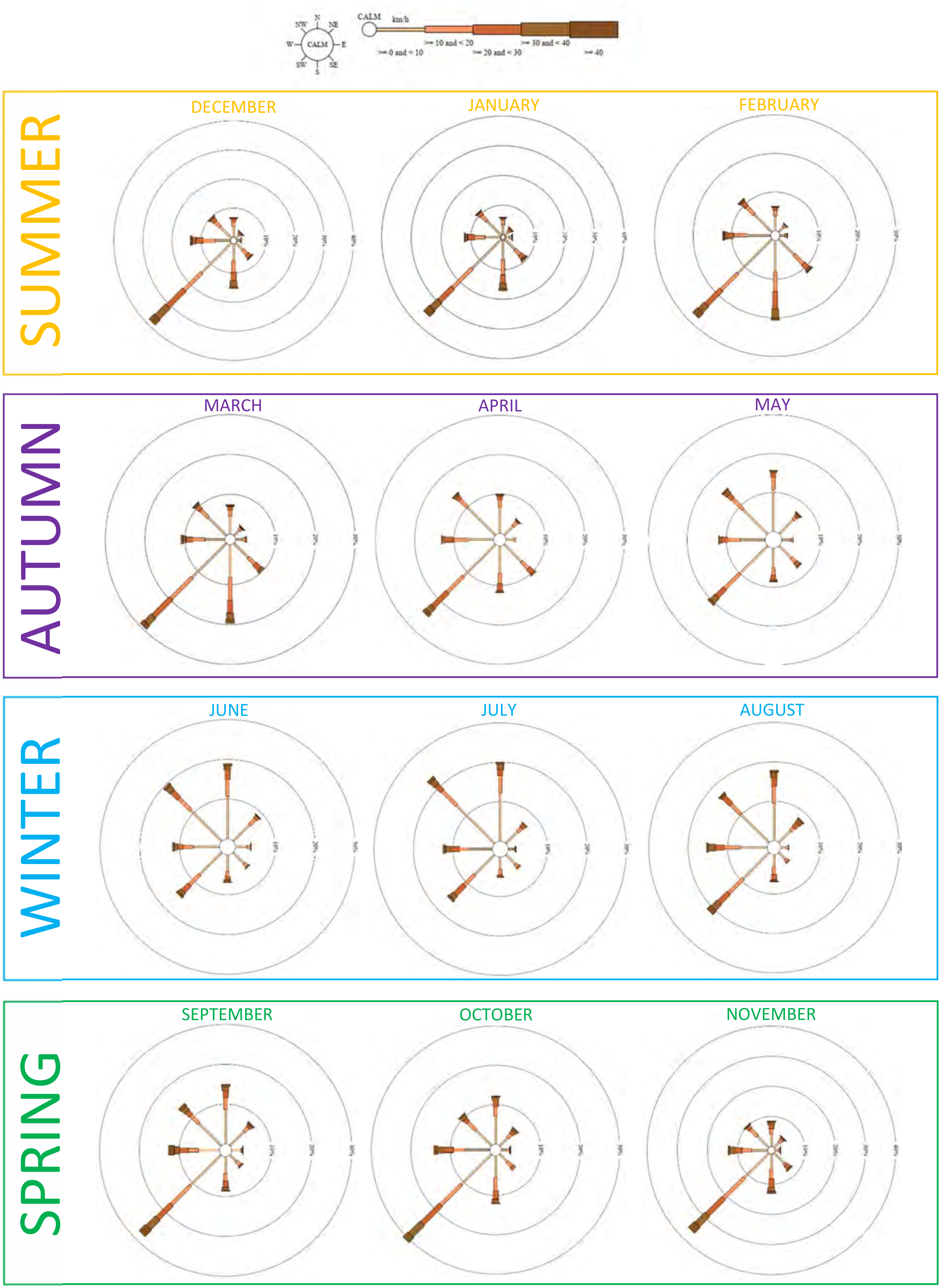
Attachment 13 – Explosives Magazine Licence 75340

Attachment 14 – Waste-derived fill management plan

Attachment 15 – Compliance summary and monitoring plan.

Attachment 1

Monthly 3pm wind roses



N
NE
E
SE
S
SW
W
NW
CALM
CALM
km/h
>= 0 and < 10
>= 10 and < 20
>= 20 and < 30
>= 30 and < 40
>= 40
SUMMER
DECEMBER
JANUARY
FEBRUARY
AUTUMN
MARCH
APRIL
MAY
WINTER
JUNE
JULY
AUGUST
SPRING
SEPTEMBER
OCTOBER
NOVEMBER

Attachment 2

Time-series aerial imagery of quarry pit water levels

Time-series aerial imagery showing water level in the Wallaroo Quarry pit

April 2010

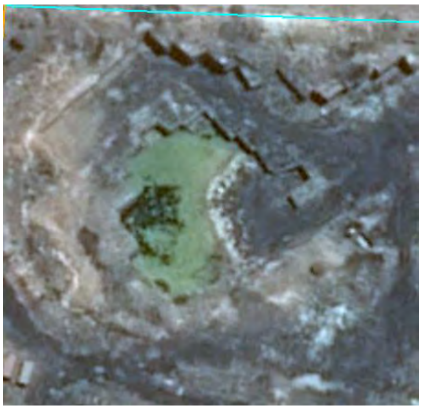
October 2010

October 2012

November 2013

November 2013

November 2015



March 2017

April 2018

October 2018

May 2020

February 2021

September 2021

Attachment 3

Pit water quality analysis report from 8 September 2022 sample

Envirolab Services Pty Ltd
ABN 37 112 535 645 - 002
25 Research Drive Croydon South VIC 3136
ph 03 9763 2500 fax 03 9763 2633
melbourne@envirolab.com.au
www.envirolab.com.au

CERTIFICATE OF ANALYSIS 33554

Client Details

Client	Macro Environmental Solutions
Attention	Terry Menadue
Address	2A Austin Ave, Athelstone, SA, 5076

Sample Details

Your Reference	**Wallaroo Quarry**
Number of Samples	1 Water
Date samples received	12/09/2022
Date completed instructions received	12/09/2022

Analysis Details

Please refer to the following pages for results, methodology summary and quality control data.

Samples were analysed as received from the client. Results relate specifically to the samples as received.

Results are reported on a dry weight basis for solids and on an as received basis for other matrices.

Please refer to the last page of this report for any comments relating to the results.

Report Details

Date results requested by	19/09/2022
Date of Issue	16/09/2022

NATA Accreditation Number 2901. This document shall not be reproduced except in full.

Accredited for compliance with ISO/IEC 17025 - Testing. **Tests not covered by NATA are denoted with ***

Results Approved By
Chris De Luca, Operations Manager
Tara White, Metals Team Leader

Authorised By

P.Adams.

Pamela Adams, Laboratory Manager

HM in water - total		
Our Reference		33554-1
Your Reference	UNITS	Sample 1- Pit Lake
Type of sample		Water
Date Sampled		08/09/2022
Date prepared	-	14/09/2022
Date analysed	-	14/09/2022
Arsenic-Total	µg/L	3
Cadmium-Total	µg/L	<0.2
Chromium-Total	µg/L	<2
Copper-Total	µg/L	49
Lead-Total	µg/L	<2
Nickel-Total	µg/L	<2
Zinc-Total	µg/L	<20
Mercury-Total	µg/L	<0.05

Miscellaneous Inorganics		
Our Reference		33554-1
Your Reference	UNITS	Sample 1- Pit Lake
Type of sample		Water
Date Sampled		08/09/2022
Date prepared	-	13/09/2022
Date analysed	-	13/09/2022
pH	pH Units	9.6
Total Dissolved Solids (grav)	mg/L	11,000

Method ID	Methodology Summary
Inorg-001	pH - Measured using pH meter and electrode in accordance with APHA latest edition, 4500-H+. Please note that the results for water analyses are indicative only as analysis outside of the APHA storage times.
Inorg-018	Total Dissolved Solids - determined gravimetrically. The solids are dried at 180±10°C.
Metals-021 CV-AAS	Determination of Mercury by Cold Vapour AAS.
Metals-022 ICP-MS	Determination of various metals by ICP-MS.

QUALITY CONTROL: HM in water - total					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date prepared	-			14/09/2022	[NT]	[NT]	[NT]	[NT]	14/09/2022	[NT]
Date analysed	-			14/09/2022	[NT]	[NT]	[NT]	[NT]	14/09/2022	[NT]
Arsenic-Total	µg/L	1	Metals-022 ICP-MS	<1	[NT]	[NT]	[NT]	[NT]	105	[NT]
Cadmium-Total	µg/L	0.1	Metals-022 ICP-MS	<0.1	[NT]	[NT]	[NT]	[NT]	108	[NT]
Chromium-Total	µg/L	1	Metals-022 ICP-MS	<1	[NT]	[NT]	[NT]	[NT]	106	[NT]
Copper-Total	µg/L	1	Metals-022 ICP-MS	<1	[NT]	[NT]	[NT]	[NT]	108	[NT]
Lead-Total	µg/L	1	Metals-022 ICP-MS	<1	[NT]	[NT]	[NT]	[NT]	100	[NT]
Nickel-Total	µg/L	1	Metals-022 ICP-MS	<1	[NT]	[NT]	[NT]	[NT]	106	[NT]
Zinc-Total	µg/L	1	Metals-022 ICP-MS	<1	[NT]	[NT]	[NT]	[NT]	107	[NT]
Mercury-Total	µg/L	0.05	Metals-021 CV-AAS	<0.05	[NT]	[NT]	[NT]	[NT]	105	[NT]

QUALITY CONTROL: Miscellaneous Inorganics						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date prepared	-			13/09/2022	[NT]	[NT]	[NT]	[NT]	13/09/2022	[NT]
Date analysed	-			13/09/2022	[NT]	[NT]	[NT]	[NT]	13/09/2022	[NT]
pH	pH Units		Inorg-001	[NT]	[NT]	[NT]	[NT]	[NT]	100	[NT]
Total Dissolved Solids (grav)	mg/L	5	Inorg-018	<5	[NT]	[NT]	[NT]	[NT]	81	[NT]

Result Definitions

NT	Not tested
NA	Test not required
INS	Insufficient sample for this test
PQL	Practical Quantitation Limit
<	Less than
>	Greater than
RPD	Relative Percent Difference
LCS	Laboratory Control Sample
NS	Not specified
NEPM	National Environmental Protection Measure
NR	Not Reported

Quality Control Definitions

Blank	This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.
Duplicate	This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.
Matrix Spike	A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.
LCS (Laboratory Control Sample)	This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.
Surrogate Spike	Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

Australian Drinking Water Guidelines recommend that Thermotolerant Coliform, Faecal Enterococci, & E.Coli levels are less than 1cfu/100mL. The recommended maximums are taken from "Australian Drinking Water Guidelines", published by NHMRC & ARMC 2011.

The recommended maximums for analytes in urine are taken from “2018 TLVs and BEIs”, as published by ACGIH (where available). Limit provided for Nickel is a precautionary guideline as per Position Paper prepared by AIOH Exposure Standards Committee, 2016.

Guideline limits for Rinse Water Quality reported as per analytical requirements and specifications of AS 4187, Amdt 2 2019, Table 7.2

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.

Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.

Spikes for Physical and Aggregate Tests are not applicable.

For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: >10xPQL - RPD acceptance criteria will vary depending on the analytes and the analytical techniques but is typically in the range 20%-50% – see ELN-P05 QA/QC tables for details; <10xPQL - RPD are higher as the results approach PQL and the estimated measurement uncertainty will statistically increase.

Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals (not SPOCAS); 60-140% for organics/SPOCAS (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was insufficient in order to satisfy laboratory QA/QC protocols.

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

Where sampling dates are not provided, Envirolab are not in a position to comment on the validity of the analysis where recommended technical holding times may have been breached.

Where matrix spike recoveries fall below the lower limit of the acceptance criteria (e.g. for non-labile or standard Organics <60%), positive result(s) in the parent sample will subsequently have a higher than typical estimated uncertainty (MU estimates supplied on request) and in these circumstances the sample result is likely biased significantly low.

Measurement Uncertainty estimates are available for most tests upon request.

Analysis of aqueous samples typically involves the extraction/digestion and/or analysis of the liquid phase only (i.e. NOT any settled sediment phase but inclusive of suspended particles if present), unless stipulated on the Envirolab COC and/or by correspondence. Notable exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, total recoverable metals and PFAS where solids are included by default.

Samples for Microbiological analysis (not Amoeba forms) received outside of the 2-8°C temperature range do not meet the ideal cooling conditions as stated in AS2031-2012.

Report Comments

Sampling dates have not been provided.

METALS: The PQL has been raised for Cadmium, Chromium, Lead, Nickel and Zinc due to the sample matrix requiring dilution.

Attachment 4

EPBC Act Protected Matters Report

EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected. Please see the caveat for interpretation of information provided here.

Report created: 13-Nov-2022

Summary

Matters of National Environment Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the Administrative Guidelines on Significance.

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance (Ramsar	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	1
Listed Threatened Species:	18
Listed Migratory Species:	14

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at https://www.dcceew.gov.au/parks-heritage/heritage

A permit may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Lands:	None
Commonwealth Heritage Places:	None
Listed Marine Species:	23
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None
Habitat Critical to the Survival of Marine Turtles:	None

Extra Information

This part of the report provides information that may also be relevant to the area you have

State and Territory Reserves:	None
Regional Forest Agreements:	None
Nationally Important Wetlands:	None
EPBC Act Referrals:	4
Key Ecological Features (Marine):	None
Biologically Important Areas:	None
Bioregional Assessments:	None
Geological and Bioregional Assessments:	None

Details

Matters of National Environmental Significance

Listed Threatened Ecological Communities [Resource Information]

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.
Status of Vulnerable, Disallowed and Ineligible are not MNES under the EPBC Act.

Community Name	Threatened Category	Presence Text
Subtropical and Temperate Coastal Saltmarsh	Vulnerable	Community likely to occur within area

Listed Threatened Species [Resource Information]

Status of Conservation Dependent and Extinct are not MNES under the EPBC Act.
Number is the current name ID.

Scientific Name	Threatened Category	Presence Text
BIRD		
Calidris canutus		
Red Knot, Knot [855]	Endangered	Species or species habitat may occur within area
Calidris ferruginea		
Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Charadrius leschenaultii		
Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat likely to occur within area
Falco hypoleucos		
Grey Falcon [929]	Vulnerable	Species or species habitat likely to occur within area
Grantiella picta		
Painted Honeyeater [470]	Vulnerable	Species or species habitat may occur within area
Limosa lapponica baueri		
Nunivak Bar-tailed Godwit, Western Alaskan Bar-tailed Godwit [86380]	Vulnerable	Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Neophema chrysogaster Orange-bellied Parrot [747]	Critically Endangered	Species or species habitat may occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Pedionomus torquatus Plains-wanderer [906]	Critically Endangered	Species or species habitat may occur within area
Pezoporus occidentalis Night Parrot [59350]	Endangered	Species or species habitat may occur within area
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area
Sternula nereis nereis Australian Fairy Tern [82950]	Vulnerable	Species or species habitat may occur within area
Thinornis cucullatus cucullatus Eastern Hooded Plover, Eastern Hooded Plover [90381]	Vulnerable	Species or species habitat may occur within area
PLANT		
Caladenia brumalis Winter Spider-orchid [54993]	Vulnerable	Species or species habitat may occur within area
Caladenia tensa Greencomb Spider-orchid, Rigid Spider-orchid [24390]	Endangered	Species or species habitat likely to occur within area
Dodonaea subglandulifera Peep Hill Hop-bush [11956]	Endangered	Species or species habitat may occur within area
Pterostylis xerophila Desert Greenhood [7997]	Vulnerable	Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Senecio macrocarpus		
Large-fruit Fireweed, Large-fruit Groundsel [16333]	Vulnerable	Species or species habitat may occur within area

Listed Migratory Species [Resource Information]

Scientific Name	Threatened Category	Presence Text
Migratory Marine Birds		
Apus pacificus		
Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Migratory Terrestrial Species		
Motacilla cinerea		
Grey Wagtail [642]		Species or species habitat may occur within area
Motacilla flava		
Yellow Wagtail [644]		Species or species habitat may occur within area
Myiagra cyanoleuca		
Satin Flycatcher [612]		Species or species habitat may occur within area
Migratory Wetlands Species		
Actitis hypoleucos		
Common Sandpiper [59309]		Species or species habitat may occur within area
Calidris acuminata		
Sharp-tailed Sandpiper [874]		Species or species habitat known to occur within area
Calidris canutus		
Red Knot, Knot [855]	Endangered	Species or species habitat may occur within area
Calidris ferruginea		
Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Calidris melanotos		
Pectoral Sandpiper [858]		Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Charadrius leschenaultii		
Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat likely to occur within area
Gallinago hardwickii		
Latham's Snipe, Japanese Snipe [863]		Species or species habitat may occur within area
Limosa lapponica		
Bar-tailed Godwit [844]		Species or species habitat may occur within area
Numenius madagascariensis		
Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Tringa nebularia		
Common Greenshank, Greenshank [832]		Species or species habitat likely to occur within area

Other Matters Protected by the EPBC Act

Listed Marine Species [Resource Information]

Scientific Name	Threatened Category	Presence Text
Bird		
Actitis hypoleucos		
Common Sandpiper [59309]		Species or species habitat may occur within area
Apus pacificus		
Fork-tailed Swift [678]		Species or species habitat likely to occur within area overfly marine area
Bubulcus ibis as Ardea ibis		
Cattle Egret [66521]		Species or species habitat may occur within area overfly marine area
Calidris acuminata		
Sharp-tailed Sandpiper [874]		Species or species habitat known to occur within area

Scientific Name	Threatened Category	Presence Text
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat may occur within area overfly marine area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area overfly marine area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area overfly marine area
Chalcites osculans as Chrysococcyx osculans Black-eared Cuckoo [83425]		Species or species habitat likely to occur within area overfly marine area
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat likely to occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat may occur within area overfly marine area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat may occur within area
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat may occur within area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area overfly marine area
Motacilla cinerea Grey Wagtail [642]		Species or species habitat may occur within area overfly marine area

Scientific Name	Threatened Category	Presence Text
Motacilla flava		
Yellow Wagtail [644]		Species or species habitat may occur within area overfly marine area
Myiagra cyanoleuca		
Satin Flycatcher [612]		Species or species habitat may occur within area overfly marine area
Neophema chrysogaster		
Orange-bellied Parrot [747]	Critically Endangered	Species or species habitat may occur within area overfly marine area
Neophema chrysostoma		
Blue-winged Parrot [726]		Species or species habitat likely to occur within area overfly marine area
Numenius madagascariensis		
Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Rostratula australis as Rostratula benghalensis (sensu lato)		
Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area overfly marine area
Thinornis cucullatus as Thinornis rubricollis		
Hooded Plover, Hooded Dotterel [87735]		Species or species habitat may occur within area overfly marine area
Thinornis cucullatus cucullatus as Thinornis rubricollis rubricollis		
Eastern Hooded Plover, Eastern Hooded Plover [90381]	Vulnerable	Species or species habitat may occur within area overfly marine area
Tringa nebularia		
Common Greenshank, Greenshank [832]		Species or species habitat likely to occur within area overfly marine area

Extra Information

EPBC Act Referrals			[Resource Information]
Title of referral	Reference	Referral Outcome	Assessment Status
Not controlled action			
Improving rabbit biocontrol: releasing another strain of RHDV, sthrn two thirds of Australia	2015/7522	Not Controlled Action	Completed
INDIGO Central Submarine Telecommunications Cable	2017/8127	Not Controlled Action	Completed
Walk the Yorke Leisure Trail Project, Yorke Peninsula, SA	2013/7059	Not Controlled Action	Completed
Not controlled action (particular manner)			
INDIGO Marine Cable Route Survey (INDIGO)	2017/7996	Not Controlled Action (Particular Manner)	Post-Approval

Caveat

1 PURPOSE

This report is designed to assist in identifying the location of matters of national environmental significance (MNES) and other matters protected by the Environment Protection and Biodiversity Conservation Act 1999 (Cth) (EPBC Act) which may be relevant in determining obligations and requirements under the EPBC Act.

The report contains the mapped locations of:

- World and National Heritage properties;
- Wetlands of International and National Importance;
- Commonwealth and State/Territory reserves;
- distribution of listed threatened, migratory and marine species;
- listed threatened ecological communities; and
- other information that may be useful as an indicator of potential habitat value.

2 DISCLAIMER

This report is not intended to be exhaustive and should only be relied upon as a general guide as mapped data is not available for all species or ecological communities listed under the EPBC Act (see below). Persons seeking to use the information contained in this report to inform the referral of a proposed action under the EPBC Act should consider the limitations noted below and whether additional information is required to determine the existence and location of MNES and other protected matters.

Where data are available to inform the mapping of protected species, the presence type (e.g. known, likely or may occur) that can be determined from the data is indicated in general terms. It is the responsibility of any person using or relying on the information in this report to ensure that it is suitable for the circumstances of any proposed use. The Commonwealth cannot accept responsibility for the consequences of any use of the report or any part thereof. To the maximum extent allowed under governing law, the Commonwealth will not be liable for any loss or damage that may be occasioned directly or indirectly through the use of, or reliance

3 DATA SOURCES

Threatened ecological communities

For threatened ecological communities where the distribution is well known, maps are generated based on information contained in recovery plans, State vegetation maps and remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Threatened, migratory and marine species

Threatened, migratory and marine species distributions have been discerned through a variety of methods. Where distributions are well known and if time permits, distributions are inferred from either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc.) together with point locations and described habitat; or modelled (MAXENT or BIOCLIM habitat modelling) using

Where little information is available for a species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc.).

In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More detailed distribution mapping methods are used to update these distributions

4 LIMITATIONS

The following species and ecological communities have not been mapped and do not appear in this report:

- threatened species listed as extinct or considered vagrants;
- some recently listed species and ecological communities;
- some listed migratory and listed marine species, which are not listed as threatened species; and
- migratory species that are very widespread, vagrant, or only occur in Australia in small numbers.

The following groups have been mapped, but may not cover the complete distribution of the species:

- listed migratory and/or listed marine seabirds, which are not listed as threatened, have only been mapped for recorded
- seals which have only been mapped for breeding sites near the Australian continent

The breeding sites may be important for the protection of the Commonwealth Marine environment.

Refer to the metadata for the feature group (using the Resource Information link) for the currency of the information.

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

-Office of Environment and Heritage, New South Wales
-Department of Environment and Primary Industries, Victoria
-Department of Primary Industries, Parks, Water and Environment, Tasmania
-Department of Environment, Water and Natural Resources, South Australia
-Department of Land and Resource Management, Northern Territory
-Department of Environmental and Heritage Protection, Queensland
-Department of Parks and Wildlife, Western Australia
-Environment and Planning Directorate, ACT
-Birdlife Australia
-Australian Bird and Bat Banding Scheme
-Australian National Wildlife Collection
-Natural history museums of Australia
-Museum Victoria
-Australian Museum
-South Australian Museum
-Queensland Museum
-Online Zoological Collections of Australian Museums
-Queensland Herbarium
-National Herbarium of NSW
-Royal Botanic Gardens and National Herbarium of Victoria
-Tasmanian Herbarium
-State Herbarium of South Australia
-Northern Territory Herbarium
-Western Australian Herbarium
-Australian National Herbarium, Canberra
-University of New England
-Ocean Biogeographic Information System
-Australian Government, Department of Defence
Forestry Corporation, NSW
-Geoscience Australia
-CSIRO
-Australian Tropical Herbarium, Cairns
-eBird Australia
-Australian Government – Australian Antarctic Data Centre
-Museum and Art Gallery of the Northern Territory
-Australian Government National Environmental Science Program
-Australian Institute of Marine Science
-Reef Life Survey Australia
-American Museum of Natural History
-Queen Victoria Museum and Art Gallery, Inveresk, Tasmania
-Tasmanian Museum and Art Gallery, Hobart, Tasmania
-Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the Contact us page.

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Attachment 5

Greencap preliminary site investigation (November 2020)

12 Greenhill Road
Wayville SA 5034
Australia

PRELIMINARY SITE INVESTIGATION

November 2020
J169128

AustralAsian Granite

72 Wallaroo Plain Road, Wallaroo

Document Control

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Project Number:	J169128	
Client Name:	**AustralAsian Granite**	
Signatures:	Prepared By:  **Varun Bhagwat** Consultant - Environment  **Alex Sereda** Principal Hydrogeologist	Authorised By:  **Dylan Burford** Practice Manager - Environmental & Contaminated Land Management

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Preliminary Site Investigation

AustralAsian Granite

72 Wallaroo Plain Road, Wallaroo

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1 INTRODUCTION

Greencap Pty Ltd (Greencap) was commissioned by AustralAsian Granite (AA Granite) to undertake a Preliminary Site Investigation (PSI) for the site located at 72 Wallaroo Plain Road, Wallaroo, South Australia ('the site' as shown in Figure 1). The site is described as Extractive Mining Lease (EML) 5973 and associated Miscellaneous Purposes Lease (MPL) 109.

Greencap understands that AA Granite holds the EML and MPL for a Harlequin Dimension Stone Quarry located on the corner of Wallaroo Plain Road and Chatties Lane, north east of the Wallaroo township. The site has been subject to various historical activities, including the placement of slag, a waste product from copper mining in the region in the early 1900s and the importation of a large volume of spoil material sourced from the Wallaroo Marina during dredging in the 1990s.

AA Granite has received correspondence from the SA EPA Mining and Radiation Branch recommending that as part of mine closure planning associated with the development of a Program for Environment Protection and Rehabilitation (PEPR), a PSI is undertaken in accordance with National Environment Protection (Assessment of Site Contamination) Measure 2013 (NEPM) to identify if imported materials have caused site contamination at the site.

The approximate site location is presented in Figure 1.

Source: www.google.com.au/maps

Figure 1: Site Location

The scope of work comprised:

- A site history, including the identification of potential contaminants of concern associated with current and past uses of the site.
- A limited soil/waste material investigation to provide an indicative assessment of the contamination status of the two known waste materials (specifically in relation to slag and marina spoil).
- Predictive modelling to assess potential risk to the environment associated with the presence of foundry waste.
- Preparation of this report and documentation of findings.

This PSI has been prepared with reference to industry standards and guidelines including: -

- The National Environment Protection (Assessment of Site Contamination) Measure 1999 (as amended 2013) (NEPM).
- SA EPA publication 'Guidelines for the assessment and remediation of site contamination', July 2018 (as updated October 2019).
- Australian Standard "Guide to the investigation and sampling of potentially contaminated soil": AS4482.1-2005.

2 SITE DETAILS

2.1 Site Identification

The site details are presented in Table 1 and the site boundary is presented as Figure 2. The current Certificate of Title and the property parcel reports are included in Appendix A.

Table 1: Site Details

Category	Details
Common Name	Lot 20
Legal Name	Allotment 20 on Deposited Plan 123080, in the area named Wallaroo, Hundred of Wallaroo
Address	72 Wallaroo Plain Road, Wallaroo
Certificate of Title	CT6233/860
Owner	Shane Christopher Dunstan and Karren Joye Dunstan
Municipality	Copper Coast Council
Zoning	Commercial
Extractive Minerals Lease	5793
Miscellaneous Purposes Licence	109

Figure 2: Site Boundary

2.2 Site Description and Current Land Use of the Site

A site inspection was conducted by an experienced Greencap consultant on 20 August 2020. Site details, including the land use and that of neighbouring properties are presented in Table 2. Photographs taken during the site inspection which show the site conditions at that time are included in Section 6.

Table 2: Site Description

Item	Detail
Current use of the site	The site is currently used for general equipment storage and occasional fill material exportation. An open-cut pit is present on the site (see Photograph 1) with the current EML and MPL, both active however no extraction of limestone or dimensional stone is currently being undertaken. The majority of the western and southern portion of the site is unoccupied without any activities being undertaken. The site is currently owned by a landscaper who is assisting in the early site rehabilitation works and has conducted some preliminary earthmoving activities across the site. A small area in the north western portion of the site is used as equipment and material laydown and a large shed is located in the north western portion of the site (see Photograph 2). The shed is used as a workshop and for storage purposes of landscaping related equipment and materials.
Proposed use of the site	Either commercial/industrial, agricultural purposes or the site will return to an area comprising native vegetation.
Site Occupier	Currently unoccupied.
Site area (approximate)	74 hectares.
Site Description	An irregular polygonal shape with a slight slope from east to west.
Neighbouring land uses	North – quarry (EML 6155) over Chatties Lane East – Stockpiled material beyond which lies agricultural land South – samphire low shrubland and salt pans West – Vacant land beyond which lies samphire low shrubland and salt pans

2.3 Proposed Site Use and Users

As presented in Section 2.1, the site is located within an agricultural area in Wallaroo. The site is currently an open-cut quarry but it not operational. Granite blocks are situated across the MPL (see Photograph 3). The future site use is likely to continue in a commercial / industrial setting (i.e. as current with workshop), agricultural purposes or future extraction dependent on the market demand for dimensional stone.

3 PREVIOUS INVESTIGATIONS

3.1 MUD Environmental – Soil Classification

In May 2020, Mud Environmental was engaged by Monopoly Property Group (MPG) to undertake an in-situ soil assessment of approximately 32,000m^3 of soils that were stockpiled on the site. It is understood that MPG were looking to utilise up to 10,000m^3 of suitable soils for use as fill material at the Wallaroo Shores redevelopment. It is understood that the soils stockpiled on the site were generated from the original construction of the Wallaroo Marina in the late 1990s.

Representative samples of stockpiled soils were collected for chemical testing in order to classify up to 10,000m^3 of the material for potential removal and re-use by MPG at the Wallaroo Shores redevelopment in accordance with EPA requirements.

The findings of the stockpiled soil investigation were that the majority of soil materials encountered across the investigation area were clayey and sandy materials with trace inclusions of slag observed in some areas. On the basis of reported chemical results, statistical assessment and physical characteristics, the majority of the material tested was classified as Waste Fill and considered suitable for re-use. However, three fill material layers did not meet the physical criteria for Waste Fill due to the possible aesthetic concerns as a result of the presence of slag and the presence of inert mineralogical physical non-conformances, and therefore were not considered suitable for consideration as potential re-use materials.

A copy of the soil classification report is presented in Appendix H.

3.2 EPA Audit Reports – Charles Terrace, Wallaroo

A Site Contamination Audit Report (SCAR) has been prepared for the property identified as the former IFL Site on Charles Terrace, Wallaroo (‘the Audit Site’) in January 2014. This Audit Site is located approximately three kilometres south west of the site under investigation. The Audit Site represents part of a larger property which was historically used as a smelting facility and fertilizer production / storage facility. The audit was commissioned by Incitec Pivot Limited (IPL) to assess the suitability of the Audit Site for high density residential and commercial / industrial land uses.

Based on the audit findings, significant soil contamination issues were predominantly limited to elevated metals concentrations in slag / fill / soil material across the majority of the Audit Site. Significant groundwater contamination issues were limited to elevated metals and nutrients concentrations.

The slag / fill /soil material across the majority of the Audit Site posed a significant phytotoxic risk and a significant risk to human health under a residential with minimal access to soil (high density developments) and commercial / industrial exposures settings. Due to the widespread presence of metals and contaminated stabilised slag / fill /soil, significant remediation was reported to be required for the Audit Site to be considered suitable for more sensitive uses.

Based on the audit recommendations, for high density residential use, a clean fill layer, followed by a slab, clean fill and 0.1m of concrete was required to be placed between the stabilised soils and the final site surface. For commercial / industrial use, a layer of clean fill followed by an impermeable robust pavement was required to be placed over the stabilised slag.

Based on the site investigations and assessments the flow of groundwater occurs to the west towards the Wallaroo Bay. Risk assessment, groundwater sampling adjacent to the receiving environment and fate and transport modelling has demonstrated that groundwater contamination across the Audit Site does not pose significant risks to the marine environment or off-site primary contact recreation. The Audit report recommended that groundwater must not be extracted for any purpose other than monitoring or groundwater contamination management. It is noted that current guidance material and screening criteria differ to that applied during the audit in 2014.

The audit reports are presented in Appendix I.

4 SITE HISTORY

The history of the site has been researched to identify its characteristics, the geological setting along with current and past activities and uses of the site. A property report for the site and surrounding area from a historic land use database was provided by Lot Search Pty Ltd. This report, which is included in Appendix B, provides the supporting information for much of the discussion in this section and should be referred to where relevant.

4.1 Plans, Historical Maps and Aerial Photographs

The approximate location of the site is indicated in an extract of the 1912 Cadastral map of the Wallaroo region for the Surveyor Generals office presented as Figure 3. The figure indicates the site was part of Hundred 292, which is also indicated on the historic titles, discussed in Section 4.2.

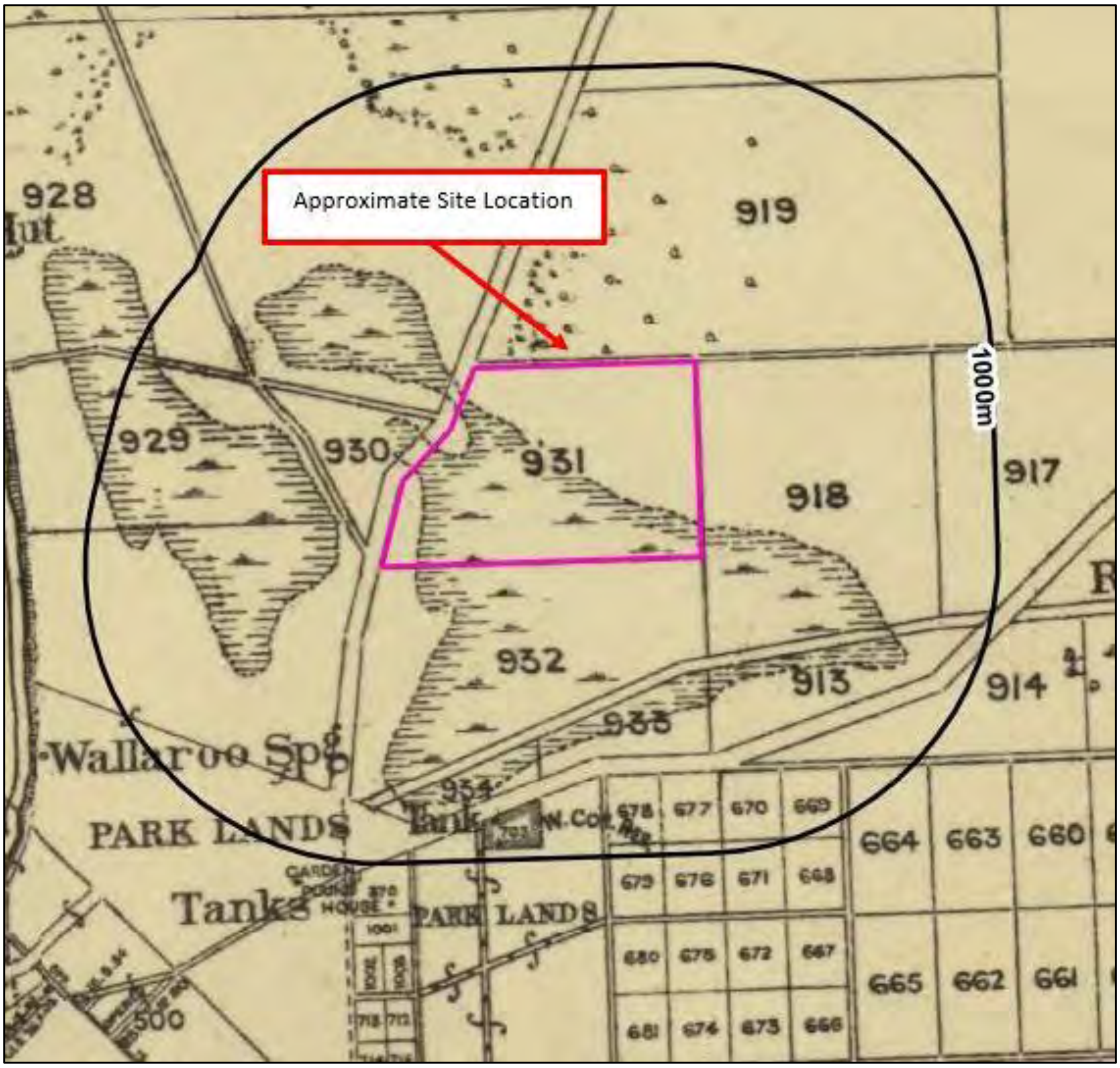


Figure 3: Extract from Hundreds Map of Wallaroo (1912)

Aerial photographs of the site dating from 1956 in approximate 10-year intervals have been reviewed by Greencap. An aerial photograph from the 1960s was not available for use in this report. Aerial photographs can be found in the Lotsearch Report presented in Appendix B. A summary of the observations made from these photographs is provided in Table 3.

Table 3: Summary of Aerial Photograph Observations

Year	Observations
1956	The site appears to be agricultural land across the extent of the EML. The MPL extends into the samphire shrubland and salt pans to the south. No infrastructure is evident on the site. Surrounding areas to the north, west and south of the site appear similar to the subject site. Present day Wallaroo Plain Road, Chatties Lane, Jones Road and North Beach Road are visible.
1975	There appears to have been some vegetation clearance in the northern half of the current EML footprint. Agricultural land use, consistent with previous observations is apparent across the balance of the EML and MPL. A small patch of disturbance is noted in the south west portion of the EML footprint however it is unclear if this is patchy vegetation or uncleared land as it extends to the flooplain. Two patches are evident within the cropped area and are likely scattered trees. Two rectangular structures are evident over the western boundary of the EML/MPL that are likely to be sheds and/or a former farming residence. No significant changes are visible for the surrounding areas.
1979	The site layout within the EML is somewhat consistent with the previous image. Commencement of quarry activities appears evident in the northern half of the EML footprint whilst agricultural activity across the balance of the site appears to have either reduced or ceased with vacant land visible. The disturbed patch in the south western portion of the EML footprint remains. An access track is evident extended through to one of the patches previously identified as a scattered tree. No significant changes are visible for the surrounding areas.
1987	There are no significant changes to the subject site identified since the 1979 image. Additional construction activity has occurred to the west with a third structure, likely a shed now visible. Other than some vegetation clearance to the north in the footprint of EML 6155, no other significant changes are visible for the surrounding areas.
1999	Significant changes have occurred within the EML and MPL footprints since the 1987 aerial image. The existing shed on the western boundary of the EML has been constructed. Three large stockpiles of what is understood to be slag waste are present, two within the EML footprint and the third in the MPL footprint to the east of the MPL. What appears to be a laydown areas has been established in the eastern portion of the MPL, south of one of the slag stockpiles. Minimal vegetation is evident in patches throughout the site. Other than early limestone extraction works to the north over Chatties Lane, no other significant changes are visible for the surrounding areas.
2003	Further significant change has occurred to the site since the 1999 aerial image. The extents of the slag stockpiles have reduced. The westernmost pile is less than 25% in lateral extend compared to the previous image. Excavation of the open cut quarry has commenced. The middle of the two slag stockpiles has also reduced in size, no significant change is evident to the easternmost stockpile. The slag material is evident across the majority of the western portion of the EML albeit not stockpiled as elsewhere on the site. Imported material, understood to be spoil generated during the dredging of the Wallaroo marina has been placed and levelled across approximately 2,000m^2 of the site, generally bound by the EML , westernmost slag stockpile and Chattlies Land to the north, site boundaries to the east and west, and the samphire shrubland to the south. Scattered debris, likely to be quarry overburden is visible across the EML. An open vegetated patch remains within the southern strip of the marina spoil.

Year	Observations
	Stockpiled material, similar in appearance to the levelled imported material continues over the western boundary of the site over an area of approximately 1,000-1,500m^2. No other significant changes are visible for the surrounding areas.
2010	The 2010 aerial image shows quarry activity has significantly progressed. The open cut pit has more than doubled in size and dimensional stone blocks ae situated across much of the EML and MPL. The westernmost slag stockpile has been removed to allow for extension of the open-cut pit, whilst on the southern portion of the central slag stockpiles remains. Quarry overburden extend to the south of the central slag stockpile and into the patch of vegetation within the southern strip of the marina spoil material. The EML footprint over Chatties Lane has doubled in size with evidence of open-cut pits now visible.
2018	The 2018 aerial image is consistent with the 2010 image. The extents of the slag material appear to have reduced, however, this may be influenced by differing contrast to the previous image. No significant changes are visible for the surrounding areas.

4.2 Previous Owners and occupiers of the site

A historical ownership search was conducted on the current Certificate of Title to assess the potential for site contamination to exist as a result of present or historical land uses. The sequence of ownership is summarised in Table 4 and copies of the historical Certificates of Title are presented in Appendix C.

Table 4: Historical Title Ownership

Certificate of Title (years covered)	Owners listed on Certificates of Title / Notes
CT6233-860 (01/2020-Current)	Shane Christopher Dunstan and Karren Joye Dunstan
CT5156-784 and CT5398-528 (2020)	*Two parcels of land amalgamated in January 2020 to create single Certificate of Title.* *CT5398/528 relates to former Allotment 1, located on the corner of Walleroo-Tickera Rd and Chatties Lane. This portion of the site is outside of the EML/MPL footprint. Historic ownership of this title is included below as it has been linked to the use of the subject site.*
Subject Site (EML/MPL)	
CT5156-784 (cancelled) (1993-2020)	Karren Joye Dunstan, Shane Christopher Dunstan (2019-2020) Australasian Granite Pty Ltd (2004-2019) Warrwick Holse Hill, Dacia Pringle Hill (1993-2004) - *Leased to Fernba Pty Ltd (1997-2002)*
CT4357-962 (1990-1997)	Peter John Charles Kelly, *contractor* (1990-1997
Adjacent Site (west of EML/MPL)	
CT5398-528 (cancelled) (1997-2020)	Karren Joye Dunstan, Shane Christopher Dunstan (2019-2020) Australasian Granite Pty Ltd (2015-2019) Seppo Sakari Karvonen (2006-2015) Australasian Granite Pty Ltd (2006-2006) Anthony Schmitzky (1999-2006) Peter John Charles Kelly, *contractor* (1997-1999)
CT4357-961 (1990-1997)	Peter John Charles Kelly, *contractor* (1990-1997)

Certificate of Title (years covered)	Owners listed on Certificates of Title / Notes
CT4193-451	*Allotments 1 and 2 were created following subdivision of CT4193-451. The layout of this CT is consistent with the current day layout following amalgamation of CT5156-784 and CT5398-528.*
CT4193-451 (1982-1997)	Peter John Charles Kelly, *contractor* (1988-1997) Bruce Raymond Olsen and Wendy Ann Olsen, *farmers* (1982-1988) Barry Hartley Snodgrass, *farmer* and Frances Dianne Snodgrass, *wife* (1982-1982)
CT979-176 (1926-1982)	Barry Hartley Snodgrass, *farmer* and Frances Dianne Snodgrass, *wife* (1979-1982) Noel Christopher Heapes, *contractor* (1974-1979) Wilfred Ronald Farrand, *farmer* (1974) Raymond Kenneth Oster and Ronald Lee Farrand, *farmers* (1971-1974) Margaretta Jane Jones, *married woman* (1956-1971) Thomas Alexander Murdoch, *farmer,* Ruby Laurel Murdoch, *married woman,* Kenneth Gordon Murdoch and Victor Ronald Murdock, *farmers* (1953-1956) Robertson Christie, *farmer* (1950-1953) Edith Grace Wall, *widow* (1944-1950) Harrold Broughton Wall, *butcher* (1913-1944) George Chatfield, *butcher* (1913)

Business Directory Searches

Searches of the Universal Business Directory and the Sands and McDougall South Australian Street, Trade, Professional and Municipal Directory conducted at approximate regular intervals between 1910 and 1991 did not identify any listings of interest onsite.

4.3 Previous activities/uses

The site has been subject to various historical activities, including the placement of slag during a period between the late 1980s to mid/late 1990s and the importation of a large volume of stockpiled material sourced from the Wallaroo Marina during dredging in the late 1990s to early 2000s.

Based on the aerial photographs and historical ownership records, the site appears to have been used for farming and/or grazing purposes until the late 1990s where a portion of the site appears to be used for quarrying purposes.

4.4 Services to the property

A search on http://maps.sa.gov.au/drainageplans/ did not identify any drainage plans for the site.

4.5 Previous and present buildings and structures

The following buildings and structures were identified during the site inspection:

- A large shed (main shed, see Photograph 2) – located in the north western portion of the site is used as a workshop and for storage purposes of landscaping related equipment and materials. The shed contains a concrete-lined maintenance pit.
- Five shipping containers – located directly south of the large shed. Contains various machinery and quarrying equipment.
- Two small demountables – located directly west of the of the large shed. The demountables were not is use at the time of inspection but have previously been used as a mess and an ablutions block.

- A concrete bund – approximately 5m in length, 3m in width and 0.5m in depth (see Photograph 11). Located approximately 50m south east of the large shed. Currently used to store scrap metal, metal pipes and wooden beams.
- A small shed – located approximately 50m east of the concrete bund. The shed contains fencing wire.
- An explosives building – located in the north central portion of the site is approximately 2m in height, width and length. A metallic structure with explosives labelled on the door (see Photograph 10). Based on anecdotal evidence, it contains explosives previously used for mining purposes.

A search of the Commonwealth Heritage List, National Heritage List, State Heritage Areas and SA Heritage Places did not return any listings for the site (refer Appendix B).

4.6 Industrial processes carried out on site and the products manufactured

No evidence was found of industrial processes or manufacturing of products being undertaken at the site.

4.7 Chemical storage and transfer areas

SafeWork SA (under the Department for Premier and Cabinet) was contacted regarding its knowledge of dangerous substances storage at the site. Safework SA advised that they do not hold any current or historical records for the site. A copy of the Safework SA response is included as Appendix D.

4.8 Raw Materials Used

Evidence of raw materials were noted on site with gravels and crushed rock being used on some of the tracks and observed across the site. Although the source of the gravel was not determined, given the material was most likely sourced directly from a commercial quarry there is a low probability of the gravel being source of any significant contamination.

4.9 Products spills, losses, incidents and accidents (including fire)

Government searches - Section 7

The South Australia Environment Protection Authority (EPA) has a statutory obligation under the *Land and Business (Sale and Conveyancing) Act, 1994* to provide information relating to environment protection. As such, a search was conducted of the EPA database for information relating to the subject land in accordance with Section 7 of the *Land and Business (Sale and Conveyancing) Act, 1994*. The EPA advised in written form of records of issues associated with:

- particulars of mortgages, charges, prescribed encumbrances affecting the land; or
- particulars relating to environmental protection including: -
  - environmental assessments;
  - waste depots;
  - production of certain waste; and
  - waste on land.

The search found that the EPA holds no records of the above particulars / activities being undertaken at the site. A copy of the EPA's written response is presented in Appendix E.

Government searches - EPA Site Contamination Index

A search was conducted of the EPA's on-line Site Contamination Index for information relating to notifications and reports received by the EPA since 1 July 2009 under *the Act*.

No contamination sites were found in the vicinity of the main site.

4.10 Discharges to land and water

Other than the presence of the slag material, no areas of staining were observed across the site.

Based on anecdotal evidence, the site was used for mining purposes and it is possible that certain chemicals were used in the mining process. However, no evidence of any spillage and / or staining was observed across the site during the time of inspection.

4.11 Wastes produced

Greencap was informed by current site owner that scrap metal is removed from site for recycling. It has previously been and currently found on site, found from illegal dumping and from old building material and fencing.

4.12 Power generation

None identified. The main shed has mains power connections.

4.13 Waste disposal, imported fill and earthmoving activities carried out on the site

The site has been subject to various historical activities including the placement of copper smelter waste (in the form of slag) in the late 1980s to 1990s and the importation of marina spoil in the late 1990s to early 2000s. Evidence of marina spoil and slag was observed across the site (see Photographs 4 to 7).

Some civil works were likely to have been carried out historically when the land was developed for farming and /or grazing and mining purposes. No evidence of buried waste was identified during the site history review or intrusive investigations. Fill was observed on the surface across the site generally consisting of sands and gravels and crushed rock.

4.14 Interview information

During the site inspection an informal interview was conducted with the current site owner, Shane Dunstan. The following information was obtained from the interview.

- The site has been used as a granite quarry, commencing approximately twenty years ago. There has been no quarrying activity for approximately the past ten years.
- The site owner purchased the site primarily for the land and the main shed which is utilised as a workshop and for storage. It includes a maintenance pit.
- The site owner has been assisting the AA Granite in the post mine rehabilitation process and has access to the limestone and waste rock at the site.
- Two of the smaller sheds used to be located inside the main shed. One was previously used as a toilet block and the other for dining purposes.
- The shipping containers located to the south of the largest shed contains material AA Granite previously used such as containers and air hoses.
- The pile of scrap metal located south east of the large shed is a combination of old fencing, material that has been illegally dumped on the site and material that has been segregated from quarry overburden (see Photograph 12). The site owner has an agreement with a contractor who takes the scrap metal off site for recycling.
- The small shed next to the pile of scrap metal contains fencing wire.

4.15 Sources of information

- Copper Coast Council – Information on zoning.
- Lot search – Historical Land Use Database (Historical business records, environmental setting) and provision of aerial photographs.

- Department of Agriculture, Fisheries and Forestry and CSIRO – Provision of acid sulphate soil information.
- Department for Environment, Water & Natural Resources, South Australia – Groundwater information.
- Department for Planning, Transport and Infrastructure, Lands Titles Office, South Australia – Provision of Certificate of Title information.
- Former Department of Mines and Energy – Provision of Groundwater and Geology information.
- Department for the Premier and Cabinet, SafeWork SA – Provision of dangerous substance licence information.
- Nearmap.com and Google Maps– provision of recent site aerial photographs and maps.
- South Australian Environment Protection Authority – Information on any known environmental issues on the site.
- South Australian Resources Information Gateway – Provision of geology and hydrogeology at the site.
- State Library of South Australia – Information on past occupancy (Sands and McDougall Information) and historic plans.
- Shane Dunstan – Current site owner.

5 REGIONAL SETTING

The site is located a rural area, with nearby land uses including agricultural and residential activities as detailed in Section 2.2. The government portal Location SA was accessed to identify and assess water bodies (potential sensitive ecological receptors) within a 2km radius of the site. The nearest sensitive ecological receptor was identified to be Wallaroo Bay located approximately 1.6km west of the site.

5.1 Soil Overview

The South Australian Resources information Gateway (SARIG) portal, which supplies electronic geoscientific and geospatial data, was accessed to identify the regional geology, hydrogeology and soil stratigraphy for the site. The result of this search is presented in Table 5.

Table 5: Regional Soil stratigraphy

Stratigraphy	Soil Type and General Description
Dominant Soil Type 1	Undifferentiated Quaternary profiles consisting of thin red brown sand and clay soil veneers.
Dominant Soil Type 2	White quartz sand of inland self dunes; grades down into yellow sand with carbonate pipes.
Minor Soil Type 1	B1: shallow highly calcareous sandy loam on calcrete.
Minor Soil Type 2	B5: shallow dark clay loam on limestone.

Data source: "Geological Survey of South Australia, Whyalla", Department of Mines and Energy Adelaide

The map produced by the Australian Soil Resource Information System classified the potential for acid sulphate soils to exist at the site as C4 Extremely Low Probability / Very Low Confidence.

5.2 Groundwater Occurrence

Reference to the SARIG produced by the Department of the Premier and Cabinet (DPC) of South Australia indicated that the expected depth to groundwater is between 5 and 10 metres below ground level (m bgl). The groundwater salinity is expected to be greater than 35,000 parts per million (ppm) expressed as total dissolved solids (TDS). The regional groundwater flow direction is expected to be west to north west, however it is possible there are local variations.

5.3 Local Groundwater Users (WaterConnect database)

A search of groundwater wells within a 2km radius was conducted using the SA Water Connect Database. The complete search is presented as part of the Lotsearch report in Appendix B.

The results indicate that one drill hole is located on the subject site. The status of the drill hole is unknown but it is a mineral exploration borehole, not a groundwater well. It was drilled in 1973 and is shown to be 457.5m deep. The depth to groundwater is not listed.

The nearest drill hole to the site is located approximately 185m to the east of the site. This is also a mineral exploration drill hole and is shown to be 13m deep. No groundwater level was recorded.

No registered groundwater wells were recorded within 2km radius of the site area. The only water record is noted in the water point WP 6430-87 records which included depth to water and water salinity measured in an old mine shaft constructed in the 1930s. Depth to water was 78 feet (23.77m) and water salinity was measured to be 26,900 mg/L which is saline. The government records indicate that the shaft was backfilled although the date was not recorded.

6 SITE INSPECTION

A site inspection was conducted on 20 August 2020 with the objective of validating anecdotal and historical information and to locate and identify additional evidence of potentially contaminating activities including: -

- structures and storage areas including underground tanks, waste pits and lagoons, hazardous materials storage, electrical transformers and hydraulic equipment, asbestos products, septic tanks and drain fields; and
- obvious visual contamination indicators such as disturbed vegetation, discoloured, oily or disturbed soil and / or the presence of any odours.

A summary of the site inspection findings is presented in Table 6. A series of photographs are presented showing the conditions during the site inspection and observations of interest. Please note the site inspection was conducted for only the northern and eastern portion of the site as this was the area where most activities have occurred. The western and southern area (south of the main track) of the site were inaccessible.

Table 6: Site Inspection Observations

Item	Details
Current uses of the site and surrounding land	The site is currently used for general equipment storage and occasional fill material exportation. An open-cut pit is present on the site (see Photograph 1) with the current EML and MPL, both active however no extraction of limestone or dimensional stone is currently being undertaken. The majority of the western and southern portion of the site is unoccupied without any activities being undertaken. The site is currently owned by a landscaper who is assisting in the early site rehabilitation works and has conducted some preliminary earthmoving activities across the site. A small area in the north western portion of the site is used as equipment and material laydown and a large shed (see Photograph 2) is located in the north western portion of the site. The shed is used as a workshop and for storage purposes of landscaping related equipment and materials.
Disturbed, coloured or stained soil	Fine layer of slag present around stockpiles and over a number of trafficable areas (see Photographs 5 and 6).
Bare soil patches, disturbed or distressed vegetation	Bare patches were observed across the northern and eastern portions of the site. Patches of grass and weeds were observed across much of the site.
Unusual odour	No unusual odours identified.
Quality of surface water	Standing water was present in the base of the open-cut pit. The water appeared clear.
Sheens on water surfaces	None observed.
Site topography and surface water drainage	A slight slope is present from the east to the west of the site, appearing to follow the 'natural' topography of the area.
Presence and type of groundwater bores on the site and adjacent landholdings	Refer Section 5.3 for details.
Condition of groundwater bore headworks	Refer Section 5.3 for details.
Measurement of groundwater levels	Refer Section 5.3 for details.

Item	Details
Conditions of building, roads, infrastructure etc.	Refer Section 4.5 for details.
The means of heating and cooling buildings on the site	None identified.
Presence of asbestos on the ground surface	None identified.
Presence of stockpiles, fill containment areas, sumps, drains, waste disposal areas, etc.	Several stockpiles were observed long the northern extent of the EML footprint and in the north eastern corner of the MPL footprint. Stockpiles comprised limestone, slag, large rock pieces and possible fill material (see Photographs 8 and 9). Slag material was prevalent across the site and stockpiled in more concentrated locations adjacent the open-cut pit and the north eastern corner of the MPL footprint (see Photograph 4). A concrete bunded area was observed south east of the main shed and currently used to store scrap metal, metal pipes and wooden beams (see Photograph 11). A pile of scrap metal and other waste material was located east of the concrete bunded area. Piles of large granite rocks were observed in various areas across the site (see Photograph 12).
Evidence of cut and fill activities	Earthworks have been conducted over the majority of the site. This includes excavation in the open-cut pit, excavation into the marina spoil and importation of large volumes of foundry waste (slag) and marina dredge spoil (see Photographs 4 to 7).
Presence of pits, ponds and lagoons	Rainwater has pooled and formed a pond at the bottom of the open-cut pit.
Presence and condition of chemical containers, holding tanks, bunds, etc	A half full phosphoric acid 1,000L IBC was observed near the scrap metal pile (it is understood this is used to store water only, see Photograph 16). The IBC was sitting above ground on a trailer. No spillage and/or stains were observed in the vicinity of the IBC. An empty phosphoric acid 1,000L IBC and oil drum were observed on the ground adjacent to the concrete bund. No evidence of spillage and/or staining was observed. An empty gas cylinder was observed lying on the ground in the north western corner of the site. Several empty 1,000L IBCs previously containing a herbicide were observed stacked together in the main quarry area (see Photograph 15). No evidence of spillage and/or staining was observed.
Presence and condition of any underground storage tanks (USTs) and associated infrastructure	None observed.
Underground structures that may be associated with sub-surface contamination	None identified.
Condition of materials storage and handling facilities and any solid or liquid waste disposal areas	A pile of several tyres was observed in the eastern portion of the site (see Photograph 13) and two old rusted empty diesel engine oil cans were observed in the vicinity (see Photograph 14). The shipping containers located south of the main shed contain old material previously used by AA Granite. No solid or liquid waste disposal areas were observed.
Any evidence of on-site spillage of dangerous goods and/or off-site migration	None.

Photograph 1: View of main quarry area looking north east (20/08/2020)

Photograph 2: View of main shed and shipping containers looking north west (20/08/2020)

Photograph 3: View of the site looking west (20/08/2020)

Photograph 4: View of a slag stockpile looking east (20/08/2020)

Photograph 5: View of the site looking west (07/09/2020)

Photograph 6: View of the site looking west (07/09/2020)

Photograph 7: View of marina spoil material looking south west (20/08/2020)

Photograph 8: View of stockpile comprising limestone, slag and rock waste looking south (20/08/2020)

Photograph 9: View of stockpiles and granite blocks looking west (20/08/2020)

Photograph 10: View of defunct explosives building looking south (20/08/2020)

Photograph 11: View of concrete bund looking south east (20/08/2020)

Photograph 12: View of scrap metal pile looking south west (20/08/2020)

Photograph 13: View of stockpiled tyres (07/09/2020)

Photograph 14: View of discarded oil cans and tyres (20/08/2020)

Photograph 15: View of IBCs previously containing herbicides looking north west (20/082020)

Photograph 16: View of IBC looking south west (20/08/2020)

7 SUMMARY OF POTENTIALLY CONTAMINATING ACTIVITIES

The historical site review has revealed some potentially contaminating activities (PCAs) across the site. The details of each of the PCAs including contaminant persistence and mobility in soils and potentially affected media are presented in Table 7.

Table 7: Details of Potentially Contaminating Activities

PCA and location	Chemicals of Interest	Persistence and mobility	Potentially Affected Media	Comments regarding the PCAs
Historical placement of slag	Copper and other heavy metals	Heavy metals – Mobility = low; persistence = high	Soil, Groundwater	Slag is waste product from copper mining that occurred in the region in the early 1900s.
Historical importation and stockpiling of marina spoil.	Heavy metals, PAHs, TRH & BTEX	Heavy metals - Mobility = low; persistence = high PAHs - Mobility = low; persistence = high TRH - Mobility = moderate; persistence = moderate BTEX – Mobility = moderate; persistence = high	Soil, Groundwater	A large volume of material sourced from the Wallaroo Marina during dredging in the 1990s was stockpiled on the site.
Use and storage of pesticides, insecticides, herbicides, fertilisers and other chemicals for weed control, farming and/or grazing or maintenance of Termiticide use under sheds.	Arsenic, Cadmium (fertilizers), OCP, OPP & herbicides (including triazines), TRH	Heavy metals – Mobility = low; persistence = high OCP – Mobility = low to moderate; persistence = high OPP – Mobility = low to moderate; persistence = low Herbicides – Mobility = low to moderate; persistence = moderate to high TRH – Mobility = moderate; persistence = moderate	Soil	The site was potentially used for farming and residential purposes prior to the late 1990s. Since then it had been used as a limestone and dimensional stone quarry. Historically, the use of OCPs as termite control chemicals was not completely discontinued until 1995 (Australian Pesticide and Veterinary Medicines Authority). Fuel related compounds and heavy metals are also known to have been used to control weed or plant growth. Any impacts would likely be limited to near surface soils.
Historical use of uncontrolled fill from various unknown sources brought onto the site for use as a base course under buildings, sealed areas or for site levelling purposes.	Heavy metals, PAHs, TRH & BTEX	Heavy metals - Mobility = low; persistence = high PAHs - Mobility = low; persistence = high TRH - Mobility = moderate; persistence = moderate BTEX – Mobility = moderate; persistence = high	Soil	Earthworks may have been undertaken when levelling the site for the development of the workshops. Imported fill may have been associated with levelling and importation of gravels for driveway. The source(s) of any historical fill other than the foundry waste and marina spoil is not known. Given the relatively flat topography of the site, in is not expected that significant filling of the site would have been necessary.

BTEX = benzene, toluene, ethylbenzene, xylenes
OCP/OPP = organochlorine pesticides / organophosphorus pesticides
PAH = polycyclic aromatic hydrocarbons
TRH = total recoverable hydrocarbons
Heavy metals = arsenic, cadmium, chromium, copper, lead, mercury, nickel, silver and zinc

8 SOIL INVESTIGATION

A limited soil/waste investigation was conducted on 20 August 2020 by an experienced Greencap environmental field scientist. Details are provided in the following sections.

8.1 Sampling Plan and Rationale

The soil/waste investigation was aimed to provide a very limited assessment and indicative information regarding the nature of the slag and marina spoil waste. The soil/waste investigation program comprised:

- Sampling at three locations within areas of slag contamination (SLAG 1 to SLAG 3).
- Sampling at three locations within areas of where marina excavation spoil has been placed (MS1 to MS3).
- Sampling at one location where there was no evidence of the above materials to provide indicative background soil quality conditions (BG).

It is noted that the sampling density not in accordance with the Australian Standards (Table E1 in AS4482.1-2005). The recommended minimum number of grid-based test locations for detection of circular hotspots in AS4482.1 for an approximate 25 hectare site in excess of 200 locations. The objective of the testing was to provide an indicative assessment of the contamination status of the slag and marina excavation spoil only.

The test locations (overlain on a recent site aerial) are presented in Figure 4.

8.2 Soil Sampling Methodology

Soil/waste samples were collected using manual sampling equipment (hand trowel) to a maximum depth of 0.1m bgl. The samples were collected using clean decontaminated manual sampling equipment. All samples collected were logged by an experienced Greencap field scientist.

A fresh pair of disposable gloves were worn by the sampler when collecting each individual sample. Soil samples were placed into acid-rinsed and solvent-washed screw top glass jars supplied by the testing laboratory. Samples were placed in a chilled portable cooler immediately following sampling and delivered under similar conditions to the analytical laboratory with accompanying chain of custody documentation.

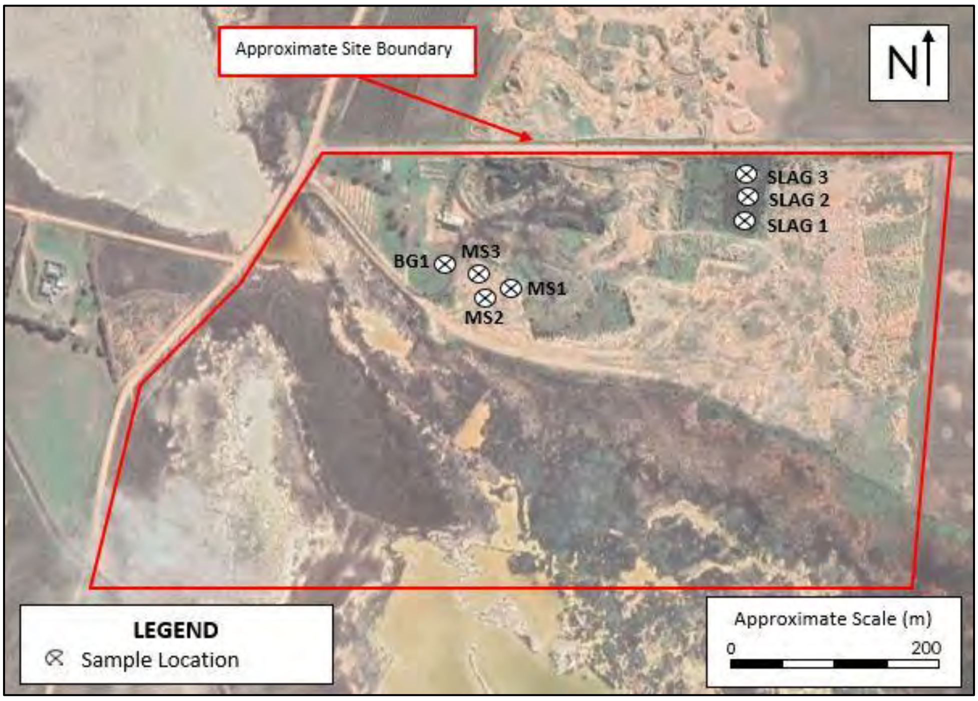


Figure 4: Sample Locations

8.3 Soil Analytical Program

All samples collected were analysed at the laboratory for pH and heavy metals. One slag and one marina spoil sample were also tested for a broad screen including heavy metals, organochlorine pesticides (OCPs), polycyclic aromatic hydrocarbons (PAHs), total recoverable hydrocarbons (TRH), benzene, toluene, ethylene and xylene (BTEX), phenols, cyanide and polychlorinated biphenyls (PCBs). The background sample was analysed for a suite of general analytes to enable consideration of site-based ecological investigation levels.

The laboratories used for the soil testing were Eurofins and Australian Laboratory Services (ALS). The laboratories are registered by the National Association of Testing Authorities (NATA), and the analyses conducted are within the NATA registration of the laboratories.

Duplicate samples were sent to the primary laboratory (Eurofins) and the secondary laboratory (ALS) for quality assurance / quality control (QA / QC) purposes. Results of the QA/QC analyses are discussed in detail in Section 8.6. A summary table of the soil analyses is presented at the end of this report and the results are discussed in Section 8.5.

8.4 Assessment Criteria / Investigation Levels

Analytical results have been compared to criteria specified in the National Environment Protection (Assessment of Site Contamination) Measure 1999 (as amended 2013) (NEPM). The fate of the site is undetermined, however, it is understood that post mining rehabilitation it is likely to be used for either commercial / industrial, agricultural purposes or remain as open space. Based on these assumptions, the relevant investigation exposure settings compared to are: -

- Ecological Investigation Levels (EILs) for commercial / industrial.
- EILs for areas of ecological significance.
- Ecological Screening Levels (ESLs) for commercial / industrial.
- ESLs for areas of ecological significance.
- Health Investigation Levels (HIL D) for commercial / industrial land use.

Ecological and health investigation levels are selected based on material type. The dominant surface soil type of the background material encountered were sandy silts (see Section 8.5). As such, as a conservative measure in the first instance, investigation exposure settings for sand and coarse soils were adopted (where applicable).

It is noted that the ESL listed in the NEPM for the compound benzo(a)pyrene is 1.4 mg/kg. However, the SA EPA recognises that this is an overly conservative level and considers it acceptable to adopt the health-based level (HIL-A of 3 mg/kg) as it is considered to be sufficiently protective of ecological receptors for use as a tier 1 investigation level. As such, an ESL of 3 mg/kg has been adopted for benzo(a)pyrene.

Site specific EILs were determined for certain chemicals as outlined in the NEPM and based on a potential future residential land use. The site specific EILs were derived using the NEPM toolbox calculator based on the following input values and rationale:

- The application of any chemicals and/or importation of material was likely to have been more than two years ago.
- A measured pH of 8.2, cation exchange capacity (CEC) of 36meq/100g, clay content of 10% and total organic carbon content of 2.5%, based on the reported results from the background sample of fill analysed.
- Ambient background concentrations of 0mg/kg as a conservative assumption in the first instance.

The laboratory limits of reporting in the soil investigation are acceptable to compare with relevant guidelines for the contaminants of concern.

8.5 Soil Investigation Results

Subsurface Conditions

The slag material sampled comprised fine black slag fragments mixed with sand and crushed rock. The marina spoil material sampled comprised cream to pale brown clayey sands, small shells and organic matter throughout. The background soil material sampled comprised dark brown sandy silts with organic matter throughout.

All samples were taken from the surface to a maximum depth of 0.1m bgl.

No stained or odorous soils or potential asbestos containing materials were observed.

Laboratory Testing Results and Discussion

A tabulated summary of the reported results is presented in Appendix F. Details of the testing results are provided in the NATA test certificates presented in Appendix G.

There were no reported results that exceeded the adopted ecological or health-based investigation/screening levels for any of the following analytes tested:

- Organochlorine pesticides;
- Organophosphorus pesticides;
- BTEX compounds (benzene, toluene, ethyl benzene and xylenes);
- Polycyclic aromatic hydrocarbons (PAH);
- Phenolics; and
- Polychlorinated biphenyls (PCBs).

The following samples reported results exceeding the EILs for areas of ecological significance:

- BG1 reported an elevated result of 120mg/kg for copper which exceeded the adopted criteria of 75mg/kg.
- SLAG 1, QC01 and QC01A reported elevated results of 2,900mg/kg, 1,100mg/kg and 4,090mg/kg for copper respectively.
- SLAG 1, QC01 and QC01A reported elevated results of 1,800mg/kg, 950mg/kg and 2,630mg/kg for zinc respectively, which exceeded the adopted criteria of 240mg/kg.
- SLAG 1 and QC01A reported elevated results of 93mg/kg and 97mg/kg for nickel respectively, which exceeded the adopted criteria of 65mg/kg.
- SLAG 2 reported elevated results of 2,400mg/kg for copper and zinc.
- SLAG 3 reported elevated results of 700mg/kg and 680mg/kg for copper and zinc respectively.

The elevated heavy metal results listed above are consistent with expectations relating to foundry waste.

MS2 reported an elevated TRH (C_{10}-C_{16} fraction with naphthalene) result of 350mg/kg that exceeded the adopted ESL for commercial / industrial criteria of 170mg/kg. As organic matter was prevalent throughout the marina spoil, it is possible that the elevated TRH fraction result is a product of this characteristic. It should be noted that reported results from several fuel-related compounds were above the laboratory limits of reporting (LORs) for MS2, however, they were below the adopted criteria.

Other than the heavy metals, cadmium and mercury, several results were reported above the LORs for heavy metals at all sample locations. Other than the exceedances listed above, these results were below the adopted criteria.

Leachate Testing

To gain further understanding of the chemical stability of the slag material, leachate tests were conducted for all heavy metal results for the SLAG 1 sample. Leachate testing was undertaken using the Australian Standard Leaching Procedure (ASLP) with pH solutions of 5.0 and 7.0. The leachate results are presented with the tabulated summary of reported results presented in Appendix F. The leachate results were compared marine ecosystem screening criteria (refer Section 9 and Table 12) with exceedances reported for copper, lead and zinc. Predictive modelling (Section 9) was subsequently undertaken to further assess risk associated with the leachability of this material.

8.6 Quality Assurance / Quality Control

Quality Assurance and Quality Control (QA / QC) measures for this investigation included: -

- Appropriate sample collection, labelling, preservation, storage and transport under chain of custody documentation in accordance with standard operating procedures by an experienced sampler.
- Collection and analyses of field QA / QC samples.
- Laboratory analyses conducted within appropriate holding times.
- Use of laboratories that hold NATA accreditation for the analyses undertaken; and
- Analysis of laboratory QA / QC samples including matrix spikes, matrix spike duplicates, and surrogates.

The following sections detail the QA/QC analyses and consider the analytical data quality.

Internal Laboratory Quality Assurance

The results of the internal quality assurance programs of the laboratory are presented with the NATA test certificates in Appendix G.

Appropriate internal QA / QC were reported by both laboratories as follows:

- Accuracy (measured by laboratory spike and surrogate recovery samples) within 70% - 130% recovery.
- Precision (measured by duplicate sample analysis) within 50% relative percentage difference.
- Minimum 95% completeness (measured by total number of analyses within acceptable limits).

The laboratory limits of reporting in the soil investigation are acceptable to compare with relevant guidelines for the contaminants of concern.

Field Duplicates

Field duplicate soil samples were submitted for analyses at the primary (intra) and secondary (inter) laboratories as summarised in Table 8.

Table 8: Soil Duplicate Analyses

Primary Sample	Field Duplicate – Primary Laboratory (Eurofins)	Field Duplicate – Secondary Laboratory (ALS)
SLAG 1	QC01 – Heavy Metals	QC01A - Heavy Metals

Notes:
Heavy metals = (arsenic, cadmium, chromium (total), copper, lead, mercury, nickel and zinc)

The frequency of field duplicate analyses for the primary chemicals of concern is acceptable when compared to the 1 per 20 analyses recommended in AS4482.1. A summary table of the field duplicate results is attached in Appendix F (with the soil results table).

The majority of relative percentage difference (RPD) calculations from inter (secondary) and intra (primary) laboratory duplicate soil analyses were all within acceptable levels with the exception of the following:

- A number of variations were calculated between the primary sample and intra-laboratory duplicate (QC01) for chromium (81%), copper (90%), lead (70%), nickel (102%) and zinc (62%). This is likely due to the heterogenous nature of the slag sample as it comprised varied slag, sand and waste material.
- A variation of 61% was calculated between the primary sample and inter-laboratory duplicate (QC01A) for arsenic. As above, these variations are likely attributable to the heterogeneity of this material. Furthermore, the reported concentrations were low which caused a high RPD value where only a small actual difference between the primary and secondary sample existed. Therefore, this RPD result is not considered significant.

Overall, it is concluded that the RPD exceedances outside of the acceptable range do not affect the usability of the data or the conclusions of the investigation.

Blank Samples

Trip blank (TB01) and rinsate blank (RB01) samples were collected on the day of sampling and analysed at the primary laboratory. The trip blank was analysed for BTEXN and the rinsate blank was analysed for heavy metals. Trip blank samples were a laboratory supplied sample (placed in esky prior to sampling) and the rinsate samples were collected from decontaminated sampling equipment.

All reported results were below laboratory reporting limits indicating no cross contamination during sample collection or sample travel has occurred. A summary table of the blank results is attached in Appendix F (with the soil results table).

Data Quality Conclusions

Overall, the internal procedures reported by the laboratories and the quality of the field QA/QC analyses indicate the analytical data is of acceptable quality for the purposes of this investigation.

9 PRELIMINARY RISK ASSESSMENT

The results of sampling of stockpiled slag material reported the presence of leachable metals (refer Section 8.5). This indicates that metals from the stockpiled material may be dissolved in the interaction with water (stormwater, dust suppression etc) and infiltrate into the ground to potentially reach groundwater.

The metal concentrations in leachability results are presented in the summary tables attached and also shown in Table 9.

Table 9: Leachable Metal Concentrations

Chemical	Leachability Results (mg/L)	
	At pH 5	At pH 7
Arsenic	<0.01	<0.01
Cadmium	<0.01	<0.005
Chromium (III+VI)	<0.01	<0.01
Copper	2.4	0.56
Lead	0.04	0.02
Mercury	<0.001	<0.001
Nickel	0.05	0.02
Zinc	0.84	0.17

If groundwater beneath the site area is impacted with elevated concentrations of metals nearby groundwater receptors may potentially be at risk.

The most recent SA EPA guideline '*Guidelines for the assessment and remediation of site contamination',* dated July 2018 (GAR) outlined a four-step process for determining realistic environmental values of groundwater at a subject site and surrounding areas. This four-step process has been used to determine the appropriate environmental values of groundwater at the site as detailed below.

9.1 Environmental Values of Groundwater

Step 1. Determination of protected environmental values of groundwater using Environment Protection (Water Quality) Policy 2015 (WQEPP)

The WQEPP identifies the applicable environmental values based on the salinity of groundwater expressed in the concentrations of total dissolved solids (TDS) are shown in Table 10.

Table 10: Environmental values of particular waters

Extract from Schedule 1, Table 3 WQEPP						
Waters	Aquatic ecosystem	Recreation and aesthetics	Drinking water for human consumption	Primary industries—irrigation and general water uses	Primary industries—livestock drinking water	Primary industries—aquaculture and human consumption of aquatic foods
Underground waters						
underground waters with a background TDS level of less than 1,200 mg/L			X	X	X	X
underground waters with a background TDS level of 1,200 mg/L or more, but less than 3,000 mg/L				X	X	X
underground waters with a background TDS level of 3,000 mg/L or more, but less than 13,000 mg/L					X	X

The TDS concentration of the shallow groundwater underlying the site was assessed based on available regional records as outlined in Section 5. The reginal records indicate that the groundwater at the site is saline with the TDS levels greater than 13,000mg/L and no environmental values are listed in Table 10 for groundwater with high level of salinity.

Step 2: Assess and identify surface water bodies within 2 km buffer zone

The nearest surface water body is the Wallaroo Bay located approximately 1,700 metres to the west of the Site.

Step 3: Review registered groundwater users (WaterConnect database)

The results of the search of groundwater wells within a two kilometre radius using the WaterConnect Database are included in Appendix B.

Apart from several groundwater wells installed for investigation and monitoring purposes (~1,700 metres to the south west) there were no groundwater wells within 2km radius of the site area registered to be installed for any water supply purposes. The locations of registered groundwater wells within a 2km radius zone are shown in Figure 5.

Step 4: Actual or potential harm to water that is not trivial – application of EPA recognised criteria

The salinity of the groundwater suggests that the groundwater is not suitable for any purposes as outlined in Table 10. However, the salinity does not discount the fact that groundwater may be used for recreational purposes, e.g. swimming pools and garden water features within residential areas located approximately 1,300 metres to the west of the site.

As indicated in Section 3.2, the flow of groundwater generally occurs towards Wallaroo Bay, a marine aquatic ecosystem, which would require protection if discharging groundwater is polluted.

Based on the above, the relevant environmental values for the site are considered to be limited to potential recreational use and protection of marine aquatic ecosystems.

The ultimate decision on whether the beneficial uses require protection rests with regulatory authorities including the Environment Protection Authority (EPA) and the Department for Environment and Water (DEW).

(Source WaterConnect Accessed 19/10/2020)

Figure 5: Registered groundwater wells within 2km zone

9.2 Groundwater Assessment Criteria

As concluded in Section 9.1, the most appropriate environmental values of groundwater to be protected are recreational use and marine aquatic ecosystems. The GAR recommends guidelines for these environmental values as presented in Table 11.

Table 11: EPA recognised criteria and environmental values of groundwater

Environmental Value	Recognised Criteria
Aquatic Ecosystems – marine and fresh	• Australian and New Zealand Guidelines for fresh and marine water quality (ANZG, 2018)
Recreational and aesthetics.	• Guidelines for Managing Risks in Recreational Water (NHMRC, 2008) • World Health Organisation (2017)

Notes: NHRMC - National Health and Medical Research Council

The Guidelines for Managing Risks in Recreational Water (NHMRC, 2008) do not specify criteria for recreational water quality. This document advocates a simple screening approach where '*a substance occurring in recreational water at a concentration of 10 times that stipulated in the drinking water guidelines may merit further consideration*'. As such, Greencap has adopted screening values for recreational waters as 10 times the potable criteria included in the Australian Drinking Water Guideline 2011 (as updated in August 2018) and World Health Organisation (2017).

9.3 Conceptual Site Model

As presented in Schedule B2 of NEPM *'A conceptual site model (CSM) is a representation of site-related information regarding contamination sources, receptors and exposure pathways between those sources and receptors.'*

Schedule B4 of NEPM states '*The fundamental concept of risk assessment is that there should be an exposure pathway linking the source of contamination and the exposed population. Where this linkage exists, an assessment of the nature and significance of the exposure pathway is required to determine the level of risk.*'

The CSM section addresses the presence of potential source(s), pathway(s) and receptor(s) and assesses potential linkages and associated risks to potential receptor if source-pathway-receptor linkages exist.

9.3.1 Chemicals of Potential Concern

The chemicals of potential concern associated with the presence of the slag material are limited to heavy metals. With the reference to Table 9, the metals which show leachability potential include copper, lead, nickel and zinc.

Metal leachability results included in Table 9 show the leachability potential under acidic and neutral conditions. A comparison of the acidic/neutral average leachable concentrations of these metals with the adopted guideline values for recreational use of groundwater and for protection of marine aquatic ecosystems is presented in Table 12.

Table 12: Comparison with Adopted Environmental Values

Analyte	Unit	Marine Ecosystem*	Primary Contact /Recreation	Average Leachate Concentration
Copper	mg/L	0.0013	20	1.48
Lead	mg/L	0.0044	0.1	0.03
Nickel	mg/L	0.07	0.2	0.05
Zinc	mg/L	0.015	3	0.51

* values derived from 95% protection for slightly to moderately disturbed ecosystems (refer https://www.waterquality.gov.au/guidelines/anz-fresh-marine); guideline exceedances are highlighted.

Table 12 shows that only marine aquatic ecosystem criteria is exceeded for copper, lead and zinc.

9.3.2 Mobility and Persistence of Chemicals of Concern

Persistence of metals of concern is expected to be moderate to high depending on salts and complexes (e.g. water soluble or insoluble salt) and sorption capacity of the aquifer material.

Sorption capacity of low permeable material, i.e. silts/clays, is generally higher than high permeability materials i.e. sands/gravels. In fractured rocks metal persistence may range from low to high depending on types of rocks and size of fractures.

The mobility of metals may range from low to high depending on pH levels, cation exchange capacity of aquifer material and presence of organic matter.

9.3.3 Source-Pathway-Receptor Linkages

9.3.3.1 Pathway

The pathway which can link receptors to contamination sources at the site is groundwater which moves (flows) to the west.

9.3.3.2 Source

For the purpose of assessing potential impacts the extent of the stockpiled area, where the waste material (mainly slag) contains leachable metals, is considered to be potential source area.

9.3.3.3 Receptor

For the situation if groundwater at the site becomes impacted with dissolved metals resulting from leaching of metals from the stockpiled waste material (i.e. slag and other mine wastes) the flowing identified groundwater receptors may potentially be at risk:

- Residents who may theoretically use groundwater for future recreational purposes (e.g. filling swimming pools or constructing garden water features); and
- Marine aquatic ecosystem of the Wallaroo Bay.

The reported leachable concentrations of metals only exceed the adopted environmental criteria for marine aquatic ecosystems (Table 9). Therefore, the only receptor which may potentially be impacted is the marine aquatic ecosystem of the Wallaroo Bay located approximately 1,800 metres to the west of the site.

9.3.3.4 Linkages

The only identified complete source-pathway-receptor linkage exists for the marine aquatic ecosystem of the Wallaroo Bay as illustrated on Figure 6.

(Image Google Earth)

Figure 6: Source-Pathway-Receptor CSM

9.4 Risk Assessment

The assessment of potential risks to the identified receptor has been undertaken via predictive modelling as described in the following subsections.

9.4.1 Analytical Formula

The formula for steady state attenuation along the centreline of a dissolved phase plume included in the ASTM Technical Standard E 1739 "*Standard Guide for Risk-Based Corrective Actions*" (RBCA) was used to estimate the concentrations of chemicals of concern towards identified receptors. The formula is included in Appendix J.

9.4.2 Input Parameters and Assumptions

The analytical modelling was conducted under conservative steady state scenario, i.e for maximum predicted concentrations versus distance. The analytical model assumes that the reduction of the concentrations within plume(s) will only occur as a result of mechanical plume dispersion through the aquifer material. The analytical model also assumes that the source of contamination is constant and no natural degradation of chemicals of concern occurs at the source and within the groundwater plume.

The adopted model input parameters are shown in Table 13 and the adopted conceptual model is shown on Figure 6.

Table 13: Model Input Parameters

Parameter	Value	Comment
Concentration at source (Csource)	Varies	Assigned average leachable concentrations (refer Table 9)
Distances to receptor (x)	1,800 metres	The distance between the Source area and the Wallaroo Bay (refer Figure 6)
Longitudinal dispersivity (ax)	0.1 of distance	Adopted 10% of the distance
Transverse dispersivity (ay)	0.01 of distance	Adopted 1% of the distance
Vertical dispersivity (az)	0.001 of distance	Adopted 0.1% of the distance
First order Degradation Constant (Λ)	0 day^{-1}	Assumes no degradation
Source width (Sw) perpendicular to the inferred groundwater flow direction	120 metres	Length of the inferred source perpendicular to the inferred flow direction to the west (Figure 6)
Source thickness (Sd)	0.5 m	Inferred assuming impacts infiltrated from the surface and contaminated the upper 0.5m of the aquifer to form a permanent source of groundwater contamination (extremely conservative assumption as the potential infiltration may only occur seasonally and permanent source in the aquifer is unlikely to be formed).
Retardation factor (Rc)	1	Assumed no plume retardation due to sorption etc

9.4.3 Predictive Modelling Results

9.4.3.1 Copper

The adopted source concentration for copper is the average reported leachable concentration between neutral and acidic conditions. This is conservative assumption as a potential for acidic rains in Australia is very low (typical sources of acidic rains are volcanic activities and massive fossil fuel combustion, industries none of which exists at Wallaroo area). The adopted source concentration was 1.5 mg/L.

Predictive modelling results are illustrated on Figure 7 and also tabulated in Appendix J.

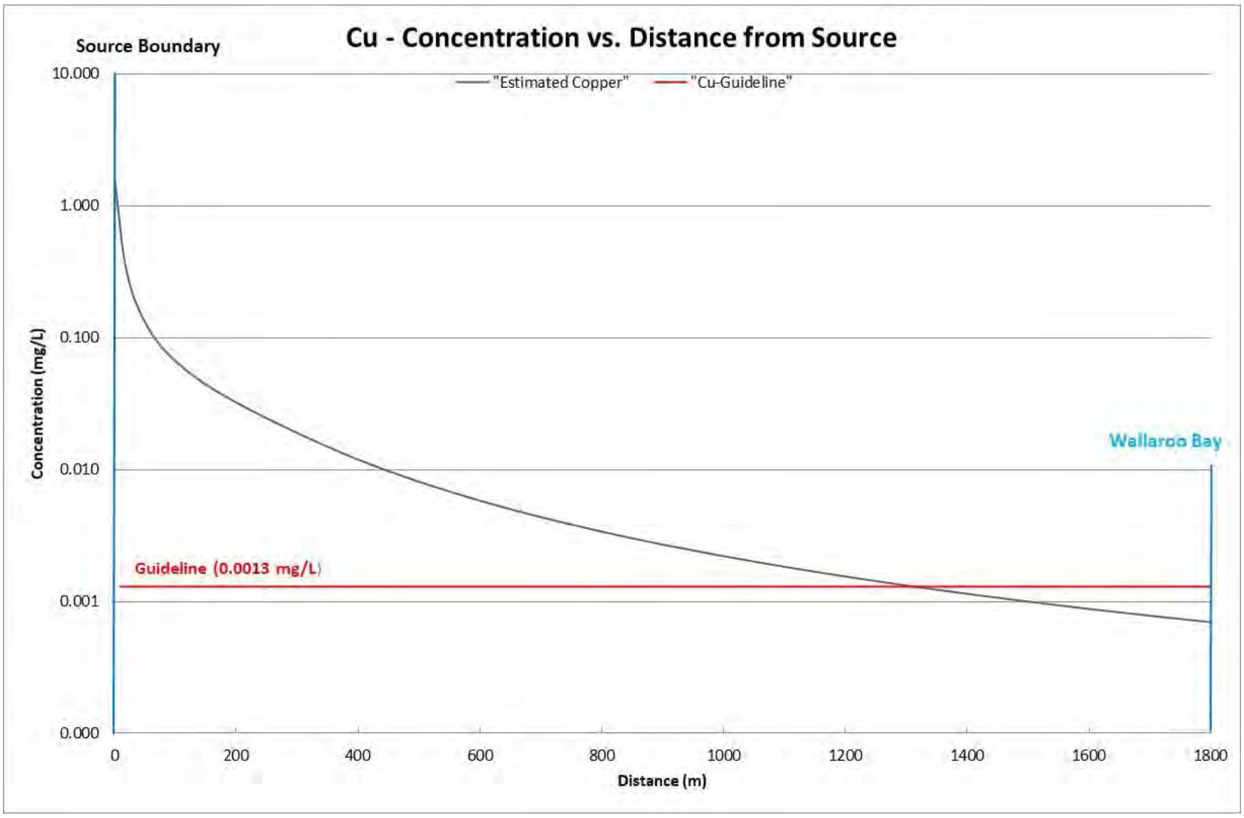


Figure 7: Estimated Copper Concentration

The model predicted no adverse impact to Wallaroo Bay from potential leaching of copper into groundwater within the source area and that it is unlikely to pose any unacceptable risk to the Wallaroo Bay ecosystem.

9.4.3.2 Lead

The adopted source concentration for lead is the acidic/neutral average leachable concentration of 0.03 mg/L (Table 12).

Predictive modelling results are illustrated on Figure 8 and also tabulated in Appendix J.

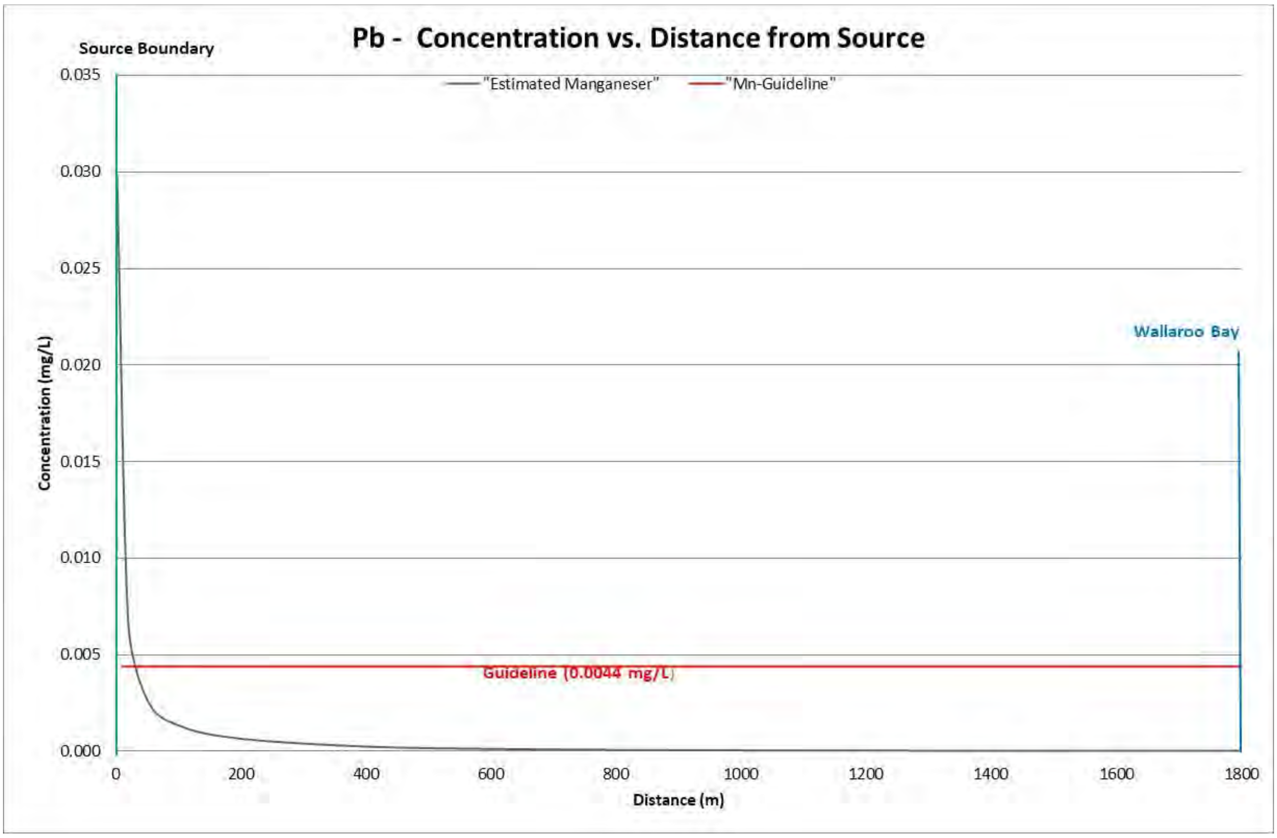


Figure 8: Estimated Lead Concentration

The model predicted no adverse impact to the Wallaroo Bay from potential leaching of lead into groundwater within the source area and unlikely to pose any risk to the Wallaroo Bay ecosystem.

9.4.3.3 Zinc

The adopted source concentration for zinc is the acidic/neutral average leachable concentration of 0.51 mg/L (Table 12). .

Predictive modelling results are illustrated on Figure 9 and also tabulated in Appendix J.

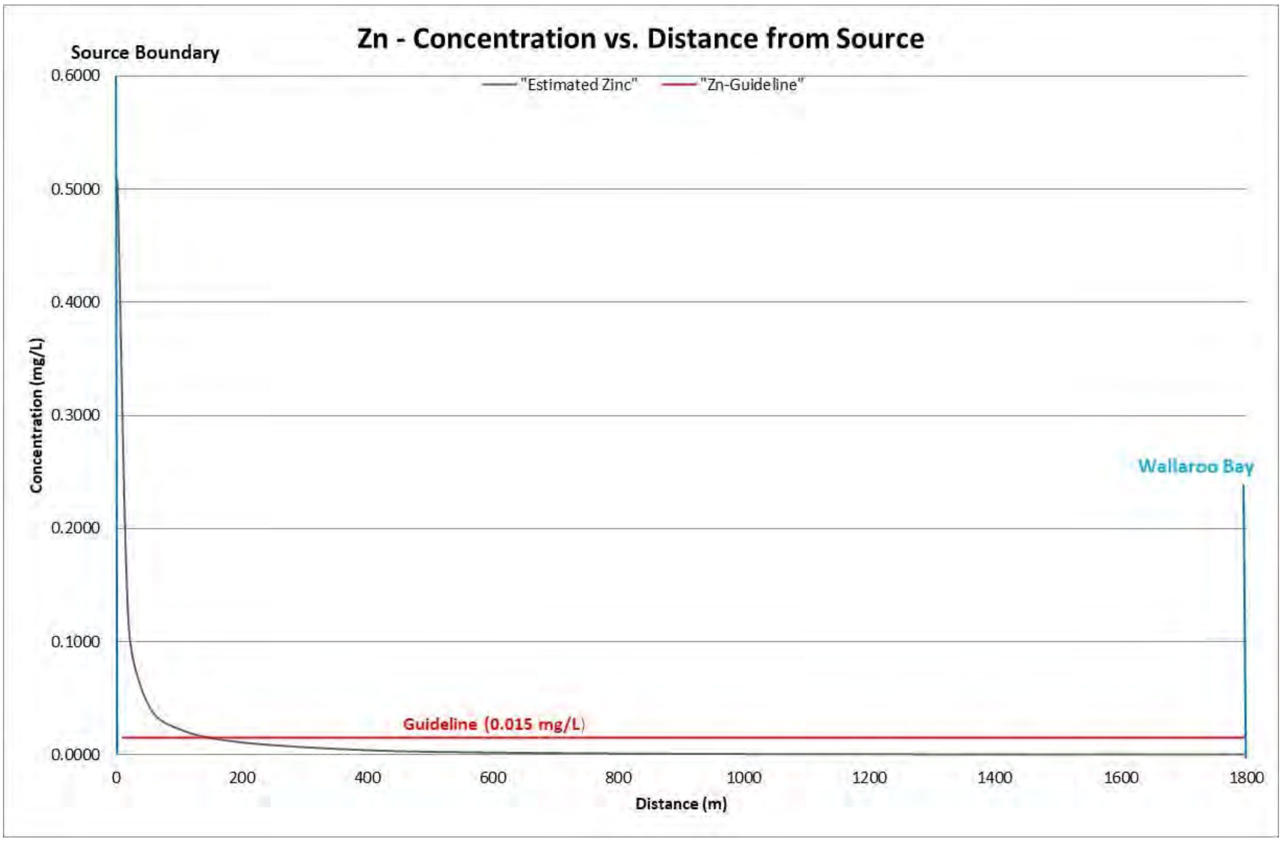


Figure 9: Estimated Zinc Concentration

The model predicted no adverse impact to the Wallaroo Bay from potential leaching of zinc into groundwater within the source area and unlikely to pose any risk to the Wallaroo Bay ecosystem.

9.4.4 Summary

Predictive modelling and a risk assessment was undertaken for the metals of concern which may leach out from the stockpiled waste material and impact on groundwater and subsequently impact on the receiving marine aquatic ecosystem of Wallaroo Bay.

Under conservative scenarios the modelling did not predict any unacceptable risks to Wallaroo Bay.

10 CONCLUSIONS

Site History

The site appears to have been used for farming and/or grazing purposes until the mid to late 1990s when an extractive minerals lease was established for the extraction of limestone and dimensional stone/granite. The quarrying activities operated for approximately ten years after which time the demand for the particular dimensional stone sourced from this site diminished and extractive activities ceased. The site has been used for general storage, workshop and laydown purposes.

The site has been subject to various historical activities, including the placement of slag at some stage during the late 1980s through until the late 1990s and the importation of a large volume of stockpiled material sourced from the Wallaroo Marina during dredging in the late 1990s/early 2000s.

The identified potential sources of contamination of main concern associated with past and present site uses include:

- The placement and storage of imported slag on the site.
- The importation and stockpiling of marina spoil.

Potential contaminants of concern associated with the identified potential sources of contamination include (but may not be limited to): heavy metals, fuel-related compounds, polycyclic aromatic hydrocarbons and to a lesser extent, insecticides and weed control chemicals.

Slag/Marina Spoil Sampling

An indicative waste material investigation was conducted, comprising the logging and sampling of three locations within areas of slag contamination, three locations within areas of where marina excavation spoil has been placed and one neutral location to provide background soil quality conditions. The maximum depth of investigation was 0.1 metres below ground level.

The slag material sampled comprised fine black slag nodules mixed with sand and crushed rock.

The marina spoil material sampled comprised beige clayey sands, small shells and organic matter throughout.

The background soil material sampled comprised dark brown sandy silts with organic matter throughout.

All samples collected were analysed at the laboratory for pH and heavy metals. One slag and one marina spoil sample were tested for a broad screen of contaminants and the background sample was analysed for a suite of general analytes to enable consideration of site-based ecological investigation levels.

The results were compared against ecological and health criteria for commercial / industrial land use and for areas of ecological significance.

Several results for heavy metals, primarily copper and zinc, exceeded the adopted ecological criteria for areas of ecological significance in all slag samples. The background sample also exceeded this criteria for the reported copper result however it should be noted that this result was orders of magnitude less than the copper results for the slag samples.

One of the marina spoil samples (MS2) reported an elevated for a TRH fraction that exceeded the adopted ecological criteria for commercial / industrial use. This result could be the cause of a large amount of organic matter collected in the sample that was prevalent across the marina spoil.

Leachate testing was undertaken for the sample SLAG 1 for all heavy metals. The leachate results were compared to marine ecosystem protection criteria with the copper, lead and zinc leachate results (average) exceeding these.

Preliminary Risk Assessment

The results of sampling of stockpiled slag material reported the presence of leachable metals which may be dissolved in the interaction with water (stormwater, dust suppression etc) and infiltrate into the ground to reach groundwater.

If groundwater beneath the site area is impacted with elevated concentrations of metals nearby groundwater receptors may potentially be at risk. The identified environmental values of groundwater to be protected are recreational use and marine aquatic ecosystems.

Leachable metal concentrations were reported to exceed only marine aquatic ecosystem criteria for leachable copper, lead and zinc.

The assessment of potential risks to the identified receptor, Wallaroo Bay, has been undertaken via predictive modelling using the formula for steady state attenuation along the centreline of a dissolved phase plume included in the ASTM Technical Standard E 1739 "*Standard Guide for Risk-Based Corrective Actions*".

Under conservative scenarios the modelling did not predict any unacceptable risks to Wallaroo Bay particularly for leachable lead and zinc.

Concluding Comments

The site has a history of broad-acre agricultural use through until the 1960/70s at which time quarry activities are likely to have commenced with the extraction of limestone from within the EML portion of the greater site. This extraction activity extended to underlying granite/dimensional stone in the late 1990s/early 2000s.

The site received large volumes of foundry waste, slag, in the period between the late 1980s to mid-late 1990s, some of which appears to have been removed from site, the balance being concentrated in large stockpiles to the central and eastern regions of the EML. Thin layers of slag material are also present across other portions of the site such as the access road entering the property. Large volumes of marina spoil were imported to the site in the period between 1999 and 2003 and may be in the order of 10m thick in some areas.

The slag material contains elevated heavy metal concentrations, primarily copper and zinc with results exceeding ecological investigation levels for areas of ecological significance but below health investigation levels for commercial/industrial use. Leachability results for heavy metals present in the slag material exceed the screening criteria for marine ecosystem protection, thereby posing a potential risk to the receiving environment, Wallaroo Bay. Predictive modelling was undertaken to further assess potential risks to the marine ecosystem associated with the presence of leachable metals in the slag material. Under conservative scenarios the modelling did not predict any unacceptable risks to Wallaroo Bay associated with potentially impacted groundwater flow and discharge.

Assessment of the marina spoil undertaken by Greencap and previously MUD Environmental identify the material as somewhat inert and classified generally as Waste Fill. Minor inclusions within this material may preclude re-use of a small volume of the material. The geotechnical suitability of the material is undetermined and dependent on the future use of the site. It is noted that some of this material is being exported offsite for use on the Wallaroo Shores development.

As the slag material presents a potential future risk to groundwater, it is recommended that a Remediation Action Plan is developed prior to the decommissioning of the quarry once the post-quarrying fate of the site is determined in consultation with the current site owner. This is to include a means to remove the contamination pathway that exists between the stockpiled slag material and groundwater that will ultimately migrate to Wallaroo Bay.

Preliminary Site Investigation

AustralAsian Granite

72 Wallaroo Plain Road, Wallaroo

Appendix A CERTIFICATES OF TITLE AND PLB REPORT

REAL PROPERTY ACT, 1886

South Australia

The Registrar-General certifies that this Title Register Search displays the records maintained in the Register Book and other notations at the time of searching.

REGISTRAR - GENERAL SOUTH AUSTRALIA

Certificate of Title - Volume 6233 Folio 860

Parent Title(s) CT 5156/784, CT 5398/528

Creating Dealing(s) RTA 13238914

Title Issued 24/01/2020 **Edition** 1 **Edition Issued** 24/01/2020

Estate Type

FEE SIMPLE

Registered Proprietor

SHANE CHRISTOPHER DUNSTAN
KARREN JOYE DUNSTAN
OF 95 HARBISON ROAD WALLAROO SA 5556
AS JOINT TENANTS

Description of Land

ALLOTMENT 20 DEPOSITED PLAN 123080
IN THE AREA NAMED WALLAROO
HUNDRED OF WALLAROO

Easements

NIL

Schedule of Dealings

NIL

Notations

Dealings Affecting Title	NIL
Priority Notices	NIL
Notations on Plan	NIL
Registrar-General's Notes	NIL
Administrative Interests	NIL

SAPPA Parcel Report

Date Created: August 28, 2020

The South Australian Property and Planning Atlas is available on the Land Services Website:
www.sa.gov.au/landservices

Scale ≈ 1:7397 (on A4 page)

250 metres≈

Address Details

Unit Number:

Street Number: 72

Street Name: WALLAROO PLAIN

Street Type: RD

Suburb: WALLAROO

Postcode: 5556

Property Details:

Council: COPPER COAST COUNCIL

State Electorate: GOYDER (2014), NARUNGGA (2018)

Federal Electorate: GREY (2013), GREY (2016), GREY (2019)

Hundred: WALLAROO

Valuation Number: 3410384418

Title Reference: CT6233/860

Plan No. Parcel No.: D123080A20

No zoning, overlay or variation details found

The information provided above, is not represented to be accurate, current or complete at the time of printing this report.

The Government of South Australia accepts no liability for the use of this data, or any reliance placed on it.

Government of South Australia
Department of Planning, Transport and Infrastructure

Preliminary Site Investigation
AustralAsian Granite
72 Wallaroo Plain Road, Wallaroo

APPENDIX B LOTSEARCH REPORT

LOTSEARCH

LOTSEARCH ENVIRO PROFESSIONAL

Address: 72 Wallaroo Plain Road, Wallaroo, SA 5556

Date: 18 Aug 2020 09:37:47

Reference: LS014098 EP

Dataset Listing

Datasets contained within this report, detailing their source and data currency:

Dataset Name	Custodian	Supply Date	Currency Date	Update Frequency	Dataset Buffer (m)	No. Features Onsite	No. Features within 100m	No. Features within Buffer
Cadastre Boundaries	PSMA Australia Limited	16/04/2020	01/02/2020	Quarterly	-	-	-	-
EPA Site Contamination Index	EPA South Australia	03/08/2020	03/08/2020	Monthly	1000	0	0	0
EPA Environmental Protection Orders	EPA South Australia	22/07/2020	22/07/2020	Monthly	1000	0	0	0
EPA Environmental Authorisations	EPA South Australia	22/07/2020	22/07/2020	Monthly	1000	0	0	1
EPA Assessment Areas	EPA South Australia	12/08/2020	12/08/2020	Quarterly	1000	0	0	0
Defence PFAS Investigation & Management Program - Investigation Sites	Department of Defence	11/08/2020	11/08/2020	Monthly	2000	0	0	0
Defence PFAS Investigation & Management Program - Management Sites	Department of Defence	11/08/2020	11/08/2020	Monthly	2000	0	0	0
Airservices Australia National PFAS Management Program	Airservices Australia	29/07/2020	29/07/2020	Monthly	2000	0	0	0
Defence 3 Year Regional Contamination Investigation Program	Department of Defence	17/08/2020	17/08/2020	Monthly	2000	0	0	0
National Waste Management Facilities Database	Geoscience Australia	15/05/2020	07/03/2017	Quarterly	1000	0	0	1
EPA Collection Depots	EPA South Australia	18/05/2020	18/05/2020	Quarterly	1000	0	0	0
National Liquid Fuel Facilities	Geoscience Australia	12/08/2020	15/03/2012	Quarterly	1000	0	0	0
Historical Business Directories (Premise & Intersection Matches)	Hardie Grant, Sands & McDougall			Not required	150	0	0	0
Historical Business Directories (Road & Area Matches)	Hardie Grant, Sands & McDougall			Not required	150	-	0	0
UBD Business Directory Dry Cleaners & Motor Garages/Service Stations (Premise & Intersection Matches)	Hardie Grant, Sands & McDougall			Not required	500	0	0	0
UBD Business Directory Dry Cleaners & Motor Garages/Service Stations (Road & Area Matches)	Hardie Grant, Sands & McDougall			Not required	500	-	0	0
Mines and Mineral Deposits	Department for Energy and Mining	13/07/2020	13/07/2020	Quarterly	1000	1	2	3
Groundwater Aquifers	Department for Environment and Water	09/04/2018	01/01/2008	As required	1000	1	1	1
Drillholes	Department for Environment and Water	13/07/2020	30/03/2020	Quarterly	2000	1	1	68
Surface Geology 1:100,000	Department for Energy and Mining	12/07/2018	01/07/2018	As required	1000	5	5	5
Geological Linear Structures 1:100,000	Department for Energy and Mining	12/07/2018	01/07/2018	As required	1000	0	0	0
Atlas of Australian Soils	ABARES	19/05/2017	17/02/2011	As required	1000	1	1	1
Soil Types	Department for Environment and Water	12/07/2018	01/07/2009	As required	1000	2	2	3
Atlas of Australian Acid Sulfate Soils	CSIRO	19/01/2017	21/02/2013	As required	1000	2	2	2
Acid Sulfate Soil Potential	Department for Environment and Water	09/04/2018	03/06/2016	As required	1000	2	2	3

Dataset Name	Custodian	Supply Date	Currency Date	Update Frequency	Dataset Buffer (m)	No. Features Onsite	No. Features within 100m	No. Features within Buffer
Soil Salinity - Watertable Induced	Department for Environment and Water	12/07/2018	01/07/2009	As required	1000	3	3	5
Soil Salinity - Non-watertable	Department for Environment and Water	12/07/2018	01/07/2009	As required	1000	3	3	3
Soil Salinity - Non-watertable (magnesia patches)	Department for Environment and Water	12/07/2018	01/07/2009	As required	1000	1	1	1
Land Development Zones	Department of Planning, Transport and Infrastructure	13/07/2020	13/07/2020	Quarterly	1000	2	2	6
Land Use Generalised 2018	Department of Planning, Transport and Infrastructure	06/04/2020	12/08/2020	Annually	1000	2	6	9
Commonwealth Heritage List	Australian Government Department of the Environment and Energy - Heritage Branch	18/05/2020	20/11/2019	Quarterly	1000	0	0	0
National Heritage List	Australian Government Department of the Environment and Energy - Heritage Branch	18/05/2020	20/11/2019	Quarterly	1000	0	0	0
State Heritage Areas	Department for Environment and Water	12/07/2018	10/11/2004	As required	1000	0	0	0
SA Heritage Places	Department for Environment and Water	13/07/2020	08/08/2019	Quarterly	1000	0	0	0
Aboriginal Land	Department for Energy and Mining	09/04/2018	08/04/2018	As required	1000	0	0	0
Bushfire Protection Areas	Department of Planning, Transport and Infrastructure	04/09/2018	20/02/2018	As required	1000	0	0	0
Bushfires and Prescribed Burns History	Department for Environment and Water	04/09/2018	26/05/2018	As required	1000	0	0	0
Groundwater Dependent Ecosystems Atlas	Bureau of Meteorology	14/08/2017	15/05/2017	Unknown	1000	7	11	18
Ramsar Wetland Areas	Department for Environment and Water	30/01/2017	30/01/2013	As required	1000	0	0	0

Site Diagram

72 Wallaroo Plain Road, Wallaroo, SA 5556

Legend

- Site Boundary
- Internal Parcel Boundaries

Total Area: 612459m²

Total Perimeter: 3238m

Disclaimers:

Measurements are approximate only and may have been simplified or smaller lengths removed for readability.

Parcels that make up a small percentage of the total site area have not been labelled for increased legibility.

Scale: 0 25 50 100 150 200 250 Meters

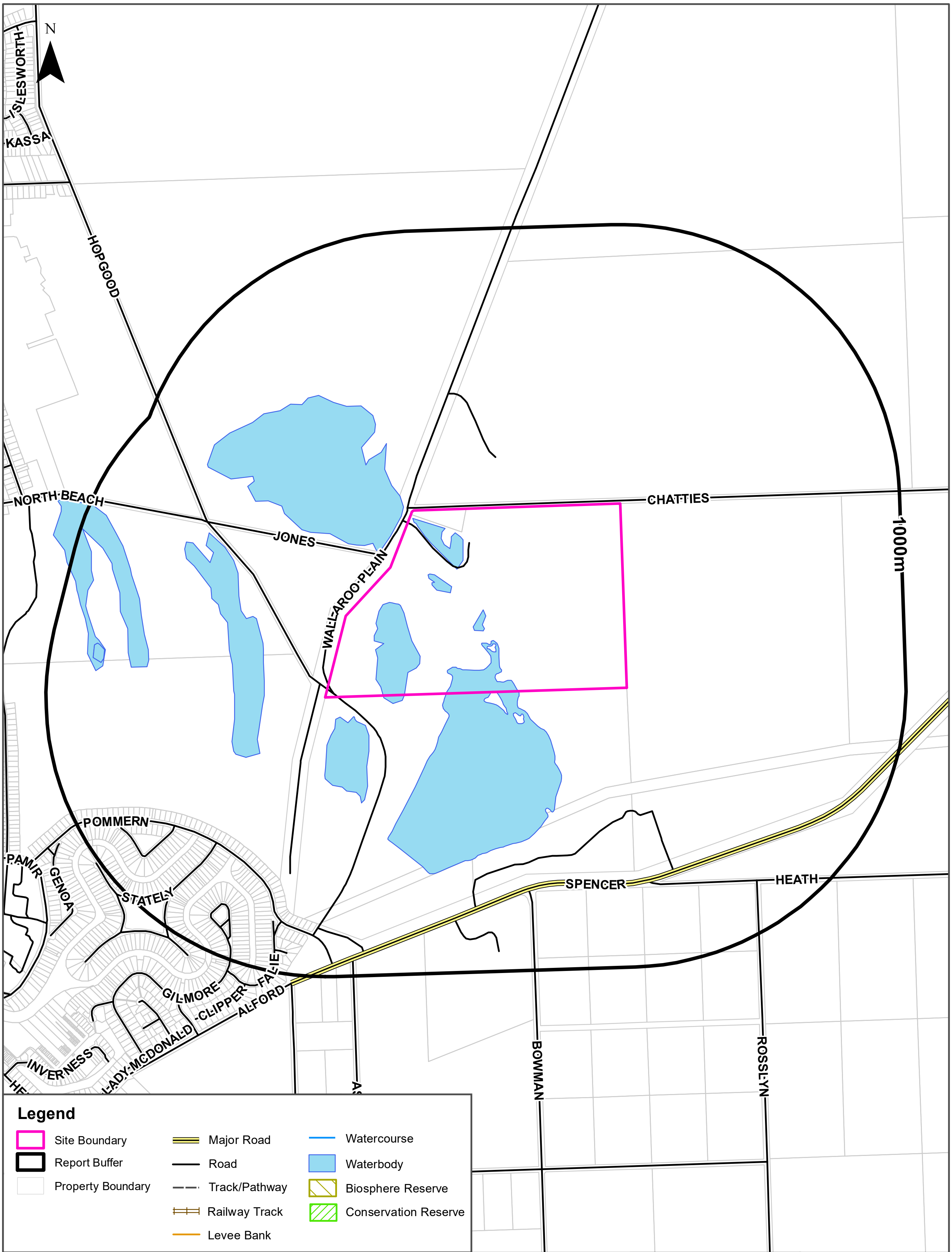
Data Sources: Aerial Imagery © Aerometrex Pty Ltd

Coordinate System: GDA 1994 MGA Zone 54

Date: 17 August 2020

Topographic Features

72 Wallaroo Plain Road, Wallaroo, SA 5556



Scale: 0 100 200 400 600 800 Meters	Data Sources: Property Boundaries - Sourced by Omnilink PTY LTD. ©PSMA Australia Limited www.psma.com.au/psma-data-copyright-and-disclaimer	Coordinate System: GDA 1994 MGA Zone 54	Date: 17 August 2020

EPA Contaminated Land

72 Wallaroo Plain Road, Wallaroo, SA 5556

EPA Site Contamination Index

Sites on the EPA Contamination Index within the dataset buffer:

Notification No	Type	Address	Activity	Status	LocConf	Dist	Dir
N/A	No records in buffer						

Site Contamination Index Data Source: EPA South Australia

EPA Public Register

72 Wallaroo Plain Road, Wallaroo, SA 5556

EPA Environment Protection and Clean Up Orders

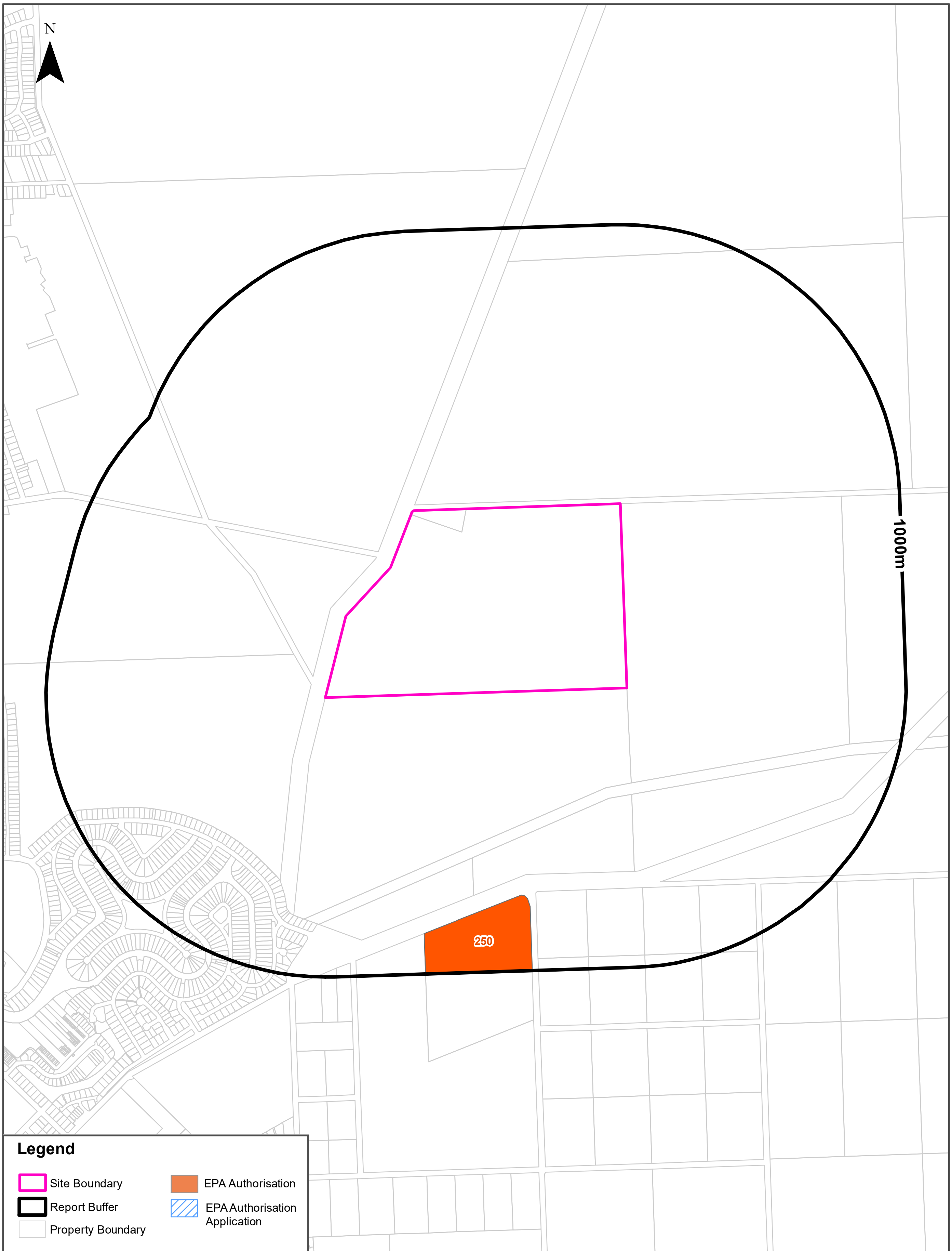
EPA Environment Protection and Clean Up Orders, within the dataset buffer:

Record No.	Record Type	Record Status	Entity	Site Address	Activity	EPA Register Status	LocConf	Dist	Dir
N/A	No records in buffer								

Authorisations Data Source: EPA South Australia

EPA Authorisations and Applications

72 Wallaroo Plain Road, Wallaroo, SA 5556



Scale: 0 100 200 400 600 800 Meters

Data Sources: Property Boundaries - Sourced by Omnilink PTY LTD. ©PSMA Australia Limited www.psma.com.au/psma-data-copyright-and-disclaimer

Coordinate System: GDA 1994 MGA Zone 54

Date: 17 August 2020

EPA Public Register

72 Wallaroo Plain Road, Wallaroo, SA 5556

EPA Authorisations and Applications

EPA Authorisations and Authorisation Applications within the dataset buffer:

Record No.	Record Type	Record Status	Entity	Site Address	Activity	EPA Register Status	LocConf	Dist	Dir
250	LICENCE	Issued	COPPER COAST COUNCIL	Section 2916, Alford Road, WALLAROO SA 5556	Waste or recycling depots (solid waste for on-site disposal)	Current EPA Register	Premise Match	729m	South

Authorisations Data Source: EPA South Australia

EPA Assessment Areas

72 Wallaroo Plain Road, Wallaroo, SA 5556

EPA Assessment Areas

EPA Assessment Areas within the dataset buffer:

Map Id	Supplied Ref	Area Name	Map Link	Status	Location Confidence	Distance	Direction
N/A	No records in buffer						

Assessment Areas Data Source: EPA South Australia

PFAS Investigation and Management Programs

72 Wallaroo Plain Road, Wallaroo, SA 5556

Defence PFAS Investigation and Management Program Investigation Sites

Sites being investigated by the Department of Defence for PFAS contamination within the dataset buffer:

Map ID	Base Name	Address	Location Confidence	Distance	Direction
N/A	No records in buffer				

Defence PFAS Investigation and Management Program Data Source: Department of Defence, Australian Government

Defence PFAS Investigation and Management Program Management Sites

Sites being managed by the Department of Defence for PFAS contamination within the dataset buffer:

Map ID	Base Name	Address	Location Confidence	Distance	Direction
N/A	No records in buffer				

Defence PFAS Investigation and Management Program Data Source: Department of Defence, Australian Government

Airservices Australia National PFAS Management Program

Sites being investigated or managed by Airservices Australia for PFAS contamination within the dataset buffer:

Map ID	Site Name	Impacts	Location Confidence	Distance	Direction
N/A	No records in buffer				

Airservices Australia National PFAS Management Program Data Custodian: Airservices Australia

Defence Sites

72 Wallaroo Plain Road, Wallaroo, SA 5556

Defence 3 Year Regional Contamination Investigation Program

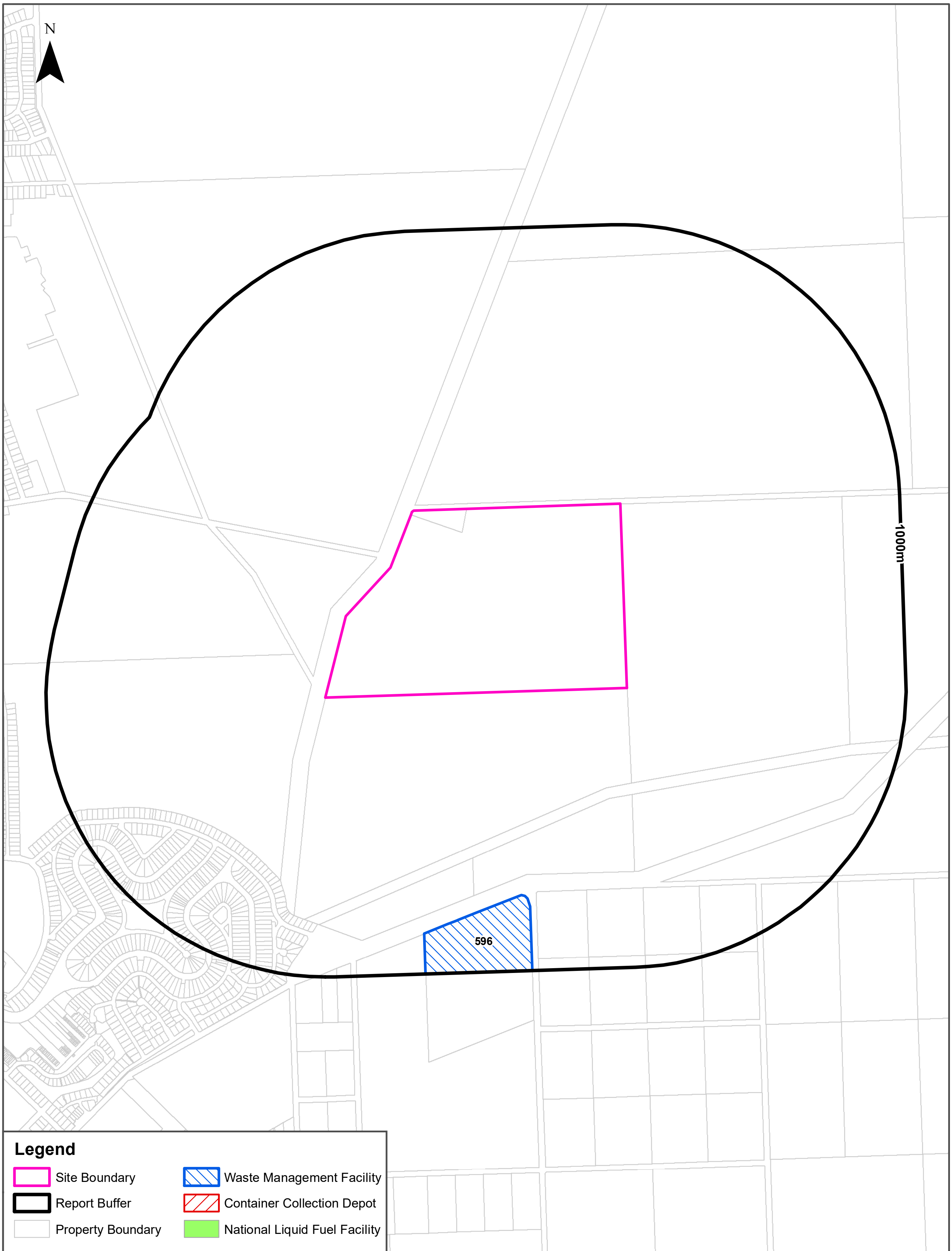
Sites which have been assessed as part of the Defence 3 Year Regional Contamination Investigation Program within the dataset buffer:

Property ID	Base Name	Address	Known Contamination	Loc Conf	Dist	Dir
N/A	No records in buffer					

Defence 3 Year Regional Contamination Investigation Program, Data Custodian: Department of Defence, Australian Government

Waste Management & Liquid Fuel Facilities

72 Wallaroo Plain Road, Wallaroo, SA 5556



Scale: 0 240 480 720 960 Meters

Data Sources: Property Boundaries - Sourced by Omnilink PTY LTD. ©PSMA Australia Limited www.psma.com.au/psma-data-copyright-and-disclaimer

Coordinate System: GDA 1994 MGA Zone 54

Date: 18 August 2020

Waste Management and Liquid Fuel Facilities

72 Wallaroo Plain Road, Wallaroo, SA 5556

National Waste Management Site Database

Sites on the National Waste Management Site Database within the dataset buffer:

Site Id	Owner	Name	Address	Suburb	Class	Revised Date	Location Confidence	Distance	Direction
596	Copper Coast District Council	Wallaroo Landfill Site	Wallaroo-Alford Road	Wallaroo	Multi-Purpose	21/07/2011	Premise Match	729m	South

Waste Management Facilities Data Source: Australian Government Geoscience Australia

EPA Approved Container Collection Depots

EPA approved container collection depots within the dataset buffer:

MapId	Name	Address	Suburb	Loc Conf	Distance	Direction
N/A	No records in buffer					

Collection Depot Data Source: EPA South Australia

National Liquid Fuel Facilities

National Liquid Fuel Facilties within the dataset buffer:

Map Id	Owner	Name	Address	Suburb	Class	Operational Status	Operator	Revision Date	Loc Conf	Dist (m)	Dir
N/A	No records in buffer										

National Liquid Fuel Facilities Data Source: Geoscience Australia

Historical Business Directories

72 Wallaroo Plain Road, Wallaroo, SA 5556

Business Directory Records 1910-1991
Premise or Road Intersection Matches

Universal Business Directory and Sands & McDougall Directory records, from years 1991, 1973, 1965, 1955, 1950, 1940, 1930, 1920 & 1910, mapped to a premise or road intersection within the dataset buffer:

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

Business Directory Content Derived from Sands & McDougall's Directory of South Australia

Business Directory Records 1910-1991
Road or Area Matches

Universal Business Directory and Sands & McDougall Directory records, from years 1991, 1973, 1965, 1955, 1950, 1940, 1930, 1920 & 1910, mapped to a road or an area, within the dataset buffer. Records are mapped to the road when a building number is not supplied, cannot be found, or the road has been renumbered since the directory was published:

Map Id	Business Activity	Premise	Ref No.	Year	Location Confidence	Approx. Dist. to Road Corridor or Area
	No records in buffer					

Business Directory Content Derived from Sands & McDougall's Directory of South Australia

Historical Business Directories

72 Wallaroo Plain Road, Wallaroo, SA 5556

Dry Cleaners, Motor Garages & Service Stations 1930-1991 Premise or Road Intersection Matches

Dry Cleaners, Motor Garages & Service Stations from UBD Business Directories and Sands & McDougall's Directories, from years 1991, 1973, 1965, 1955, 1950, 1940 & 1930, mapped to a premise or road intersection, within the dataset buffer.

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

Historical Business Directories

72 Wallaroo Plain Road, Wallaroo, SA 5556

Dry Cleaners, Motor Garages & Service Stations 1930-1991
Road or Area Matches

Dry Cleaners, Motor Garages & Service Stations from UBD Business Directories and Sands & McDougall's Directories, from years 1991, 1973, 1965, 1955, 1950, 1940 & 1930, mapped to a road or an area, within the dataset buffer. Records are mapped to the road when a building number is not supplied, cannot be found, or the road has been renumbered since the directory was published.

Map Id	Business Activity	Premise	Ref No.	Year	Location Confidence	Approx. Dist. to Road Corridor or Area
	No records in buffer					

Aerial Imagery 2018

72 Wallaroo Plain Road, Wallaroo, SA 5556

Legend

Site Boundary

Buffer 150m

Scale: 0 90 180 270 360 Meters	Data Sources: Aerial Imagery © Aerometrex Pty Ltd	Coordinate System: GDA 1994 MGA Zone 54	Date: 17 August 2020

Aerial Imagery 2010

72 Wallaroo Plain Road, Wallaroo, SA 5556

Scale: 0 90 180 270 360 Meters	Data Source Aerial Imagery: © 2020 Google Inc, used with permission. Google and the Google logo are registered trademarks of Google Inc.	Coordinate System: GDA 1994 MGA Zone 54	Date: 17 August, 2020

Aerial Imagery 2003

72 Wallaroo Plain Road, Wallaroo, SA 5556

Scale: 0 90 180 270 360 Meters	Data Sources Aerial Imagery: © South Australia Department for Environment & Water	Coordinate System: GDA 1994 MGA Zone 54	Date: 21 August, 2020

Aerial Imagery 1999

72 Wallaroo Plain Road, Wallaroo, SA 5556

Scale: 0 90 180 270 360 Meters	Data Sources Aerial Imagery: © South Australia Department for Environment & Water	Coordinate System: GDA 1994 MGA Zone 54	Date: 17 August, 2020

Aerial Imagery 1987

72 Wallaroo Plain Road, Wallaroo, SA 5556

Scale:
0 90 180 270 360
Meters

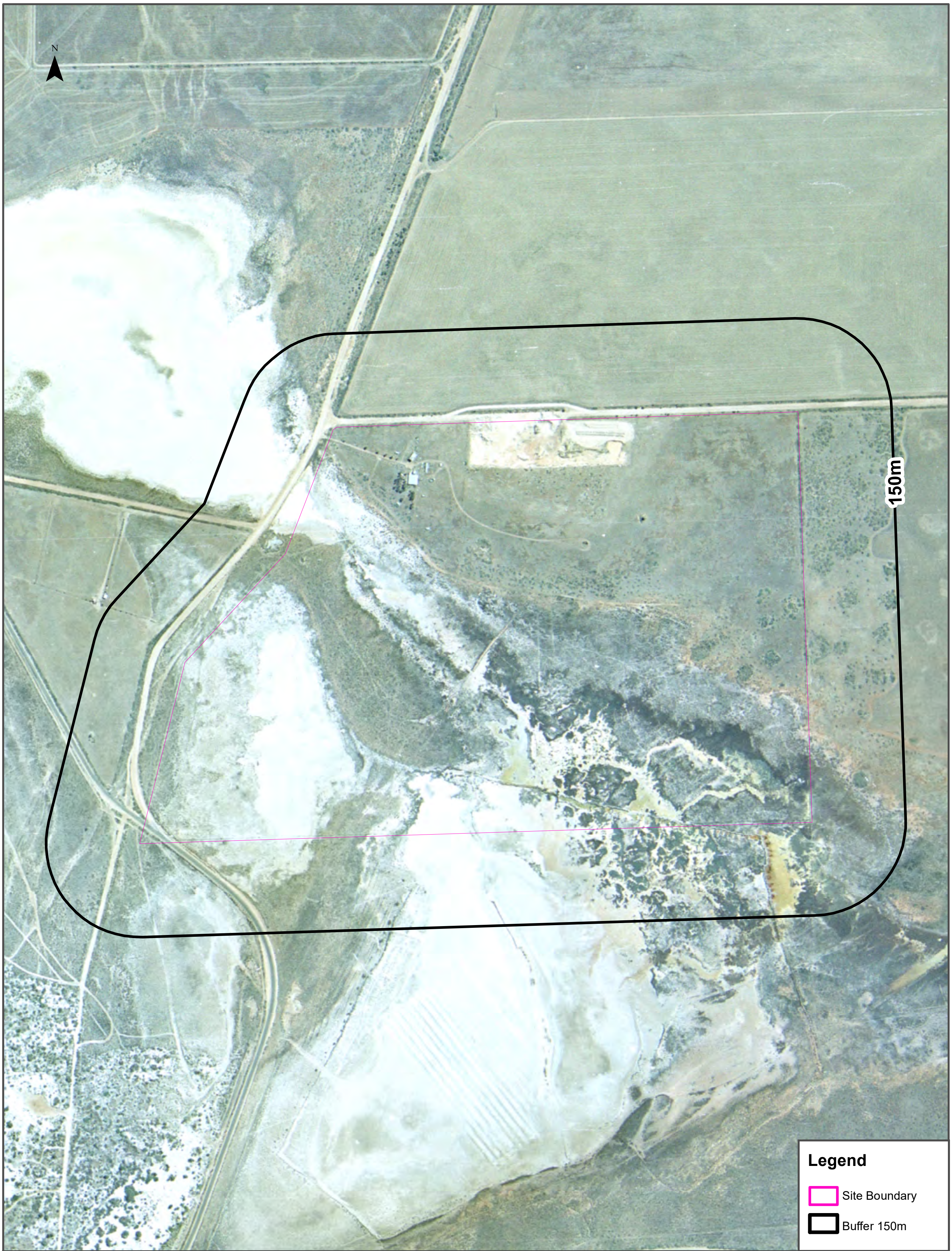
Data Sources Aerial Imagery: © South Australia Department for Environment & Water

Coordinate System: GDA 1994 MGA Zone 54

Date: 17 August, 2020

Aerial Imagery 1979

72 Wallaroo Plain Road, Wallaroo, SA 5556



Scale: 0 90 180 270 360 Meters	Data Sources Aerial Imagery: © South Australia Department for Environment & Water	Coordinate System: GDA 1994 MGA Zone 54	Date: 17 August, 2020

Aerial Imagery 1975

72 Wallaroo Plain Road, Wallaroo, SA 5556

Scale: 0 90 180 270 360 Meters	Data Sources Aerial Imagery: © South Australia Department for Environment & Water	Coordinate System: GDA 1994 MGA Zone 54	Date: 21 August, 2020

Aerial Imagery 1956

72 Wallaroo Plain Road, Wallaroo, SA 5556

Scale: 0 90 180 270 360 Meters

Data Sources Aerial Imagery: © South Australia Department for Environment & Water

Coordinate System: GDA 1994 MGA Zone 54

Date: 21 August, 2020

Historical Map 1982

2 Wallaroo Plain Road, Wallaroo, SA 5556

Scale: 0 200 400 800 Metres

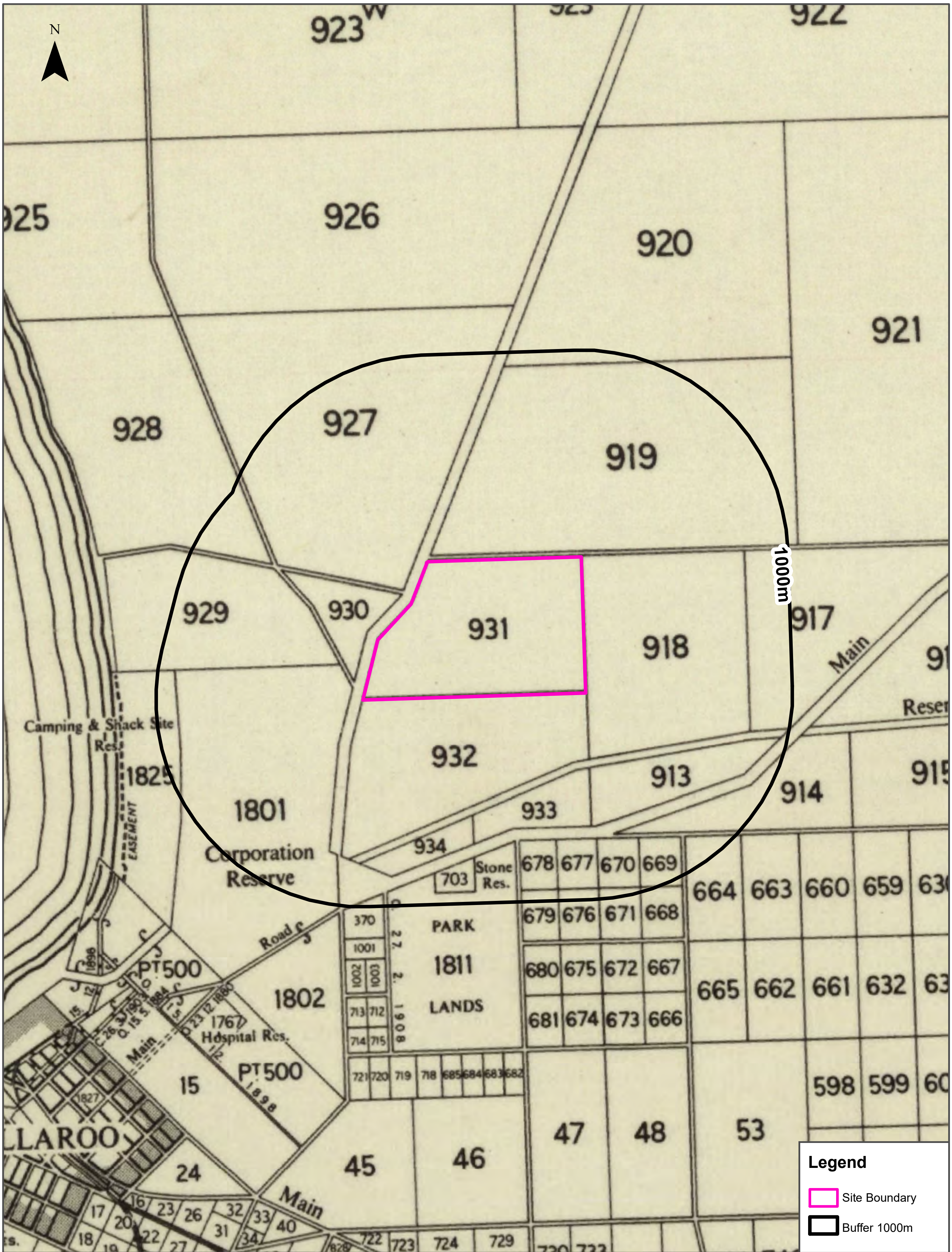
Data Sources: NATMAP 1:100,000 Topographic Maps
Geoscience Australia

Coordinate System:
GDA 1994 MGA Zone 54

Date: 17 August 2020

Historical Map 1961

72 Wallaroo Plain Road, Wallaroo, SA 5556



Scale: 0 200 400 800 Metres

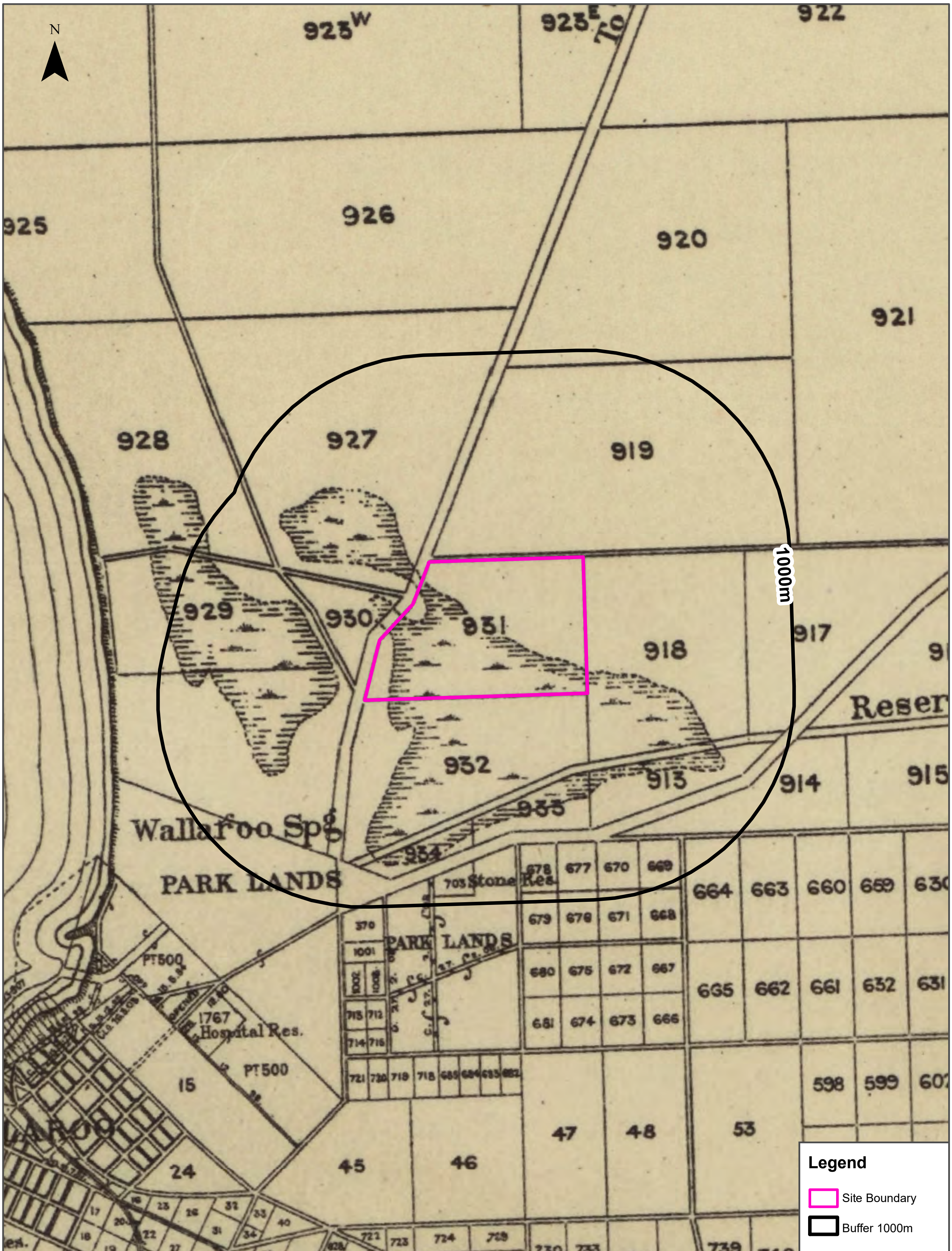
Data Sources: Hundred Map - Wallaroo
Surveyor General's Office, Adelaide

Coordinate System:
GDA 1994 MGA Zone 54

Date: 17 August 2020

Historical Map 1953

72 Wallaroo Plain Road, Wallaroo, SA 5556



Legend

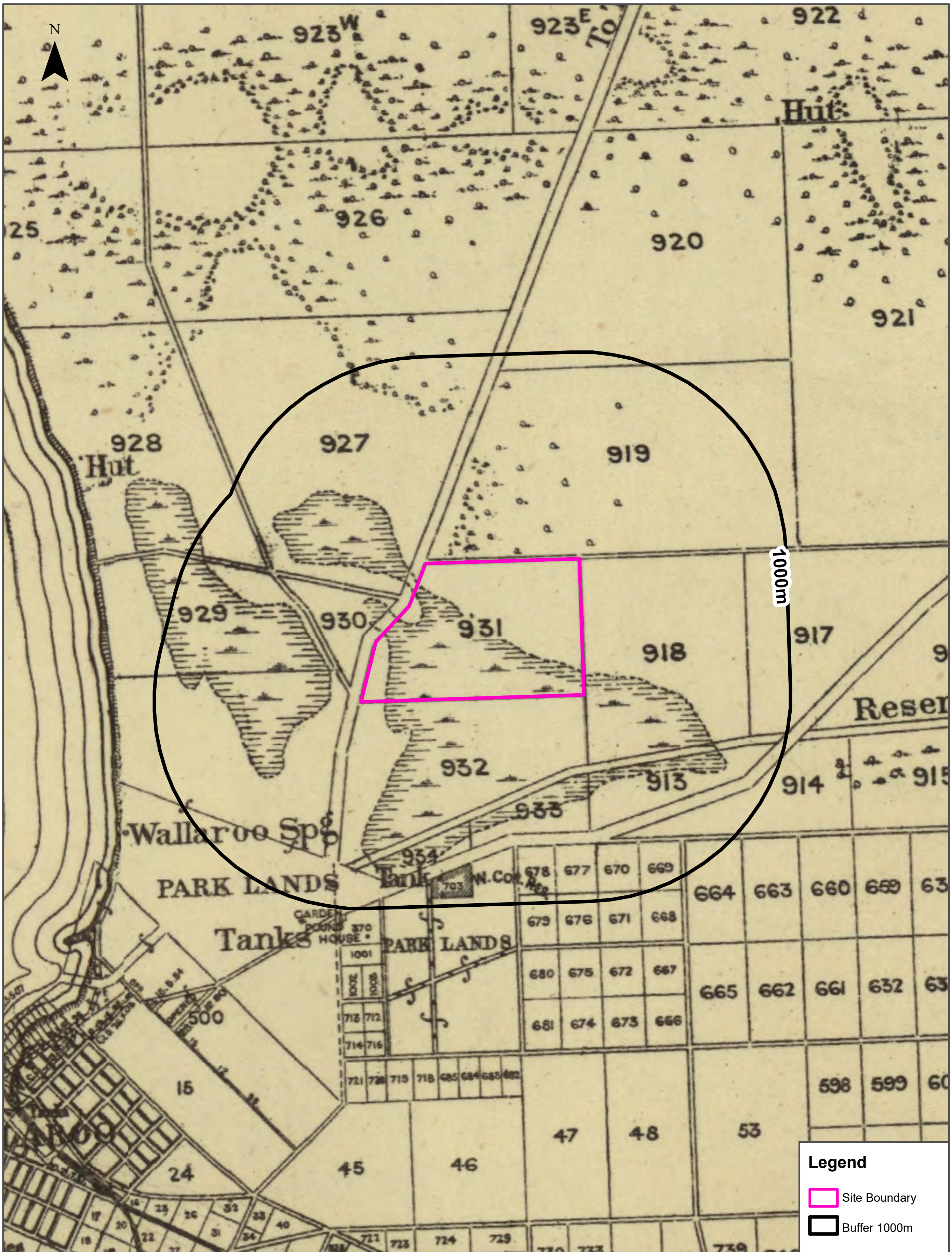
Site Boundary

Buffer 1000m

Scale: 0 200 400 800 Metres	Data Sources: Hundred Map - Wallaroo Surveyor General's Office, Adelaide	Coordinate System: GDA 1994 MGA Zone 54	Date: 17 August 2020

Historical Map 1912

72 Wallaroo Plain Road, Wallaroo, SA 5556



Scale: 0 200 400 800 Metres

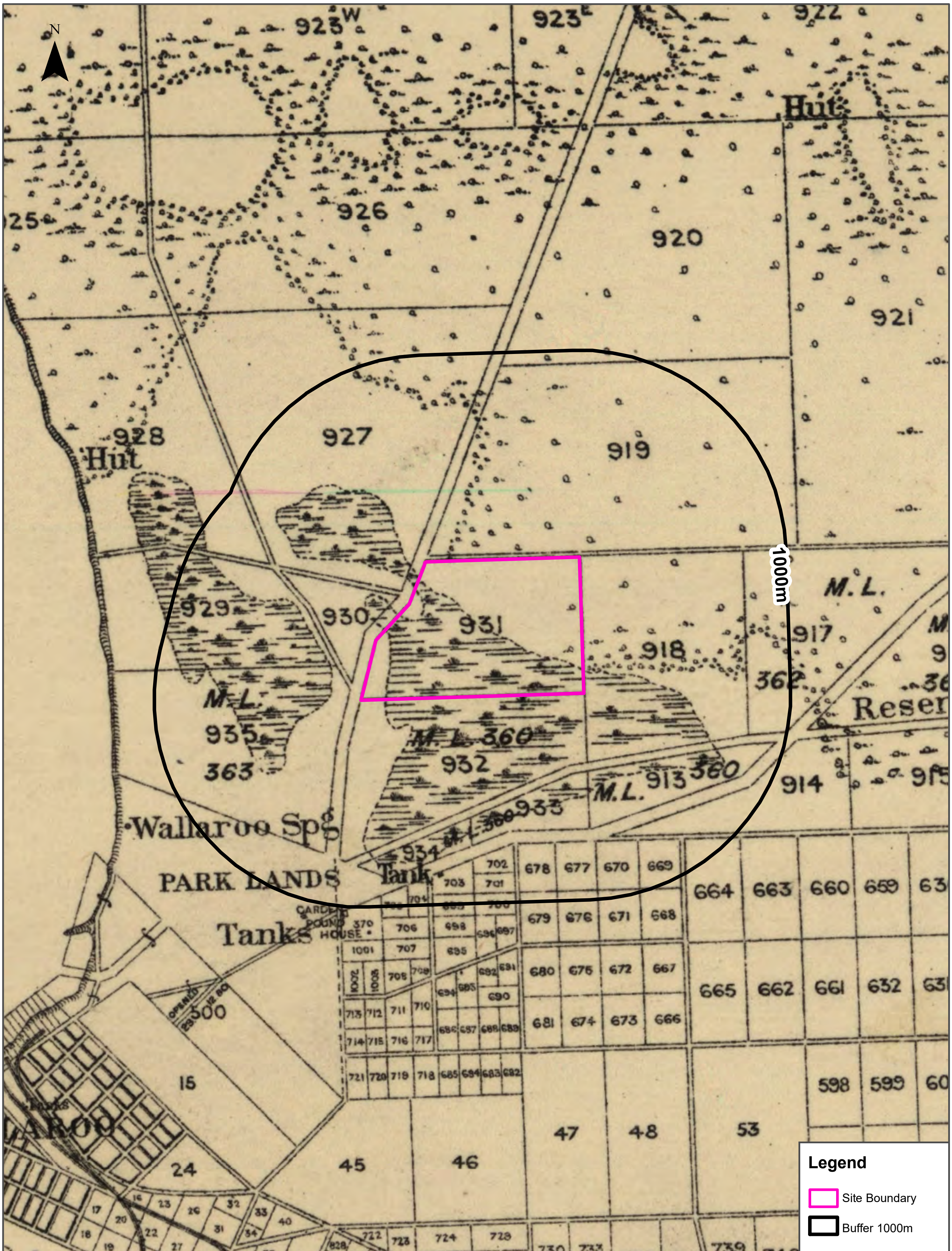
Data Sources: Hundred Map - Wallaroo
Surveyor General's Office, Adelaide

Coordinate System:
GDA 1994 MGA Zone 54

Date: 17 August 2020

Historical Map 1888

72 Wallaroo Plain Road, Wallaroo, SA 5556



Scale: 0 200 400 800 Metres

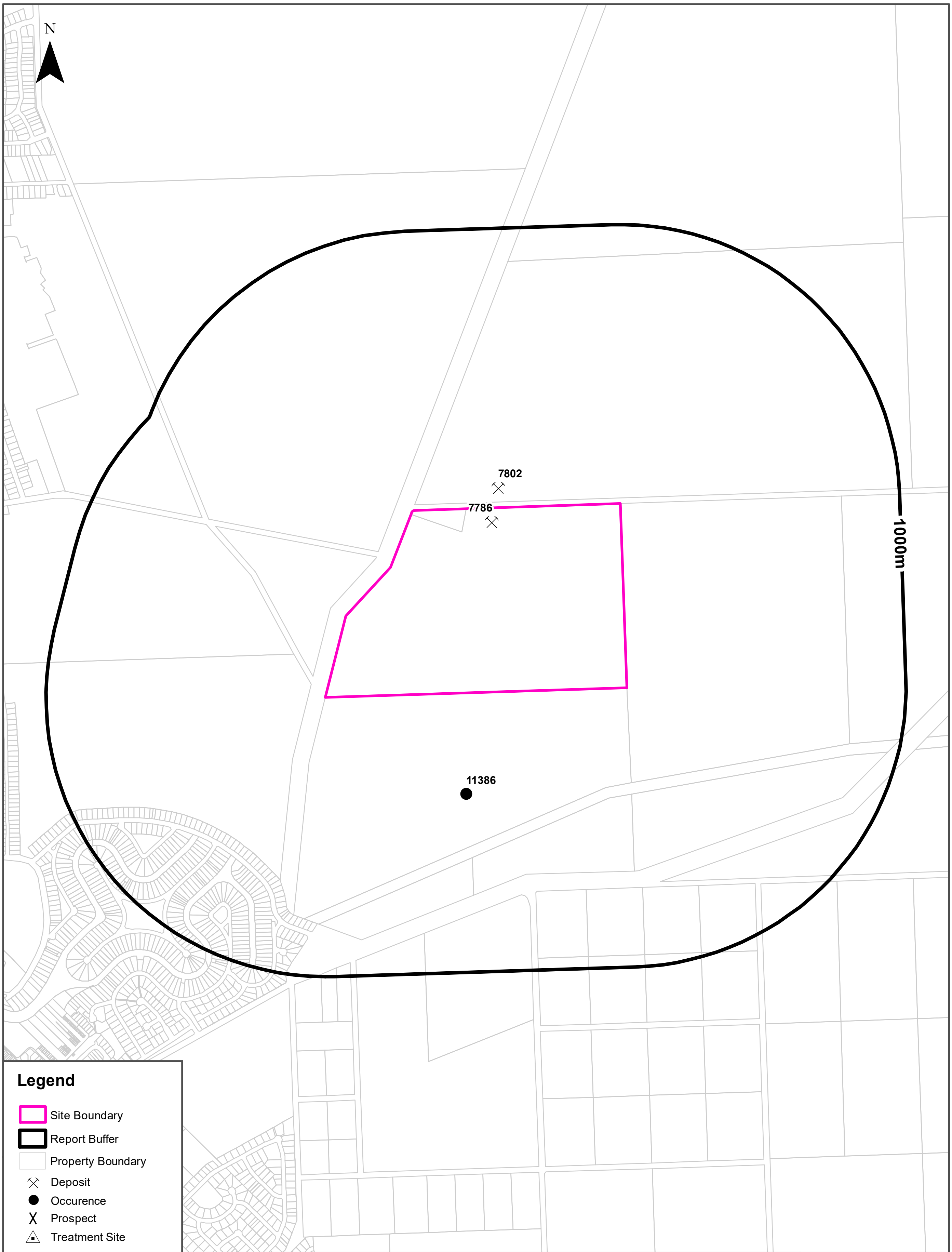
Data Sources: Hundred Map - Wallaroo
Surveyor General's Office, Adelaide

Coordinate System:
GDA 1994 MGA Zone 54

Date: 17 August 2020

Mines and Mineral Deposits

72 Wallaroo Plain Road, Wallaroo, SA 5556



Data Sources: Property Boundaries - Sourced by Omnilink PTY LTD. ©PSMA Australia Limited www.psma.com.au/psma-data-copyright-and-disclaimer

Coordinate System: GDA 1994 MGA Zone 54

Date: 17 August 2020

Mining

72 Wallaroo Plain Road, Wallaroo, SA 5556

Mines and Mineral Deposits

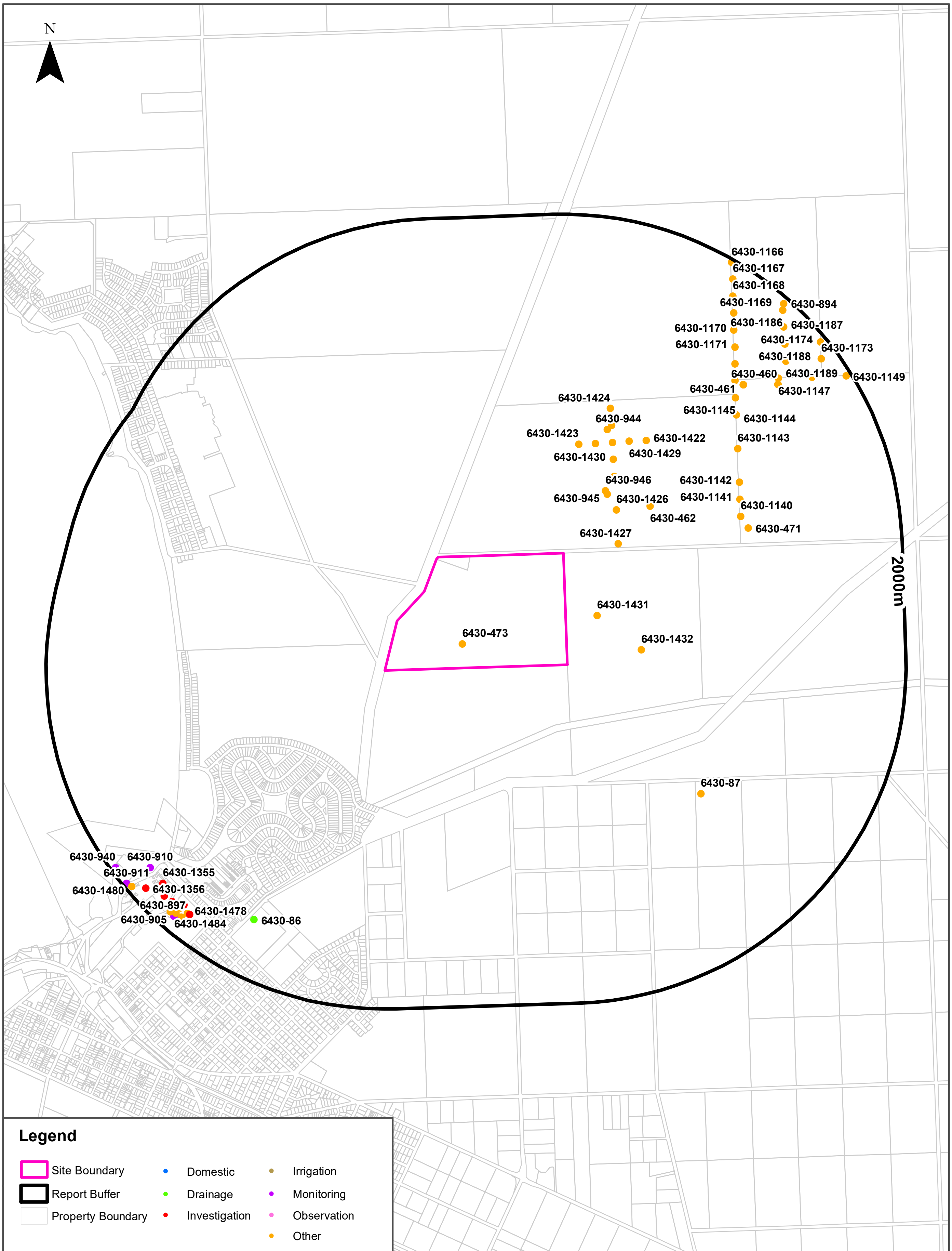
Mines and mineral deposits within the dataset buffer:

Deposit No.	Name	Class	Status	Commodity	Year	Description	Dist	Dir'n
7786	HARLEQUIN STONE	DEPOSIT	Active Mine	Granite	1992	quarry developed on a metasomatised gneiss of the Palaeoproterozoic Oorlano Metasomatite, and characterised by colours of vivid pale green to pink-red against a background of dark-grey to deep blue. Production from 1992-2009 ~56,000t.	0m	Onsite
7802	OORALLAW HARLEQUIN	DEPOSIT	Seasonal	Calcrete, Granite	2005	Pleistocene calcrete overlying Mesoproterozoic Oorlano Metasomatite. Total production from 2005-12 was ~58,800 tonne including 53,500 tonne for road base material to 2009, and thereafter 8,300 tonne granite for dimension stone.	71m	North
11386	WALLAROO	OCCURRENCE	Not worked	Salt	1949	low lying swamp area considered for salt production. Advantages proximity to sea, and transport hub, disadvantage, winter flooding, and small area available.	361m	South

All Mines and Mineral Deposits Data Source: Dept. of State Development, Resources and Energy - South Australia

Drillholes

72 Wallaroo Plain Road, Wallaroo, SA 5556



Scale: 0 200 400 800 1,200 Meters

Data Sources: Property Boundaries - Sourced by Omnilink PTY LTD. ©PSMA Australia Limited www.psma.com.au/psma-data-copyright-and-disclaimer

Coordinate System: GDA 1994 MGA Zone 54

Date: 17 August 2020

Groundwater and Drillholes

72 Wallaroo Plain Road, Wallaroo, SA 5556

Groundwater Aquifers

Groundwater aquifers within the dataset buffer:

Aquifer Code	Description	Distance	Direction
30	Fractured Rocks - Cambrian and Precambrian rocks - quartzite, sandstone, limestone, dolomite, slate, marble, siltstone, phyllite, schist and gneiss	0m	Onsite

Groundwater Aquifers Data Source: Dept. of Environment, Water and Natural Resources - South Australia

Drillholes

Drillholes within the dataset buffer:

Unit No	Drillhole No	Name	Status	Purpose	Drill Date	Max Depth	Ref Elev	Ground Elev	PH	TDS	EC	Yield	DTW	SWL	RSWL	Dist	Dir'n
6430-473	23654	DDH 133	Unknown		1973-09-19	457.50										0m	Onsite
6430-1431	268395	MPDRB-040			2003-02-08	13.00		7.23								185m	East
6430-1427	268391	MPDRB-036			2003-02-07	23.00		9.99								327m	North East
6430-1426	268390	MPDRB-035			2003-02-07	42.00		12.98								401m	North East
6430-945	205738	MPD 4			2005-01-09	24.00		14.00								431m	North East
6430-1432	268396	MPDRB-041			2003-02-08	24.00		6.50								439m	East
6430-946	205739	MPD 5			2005-01-09	158.00		14.00								442m	North East
6430-1425	268389	MPDRB-034			2003-02-06	48.00		15.30								542m	North East
6430-462	23643	DDH 122	Unknown		1972-07-24	364.69										581m	North East
6430-1430	268394	MPDRB-039			2003-02-08	46.00		16.68								625m	North East
6430-1423	268387	MPDRB-032			2003-02-06	56.00		15.06								646m	North East
6430-1428	268392	MPDRB-037			2003-02-07	55.00		15.77								672m	North East
6430-1421	268385	MPDRB-030			2003-02-05	55.00		17.10								712m	North East
6430-1429	268393	MPDRB-038			2003-02-07	46.00		17.08								763m	North East
6430-944	205737	MPD 3			2005-01-09	164.00		18.00								773m	North East
6430-1420	268384	MPDRB-029			2003-02-05	28.00		18.59								803m	North East
6430-1422	268386	MPDRB-031			2003-02-06	59.00		16.82								823m	North East
6430-1424	268388	MPDRB-033			2003-02-06	48.00		17.88								895m	North East
6430-1140	212105	MPDAC 467			2005-08-27	17.50										1067m	East
6430-1141	212106	MPDAC 468			2005-08-27	18.00										1088m	North East

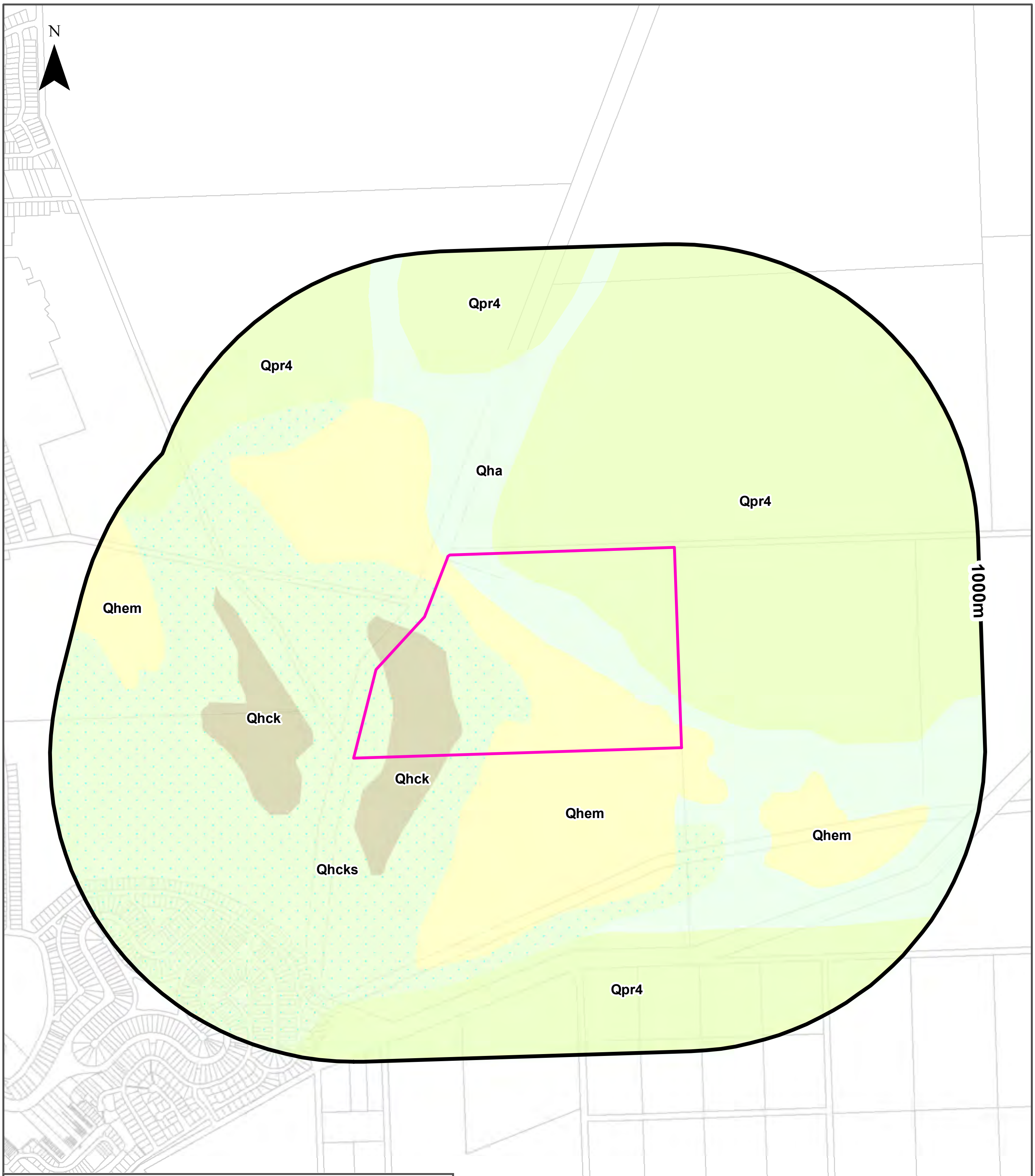
Unit No	Drillhole No	Name	Status	Purpose	Drill Date	Max Depth	Ref Elev	Ground Elev	PH	TDS	EC	Yield	DTW	SWL	RSWL	Dist	Dir'n
6430-87	23268	KOOAGNIE MINE SHAFT	Backfilled			23.77		20.92		26903	42250		23.77	23.77	-2.85	1098 m	South East
6430-471	23652	DDH 131	Unknown		1973-05-08	150.88										1100 m	East
6430-1142	212107	MPDAC 469			2005-08-27	22.00										1117 m	North East
6430-1143	212108	MPDAC 470			2005-08-27	18.00										1197 m	North East
6430-1144	212109	MPDAC 471			2005-08-27	25.00										1305 m	North East
6430-1145	212110	MPDAC 472			2005-08-27	18.00										1367 m	North East
6430-1146	212111	MPDAC 473			2005-08-27	30.00										1434 m	North East
6430-460	23641	DDH 121A	Unknown		1972-05-10	279.19										1453 m	North East
6430-461	23642	DDH 121B	Unknown		1972-05-20	279.37										1453 m	North East
6430-459	23640	DDH 121	Unknown		1972-04-10	38.56										1453 m	North East
6430-1172	212137	MPDAC 499			2005-08-28	14.00										1506 m	North East
6430-1171	212136	MPDAC 498			2005-08-28	9.00										1581 m	North East
6430-1312	220560	MPD-05-18			2005-06-17	656.70										1609 m	North East
6430-1322	232682	MPD-05-18			2005-06-17	656.70		12.00								1609 m	North East
6430-1147	212112	MPDAC 474			2005-08-27	16.00										1633 m	North East
6430-1170	212135	MPDAC 497			2005-08-28	7.00										1655 m	North East
6430-86	23267		Abandoned	Drainage	1973-10-03	8.50		23.88								1665 m	South West
6430-1189	212154	MPDAC 516			2005-08-29	24.00										1733 m	North East
6430-1169	212134	MPDAC 496			2005-08-28	24.00										1735 m	North East
6430-1188	212153	MPDAC 515			2005-08-29	30.00										1796 m	North East
6430-1148	212113	MPDAC 475			2005-08-27	20.00										1797 m	North East
6430-910	195425	MW 17		Monitoring	2002-04-15	6.00		2.26					3.75	3.75	-1.49	1811 m	South West
6430-1168	212133	MPDAC 495			2005-08-28	22.00										1815 m	North East
6430-1355	264101	MW 66	Backfilled	Investigation	2010-12-14	5.00		8.00								1819 m	South West
6430-1352	264092	MW 63		Investigation	2010-12-14	7.70		13.91								1823 m	South West
6430-1351	264091	MW 62		Investigation	2010-12-13	10.80		13.45								1848 m	South West
6430-1478	279141	NW 62	Backfilled			10.00		12.71								1849 m	South West
6430-1475	279138	MW 60 (BH60)	Backfilled			10.20		12.99					7.00	7.00	5.99	1850 m	South West
6430-1353	264094	MW 64	Backfilled	Investigation	2010-12-14	7.00		12.13								1856 m	South West
6430-1187	212152	MPDAC 514			2005-08-29	9.00										1861 m	North East
6430-1354	264099	MW 65		Investigation	2010-12-14	6.00		9.36								1865 m	South West
6430-1476	279139	NW 61 (BH61)	Backfilled			12.00		14.10					8.70	8.70	5.40	1889 m	South West
6430-1484	279147	MW 18	Backfilled			24.00		13.89								1891 m	South West
6430-1474	279137	NW 53 58	Backfilled			13.00		13.89								1892 m	South West

Unit No	Drillhole No	Name	Status	Purpose	Drill Date	Max Depth	Ref Elev	Ground Elev	PH	TDS	EC	Yield	DTW	SWL	RSWL	Dist	Dir'n
6430-1167	212132	MPDAC 494			2005-08-28	10.00										1899 m	North East
6430-1173	212138	MPDAC 500			2005-08-28	15.00										1904 m	North East
6430-1479	279142	NW2 - 5	Backfilled			14.00		14.69								1909 m	South West
6430-905	193597	PB 22		Monitoring		18.00		13.97					7.71	7.71	6.26	1911 m	South West
6430-1356	264102	MW 67	Backfilled	Investigation	2010-12-14	6.00		10.17								1912 m	South West
6430-897	193568	MW 2R		Monitoring	2002-09-13	13.00	11.72	11.37					12.01	11.66	-0.29	1914 m	South West
6430-1186	212151	MPDAC 513			2005-08-29	4.00										1930 m	North East
6430-1174	212139	MPDAC 501			2005-08-28	24.00										1961 m	North East
6430-894	192429	ALFORD WEST MAWD 2			1993-10-12	381.00										1963 m	North East
6430-1149	212114	MPDAC 476			2005-08-27	18.00										1967 m	North East
6430-1480	279143	NW2 - 4	Backfilled			11.80		6.00								1967 m	South West
6430-940	200935			Monitoring	2004-08-24	5.30		0.66				0.0100	3.50	3.50	-2.84	1972 m	South West
6430-911	195426	MW 16		Monitoring	2002-04-17	6.00		4.46					4.31	4.31	0.15	1978 m	South West
6430-1166	212131	MPDAC 493			2005-08-28	11.00										1981 m	North East

Drillholes Data Source: Dept of Environment, Water and Natural Resources - South Australia

Geology 1:100,000

72 Wallaroo Plain Road, Wallaroo, SA 5556



Legend

- Site Boundary
- Report Buffer
- Property Boundary

Linear Feature

- Alluvial fan
- Dyke
- Fault
- Fold
- Gilgai
- Joint
- Lineament
- Open cut quarry
- Shear zone
- Other Linear Feature

Scale: 0 100 200 400 600 800 Meters	Data Sources: Property Boundaries - Sourced by Omnilink PTY LTD. ©PSMA Australia Limited www.psma.com.au/psma-data-copyright-and-disclaimer	Coordinate System: GDA 1994 MGA Zone 54	Date: 17 August 2020

Geology

72 Wallaroo Plain Road, Wallaroo, SA 5556

Surface Geology 1:100,000

Surface Geology Units within the dataset buffer:

Map Unit Code	Name	Description	Parent Name	Province	Age	Min Age	Max Age	Distance
Qha	Unnamed GIS Unit - see description	Undifferentiated Holocene alluvial/fluvial sediments.	Unnamed GIS Unit - see description	UNKNOWN	HOLOCENE	Holocene	Holocene	0m
Qhck	Saint Kilda Formation	Coastal marine sediment: calcareous, fossiliferous sand and mud of iintertidal sand flats, beaches and tidal marshes; organic, gypseous clay of supratidal flats.	Unnamed GIS Unit - see description	ST VINCENT BASIN	HOLOCENE	Holocene	Holocene	0m
Qhcks	Semaphore Sand Member	Unconsolidated white bioclastic quartz-carbonate sand of modern beaches and transgressive dune fields.	Saint Kilda Formation	ST VINCENT BASIN	HOLOCENE	Holocene	Holocene	0m
Qhem	Moornaba Sand	Sand, aeolian, off-white and pale yellow, quartz-rich with carbonate pipes.	Unnamed GIS Unit - see description	COASTAL QUATERNARY	HOLOCENE	Holocene	Holocene	0m
Qpr4	Unnamed GIS Unit - see description	Pleistocene gravel, clay, silt and sand with soft carbonate, overlying nodular/tabular calcrete.	Unnamed GIS Unit - see description	UNKNOWN	PLEISTOCENE	Pleistocene	Pleistocene	0m

Geology Data Source: Dept of Environment, Water and Natural Resources - South Australia

Linear Structures 1:100,000

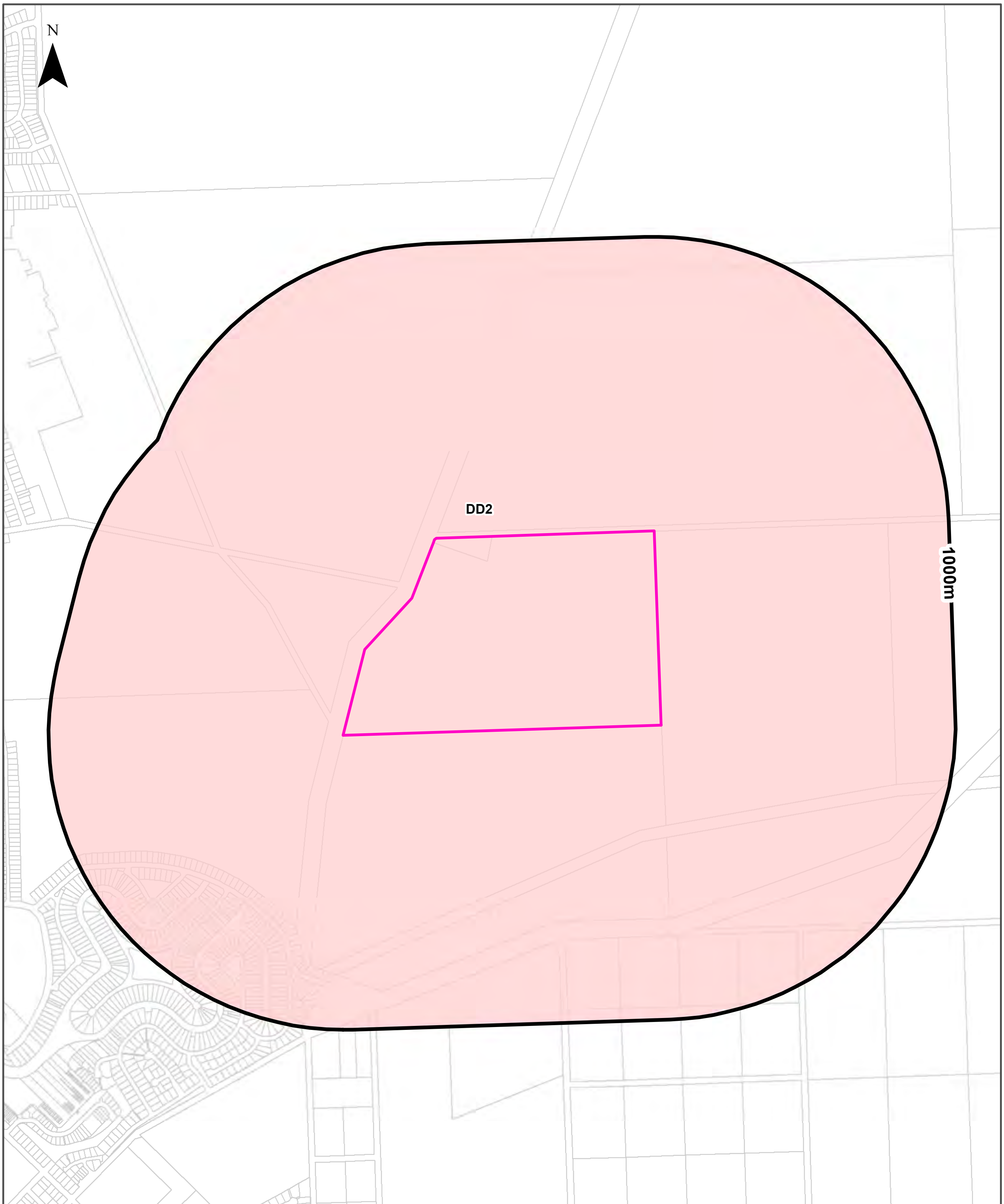
Linear geological structures within the dataset buffer:

Map Code	Description	Distance
N/A	No features in buffer	

Geology Data Source: Dept of Environment, Water and Natural Resources - South Australia

Atlas of Australian Soils

72 Wallaroo Plain Road, Wallaroo, SA 5556



Legend

Site Boundary
Report Buffer
Property Boundary

Australian Soil Classification Orders

Anthroposol, Dermosol, Kandosol, Podosol, Tenosol, No Data
Calcarosol, Ferrosol, Kurosol, Rudosol, Vertosol
Chromosol, Hydrosol, Organosol, Sodosol, Lake

Scale: 0 100 200 400 600 800 Meters	Data Sources: Property Boundaries - Sourced by Omnilink PTY LTD. ©PSMA Australia Limited www.psma.com.au/psma-data-copyright-and-disclaimer	Coordinate System: GDA 1994 MGA Zone 54	Date: 17 August 2020

Soils

72 Wallaroo Plain Road, Wallaroo, SA 5556

Atlas of Australian Soils

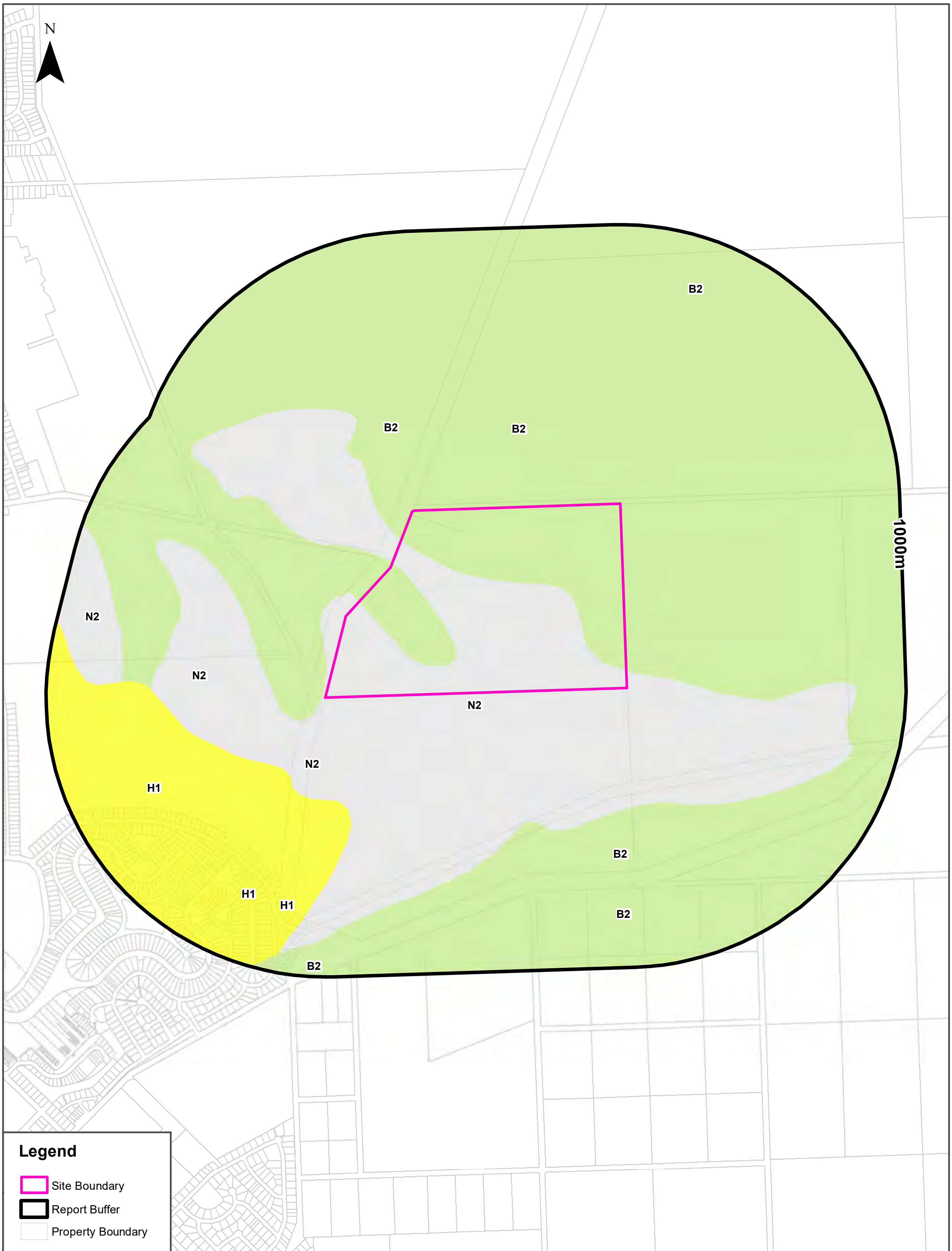
Soil mapping units and Australian Soil Classification orders within the dataset buffer:

Map Unit Code	Soil Order	Map Unit Description	Distance
DD2	Calcarosol	Plains with more or less isolated tracts of dunes: broad plains of brown calcareous earths (especially Gc1.12) with areas of exposed caliche and crusty loamy soils (Dr1.33), (Dr1.43), and (Dr1.13), with clay pans, saline soils (unclassified), swamps, and intermittent lakes in the lower-lying portions; also dunes of brown sands (Uc5.1) and brown calcareous earths (Gc1.22).	0m

Atlas of Australian Soils Data Source: CSIRO

Soil Types

72 Wallaroo Plain Road, Wallaroo, SA 5556



Scale: 0 100 200 400 Meters	Data Sources: Property Boundaries - Sourced by Omnilink PTY LTD. ©PSMA Australia Limited www.psma.com.au/psma-data-copyright-and-disclaimer	Coordinate System: GDA 1994 MGA Zone 54	Date: 17 August 2020

Soils

72 Wallaroo Plain Road, Wallaroo, SA 5556

Soil Types

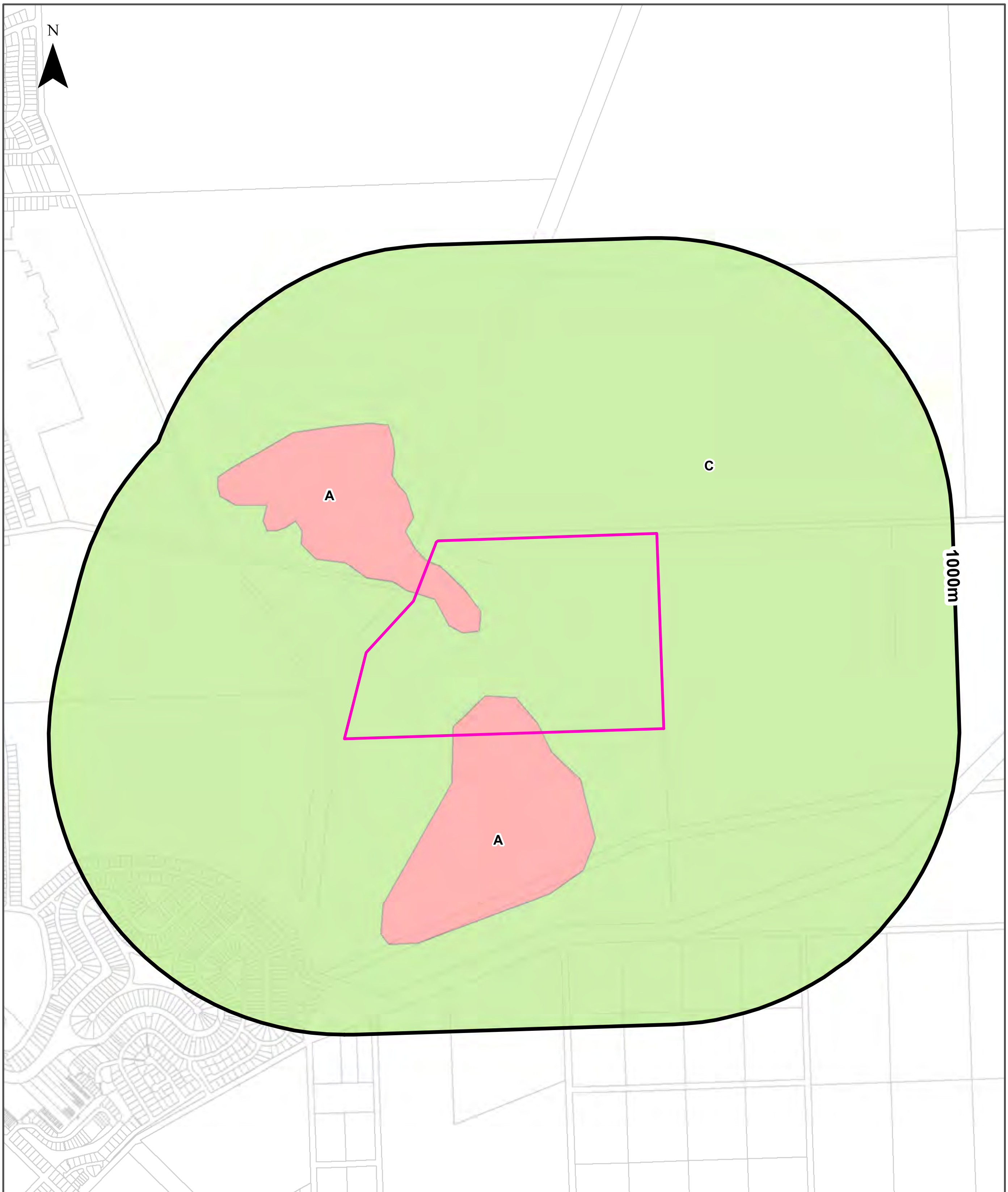
Soil types within the dataset buffer:

Map category code	Soil type description	Distance
N2	Saline soil	0m
B2	Shallow calcareous loam on calcrete	0m
H1	Carbonate sand	297m

Soil Types Data Source: Dept of Environment, Water and Natural Resources - South Australia

Atlas of Australian Acid Sulfate Soils

72 Wallaroo Plain Road, Wallaroo, SA 5556



Legend

Site Boundary
Report Buffer
Property Boundary

Probability of occurrence of Acid Sulfate Soils

A. High (>70%)
B. Low (6-70%)
C. Extremely Low (1-5%)
D. No Chance (0%)

Scale: 0 100 200 400 600 800 Meters	Data Sources: Property Boundaries - Sourced by Omnilink PTY LTD. ©PSMA Australia Limited www.psma.com.au/psma-data-copyright-and-disclaimer	Coordinate System: GDA 1994 MGA Zone 54	Date: 17 August 2020

Acid Sulfate Soils

72 Wallaroo Plain Road, Wallaroo, SA 5556

Atlas of Australian Acid Sulfate Soils

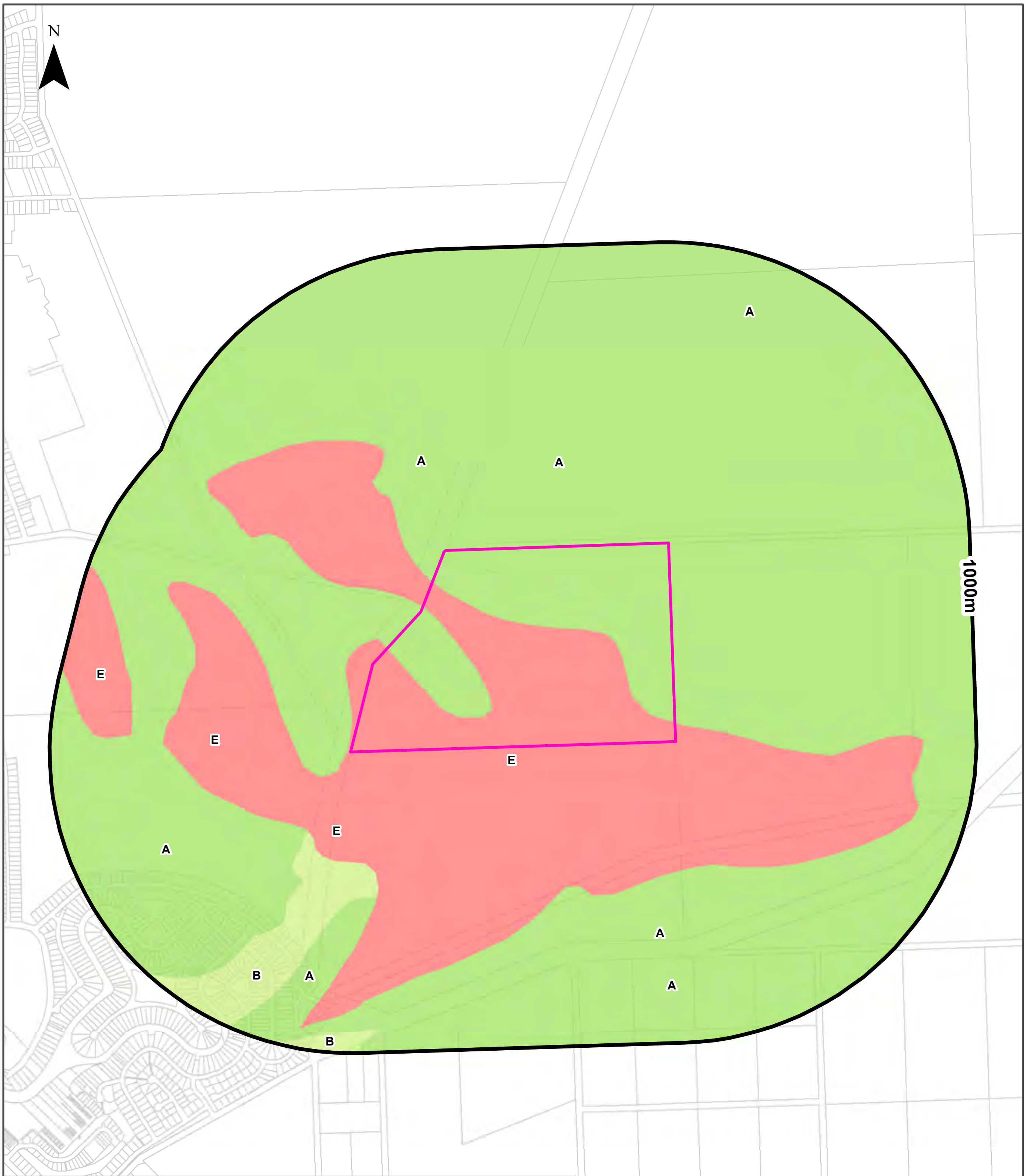
Atlas of Australian Acid Sulfate Soil categories within the dataset buffer:

Class	Description	Distance
A	High Probability of occurrence. >70% chance of occurrence.	0m
C	Extremely low probability of occurrence. 1-5% chance of occurrence with occurrences in small localised areas.	0m

Atlas of Australian Acid Sulfate Soils Data Source: CSIRO

Acid Sulfate Soils Potential

72 Wallaroo Plain Road, Wallaroo, SA 5556



Legend

Proportion of land susceptible to the development of Acid Sulfate Soils

- Site Boundary
- Report Buffer
- Property Boundary
- Negligible
- 1-10%
- 10-30%
- 30-60%
- More than 60%
- Incomplete data (usually wet inland areas)
- Not applicable - No assessment/ analysis

Scale: 0 100 200 400 Meters	Data Sources: Property Boundaries - Sourced by Omnilink PTY LTD. ©PSMA Australia Limited www.psma.com.au/psma-data-copyright-and-disclaimer	Coordinate System: GDA 1994 MGA Zone 54	Date: 17 August 2020

Acid Sulfate Soils

72 Wallaroo Plain Road, Wallaroo, SA 5556

Acid Sulfate Soil Potential

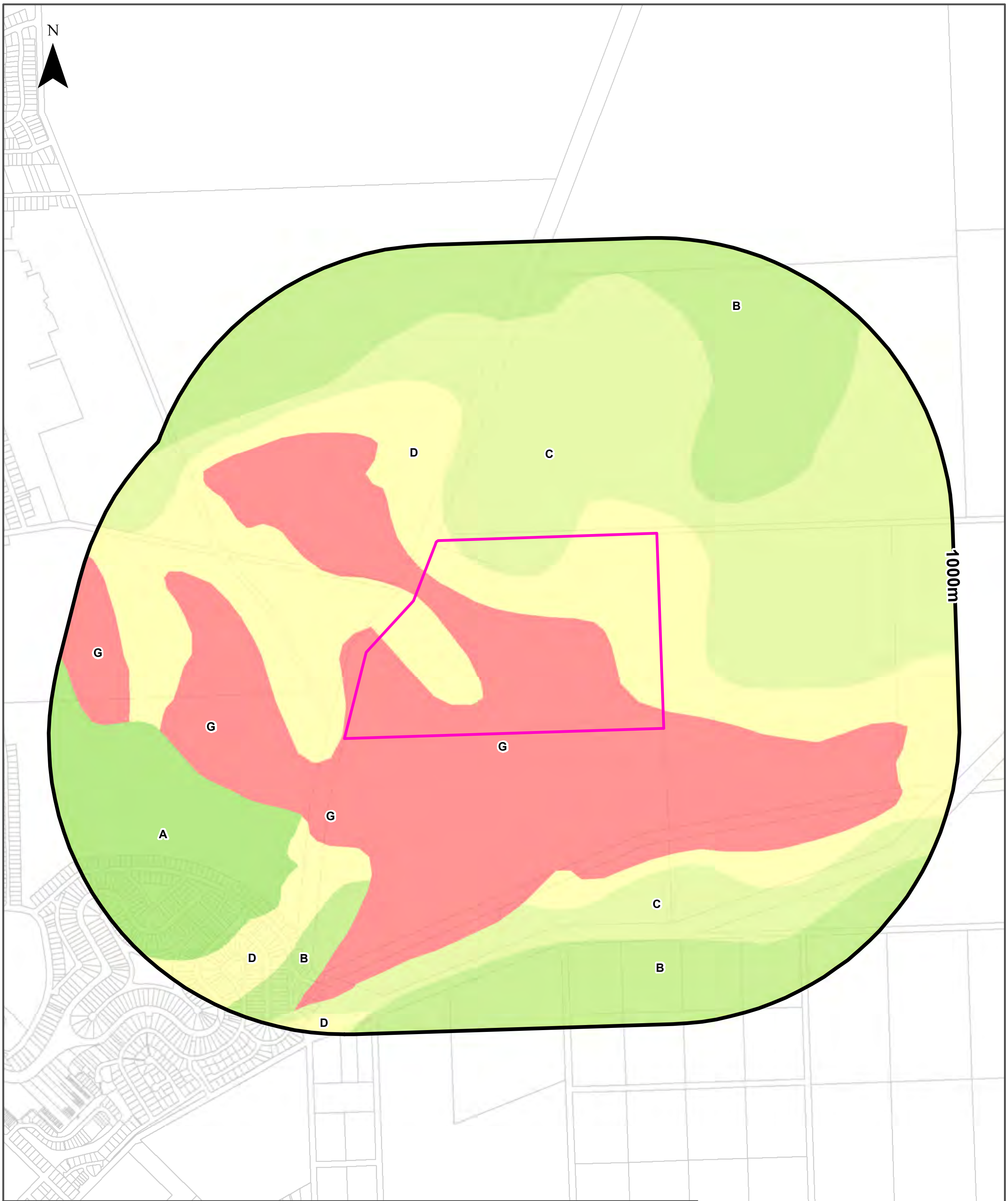
Acid sulfate soil potential within the dataset buffer:

Map category code	Proportion of land susceptible to the development of acid sulfate soils	Distance
E	More than 60%	0m
A	Negligible	0m
B	1–10%	300m

Acid Sulfate Soils Data Source: Dept of Environment, Water and Natural Resources - South Australia

Soil Salinity - Watertable Induced

72 Wallaroo Plain Road, Wallaroo, SA 5556



Legend

Site Boundary
Report Buffer
Property Boundary

Severity of watertable induced soil salinity

A. Negligible
B. Moderately low
C. Moderate
D. Moderately high
E. Moderately high to high
F. High
G. Very high to extreme
X. Not applicable

Scale: 0 160 320 Meters

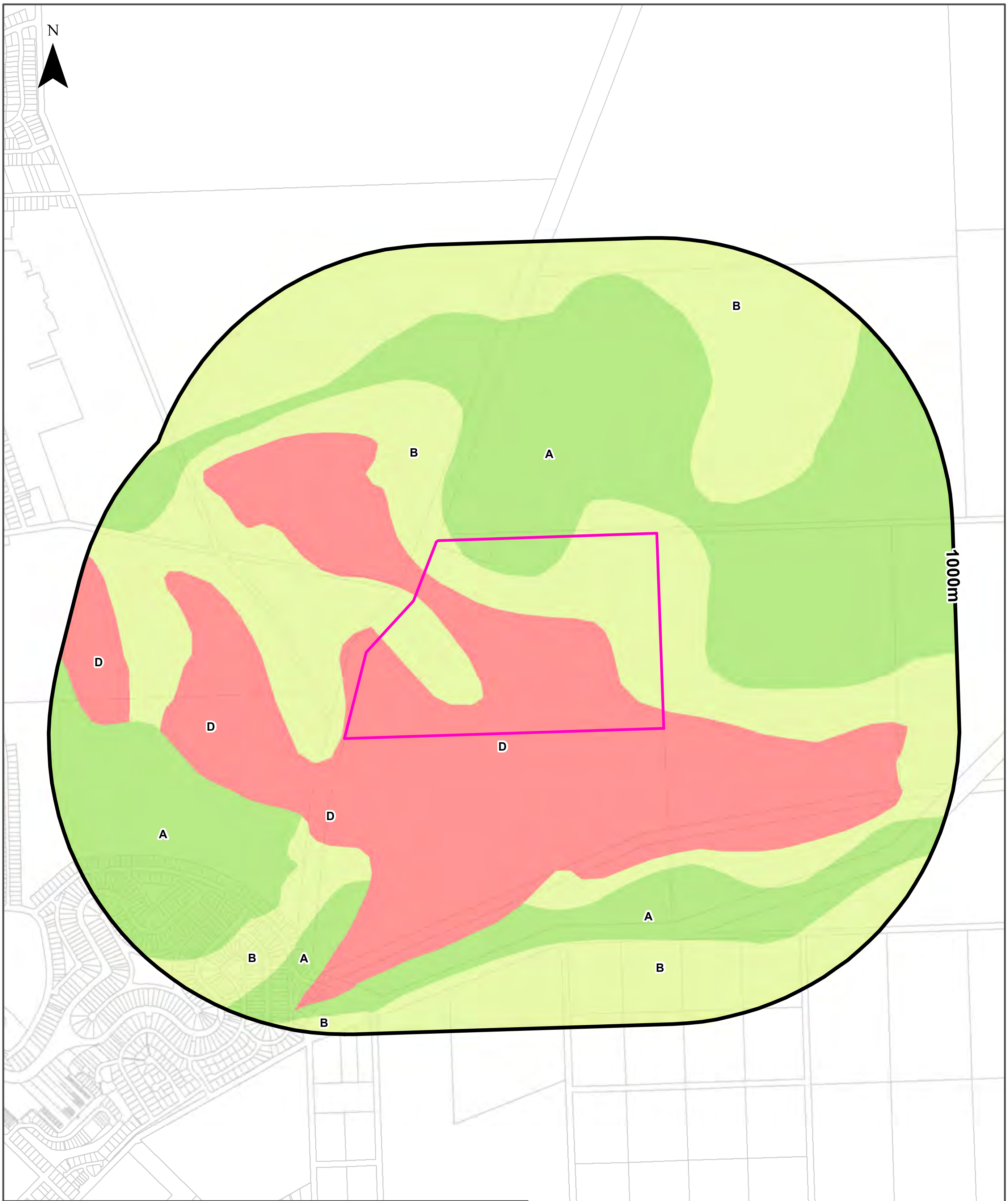
Data Sources: Property Boundaries - Sourced by Omnilink PTY LTD. ©PSMA Australia Limited www.psma.com.au/psma-data-copyright-and-disclaimer

Coordinate System: GDA 1994 MGA Zone 54

Date: 17 August 2020

Soil Salinity - Non-watertable

72 Wallaroo Plain Road, Wallaroo, SA 5556



Legend

Site Boundary
Report Buffer
Property Boundary

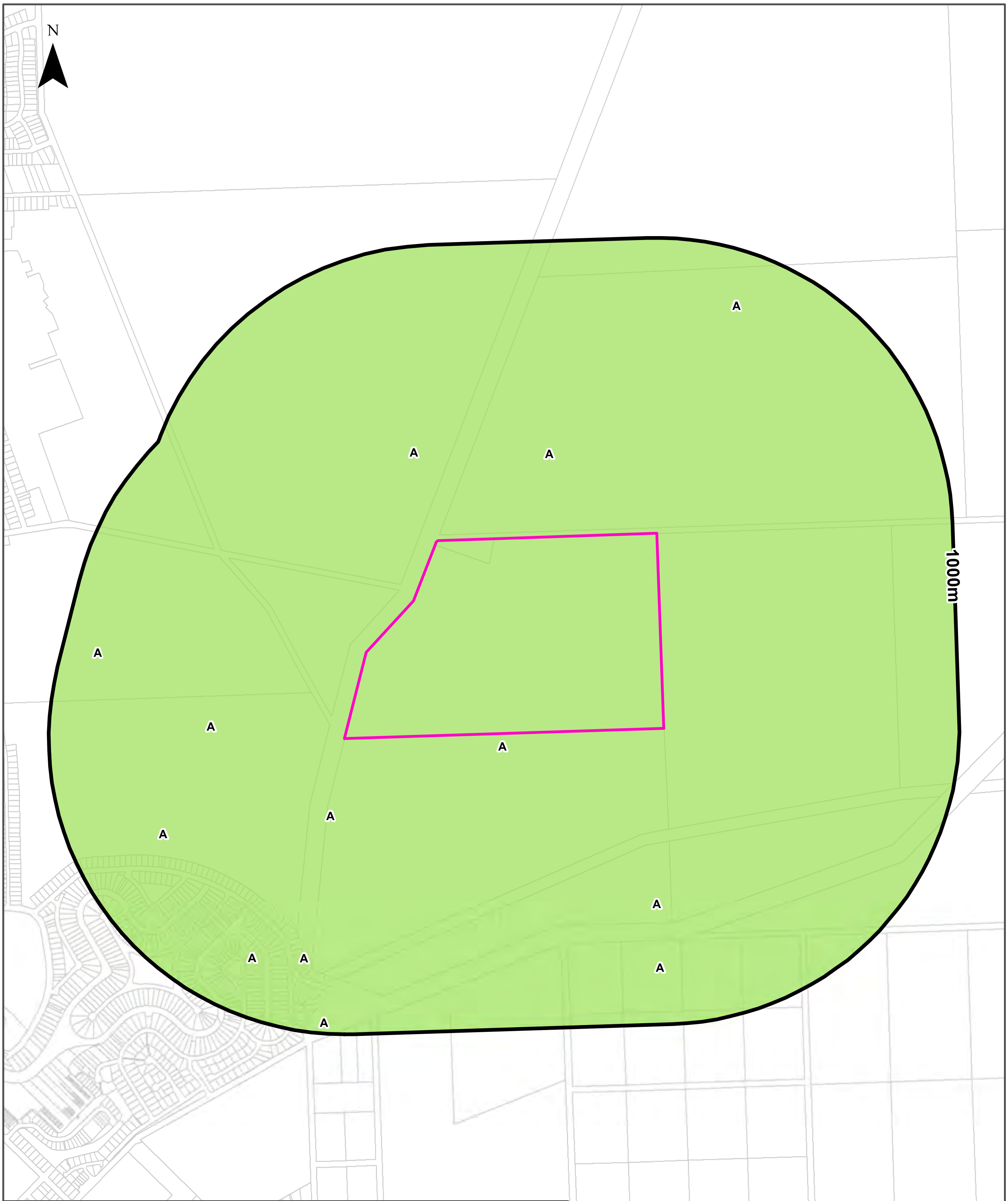
Severity of non-watertable induced soil salinity

A. Low
B. Moderately low
C. Moderate
D. Moderately high to high
X. Not applicable

Scale: 0 160 320 Meters	Data Sources: Property Boundaries - Sourced by Omnilink PTY LTD. ©PSMA Australia Limited www.psma.com.au/psma-data-copyright-and-disclaimer	Coordinate System: GDA 1994 MGA Zone 54	Date: 17 August 2020

Soil Salinity - Non-watertable (Magnesia Patches)

72 Wallaroo Plain Road, Wallaroo, SA 5556



Legend

Site Boundary

Report Buffer

Property Boundary

Proportion of land affected by magnesia patches

A. Negligible

B. Up to 2%

C. 2-10%

D. 10-50%

E. More than 50%

X. Not applicable

Scale: 0 160 320 Meters	Data Sources: Property Boundaries - Sourced by Omnilink PTY LTD. ©PSMA Australia Limited www.psma.com.au/psma-data-copyright-and-disclaimer	Coordinate System: GDA 1994 MGA Zone 54	Date: 17 August 2020

Soil Salinity

72 Wallaroo Plain Road, Wallaroo, SA 5556

Soil Salinity - Watertable Induced

Watertable induced soil salinity within the dataset buffer:

Map category code	Severity description	Distance
C	Moderate salinity, or 2-10% of land affected by highly saline seepage	0m
D	Moderately high salinity, or 10-30% of land affected by highly saline seepage	0m
G	Very high to extreme salinity (mainly primary)	0m
B	Moderately low salinity, or less than 2% of land affected by highly saline seepage	201m
A	Negligible	297m

Salinity Watertable Induced Data Source: Dept of Environment, Water and Natural Resources - South Australia

Soil Salinity - Non-Watertable

Non-watertable soil salinity within the dataset buffer:

Map category code	Severity description	Surface ECe (dS/m)	Subsoil ECe (dS/m)	Distance
A	Low	<2	<4	0m
B	Moderately low	2-4	4-8	0m
D	Moderately high to high	>8	>16	0m

Salinity Non-Watertable Data Source: Dept of Environment, Water and Natural Resources - South Australia

Soil Salinity - Non-Watertable (Magnesia Patches)

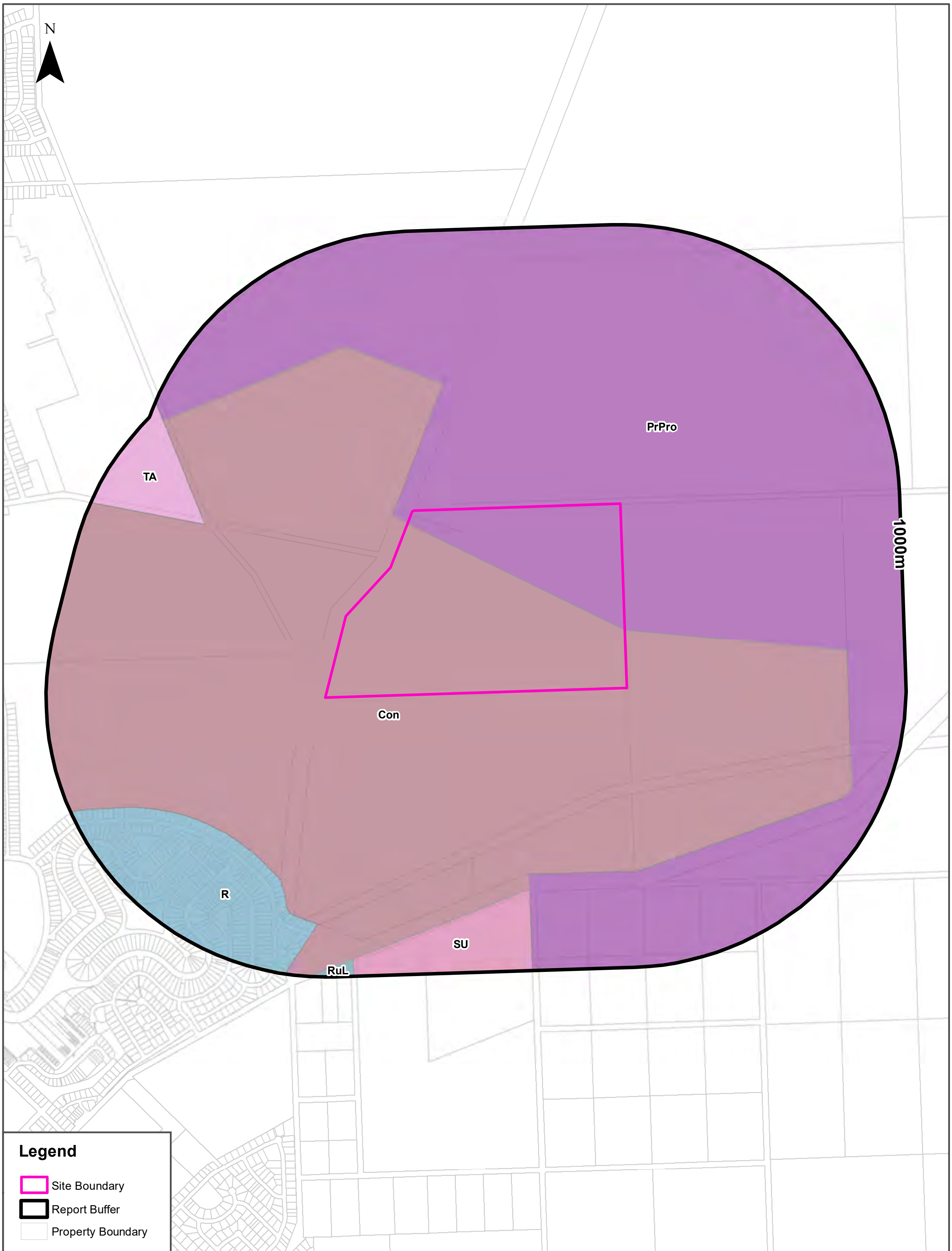
Magnesia patches within the dataset buffer:

Map category code	Proportion of land affected by magnesia patches	Distance
A	Negligible	0m

Salinity Non-Watertable (Magnesia Patches) Data Source: Dept of Environment, Water and Natural Resources - South Australia

Land Development Zones

72 Wallaroo Plain Road, Wallaroo, SA 5556



Legend

- Site Boundary
- Report Buffer
- Property Boundary

Scale: 0 100 200 400 600 800 Meters

Data Sources: Property Boundaries - Sourced by Omnilink PTY LTD. ©PSMA Australia Limited www.psma.com.au/psma-data-copyright-and-disclaimer

Coordinate System: GDA 1994 MGA Zone 54

Date: 17 August 2020

Planning

72 Wallaroo Plain Road, Wallaroo, SA 5556

Land Development Zones

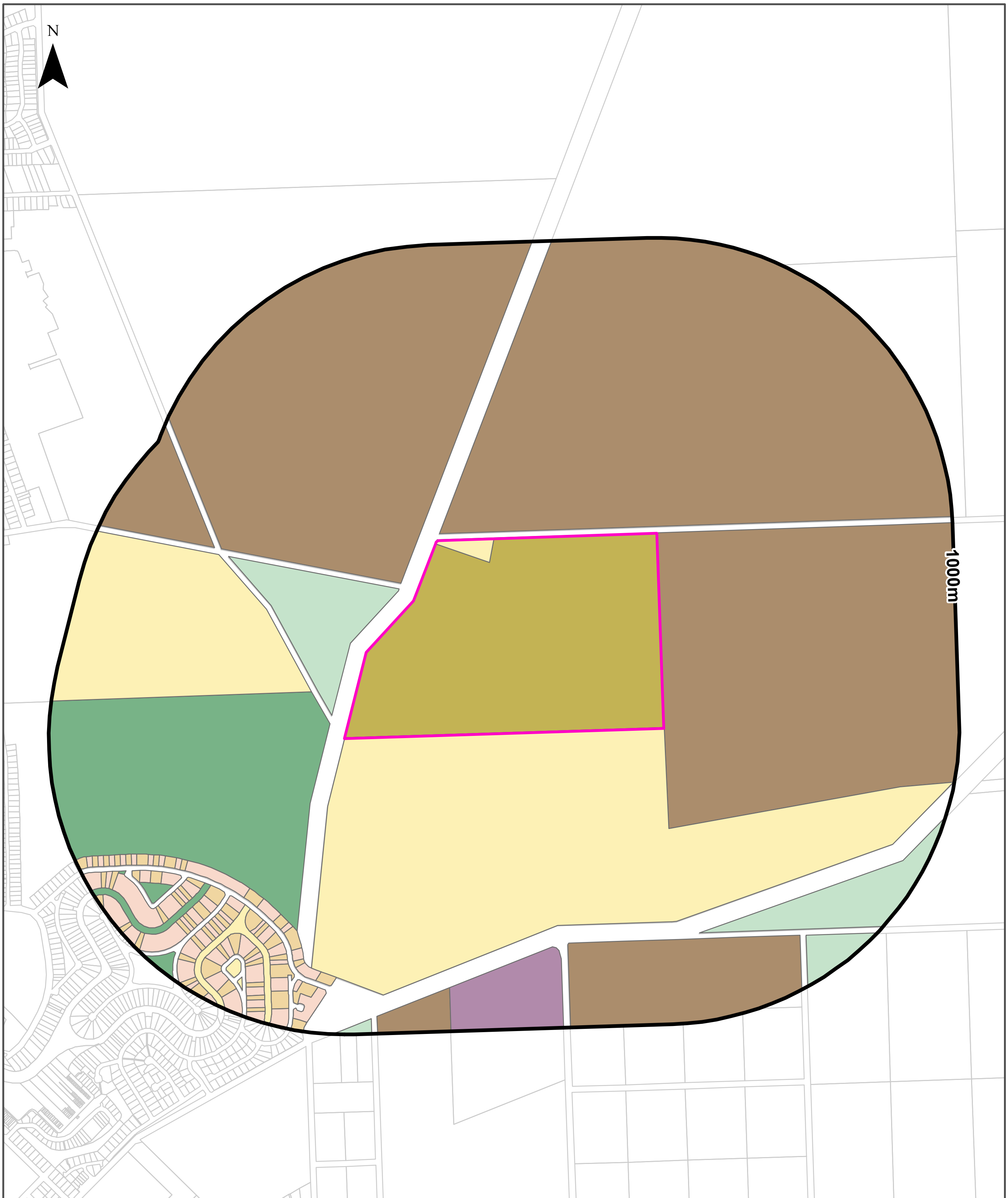
Land development zoning within the dataset buffer:

Zone Code	Development Plan Code	Zone Description	Devlopment Category	Distance	Direction
Con	COCO	Conservation	ENVIRONMENTAL CONSTRAINT	0m	Onsite
PrPro	COCO	Primary Production	PRIMARY PRODUCTION - MINING	0m	Onsite
R	COCO	Residential	RESIDENTIAL	602m	South West
TA	COCO	Tourist Accommodation	MISCELLANEOUS	602m	North West
SU	COCO	Special Use	MISCELLANEOUS	709m	South
RuL	COCO	Rural Living	RURAL LIVING	939m	South

Land Development Zones Data Source: Dept of Planning, Transport and Infrastructure - South Australia

Land Use Generalised 2018

72 Wallaroo Plain Road, Wallaroo, SA 5556



Legend

	No Description	Forestry	Non Private Residential	Retail Commercial
	Agriculture	Golf	Public Institution	Rural Residential
Site Boundary	Commercial	Horticulture	Recreation	Utilities or Industry
Report Buffer	Education	Livestock	Reserves	Vacant
Property Boundary	Food Industry	Mining or Quarrying	Residential	Vacant Urban Land

Scale: 0 100 200 400 600 800 1,000 Meters

Data Sources: Property Boundaries - Sourced by Omnilink PTY LTD. ©PSMA Australia Limited www.psma.com.au/psma-data-copyright-and-disclaimer

Coordinate System: GDA 1994 MGA Zone 54

Date: 17 August 2020

Planning

72 Wallaroo Plain Road, Wallaroo, SA 5556

Land Use Generalised 2018

Land use classes within the dataset buffer:

Description	Distance	Direction
Mining or Quarrying	0m	Onsite
Vacant	0m	Onsite
Vacant	0m	South
Agriculture	2m	East
Rural Residential	59m	West
Reserves	60m	West
Residential	599m	South West
Vacant Urban Land	599m	South West
Utilities or Industry	726m	South

Land Use Generalised Data Source: Dept of Planning, Transport and Infrastructure - South Australia

Heritage

72 Wallaroo Plain Road, Wallaroo, SA 5556

Commonwealth Heritage List

What are the Commonwealth Heritage List Items located within the dataset buffer?

Place Id	Name	Address	Place File No	Class	Status	Register Date	Distance	Direction
N/A	No records in buffer							

Heritage Data Source: Australian Government Department of the Environment and Energy - Heritage Branch

National Heritage List

What are the National Heritage List Items located within the dataset buffer?
Note. Please click on Place Id to activate a hyperlink to online website.

Place Id	Name	Address	Place File No	Class	Status	Register Date	Distance	Direction
N/A	No records in buffer							

Heritage Data Source: Australian Government Department of the Environment and Energy - Heritage Branch

State Heritage Areas

State Heritage Areas within the dataset buffer:

Heritage Id	Name	Distance	Direction
N/A	No records in buffer		

Heritage Areas Data Source: Dept of Environment, Water and Natural Resources - South Australia

SA Heritage Places

SA Heritage Places within the dataset buffer:

Heritage No	Location	Heritage Class	Australian Class	Details	Auth Date	Distance	Direction
N/A	No records in buffer						

Heritage Places Data Source: Dept of Environment, Water and Natural Resources - South Australia

Aboriginal Land

Aboriginal Land within the dataset buffer:

Map Id	Grant Date	Address	Locality	Description	Title	Distance	Direction
N/A	No records in buffer						

Aboriginal Land Data Source: Department of State Development, Resources and Energy - South Australia

Natural Hazards

72 Wallaroo Plain Road, Wallaroo, SA 5556

Bushfire Protection Areas

Bushfire Protection Areas within the dataset buffer:

Map Id	Bushfire Risk Code	Development Plan Code	Additional Development Criteria	Distance	Direction
N/A	No records in buffer				

Bushfire Protection Areas Data Source: Dept of Planning, Transport and Infrastructure - South Australia

Bushfires and Prescribed Burns History

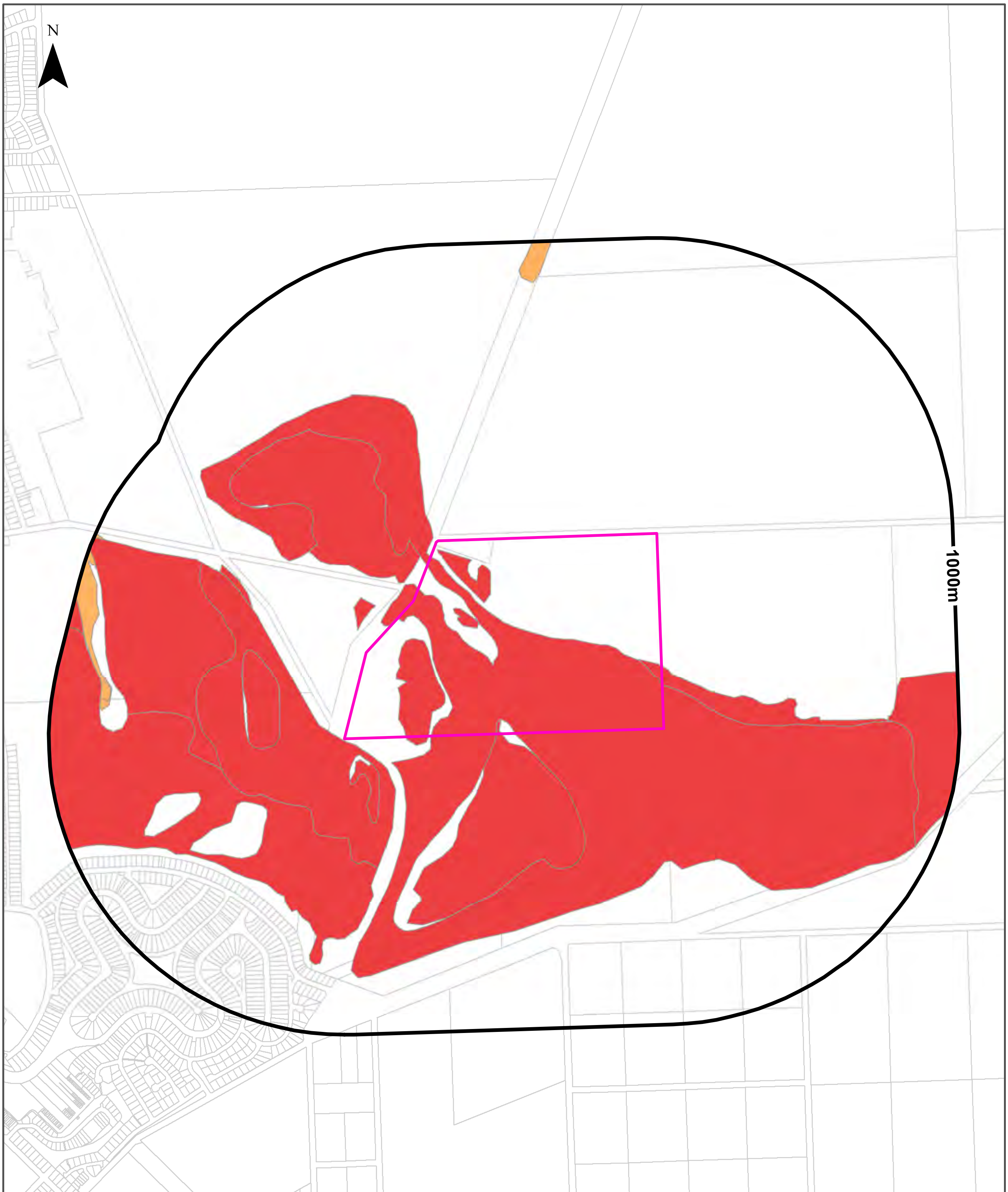
Bushfires and prescribed burns within the dataset buffer:

Map Id	Incident No.	Incident Name	Incident Type	Date of Fire	Area of Fire	Distance	Direction
N/A	No records in buffer						

Bushfires and Prescribed Burns History Data Source: Dept of Environment, Water and Natural Resources - South Australia

Ecological Constraints - Groundwater Dependent Ecosystems Atlas

72 Wallaroo Plain Road, Wallaroo, SA 5556



Legend

- Site Boundary
- Report Buffer
- Property Boundaries
- High potential GDE - from national assessment
- High potential GDE - from regional studies
- Moderate potential GDE - from national assessment
- Moderate potential GDE - from regional studies
- Low potential GDE - from national assessment
- Low potential GDE - from regional studies
- Known GDE - from regional studies
- Unclassified potential GDE - from national assessment
- Unclassified potential GDE - from regional studies

Scale: 0 100 200 400 Meters

Data Sources: Property Boundaries - Sourced by Omnilink PTY LTD. ©PSMA Australia Limited www.psma.com.au/psma-data-copyright-and-disclaimer

Coordinate System: GDA 1994 MGA Zone 54

Date: 17 August 2020

Ecological Constraints

72 Wallaroo Plain Road, Wallaroo, SA 5556

Groundwater Dependent Ecosystems Atlas

GDEs within the dataset buffer:

MapID	Type	Name	GDE Potential	IDE Likelihood	Geomorphology	Ecosystem Type	Aquifer Geology	Distance
6186	Aquatic		High potential GDE - from national assessment	10	Undulating lowland of folded crystalline and metamorphic rocks; cover of calcrete and stabilized north-west/south-east longitudinal dunes.	Wetland		0m
165427	Terrestrial		High potential GDE - from national assessment	10	Undulating lowland of folded crystalline and metamorphic rocks; cover of calcrete and stabilized north-west/south-east longitudinal dunes.	Vegetation		0m
61795	Aquatic		High potential GDE - from national assessment	10	Undulating lowland of folded crystalline and metamorphic rocks; cover of calcrete and stabilized north-west/south-east longitudinal dunes.	Wetland		0m
87426	Terrestrial		High potential GDE - from national assessment	4	Undulating lowland of folded crystalline and metamorphic rocks; cover of calcrete and stabilized north-west/south-east longitudinal dunes.	Vegetation		0m
41492	Aquatic		High potential GDE - from national assessment	10	Undulating lowland of folded crystalline and metamorphic rocks; cover of calcrete and stabilized north-west/south-east longitudinal dunes.	Wetland		0m
44130	Aquatic		High potential GDE - from national assessment	9	Undulating lowland of folded crystalline and metamorphic rocks; cover of calcrete and stabilized north-west/south-east longitudinal dunes.	Wetland		0m
44820	Aquatic		High potential GDE - from national assessment	10	Undulating lowland of folded crystalline and metamorphic rocks; cover of calcrete and stabilized north-west/south-east longitudinal dunes.	Wetland		0m
101082	Terrestrial		High potential GDE - from national assessment	8	Undulating lowland of folded crystalline and metamorphic rocks; cover of calcrete and stabilized north-west/south-east longitudinal dunes.	Vegetation		6m
67897	Aquatic		High potential GDE - from national assessment	6	Undulating lowland of folded crystalline and metamorphic rocks; cover of calcrete and stabilized north-west/south-east longitudinal dunes.	Wetland		29m

MapID	Type	Name	GDE Potential	IDE Likelihood	Geomorphology	Ecosystem Type	Aquifer Geology	Distance
27421	Aquatic		High potential GDE - from national assessment	10	Undulating lowland of folded crystalline and metamorphic rocks; cover of calcrete and stabilized north-west/south-east longitudinal dunes.	Wetland		71m
106010	Terrestrial		High potential GDE - from national assessment	9	Undulating lowland of folded crystalline and metamorphic rocks; cover of calcrete and stabilized north-west/south-east longitudinal dunes.	Vegetation		73m
27425	Aquatic		High potential GDE - from national assessment	10	Undulating lowland of folded crystalline and metamorphic rocks; cover of calcrete and stabilized north-west/south-east longitudinal dunes.	Wetland		217m
101663	Terrestrial		High potential GDE - from national assessment	10	Undulating lowland of folded crystalline and metamorphic rocks; cover of calcrete and stabilized north-west/south-east longitudinal dunes.	Vegetation		265m
106001	Terrestrial		High potential GDE - from national assessment	6	Undulating lowland of folded crystalline and metamorphic rocks; cover of calcrete and stabilized north-west/south-east longitudinal dunes.	Vegetation		427m
10654	Aquatic		Moderate potential GDE - from national assessment	6	Undulating lowland of folded crystalline and metamorphic rocks; cover of calcrete and stabilized north-west/south-east longitudinal dunes.	Wetland		645m
106019	Terrestrial		High potential GDE - from national assessment	6	Undulating lowland of folded crystalline and metamorphic rocks; cover of calcrete and stabilized north-west/south-east longitudinal dunes.	Vegetation		758m
38054	Aquatic		Moderate potential GDE - from national assessment	10	Undulating lowland of folded crystalline and metamorphic rocks; cover of calcrete and stabilized north-west/south-east longitudinal dunes.	Wetland		805m
118936	Terrestrial		Moderate potential GDE - from national assessment	8	Undulating lowland of folded crystalline and metamorphic rocks; cover of calcrete and stabilized north-west/south-east longitudinal dunes.	Vegetation		859m

Groundwater Dependent Ecosystems Atlas Data Source: The Bureau of Meteorology

Ecological Constraints

72 Wallaroo Plain Road, Wallaroo, SA 5556

Ramsar Wetlands

Ramsar Wetlands within the dataset buffer:

Wetland	Distance	Direction
No records in buffer		

Ramsar Wetlands Data Source: Dept of Environment, Water and Natural Resources - South Australia

Location Confidences

Where Lotsearch has had to georeference features from supplied addresses, a location confidence has been assigned to the data record. This indicates a confidence to the positional accuracy of the feature. Where applicable, a code is given under the field heading “LC” or “LocConf”. These codes lookup to the following location confidences:

LC Code	Location Confidence
Premise match	Georeferenced to the site location / premise or part of site
General area or suburb match	Georeferenced with the confidence of the general/approximate area
Road match	Georeferenced to the road or rail
Road intersection	Georeferenced to the road intersection
Feature is a buffered point	Feature is a buffered point
Land adjacent to geocoded site	Land adjacent to Georeferenced Site
Network of features	Georeferenced to a network of features

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Preliminary Site Investigation

AustralAsian Granite

72 Wallaroo Plain Road, Wallaroo

APPENDIX C HISTORIC TITLES

Certificate of Title

Title Reference:	CT 5156/784
Status:	CANCELLED
Parent Title(s):	CT 4357/962
Dealing(s) Creating Title:	CONVERTED TITLE
Title Issued:	23/11/1993
Title Cancelled:	24/01/2020
Edition:	6

Child Titles

Title Reference	Status	Estate Type	Plan / Parcel	Proprietors/Lessees/ Custodians at time of issue
CT 6233/860	CURRENT	FEE SIMPLE	D123080 ALLOTMENT 20	SHANE CHRISTOPHER DUNSTAN KARREN JOYE DUNSTAN

Certificate of Title

Title Reference: CT 5156/784

Status: CANCELLED

Parent Title(s): CT 4357/962

Dealing(s) Creating Title: CONVERTED TITLE

Title Issued: 23/11/1993

Title Cancelled: 24/01/2020

Child Title(s): CT 6233/860

Edition: 6

Dealings

Lodgement Date	Completion Date	Dealing Number	Dealing Type	Dealing Status	Details
15/01/2020	24/01/2020	13238914	APPLICATION FOR AMALGAMATIO N OF PARCELS	REGISTERE D	KARREN JOYE DUNSTAN, SHANE CHRISTOPHER DUNSTAN
26/08/2019	10/10/2019	13186485	TRANSFER	REGISTERE D	SHANE CHRISTOPHER DUNSTAN, KARREN JOYE DUNSTAN
26/08/2019	10/10/2019	13163954	DISCHARGE OF MORTGAGE	REGISTERE D	9856383
31/05/2004	21/06/2004	9856383	MORTGAGE	REGISTERE D	AUSTRALIA & NEW ZEALAND BANKING GROUP LTD.
31/05/2004	21/06/2004	9856382	TRANSFER	REGISTERE D	AUSTRALASIAN GRANITE PTY. LTD. (ACN: 050 516 455)
03/12/2002	11/12/2002	9479018	SURRENDER OF LEASE	REGISTERE D	8334562
24/07/1997	12/08/1997	8334562	LEASE	REGISTERE D	FERNBA PTY. LTD. (ACN: 067 225 558)
01/11/1993	26/11/1993	7603277	TRANSFER	REGISTERE D	WARWICK HALSE HILL, DACIA PRINGLE HILL

Certificate of Title

Title Reference:	CT 5398/528
Status:	CANCELLED
Parent Title(s):	CT 4357/961
Dealing(s) Creating Title:	CONVERTED TITLE
Title Issued:	18/02/1997
Title Cancelled:	24/01/2020
Edition:	8

Child Titles

Title Reference	Status	Estate Type	Plan / Parcel	Proprietors/Lessees/ Custodians at time of issue
CT 6233/860	CURRENT	FEE SIMPLE	D123080 ALLOTMENT 20	SHANE CHRISTOPHER DUNSTAN KARREN JOYE DUNSTAN

Certificate of Title

Title Reference: CT 5398/528

Status: CANCELLED

Parent Title(s): CT 4357/961

Dealing(s) Creating Title: CONVERTED TITLE

Title Issued: 18/02/1997

Title Cancelled: 24/01/2020

Child Title(s): CT 6233/860

Edition: 8

Dealings

Lodgement Date	Completion Date	Dealing Number	Dealing Type	Dealing Status	Details
15/01/2020	24/01/2020	13238914	APPLICATION FOR AMALGAMATION OF PARCELS	REGISTERED	KARREN JOYE DUNSTAN, SHANE CHRISTOPHER DUNSTAN
26/08/2019	10/10/2019	13163955	TRANSFER	REGISTERED	SHANE CHRISTOPHER DUNSTAN, KARREN JOYE DUNSTAN
26/08/2019	10/10/2019	13163953	DISCHARGE OF MORTGAGE	REGISTERED	12323696
08/05/2015	12/06/2015	12323696	MORTGAGE	REGISTERED	SEPPO SAKARI KARVONEN
08/05/2015	12/06/2015	12323695	TRANSFER	REGISTERED	AUSTRALASIAN GRANITE PTY. LTD. (ACN: 050 516 455)
05/09/2014	22/09/2014	12193630	DISCHARGE OF MORTGAGE	REGISTERED	11777229
19/06/2012	03/07/2012	11777229	MORTGAGE	REGISTERED	AUSTRALIA & NEW ZEALAND BANKING GROUP LTD.
14/09/2006	09/10/2006	10545534	TRANSFER	REGISTERED	SEPPO SAKARI KARVONEN
21/03/2006	06/04/2006	10422543	TRANSFER	REGISTERED	AUSTRALASIAN GRANITE PTY. LTD. (ACN: 050 516 455)
21/03/2006	06/04/2006	10422542	DISCHARGE OF MORTGAGE	REGISTERED	8653395
24/03/1999	13/04/1999	8653395	MORTGAGE	REGISTERED	COMMONWEALTH BANK OF AUSTRALIA
24/03/1999	13/04/1999	8653394	TRANSFER	REGISTERED	ANTHONY SCHMITZKY

ORIGINAL
CERTIFICATE OF TITLE

South Australia

Register Book,
Volume 4357 Folio 961

New Certificate for portion of the Land in Vol.4193 Folio 451

PETER JOHN CHARLES KELLY of Tickera Road Wallaroo 5556 Contractor is the proprietor of an estate in fee simple subject nevertheless to such encumbrances liens and interests as are notified by memorial underwritten or endorsed hereon in ALLOTMENT 1 of Section 931 HUNDRED OF WALLAROO (L.T.R.O. DEPOSITED PLAN No.27804) and delineated on the diagram hereon

V. Gudisthai

Deputy Registrar-General

Dated 12 April 1990

REGISTRAR-GENERAL SOUTH AUSTRALIA

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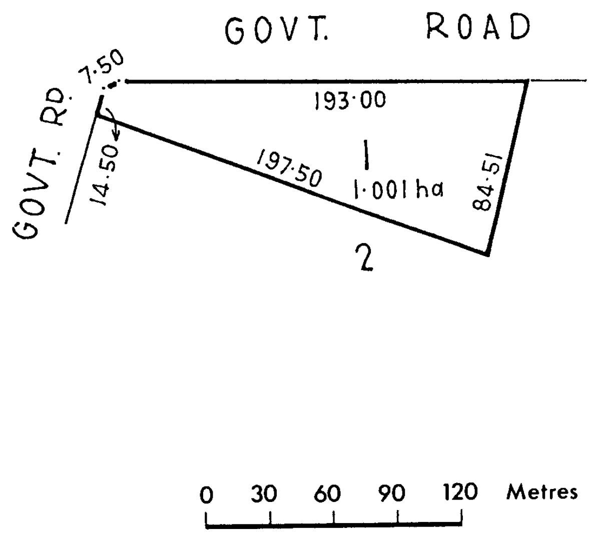

ORIGINAL

CERTIFICATE OF TITLE

South Australia

Register Book,

Volume 4357 Folio 962

New Certificate for portion of the Land in Vol.4193 Folio 451

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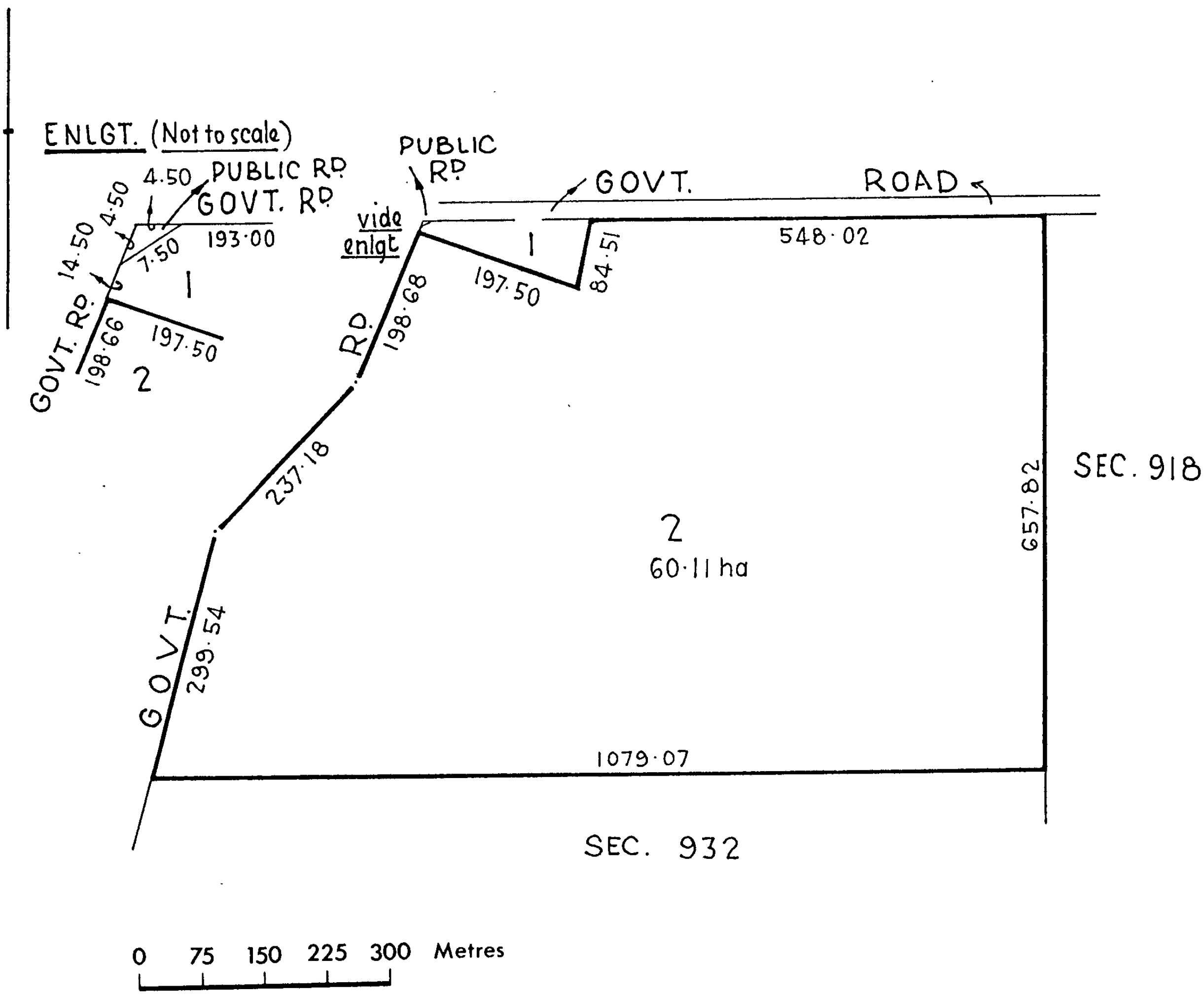
V. Gudinki

Deputy Registrar-General

Dated 12 April 1990

REGISTRAR-GENERAL SOUTH AUSTRALIA



61

VOL 4357 FOL 962

CANCELLED

CONVERTED TO A COMPUTERISED TITLE

ORIGINAL

CERTIFICATE OF TITLE

South Australia

Register Book,
Volume 4193 Folio 451

New Certificate for the whole of the Land in Vol.979 Folio 176

BARRY HARTLEY SNODGRASS of Tickera 5554 Farmer and FRANCES DIANNE SNODGRASS his wife are the proprietors of an estate in fee simple subject nevertheless to such encumbrances liens and interests as are notified by memorial underwritten or endorsed hereon in SECTION 931 HUNDRED OF WALLAROO delineated on the plan hereon by bold black lines

In witness whereof I have signed my name and affixed my seal this 22nd day of June 1982

Signed the 22nd day of June
1982, in the presence of

Deputy Registrar-General

REGISTRAR-GENERAL SOUTH AUSTRALIA

~~T4885408~~

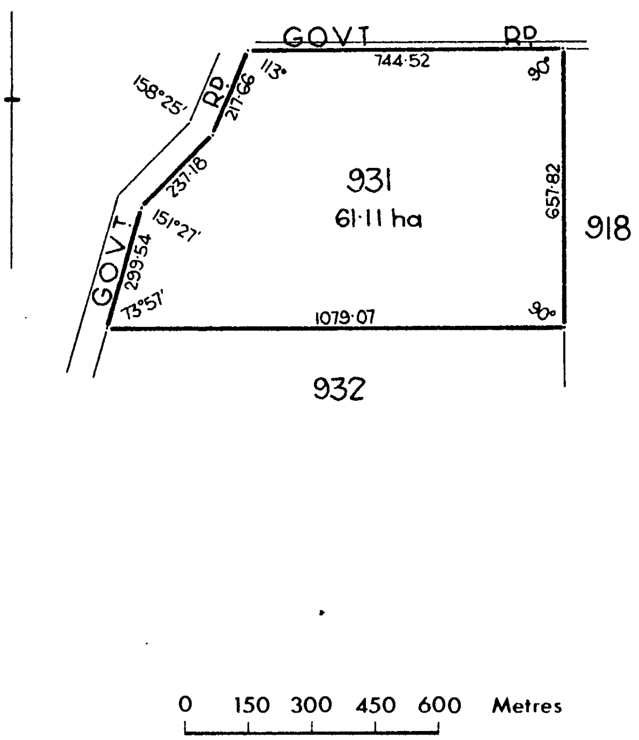
TRANSFER 4885408 to BRUCE RAYMOND OLSEN and WENDY ANN OLSEN both of Matta Road Kadina 5554 Farmers of the within land Produced 6.5.1982 at 1 p.m.

~~M5075651~~

MORTGAGE 5075651 to AUSTRALIA AND NEW ZEALAND BANKING GROUP LIMITED Produced 14.7.1983 at 2.40 p.m.

P/A 4523763
The within land is discharged from Mortgage 5075651 vide 6468917 Produced 12.1.1988 at 12:15

TRANSFER 6468918 to PETER JOHN CHARLES KELLY of Tickera Road Wallaroo 5556 Contractor of the within land Produced 13.1.1988 at 12:15



Cancelled as regards that portion of the within land comprised in Deposited Plan 27804 (RT 6846784)
and new Certificates issued
Vol. 4357 Folios 961 & 962
OVER

VOL 4193 FOL 451

~~Portion~~ Balance of the within land as is comprised in
Allotment 3
in D.P. 27804 is vested as public road in
The District Council of Northern York Peninsula
vide Sec.223le of the Real Property Act 1886 as amended
CANCELLED AS REGARDS THE ABOVE LAND
AND NEW CERTIFICATE OF TITLE ISSUED
Volume 4357 Folio 963

REGISTRAR-GENERAL SOUTH AUSTRALIA

Day. H. Bosanquet
r4885408

CANCELLED
AND NEW CERTIFICATE OF TITLE
ISSUED VIDE 4885408 VOL. 4193 FOL. 451.

South Australia.

Register Book.
Vol. 979 Folio 176

J. W. Giles
Registrar-General.

Land Grant.

[IN DUPLICATE.]

His Excellency the Governor in consideration of Seventy five pounds and ten shillings

sterling heretofore paid to the Treasurer as appears by the receipt at foot by George Chatfield of Wallaroo Butcher

hereinafter called the Grantee doth hereby in the name and on behalf of **His Majesty Grant** unto the Grantee **All** that section of land containing One hundred and fifty one acres or thereabouts situate in the Hundred of Wallaroo County of Daly and numbered 931

and delineated in the public maps deposited in the Survey Office at **Adelaide** and in the plan in the margin hereof **Except and reserved unto His Majesty** His Heirs and Successors all gold silver copper tin and other metals ore minerals and other substances containing metals and all gems precious stones coal and mineral oil in and upon such land and all incidental powers as provided for in "The Crown Lands Act 1903." **To hold** unto and to the use of the Grantee and the Heirs of the Grantee for ever.

Given under the hand of the Governor and the Public Seal of South Australia this Sixth day of December one thousand nine hundred and Thirteen

BY COMMAND.

Fred Young
Commissioner of Crown Lands.

Certified correct,
[signature]
Surveyor-General.

Exd. [initials]

Received Seventy five pounds and ten shillings sterling purchase-money as before expressed.

£ 75 : 10 : 0

[signature]
Treasurer

Transfer No 599357 from George Chatfield to Harold Broughton Hall of Wallaroo Butcher of an estate in fee simple in the within land produced for registration the 10 day of October 1913 at 12.15 pm
Vernon H Edwards A.g.h. Regd.

B

T1941255

The above name Harrold Broughton Wall is altered to Harold Broughton Wall vide request in Memorandum No 608727 Produced for registration the 28 day of February 1914 at 11.30 am

M H Salter Dep Regr

TRANSFER No. 1941255 FROM Thomas Alexander Murdoch, Kenneth Gordon Murdoch, Victor Ronald Murdoch and Ruby Laurel Murdoch to Margretta Jane Jones of Wallaroo Married Woman OF AN ESTATE IN FEE SIMPLE IN THE WITHIN LAND.

PRODUCED FOR REGISTRATION THE 16 DAY OF April 1958 AT 11.40 am

DEP. REG. GENL.

TRANSMISSION APPLICATION No. 1402845

Edith Grace Wall of Wallaroo Widow is PROPRIETOR OF AN ESTATE IN FEE SIMPLE IN THE WITHIN LAND AS THE EXECUTRIX NAMED IN THE WILL DATED THE 18 DAY OF February 1928 OF THE ABOVE NAMED Harold Broughton Wall WHO DIED ON THE 24 DAY OF August 1943 AS APPEARS BY PROBATE DATED THE 16 DAY OF November 1943 PRODUCED FOR REGISTRATION THE 8 DAY OF February 1944 AT 2.50 P.M.

S H Rogers DEP. REG. GENL.

TRANSFER No. 3268922 TO

Raymond Kenneth Oster and Ronald Lee Farrand both of Wallaroo Farmers as tenants in common in OF THE WITHIN LAND. PRODUCED 9.12.1971 AT 12:55 pm

R. Condon DEP. REG. GEN.

MORTGAGE No. 3268923 TO

Margretta Jane Jones

PRODUCED 9.12.1971 AT 12:55 pm

R. Condon DEP. REG. GEN.

TRANSFER No. 1402846 FROM

Edith Grace Wall to the said Edith Grace Wall OF AN ESTATE IN FEE SIMPLE IN THE WITHIN LAND

PRODUCED FOR REGISTRATION THE 8 DAY OF February 1944 AT 2.50 p

S H Rogers DEP. REG. GENL.

T3577402

TRANSFER No. 3577402 FROM

Raymond Kenneth Oster to Wilfred Ronald Farrand of 3 Charles Terrace Wallaroo 5556 Farmer of one undivided moiety in OF THE WITHIN LAND PRODUCED 13.2.1974 at 11.5 am

D. G. Randell DEP. REG. GEN.

D 3268923 T3684357

T1649389

TRANSFER No. 1649389 FROM

Edith Grace Wall to Robertson Christie of Wallaroo Farmer OF AN ESTATE IN FEE SIMPLE IN THE WITHIN LAND

PRODUCED FOR REGISTRATION THE 9 DAY OF November 1950 AT 11.15 am

S H Rogers DEP. REG. GENL.

DISCHARGE OF MORTGAGE No. 3268923 BY ENDORSEMENT THEREON. PRODUCED 13.11.1979 AT 11.20 am

P. R. Whitington pro DEP. REG. GEN.

TRANSFER No. 3684357 To

Noel Christopher Heapes of Wallaroo 5556 Contractor OF THE WITHIN LAND PRODUCED 13.11.1979 AT 11.20 A.M.

P. R. Whitington pro DEP. REG. GEN.

M4098828

T1761881

TRANSFER No. 1761881 FROM

Robertson Christie to Thomas Alexander Murdoch Farmer Ruby Laurel Murdoch married woman Kenneth Gordon Murdoch and Victor Ronald Murdoch both Farmers all of Warooka OF AN ESTATE IN FEE SIMPLE IN THE WITHIN LAND as tenants in common PRODUCED FOR REGISTRATION THE 15 DAY OF January 1953 AT 2.30 pm

S H Rogers DEP. REG. GENL.

MORTGAGE No. 4098828 TO

Electrical Investments Limited

PRODUCED 27.9.1977 AT noon.

D4400841 T4400842

DISCHARGE OF MORTGAGE NO 4098828 BY ENDORSEMENT THEREON VIDE NO. 4400841

PRODUCED 28.6.1979 AT 1 p.m.

TRANSFER No. 4400842 to

Barry Hartley Snodgrass Farmer and Frances Dianne Snodgrass his wife both of Tickera 5554 OF THE WITHIN LAND. PRODUCED 28.6.1979 at 1p.m.

See face of CT

NEW C.T. ISSUED

Preliminary Site Investigation

AustralAsian Granite

72 Wallaroo Plain Road, Wallaroo

APPENDIX D DANGEROUS SUBSTANCES SEARCH

Government of South Australia
SafeWork SA

11 September 2020

Education Team

Level 4 World Park A
33 Richmond Road
Keswick SA 5035

GPO Box 465
Adelaide SA 5001

DX 715 Adelaide

Phone 1300 365 255
Email licensing.safework@sa.gov.au

ABN 50-560-588-327

www.safework.sa.gov.au

Varun Bhagwat
Greencap
12 Greenhill Road
WAYVILLE SA 5034

Varun.Bhagwat@greencap.com.au

Dear Varun

DANGEROUS SUBSTANCES LICENCE SEARCH

PROPERTY DETAILS: 72 WALLAROO PLAIN ROAD, WALLAROO SA 5556

Further to your application for a Dangerous Substance Search dated 26 August 2020 received for the abovementioned site, I advise that there are no current or historical records for this site.

Yours sincerely

Manager, Education
SAFEWORK SA

Preliminary Site Investigation

AustralAsian Granite

72 Wallaroo Plain Road, Wallaroo

Appendix E EPA SECTION 7 SEARCH

Environment Protection Authority
GPO Box 2607 Adelaide SA 5001
211 Victoria Square Adelaide SA 5000
T (08) 8204 2004
Country areas 1800 623 445

Greencap
12 Greenhill Road
WAYVILLE SA 5034

Contact: Section 7
Telephone: (08) 8204 2026
Email: epasection7@sa.gov.au

Contact: Public Register
Telephone: (08) 8204 9128
Email: epa.publicregister@sa.gov.au

20 August, 2020

EPA STATEMENT TO FORM 1 - CONTRACTS FOR SALE OF LAND OR BUSINESS

The EPA provides this statement to assist the vendor meet its obligations under section 7(1)(b) of the *Land and Business (Sale and Conveyancing) Act 1994*. A response to the questions prescribed in Schedule 1-Contracts for sale of land or business-forms (Divisions 1 and 2) of the *Land and Business (Sale and Conveyancing) Act 1994* is provided in relation to the land.

I refer to your enquiry concerning the parcel of land comprised in

Title Reference	CT Volume 6233 Folio 860
Address	72 Wallaroo Plain Road, WALLAROO SA 5556

Schedule – Division 1 – *Land and Business (Sale and Conveyancing) Regulations 2010*

PARTICULARS OF MORTGAGES, CHARGES AND PRESCRIBED ENCUMBRANCES AFFECTING THE LAND

7. Environment Protection Act 1993

Does the EPA hold any of the following details relating to the *Environment Protection Act 1993*:

7.1	Section 59 - Environment performance agreement that is registered in relation to the land.	NO
7.2	Section 93 - Environment protection order that is registered in relation to the land.	NO
7.3	Section 93A - Environment protection order relating to cessation of activity that is registered in relation to the land.	NO
7.4	Section 99 - Clean-up order that is registered in relation to the land.	NO
7.5	Section 100 - Clean-up authorisation that is registered in relation to the land.	NO
7.6	Section 103H - Site contamination assessment order that is registered in relation to the land.	NO
7.7	Section 103J - Site remediation order that is registered in relation to the land.	NO

7.8	Section 103N - Notice of declaration of special management area in relation to the land (due to possible existence of site contamination).	NO
7.9	Section 103P - Notation of site contamination audit report in relation to the land.	NO
7.10	Section 103S - Notice of prohibition or restriction on taking water affected by site contamination in relation to the land.	NO

Schedule – Division 2 – *Land and Business (Sale and Conveyancing) Regulations 2010*

PARTICULARS RELATING TO ENVIRONMENT PROTECTION

3-Licences and exemptions recorded by EPA in public register

Does the EPA hold any of the following details in the public register:

a)	details of a current licence issued under Part 6 of the *Environment Protection Act 1993* to conduct, at the land-	
i)	a waste or recycling depot (as referred to in clause 3(3) of Schedule 1 Part A of that Act); or[1]	NO
ii)	activities producing listed wastes (as referred to in clause 3(4) of Schedule 1 Part A of that Act); or[1]	NO
iii)	any other prescribed activity of environmental significance under Schedule 1 of that Act?	NO
b)	details of a licence no longer in force issued under Part 6 of the *Environment Protection Act 1993* to conduct, at the land-	
i)	a waste or recycling depot (as referred to in clause 3(3) of Schedule 1 Part A of that Act); or[1]	NO
ii)	activities producing listed wastes (as referred to in clause 3(4) of Schedule 1 Part A of that Act); or[1]	NO
iii)	any other prescribed activity of environmental significance under Schedule 1 of that Act?	NO
c)	details of a current exemption issued under Part 6 of the *Environment Protection Act 1993* from the application of a specified provision of that Act in relation to an activity carried on at the land?	NO
d)	details of an exemption no longer in force issued under Part 6 of the *Environment Protection Act 1993* from the application of a specified provision of that Act in relation to an activity carried on at the land?	NO
e)	details of a licence issued under the repealed *South Australian Waste Management Commission Act 1979* to operate a waste depot at the land?	NO
f)	details of a licence issued under the repealed *Waste Management Act 1987* to operate a waste depot at the land?	NO

[1] Note Schedule 1 Part A of the Environment Protection Act 1993 changed on 1 June 2019. Land and Business (Sale and Conveyancing) Regulations 2010 references to a 'waste or recycling depot' under 'clause 3(3)' are out of date and are to be read instead as clause 3(1), 3(2), 3(3)(a), 3(3)(b), 3(5)(b) or 3(5)(c) or a combination of them from 1 June 2019. Similarly, references to 'activities producing listed wastes' under 'clause 3(4)' are out of date and are to be read instead as clause 3(5)(a) from 1 June 2019.

g)	details of a licence issued under the repealed *South Australian Waste Management Commission Act 1979* to produce waste of a prescribed kind (within the meaning of that Act) at the land?	NO
h)	details of a licence issued under the repealed *Waste Management Act 1987* to produce prescribed waste (within the meaning of that Act) at the land?	NO

4-Pollution and site contamination on the land - details recorded by the EPA in public register

Does the EPA hold any of the following details in the public register in relation to the land or part of the land:

a)	details of serious or material environmental harm caused or threatened in the course of an activity (whether or not notified under section 83 of the *Environment Protection Act 1993*)?	NO
b)	details of site contamination notified to the EPA under section 83A of the *Environment Protection Act 1993*?	NO
c)	a copy of a report of an environmental assessment (whether prepared by the EPA or some other person or body and whether or not required under legislation) that forms part of the information required to be recorded in the public register?	NO
d)	a copy of a site contamination audit report?	NO
e)	details of an agreement for the exclusion or limitation of liability for site contamination to which section 103E of the *Environment Protection Act 1993* applies?	NO
f)	details of an agreement entered into with the EPA relating to an approved voluntary site contamination assessment proposal under section 103I of the *Environment Protection Act 1993?*	NO
g)	details of an agreement entered into with the EPA relating to an approved voluntary site remediation proposal under section 103K of the *Environment Protection Act 1993?*	NO
h)	details of a notification under section 103Z(1) of the *Environment Protection Act 1993* relating to the commencement of a site contamination audit?	NO
i)	details of a notification under section 103Z(2) of the *Environment Protection Act 1993* relating to the termination before completion of a site contamination audit?	NO
j)	details of records, held by the former *South Australian Waste Management Commission* under the repealed *Waste Management Act 1987*, of waste (within the meaning of that Act) having been deposited on the land between 1 January 1983 and 30 April 1995?	NO

5-Pollution and site contamination on the land - other details held by EPA

Does the EPA hold any of the following details in relation to the land or part of the land:

a)	a copy of a report known as a "Health Commission Report" prepared by or on behalf of the *South Australian Health Commission* (under the repealed *South Australian Health Commission Act 1976*)?	NO

b)	details (which may include a report of an environmental assessment) relevant to an agreement entered into with the EPA relating to an approved voluntary site contamination assessment proposal under section 103I of the *Environment Protection Act 1993?*	NO
c)	details (which may include a report of an environmental assessment) relevant to an agreement entered into with the EPA relating to an approved voluntary site remediation proposal under section 103K of the *Environment Protection Act 1993*?	NO
d)	a copy of a pre-1 July 2009 site audit report?	NO
e)	details relating to the termination before completion of a pre-1 July 2009 site audit?	NO

All care and diligence has been taken to access the above information from available records. Historical records provided to the EPA concerning matters arising prior to 1 May 1995 are limited and may not be accurate or complete and therefore the EPA cannot confirm the accuracy of the historical information provided.

Preliminary Site Investigation
AustralAsian Granite
72 Wallaroo Plain Road, Wallaroo

Appendix F RESULTS SUMMARY TABLES

			OCP		Phenols									NEPM 2013 TRH Fractions						TPH						BTEX					
			Vic EPA IWRG 621 OCP (Total)*	Vic EPA IWRG 621 Other OCP (Total)*	2,4-dimethylphenol	2,4-dinitrophenol	2-methylphenol	2-nitrophenol	3-&4-methylphenol	4,6-Dinitro-2-methylphenol	4-chloro-3-methylphenol	4-nitrophenol	Phenol	>C16-C34 (F3)	C6-C10 without BTEX (F1)	C6-C10 with BTEX (F1)	C10-C16 without Naphthalene (F2)	>C34-C40 (F4)	C10-C16 with Naphthalene (F2)	C6 - C9	C10 - C14	C15 - C28	C29-C36	+C10 - C36 (Sum of total)	C10 - C40 (Sum of total)	Benzene	Ethylbenzene	Toluene	Xylene (m & p)	Xylene (o)	Xylene Total
			MG/KG	MG/KG	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
EQL			0.1	0.1	0.5	5	0.2	1	0.4	5	1	5	0.5	100	20	20	50	100	50	20	20	50	50	50	100	0.1	0.1	0.1	0.2	0.1	0.3
NEPM 2013 Calculated EIL values for Urban Commercial / Industrial																															
NEPM 2013 Calculated EIL values for Areas of Ecological Significance																															
NEPM 2013 Table 1A(1) HILs Comm/Ind D Soil													240000																		
NEPM 2013 Table 1B(6) ESLs for Areas of Ecological Significance, Coarse Soil 0-2m														-	125			-	25							8	1.5	10			10
NEPM 2013 Table 1B(6) ESLs for Comm/Ind, Coarse Soil 0-2m														1700	215			3300	170							75	165	135			180
SA EPA Waste Fill																															
SA Intermediate Waste Soil																															
SA Low Level Waste																															
Location	Field_ID	Sample Date																													
BG 1	BG 1	20/08/2020	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MS 1	MS 1	20/08/2020	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MS 2	MS 2	20/08/2020	<0.1	<0.1	<0.5	<5	<0.2	<1	<0.4	<5	<1	<5	<0.5	960	<20	<20	350	<100	350	<20	230	1100	<50	1330	1310	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3
MS 3	MS 3	20/08/2020	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SLAG 1	SLAG 1	20/08/2020	<0.1	<0.1	<0.5	<5	<0.2	<1	<0.4	<5	<1	<5	<0.5	<100	<20	<20	<50	<100	<50	<20	<20	<50	<50	<50	<100	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3
	QC01 (Duplicate of SLAG 1)	20/08/2020	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	QC01A (Duplicate of SLAG 1)	20/08/2020	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SLAG 2	SLAG 2	20/08/2020	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SLAG 3	SLAG 3	20/08/2020	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Preliminary Site Investigation
Soil Results
72 Wallaroo Plain Rd, Wallaroo
August 200

			Metals																												
			Arsenic	Arsenic (Leachate pH 5)	Arsenic (Leachate pH 7)	Cadmium	Cadmium (Leachate pH 5)	Cadmium (Leachate pH 7)	Chromium (III+VI)	Chromium (Leachate pH 5)	Chromium (Leachate pH 7)	Copper	Copper (Leachate pH 5)	Copper (Leachate pH 7)	Iron	Lead	Lead (Leachate pH 5)	Lead (Leachate pH 7)	Mercury	Mercury (Leachate pH 5)	Mercury (Leachate pH 7)	Molybdenum	Nickel	Nickel (Leachate pH 5)	Nickel (Leachate pH 7)	Selenium	Silver	Tin	Zinc	Zinc (Leachate pH 5)	Zinc (Leachate pH 7)
			mg/kg	mg/L	mg/L	mg/kg	mg/L	mg/L	mg/kg	mg/L	mg/L	mg/kg	mg/L	mg/L	mg/kg	mg/kg	mg/L	mg/L	mg/kg	mg/L	mg/L	mg/kg	mg/kg	mg/L	mg/L	mg/kg	mg/kg	mg/kg	mg/kg	mg/L	mg/L
EQL			2	0.01	0.01	0.4	0.01	0.01	2	0.01	0.01	5	0.01	0.01	20	5	0.01	0.01	0.1	0.001	0.001	5	2	0.01	0.01	2	0.2	10	5	0.01	0.01
NEPM 2013 Calculated EIL values for Urban Commercial / Industrial			160						660			320				1800							680						1700		
NEPM 2013 Calculated EIL values for Areas of Ecological Significance			40						130			75				470							65						240		
NEPM 2013 Table 1A(1) HILs Comm/Ind D Soil			3000			900						240000				1500			730				6000			10000			400000		
NEPM 2013 Table 1B(6) ESLs for Areas of Ecological Significance, Coarse Soil 0-2m																															
NEPM 2013 Table 1B(6) ESLs for Comm/Ind, Coarse Soil 0-2m																															
SA EPA Waste Fill																															
SA Intermediate Waste Soil				5	5		0.5	0.5					10	10			5	5		0.1	0.1			2	2					250	250
SA Low Level Waste				5	5		0.5	0.5		20	20		10	10			5	5		0.1	0.1			2	2					250	250
Location	Field_ID	Sample Date																													
BG 1	BG 1	20/08/2020	2.4	-	-	<0.4	-	-	16	-	-	120	-	-	13,000	15	-	-	<0.1	-	-	-	8	-	-	-	-	-	73	-	-
MS 1	MS 1	20/08/2020	6.4	-	-	<0.4	-	-	29	-	-	12	-	-	-	7.3	-	-	<0.1	-	-	-	5.5	-	-	-	-	-	24	-	-
MS 2	MS 2	20/08/2020	7.3	-	-	<0.4	-	-	12	-	-	26	-	-	-	5.8	-	-	<0.1	-	-	<5	6.1	-	-	<2	<0.2	<10	32	-	-
MS 3	MS 3	20/08/2020	13	-	-	<0.4	-	-	7.2	-	-	5.2	-	-	-	<5	-	-	<0.1	-	-	-	<5	-	-	-	-	-	6.7	-	-
SLAG 1	SLAG 1	20/08/2020	3.2	<0.01	<0.01	<0.4	<0.01	<0.005	12	<0.01	<0.01	2900	2.4	0.56	-	100	0.04	0.02	<0.1	<0.001	<0.001	11	93	0.05	0.02	<2	<0.2	<10	1800	0.84	0.17
	QC01 (Duplicate of SLAG 1)	20/08/2020	<2	-	-	<0.4	-	-	5.1	-	-	1100	-	-	-	48	-	-	<0.1	-	-	-	30	-	-	-	-	-	950	-	-
	QC01A (Duplicate of SLAG 1)	20/08/2020	6	-	-	<1	-	-	14	-	-	4090	-	-	-	126	-	-	<0.1	-	-	-	97	-	-	-	-	-	2630	-	-
SLAG 2	SLAG 2	20/08/2020	2.6	-	-	<0.4	-	-	13	-	-	2400	-	-	-	140	-	-	<0.1	-	-	-	64	-	-	-	-	-	2400	-	-
SLAG 3	SLAG 3	20/08/2020	<2	-	-	<0.4	-	-	<5	-	-	700	-	-	-	50	-	-	<0.1	-	-	-	19	-	-	-	-	-	680	-	-

			PAH		PAH/Phenols																		Phenolics		
			Benzo(a)pyrene TEQ (lower bound) *	Benzo(a)pyrene TEQ (upper bound) *	Acenaphthene	Acenaphthylene	Anthracene	Benz(a)anthracene	Benzo(a) pyrene	Benzo(a)pyrene TEQ (medium bound) *	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	Chrysene	Benzo[b+j]fluoranthene	Dibenz(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-c,d)pyrene	Naphthalene	PAHs (Sum of total)	Phenanthrene	Pyrene	4,6-Dinitro-o-cyclohexyl phenol	Phenols (Total Halogenated)	Phenols (Total Non Halogenated)
			MG/KG	MG/KG	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
EQL			0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	20	1	20
NEPM 2013 Calculated EIL values for Urban Commercial / Industrial																			370						
NEPM 2013 Calculated EIL values for Areas of Ecological Significance																			10						
NEPM 2013 Table 1A(1) HILs Comm/Ind D Soil										40										4000					
NEPM 2013 Table 1B(6) ESLs for Areas of Ecological Significance, Coarse Soil 0-2m									1.4																
NEPM 2013 Table 1B(6) ESLs for Comm/Ind, Coarse Soil 0-2m									1.4																
SA EPA Waste Fill																									
SA Intermediate Waste Soil																									
SA Low Level Waste																									
Location	Field_ID	Sample Date																							
BG 1	BG 1	20/08/2020	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MS 1	MS 1	20/08/2020	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MS 2	MS 2	20/08/2020	<0.5	1.2	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<20	<1	<20
MS 3	MS 3	20/08/2020	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SLAG 1	SLAG 1	20/08/2020	<0.5	1.2	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<20	<1	<20
	QC01 (Duplicate of SLAG 1)	20/08/2020	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	QC01A (Duplicate of SLAG 1)	20/08/2020	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SLAG 2	SLAG 2	20/08/2020	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SLAG 3	SLAG 3	20/08/2020	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

			Organochlorine Pesticides																						Herbicides	Halogenated Benzenes
			DDE	a-BHC	Aldrin	Aldrin + Dieldrin	b-BHC	chlordane	d-BHC	DDD	DDT	DDT+DDE+DDD	Dieldrin	Endosulfan I	Endosulfan II	Endosulfan sulphate	Endrin	Endrin aldehyde	Endrin ketone	g-BHC (Lindane)	Heptachlor	Heptachlor epoxide	Methoxychlor	Toxaphene	Dinoseb	Hexachlorobenzene
			mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
EQL			0.05	0.05	0.05	0.05	0.05	0.1	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	1	20	0.05
NEPM 2013 Calculated EIL values for Urban Commercial / Industrial											640															
NEPM 2013 Calculated EIL values for Areas of Ecological Significance											3															
NEPM 2013 Table 1A(1) HILs Comm/Ind D Soil						45		530				3600					100				50		2500	160		80
NEPM 2013 Table 1B(6) ESLs for Areas of Ecological Significance, Coarse Soil 0-2m																										
NEPM 2013 Table 1B(6) ESLs for Comm/Ind, Coarse Soil 0-2m																										
SA EPA Waste Fill																										
SA Intermediate Waste Soil																										
SA Low Level Waste																										
Location	Field_ID	Sample Date																								
BG 1	BG 1	20/08/2020	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MS 1	MS 1	20/08/2020	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MS 2	MS 2	20/08/2020	<0.05	<0.05	<0.05	<0.05	<0.05	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<1	<20	<0.05
MS 3	MS 3	20/08/2020	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SLAG 1	SLAG 1	20/08/2020	<0.05	<0.05	<0.05	<0.05	<0.05	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<1	<20	<0.05
	QC01 (Duplicate of SLAG 1)	20/08/2020	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	QC01A (Duplicate of SLAG 1)	20/08/2020	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SLAG 2	SLAG 2	20/08/2020	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SLAG 3	SLAG 3	20/08/2020	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

			Halogenated Phenols							Polychlorinated Biphenyls								Inorganics				
			2,4,5-trichlorophenol	2,4,6-trichlorophenol	2,4-dichlorophenol	2,6-dichlorophenol	2-chlorophenol	Pentachlorophenol	tetrachlorophenols	Arochlor 1016	Arochlor 1221	Arochlor 1232	Arochlor 1242	Arochlor 1248	Arochlor 1254	Arochlor 1260	PCBs (Sum of total)	Cyanide Total	Fluoride	Moisture Content (dried @ 103°C)	pH (aqueous extract)	pH (Lab)
			mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	%	pH_Units	pH_Units
EQL			1	1	0.5	0.5	0.5	1	10	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	5	100	1	0.1	0.1
NEPM 2013 Calculated EIL values for Urban Commercial / Industrial																						
NEPM 2013 Calculated EIL values for Areas of Ecological Significance																						
NEPM 2013 Table 1A(1) HILs Comm/Ind D Soil								660									7					
NEPM 2013 Table 1B(6) ESLs for Areas of Ecological Significance, Coarse Soil 0-2m																						
NEPM 2013 Table 1B(6) ESLs for Comm/Ind, Coarse Soil 0-2m																						
SA EPA Waste Fill																						
SA Intermediate Waste Soil																						
SA Low Level Waste																						
Location	Field_ID	Sample Date																				
BG 1	BG 1	20/08/2020	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	13	8.1	8.2
MS 1	MS 1	20/08/2020	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	15	8.6	-
MS 2	MS 2	20/08/2020	<1	<1	<0.5	<0.5	<0.5	<1	<10	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5	<100	12	8.2	-
MS 3	MS 3	20/08/2020	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7.1	9.4	-
SLAG 1	SLAG 1	20/08/2020	<1	<1	<0.5	<0.5	<0.5	<1	<10	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5	<100	2.1	9.3	-
	QC01 (Duplicate of SLAG 1)	20/08/2020	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.7	-	-
	QC01A (Duplicate of SLAG 1)	20/08/2020	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SLAG 2	SLAG 2	20/08/2020	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	9.4	-
SLAG 3	SLAG 3	20/08/2020	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.7	9.3	-

Preliminary Site Investigation
Relative Percentage Duplicate Results
72 Wallaroo Plain Rd, Wallaroo
August 2020

			Field ID	SLAG 1	QC01	**RPD**	SLAG 1	QC01A	**RPD**
			Sampled Date/Time	20/08/2020	20/08/2020		20/08/2020	20/08/2020	
Chem_Group	**ChemName**	**Units**	**EQL**						
Metals	Arsenic	mg/kg	2 (Primary): 5 (Interlab)	3.2	<2.0	46	**3.2**	**6.0**	**61**
	Cadmium	mg/kg	0.4 (Primary): 1 (Interlab)	<0.4	<0.4	0	<0.4	<1.0	0
	Chromium (III+VI)	mg/kg	5 (Primary): 2 (Interlab)	**12.0**	**5.1**	**81**	12.0	14.0	15
	Copper	mg/kg	5	**2900.0**	**1100.0**	**90**	2900.0	4090.0	34
	Lead	mg/kg	5	**100.0**	**48.0**	**70**	100.0	126.0	23
	Mercury	mg/kg	0.1	<0.1	<0.1	0	<0.1	<0.1	0
	Nickel	mg/kg	5 (Primary): 2 (Interlab)	**93.0**	**30.0**	**102**	93.0	97.0	4
	Zinc	mg/kg	5	**1800.0**	**950.0**	**62**	1800.0	2630.0	37
Inorganics	Moisture Content (dr	%	1	2.1	1.7	21	2.1		

GREENCAP

			Field ID	RB01	TB01
			Sampled_Date/Time	20/08/2020	20/08/2020
			Sample Type	Rinsate	Trip_B
Chem_Group	ChemName	Units	EQL		
BTEX	Benzene	µg/l	1		<1
	Ethylbenzene	µg/l	1		<1
	Toluene	µg/l	1		<1
	Xylene (m & p)	µg/l	2		<2
	Xylene (o)	µg/l	1		<1
	Xylene Total	µg/l	3		<3
Metals	Arsenic	mg/l	0.001	<0.001	
	Cadmium	mg/l	0.0002	<0.0002	
	Chromium (III+VI)	mg/l	0.001	<0.001	
	Copper	mg/l	0.001	<0.001	
	Lead	mg/l	0.001	<0.001	
	Mercury	mg/l	0.0001	<0.0001	
	Nickel	mg/l	0.001	<0.001	
	Zinc	mg/l	0.005	<0.005	

Preliminary Site Investigation

AustralAsian Granite

72 Wallaroo Plain Road, Wallaroo

APPENDIX G NATA LABORATORY CERTIFICATES

Chain of Custody - Greencap Adelaide
Ph. 8299 9955

GREENCAP

Client	:	AA Granite	Date	:	20/08/2020
Project	:	Soil Investigation	Sampled by	:	Varun Bhagwat
Project Manager	:	Dylan Burford	Sampler Mobile	:	0428 829 444
Job No.	:	J169128	Purchase Order	:	PO277924
Location	:	Wallaroo Plain Rd, Wallaroo	T/Around		***STANDARD TAT***

Please email results to: Dylan.Burford@greencap.com.au Varun.Bhagwat@greencap.com.au

Relinquished by: VB 20/8/2020	Recieved by:	Relinquished by:	Received by:
Signature & date	*Signature & date* 20/8 5:47pm	*Signature & date*	*Signature & date*

Field ID	Depth	Sampled	Matrixl (*Soil, Water, Vapour, etc*)	Sample Containers: 250ml Soil Jar	40ml Vials (HCL preserved)	100ml Glass Amber (semi-volatile)	60ml Plastic (Nitric Acid Preserved)	60ml Plastic Nturients (h_2SO4)	500ml Plastic (unpreserved)	60ml Ferrous Iron (HCL)	60ml Plastic - Cyanide/Hex Cr (NaOH)	250ml Plastic (PFOS/PFOA)	Testing: pH	M8: Metals (As, Cd, Cr, Cu, Ni, Pb, Zn, Hg)	R6: Vic EPA Short Screen	R21: NEPM Screen for Soil Classification	BTEX							Hold
SLAG 1		20/08/2020	S	1									X		X									
SLAG 2		20/08/2020	S	1									X	X										
SLAG 3		20/08/2020	S	1									X	X										
MS 1		20/08/2020	S	1									X	X										
MS 2		20/08/2020	S	1									X		X									
MS 3		20/08/2020	S	1									X	X										
BG 1		20/08/2020	S	1									X	X		X								
RUBBISH SP		20/08/2020	S	1																				X
QC01		20/08/2020	S	1										X										
RB01		20/08/2020	W		2	1	1							X										
TB01		20/08/2020	W		2												X							
Totals				9	4	1	1	0	0	0	0	0	7	7	2	1	1	0	0	0	0	0	0	0

739188

eurofins | Environment Testing

PROJECT INFORMATION

Date Received: 20/8/20

Company: GL

Contact person: LB

Contact Number: 0428 829 441

Contact E-mail:

Project Name/site: SOIL INVESTIGATION / WALLAROO

Project Number: J169128

COC: Attached ☐
E-mailed ☑
Not received ☐

Sample Receipt Advice

Company name:	Greencap SA P/L
Contact name:	Dylan Burford
Project name:	SOIL INVESTIGATION
Project ID:	J169128
Turnaround time:	5 Day
Date/Time received	Aug 20, 2020 5:47 PM
Eurofins reference	739188

Sample Information

- ✓ A detailed list of analytes logged into our LIMS, is included in the attached summary table.
- ✓ Sample Temperature of a random sample selected from the batch as recorded by Eurofins Sample Receipt : 10.3 degrees Celsius.
- ✓ All samples have been received as described on the above COC.
- ✓ COC has been completed correctly.
- ✓ Attempt to chill was evident.
- ✓ Appropriately preserved sample containers have been used.
- ✓ All samples were received in good condition.
- ✓ Samples have been provided with adequate time to commence analysis in accordance with the relevant holding times.
- ✓ Appropriate sample containers have been used.
- ✓ Sample containers for volatile analysis received with zero headspace.
- ✗ Split sample sent to requested external lab.
- ✗ Some samples have been subcontracted.
- N/A Custody Seals intact (if used).

Notes

Samples received by the laboratory after 5.30pm are deemed to have been received the following working day.

Contact

If you have any questions with respect to these samples, please contact your Analytical Services Manager:

Michael Cassidy on phone : +61 3 8564 5000 or by email: MichaelCassidy@eurofins.com

Results will be delivered electronically via email to Dylan Burford - dylan.burford@greencap.com.au.

Note: A copy of these results will also be delivered to the general Greencap SA P/L email address.

Certificate of Analysis

Environment Testing

NATA Accredited
Accreditation Number 1261
Site Number 1254

Accredited for compliance with ISO/IEC 17025 – Testing
The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.

Greencap SA P/L
12 Greenhill Road
Wayville
SA 5034

Attention: **Dylan Burford**

Report	**739188-S**
Project name	SOIL INVESTIGATION
Project ID	J169128
Received Date	Aug 20, 2020

Client Sample ID			**SLAG 1**	**SLAG 2**	**SLAG 3**	**MS 1**
Sample Matrix			**Soil**	**Soil**	**Soil**	**Soil**
Eurofins Sample No.			**M20-Au32176**	**M20-Au32177**	**M20-Au32178**	**M20-Au32179**
Date Sampled			**Aug 20, 2020**	**Aug 20, 2020**	**Aug 20, 2020**	**Aug 20, 2020**
Test/Reference	LOR	Unit				
Total Recoverable Hydrocarbons - 1999 NEPM Fractions						
TRH C6-C9	20	mg/kg	< 20	-	-	-
TRH C10-C14	20	mg/kg	< 20	-	-	-
TRH C15-C28	50	mg/kg	< 50	-	-	-
TRH C29-C36	50	mg/kg	< 50	-	-	-
TRH C10-C36 (Total)	50	mg/kg	< 50	-	-	-
BTEX						
Benzene	0.1	mg/kg	< 0.1	-	-	-
Toluene	0.1	mg/kg	< 0.1	-	-	-
Ethylbenzene	0.1	mg/kg	< 0.1	-	-	-
m&p-Xylenes	0.2	mg/kg	< 0.2	-	-	-
o-Xylene	0.1	mg/kg	< 0.1	-	-	-
Xylenes - Total*	0.3	mg/kg	< 0.3	-	-	-
4-Bromofluorobenzene (surr.)	1	%	104	-	-	-
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
Naphthalene[N02]	0.5	mg/kg	< 0.5	-	-	-
TRH C6-C10	20	mg/kg	< 20	-	-	-
TRH C6-C10 less BTEX (F1)[N04]	20	mg/kg	< 20	-	-	-
TRH >C10-C16	50	mg/kg	< 50	-	-	-
TRH >C10-C16 less Naphthalene (F2)[N01]	50	mg/kg	< 50	-	-	-
TRH >C16-C34	100	mg/kg	< 100	-	-	-
TRH >C34-C40	100	mg/kg	< 100	-	-	-
TRH >C10-C40 (total)*	100	mg/kg	< 100	-	-	-
Polycyclic Aromatic Hydrocarbons						
Benzo(a)pyrene TEQ (lower bound) *	0.5	mg/kg	< 0.5	-	-	-
Benzo(a)pyrene TEQ (medium bound) *	0.5	mg/kg	0.6	-	-	-
Benzo(a)pyrene TEQ (upper bound) *	0.5	mg/kg	1.2	-	-	-
Acenaphthene	0.5	mg/kg	< 0.5	-	-	-
Acenaphthylene	0.5	mg/kg	< 0.5	-	-	-
Anthracene	0.5	mg/kg	< 0.5	-	-	-
Benz(a)anthracene	0.5	mg/kg	< 0.5	-	-	-
Benzo(a)pyrene	0.5	mg/kg	< 0.5	-	-	-
Benzo(b&j)fluoranthene[N07]	0.5	mg/kg	< 0.5	-	-	-
Benzo(g.h.i)perylene	0.5	mg/kg	< 0.5	-	-	-
Benzo(k)fluoranthene	0.5	mg/kg	< 0.5	-	-	-
Chrysene	0.5	mg/kg	< 0.5	-	-	-

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Client Sample ID Sample Matrix Eurofins Sample No. Date Sampled Test/Reference	LOR	Unit	SLAG 1 Soil M20-Au32176 Aug 20, 2020	SLAG 2 Soil M20-Au32177 Aug 20, 2020	SLAG 3 Soil M20-Au32178 Aug 20, 2020	MS 1 Soil M20-Au32179 Aug 20, 2020
Polycyclic Aromatic Hydrocarbons						
Dibenz(a.h)anthracene	0.5	mg/kg	< 0.5	-	-	-
Fluoranthene	0.5	mg/kg	< 0.5	-	-	-
Fluorene	0.5	mg/kg	< 0.5	-	-	-
Indeno(1.2.3-cd)pyrene	0.5	mg/kg	< 0.5	-	-	-
Naphthalene	0.5	mg/kg	< 0.5	-	-	-
Phenanthrene	0.5	mg/kg	< 0.5	-	-	-
Pyrene	0.5	mg/kg	< 0.5	-	-	-
Total PAH*	0.5	mg/kg	< 0.5	-	-	-
2-Fluorobiphenyl (surr.)	1	%	101	-	-	-
p-Terphenyl-d14 (surr.)	1	%	88	-	-	-
Organochlorine Pesticides						
Chlordanes - Total	0.1	mg/kg	< 0.1	-	-	-
4.4'-DDD	0.05	mg/kg	< 0.05	-	-	-
4.4'-DDE	0.05	mg/kg	< 0.05	-	-	-
4.4'-DDT	0.05	mg/kg	< 0.05	-	-	-
a-BHC	0.05	mg/kg	< 0.05	-	-	-
Aldrin	0.05	mg/kg	< 0.05	-	-	-
b-BHC	0.05	mg/kg	< 0.05	-	-	-
d-BHC	0.05	mg/kg	< 0.05	-	-	-
Dieldrin	0.05	mg/kg	< 0.05	-	-	-
Endosulfan I	0.05	mg/kg	< 0.05	-	-	-
Endosulfan II	0.05	mg/kg	< 0.05	-	-	-
Endosulfan sulphate	0.05	mg/kg	< 0.05	-	-	-
Endrin	0.05	mg/kg	< 0.05	-	-	-
Endrin aldehyde	0.05	mg/kg	< 0.05	-	-	-
Endrin ketone	0.05	mg/kg	< 0.05	-	-	-
g-BHC (Lindane)	0.05	mg/kg	< 0.05	-	-	-
Heptachlor	0.05	mg/kg	< 0.05	-	-	-
Heptachlor epoxide	0.05	mg/kg	< 0.05	-	-	-
Hexachlorobenzene	0.05	mg/kg	< 0.05	-	-	-
Methoxychlor	0.05	mg/kg	< 0.05	-	-	-
Toxaphene	1	mg/kg	< 1	-	-	-
Aldrin and Dieldrin (Total)*	0.05	mg/kg	< 0.05	-	-	-
DDT + DDE + DDD (Total)*	0.05	mg/kg	< 0.05	-	-	-
Vic EPA IWRG 621 OCP (Total)*	0.1	mg/kg	< 0.1	-	-	-
Vic EPA IWRG 621 Other OCP (Total)*	0.1	mg/kg	< 0.1	-	-	-
Dibutylchlorendate (surr.)	1	%	81	-	-	-
Tetrachloro-m-xylene (surr.)	1	%	96	-	-	-
Polychlorinated Biphenyls						
Aroclor-1016	0.1	mg/kg	< 0.1	-	-	-
Aroclor-1221	0.1	mg/kg	< 0.1	-	-	-
Aroclor-1232	0.1	mg/kg	< 0.1	-	-	-
Aroclor-1242	0.1	mg/kg	< 0.1	-	-	-
Aroclor-1248	0.1	mg/kg	< 0.1	-	-	-
Aroclor-1254	0.1	mg/kg	< 0.1	-	-	-
Aroclor-1260	0.1	mg/kg	< 0.1	-	-	-
Total PCB*	0.1	mg/kg	< 0.1	-	-	-
Dibutylchlorendate (surr.)	1	%	81	-	-	-
Tetrachloro-m-xylene (surr.)	1	%	96	-	-	-

Client Sample ID			SLAG 1	SLAG 2	SLAG 3	MS 1
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			M20-Au32176	M20-Au32177	M20-Au32178	M20-Au32179
Date Sampled			Aug 20, 2020	Aug 20, 2020	Aug 20, 2020	Aug 20, 2020
Test/Reference	LOR	Unit				
Phenols (Halogenated)						
2-Chlorophenol	0.5	mg/kg	< 0.5	-	-	-
2.4-Dichlorophenol	0.5	mg/kg	< 0.5	-	-	-
2.4.5-Trichlorophenol	1	mg/kg	< 1	-	-	-
2.4.6-Trichlorophenol	1	mg/kg	< 1	-	-	-
2.6-Dichlorophenol	0.5	mg/kg	< 0.5	-	-	-
4-Chloro-3-methylphenol	1	mg/kg	< 1	-	-	-
Pentachlorophenol	1	mg/kg	< 1	-	-	-
Tetrachlorophenols - Total	10	mg/kg	< 10	-	-	-
Total Halogenated Phenol*	1	mg/kg	< 1	-	-	-
Phenols (non-Halogenated)						
2-Cyclohexyl-4.6-dinitrophenol	20	mg/kg	< 20	-	-	-
2-Methyl-4.6-dinitrophenol	5	mg/kg	< 5	-	-	-
2-Methylphenol (o-Cresol)	0.2	mg/kg	< 0.2	-	-	-
2-Nitrophenol	1.0	mg/kg	< 1	-	-	-
2.4-Dimethylphenol	0.5	mg/kg	< 0.5	-	-	-
2.4-Dinitrophenol	5	mg/kg	< 5	-	-	-
3&4-Methylphenol (m&p-Cresol)	0.4	mg/kg	< 0.4	-	-	-
4-Nitrophenol	5	mg/kg	< 5	-	-	-
Dinoseb	20	mg/kg	< 20	-	-	-
Phenol	0.5	mg/kg	< 0.5	-	-	-
Total Non-Halogenated Phenol*	20	mg/kg	< 20	-	-	-
Phenol-d6 (surr.)	1	%	67	-	-	-
Cyanide (total)	5	mg/kg	< 5	-	-	-
Fluoride (Total)	100	mg/kg	< 100	-	-	-
pH (1:5 Aqueous extract at 25°C as rec.)	0.1	pH Units	9.3	9.4	9.3	8.6
% Moisture	1	%	2.1	2.0	2.7	15
Heavy Metals						
Arsenic	2	mg/kg	3.2	2.6	< 2	6.4
Cadmium	0.4	mg/kg	< 0.4	< 0.4	< 0.4	< 0.4
Chromium	5	mg/kg	12	13	< 5	29
Copper	5	mg/kg	2900	2400	700	12
Lead	5	mg/kg	100	140	50	7.3
Mercury	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Molybdenum	5	mg/kg	11	-	-	-
Nickel	5	mg/kg	93	64	19	5.5
Selenium	2	mg/kg	< 2	-	-	-
Silver	0.2	mg/kg	< 0.2	-	-	-
Tin	10	mg/kg	< 10	-	-	-
Zinc	5	mg/kg	1800	2400	680	24

Client Sample ID			MS 2	MS 3	BG 1	QC01
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			M20-Au32180	M20-Au32181	M20-Au32182	M20-Au32183
Date Sampled			Aug 20, 2020	Aug 20, 2020	Aug 20, 2020	Aug 20, 2020
Test/Reference	LOR	Unit				
Total Recoverable Hydrocarbons - 1999 NEPM Fractions						
TRH C6-C9	20	mg/kg	< 20	-	-	-
TRH C10-C14	20	mg/kg	230	-	-	-
TRH C15-C28	50	mg/kg	1100	-	-	-
TRH C29-C36	50	mg/kg	< 50	-	-	-
TRH C10-C36 (Total)	50	mg/kg	1330	-	-	-
BTEX						
Benzene	0.1	mg/kg	< 0.1	-	-	-
Toluene	0.1	mg/kg	< 0.1	-	-	-
Ethylbenzene	0.1	mg/kg	< 0.1	-	-	-
m&p-Xylenes	0.2	mg/kg	< 0.2	-	-	-
o-Xylene	0.1	mg/kg	< 0.1	-	-	-
Xylenes - Total*	0.3	mg/kg	< 0.3	-	-	-
4-Bromofluorobenzene (surr.)	1	%	102	-	-	-
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
Naphthalene[N02]	0.5	mg/kg	< 0.5	-	-	-
TRH C6-C10	20	mg/kg	< 20	-	-	-
TRH C6-C10 less BTEX (F1)[N04]	20	mg/kg	< 20	-	-	-
TRH >C10-C16	50	mg/kg	350	-	-	-
TRH >C10-C16 less Naphthalene (F2)[N01]	50	mg/kg	350	-	-	-
TRH >C16-C34	100	mg/kg	960	-	-	-
TRH >C34-C40	100	mg/kg	< 100	-	-	-
TRH >C10-C40 (total)*	100	mg/kg	1310	-	-	-
Polycyclic Aromatic Hydrocarbons						
Benzo(a)pyrene TEQ (lower bound) *	0.5	mg/kg	< 0.5	-	-	-
Benzo(a)pyrene TEQ (medium bound) *	0.5	mg/kg	0.6	-	-	-
Benzo(a)pyrene TEQ (upper bound) *	0.5	mg/kg	1.2	-	-	-
Acenaphthene	0.5	mg/kg	< 0.5	-	-	-
Acenaphthylene	0.5	mg/kg	< 0.5	-	-	-
Anthracene	0.5	mg/kg	< 0.5	-	-	-
Benz(a)anthracene	0.5	mg/kg	< 0.5	-	-	-
Benzo(a)pyrene	0.5	mg/kg	< 0.5	-	-	-
Benzo(b&j)fluoranthene[N07]	0.5	mg/kg	< 0.5	-	-	-
Benzo(g.h.i)perylene	0.5	mg/kg	< 0.5	-	-	-
Benzo(k)fluoranthene	0.5	mg/kg	< 0.5	-	-	-
Chrysene	0.5	mg/kg	< 0.5	-	-	-
Dibenz(a.h)anthracene	0.5	mg/kg	< 0.5	-	-	-
Fluoranthene	0.5	mg/kg	< 0.5	-	-	-
Fluorene	0.5	mg/kg	< 0.5	-	-	-
Indeno(1.2.3-cd)pyrene	0.5	mg/kg	< 0.5	-	-	-
Naphthalene	0.5	mg/kg	< 0.5	-	-	-
Phenanthrene	0.5	mg/kg	< 0.5	-	-	-
Pyrene	0.5	mg/kg	< 0.5	-	-	-
Total PAH*	0.5	mg/kg	< 0.5	-	-	-
2-Fluorobiphenyl (surr.)	1	%	100	-	-	-
p-Terphenyl-d14 (surr.)	1	%	95	-	-	-

Client Sample ID			MS 2	MS 3	BG 1	QC01
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			M20-Au32180	M20-Au32181	M20-Au32182	M20-Au32183
Date Sampled			Aug 20, 2020	Aug 20, 2020	Aug 20, 2020	Aug 20, 2020
Test/Reference	LOR	Unit				
Organochlorine Pesticides						
Chlordanes - Total	0.1	mg/kg	< 0.1	-	-	-
4.4'-DDD	0.05	mg/kg	< 0.05	-	-	-
4.4'-DDE	0.05	mg/kg	< 0.05	-	-	-
4.4'-DDT	0.05	mg/kg	< 0.05	-	-	-
a-BHC	0.05	mg/kg	< 0.05	-	-	-
Aldrin	0.05	mg/kg	< 0.05	-	-	-
b-BHC	0.05	mg/kg	< 0.05	-	-	-
d-BHC	0.05	mg/kg	< 0.05	-	-	-
Dieldrin	0.05	mg/kg	< 0.05	-	-	-
Endosulfan I	0.05	mg/kg	< 0.05	-	-	-
Endosulfan II	0.05	mg/kg	< 0.05	-	-	-
Endosulfan sulphate	0.05	mg/kg	< 0.05	-	-	-
Endrin	0.05	mg/kg	< 0.05	-	-	-
Endrin aldehyde	0.05	mg/kg	< 0.05	-	-	-
Endrin ketone	0.05	mg/kg	< 0.05	-	-	-
g-BHC (Lindane)	0.05	mg/kg	< 0.05	-	-	-
Heptachlor	0.05	mg/kg	< 0.05	-	-	-
Heptachlor epoxide	0.05	mg/kg	< 0.05	-	-	-
Hexachlorobenzene	0.05	mg/kg	< 0.05	-	-	-
Methoxychlor	0.05	mg/kg	< 0.05	-	-	-
Toxaphene	1	mg/kg	< 1	-	-	-
Aldrin and Dieldrin (Total)*	0.05	mg/kg	< 0.05	-	-	-
DDT + DDE + DDD (Total)*	0.05	mg/kg	< 0.05	-	-	-
Vic EPA IWRG 621 OCP (Total)*	0.1	mg/kg	< 0.1	-	-	-
Vic EPA IWRG 621 Other OCP (Total)*	0.1	mg/kg	< 0.1	-	-	-
Dibutylchlorendate (surr.)	1	%	89	-	-	-
Tetrachloro-m-xylene (surr.)	1	%	98	-	-	-
Polychlorinated Biphenyls						
Aroclor-1016	0.1	mg/kg	< 0.1	-	-	-
Aroclor-1221	0.1	mg/kg	< 0.1	-	-	-
Aroclor-1232	0.1	mg/kg	< 0.1	-	-	-
Aroclor-1242	0.1	mg/kg	< 0.1	-	-	-
Aroclor-1248	0.1	mg/kg	< 0.1	-	-	-
Aroclor-1254	0.1	mg/kg	< 0.1	-	-	-
Aroclor-1260	0.1	mg/kg	< 0.1	-	-	-
Total PCB*	0.1	mg/kg	< 0.1	-	-	-
Dibutylchlorendate (surr.)	1	%	89	-	-	-
Tetrachloro-m-xylene (surr.)	1	%	98	-	-	-
Phenols (Halogenated)						
2-Chlorophenol	0.5	mg/kg	< 0.5	-	-	-
2.4-Dichlorophenol	0.5	mg/kg	< 0.5	-	-	-
2.4.5-Trichlorophenol	1	mg/kg	< 1	-	-	-
2.4.6-Trichlorophenol	1	mg/kg	< 1	-	-	-
2.6-Dichlorophenol	0.5	mg/kg	< 0.5	-	-	-
4-Chloro-3-methylphenol	1	mg/kg	< 1	-	-	-
Pentachlorophenol	1	mg/kg	< 1	-	-	-
Tetrachlorophenols - Total	10	mg/kg	< 10	-	-	-
Total Halogenated Phenol*	1	mg/kg	< 1	-	-	-

Client Sample ID			MS 2	MS 3	BG 1	QC01
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			M20-Au32180	M20-Au32181	M20-Au32182	M20-Au32183
Date Sampled			Aug 20, 2020	Aug 20, 2020	Aug 20, 2020	Aug 20, 2020
Test/Reference	LOR	Unit				
Phenols (non-Halogenated)						
2-Cyclohexyl-4.6-dinitrophenol	20	mg/kg	< 20	-	-	-
2-Methyl-4.6-dinitrophenol	5	mg/kg	< 5	-	-	-
2-Methylphenol (o-Cresol)	0.2	mg/kg	< 0.2	-	-	-
2-Nitrophenol	1.0	mg/kg	< 1	-	-	-
2.4-Dimethylphenol	0.5	mg/kg	< 0.5	-	-	-
2.4-Dinitrophenol	5	mg/kg	< 5	-	-	-
3&4-Methylphenol (m&p-Cresol)	0.4	mg/kg	< 0.4	-	-	-
4-Nitrophenol	5	mg/kg	< 5	-	-	-
Dinoseb	20	mg/kg	< 20	-	-	-
Phenol	0.5	mg/kg	< 0.5	-	-	-
Total Non-Halogenated Phenol*	20	mg/kg	< 20	-	-	-
Phenol-d6 (surr.)	1	%	64	-	-	-
Cyanide (total)	5	mg/kg	< 5	-	-	-
Fluoride (Total)	100	mg/kg	< 100	-	-	-
pH (1:5 Aqueous extract at 25°C as rec.)	0.1	pH Units	8.2	9.4	8.1	-
% Moisture	1	%	12	7.1	13	1.7
% Clay	1	%	-	-	10	-
Conductivity (1:5 aqueous extract at 25°C as rec.)	10	uS/cm	-	-	2600	-
pH (units)(1:5 soil:CaCl2 extract at 25°C as rec.)	0.1	pH Units	-	-	8.2	-
Total Organic Carbon	0.1	%	-	-	2.5	-
Heavy Metals						
Arsenic	2	mg/kg	7.3	13	2.4	< 2
Cadmium	0.4	mg/kg	< 0.4	< 0.4	< 0.4	< 0.4
Chromium	5	mg/kg	12	7.2	16	5.1
Copper	5	mg/kg	26	5.2	120	1100
Iron	20	mg/kg	-	-	13000	-
Lead	5	mg/kg	5.8	< 5	15	48
Mercury	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Molybdenum	5	mg/kg	< 5	-	-	-
Nickel	5	mg/kg	6.1	< 5	8.0	30
Selenium	2	mg/kg	< 2	-	-	-
Silver	0.2	mg/kg	< 0.2	-	-	-
Tin	10	mg/kg	< 10	-	-	-
Zinc	5	mg/kg	32	6.7	73	950
Heavy Metals						
Iron (%)	0.01	%	-	-	1.3	-
Cation Exchange Capacity						
Cation Exchange Capacity	0.05	meq/100g	-	-	36	-

Sample History

Where samples are submitted/analysed over several days, the last date of extraction and analysis is reported.
A recent review of our LIMS has resulted in the correction or clarification of some method identifications. Due to this, some of the method reference information on reports has changed. However, no substantive change has been made to our laboratory methods, and as such there is no change in the validity of current or previous results.

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
Total Recoverable Hydrocarbons - 1999 NEPM Fractions	Melbourne	Aug 21, 2020	14 Days
- Method: LTM-ORG-2010 TRH C6-C40			
BTEX	Melbourne	Aug 21, 2020	14 Days
- Method: LTM-ORG-2010 TRH C6-C40			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Melbourne	Aug 21, 2020	14 Days
- Method: LTM-ORG-2010 TRH C6-C40			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Melbourne	Aug 21, 2020	
- Method: LTM-ORG-2010 TRH C6-C40			
Polycyclic Aromatic Hydrocarbons	Melbourne	Aug 21, 2020	14 Days
- Method: LTM-ORG-2130 PAH and Phenols in Soil and Water			
Organochlorine Pesticides	Melbourne	Aug 21, 2020	14 Days
- Method: LTM-ORG-2220 OCP & PCB in Soil and Water (USEPA 8270)			
Polychlorinated Biphenyls	Melbourne	Aug 21, 2020	28 Days
- Method: LTM-ORG-2220 OCP & PCB in Soil and Water (USEPA 8082)			
Phenols (Halogenated)	Melbourne	Aug 21, 2020	14 Days
- Method: LTM-ORG-2130 PAH and Phenols in Soil and Water			
Phenols (non-Halogenated)	Melbourne	Aug 21, 2020	14 Days
- Method: LTM-ORG-2130 PAH and Phenols in Soil and Water			
Cyanide (total)	Melbourne	Aug 21, 2020	14 Days
- Method: LTM-INO-4020 Total Free WAD Cyanide by CFA			
Fluoride (Total)	Melbourne	Aug 24, 2020	28 Days
- Method: LTM-INO-4150 Determination of Total Fluoride PART B – ISE			
Metals IWRG 621 : Metals M12	Melbourne	Aug 21, 2020	28 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
pH (1:5 Aqueous extract at 25°C as rec.)	Melbourne	Aug 21, 2020	7 Days
- Method: LTM-GEN-7090 pH in soil by ISE			
Metals M8	Melbourne	Aug 21, 2020	180 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
% Moisture	Melbourne	Aug 21, 2020	14 Days
- Method: LTM-GEN-7080 Moisture			
NEPM Screen for Soil Classification			
% Clay	Brisbane	Aug 24, 2020	0 Days
- Method: LTM-GEN-7040			
Conductivity (1:5 aqueous extract at 25°C as rec.)	Melbourne	Aug 21, 2020	7 Days
- Method: LTM-INO-4030 Conductivity			
pH (units)(1:5 soil:CaCl2 extract at 25°C as rec.)	Melbourne	Aug 21, 2020	7 Days
- Method: LTM-GEN-7090 pH in soil by ISE			
Total Organic Carbon	Melbourne	Aug 24, 2020	28 Days
- Method: LTM-INO-4060 Total Organic Carbon in water and soil			
Heavy Metals	Melbourne	Aug 21, 2020	180 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
Cation Exchange Capacity	Melbourne	Aug 24, 2020	180 Days
- Method: LTM-MET-3060 Cation Exchange Capacity by bases & Exchangeable Sodium Percentage			

Company Name:	Greencap SA P/L	**Order No.:**	PO277924	**Received:**	Aug 20, 2020 5:47 PM
Address:	12 Greenhill Road	**Report #:**	739188	**Due:**	Aug 28, 2020
	Wayville	**Phone:**	08 8299 9955	**Priority:**	5 Day
	SA 5034	**Fax:**	08 8299 9954	**Contact Name:**	Dylan Burford
Project Name:	SOIL INVESTIGATION				
Project ID:	J169128				

Eurofins Analytical Services Manager : Michael Cassidy

Sample Detail						HOLD	pH (1:5 Aqueous extract at 25°C as rec.)	Metals M8	BTEX	Moisture Set	NEPM Screen for Soil Classification	Vic EPA Short Screen
Melbourne Laboratory - NATA Site # 1254 & 14271						X	X	X	X	X	X	X
Sydney Laboratory - NATA Site # 18217												
Brisbane Laboratory - NATA Site # 20794											X	
Perth Laboratory - NATA Site # 23736												
Newcastle Laboratory												
External Laboratory												
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**							
1	SLAG 1	Aug 20, 2020		Soil	M20-Au32176		X			X		X
2	SLAG 2	Aug 20, 2020		Soil	M20-Au32177		X	X		X		
3	SLAG 3	Aug 20, 2020		Soil	M20-Au32178		X	X		X		
4	MS 1	Aug 20, 2020		Soil	M20-Au32179		X	X		X		
5	MS 2	Aug 20, 2020		Soil	M20-Au32180		X			X		X
6	MS 3	Aug 20, 2020		Soil	M20-Au32181		X	X		X		
7	BG 1	Aug 20, 2020		Soil	M20-Au32182		X	X		X	X	
8	QC01	Aug 20, 2020		Soil	M20-Au32183			X		X		
9	RB01	Aug 20, 2020		Water	M20-Au32184			X				

Company Name:	Greencap SA P/L	**Order No.:**	PO277924	**Received:**	Aug 20, 2020 5:47 PM
Address:	12 Greenhill Road	**Report #:**	739188	**Due:**	Aug 28, 2020
	Wayville	**Phone:**	08 8299 9955	**Priority:**	5 Day
	SA 5034	**Fax:**	08 8299 9954	**Contact Name:**	Dylan Burford
Project Name:	SOIL INVESTIGATION				
Project ID:	J169128				

Eurofins Analytical Services Manager : Michael Cassidy

Sample Detail						HOLD	pH (1:5 Aqueous extract at 25°C as rec.)	Metals M8	BTEX	Moisture Set	NEPM Screen for Soil Classification	Vic EPA Short Screen
Melbourne Laboratory - NATA Site # 1254 & 14271						X	X	X	X	X	X	X
Sydney Laboratory - NATA Site # 18217												
Brisbane Laboratory - NATA Site # 20794											X	
Perth Laboratory - NATA Site # 23736												
10	TB01	Aug 20, 2020		Water	M20-Au32185				X			
11	RUBBISH SP	Aug 20, 2020		Soil	M20-Au32186	X						
Test Counts						1	7	7	1	8	1	2

Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples follows guidelines delineated in the National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended May 2013 and are included in this QC report where applicable. Additional QC data may be available on request.
2. All soil/sediment/solid results are reported on a dry basis, unless otherwise stated.
3. All biota/food results are reported on a wet weight basis on the edible portion, unless otherwise stated.
4. Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
5. Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds.
6. SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
7. Samples were analysed on an 'as received' basis.
8. Information identified on this report with blue colour, indicates data provided by customer, that may have an impact on the results.
9. This report replaces any interim results previously issued.

Holding Times

Please refer to 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours prior to sample receipt deadlines as stated on the SRA.

If the Laboratory did not receive the information in the required timeframe, and regardless of any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

For VOCs containing vinyl chloride, styrene and 2-chloroethyl vinyl ether the holding time is 7 days however for all other VOCs such as BTEX or C6-10 TRH then the holding time is 14 days.

****NOTE:** pH duplicates are reported as a range NOT as RPD

Units

mg/kg: milligrams per kilogram	**mg/L:** milligrams per litre	**ug/L:** micrograms per litre
ppm: Parts per million	**ppb:** Parts per billion	**%:** Percentage
org/100mL: Organisms per 100 millilitres	**NTU:** Nephelometric Turbidity Units	**MPN/100mL:** Most Probable Number of organisms per 100 millilitres

Terms

Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
LOR	Limit of Reporting.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
LCS	Laboratory Control Sample - reported as percent recovery.
CRM	Certified Reference Material - reported as percent recovery.
Method Blank	In the case of solid samples these are performed on laboratory certified clean sands and in the case of water samples these are performed on de-ionised water.
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
USEPA	United States Environmental Protection Agency
APHA	American Public Health Association
TCLP	Toxicity Characteristic Leaching Procedure
COC	Chain of Custody
SRA	Sample Receipt Advice
QSM	US Department of Defense Quality Systems Manual Version 5.3
CP	Client Parent - QC was performed on samples pertaining to this report
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within.
TEQ	Toxic Equivalency Quotient

QC - Acceptance Criteria

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is 30% however the following acceptance guidelines are equally applicable:

Results <10 times the LOR : No Limit

Results between 10-20 times the LOR : RPD must lie between 0-50%

Results >20 times the LOR : RPD must lie between 0-30%

Surrogate Recoveries: Recoveries must lie between 20-130% Phenols & 50-150% PFASs

PFAS field samples that contain surrogate recoveries in excess of the QC limit designated in QSM 5.3 where no positive PFAS results have been reported have been reviewed and no data was affected.

WA DWER (n=10): PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

QC Data General Comments

1. Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
3. Organochlorine Pesticide analysis - where reporting LCS data, Toxaphene & Chlordane are not added to the LCS.
4. Organochlorine Pesticide analysis - where reporting Spike data, Toxaphene is not added to the Spike.
5. Total Recoverable Hydrocarbons - where reporting Spike & LCS data, a single spike of commercial Hydrocarbon products in the range of C12-C30 is added and it's Total Recovery is reported in the C10-C14 cell of the Report.
6. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling.Therefore laboratory analysis is unlikely to be completed within holding time. Analysis will begin as soon as possible after sample receipt.
7. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of Recovery the term "INT" appears against that analyte.
8. Polychlorinated Biphenyls are spiked only using Aroclor 1260 in Matrix Spikes and LCS.
9. For Matrix Spikes and LCS results a dash " -" in the report means that the specific analyte was not added to the QC sample.
10. Duplicate RPDs are calculated from raw analytical data thus it is possible to have two sets of data.

Quality Control Results

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank							
Total Recoverable Hydrocarbons - 1999 NEPM Fractions							
TRH C6-C9	mg/kg	< 20			20	Pass	
TRH C10-C14	mg/kg	< 20			20	Pass	
TRH C15-C28	mg/kg	< 50			50	Pass	
TRH C29-C36	mg/kg	< 50			50	Pass	
Method Blank							
BTEX							
Benzene	mg/kg	< 0.1			0.1	Pass	
Toluene	mg/kg	< 0.1			0.1	Pass	
Ethylbenzene	mg/kg	< 0.1			0.1	Pass	
m&p-Xylenes	mg/kg	< 0.2			0.2	Pass	
o-Xylene	mg/kg	< 0.1			0.1	Pass	
Xylenes - Total*	mg/kg	< 0.3			0.3	Pass	
Method Blank							
Total Recoverable Hydrocarbons - 2013 NEPM Fractions							
Naphthalene	mg/kg	< 0.5			0.5	Pass	
TRH C6-C10	mg/kg	< 20			20	Pass	
TRH >C10-C16	mg/kg	< 50			50	Pass	
TRH >C16-C34	mg/kg	< 100			100	Pass	
TRH >C34-C40	mg/kg	< 100			100	Pass	
Method Blank							
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	mg/kg	< 0.5			0.5	Pass	
Acenaphthylene	mg/kg	< 0.5			0.5	Pass	
Anthracene	mg/kg	< 0.5			0.5	Pass	
Benz(a)anthracene	mg/kg	< 0.5			0.5	Pass	
Benzo(a)pyrene	mg/kg	< 0.5			0.5	Pass	
Benzo(b&j)fluoranthene	mg/kg	< 0.5			0.5	Pass	
Benzo(g.h.i)perylene	mg/kg	< 0.5			0.5	Pass	
Benzo(k)fluoranthene	mg/kg	< 0.5			0.5	Pass	
Chrysene	mg/kg	< 0.5			0.5	Pass	
Dibenz(a.h)anthracene	mg/kg	< 0.5			0.5	Pass	
Fluoranthene	mg/kg	< 0.5			0.5	Pass	
Fluorene	mg/kg	< 0.5			0.5	Pass	
Indeno(1.2.3-cd)pyrene	mg/kg	< 0.5			0.5	Pass	
Naphthalene	mg/kg	< 0.5			0.5	Pass	
Phenanthrene	mg/kg	< 0.5			0.5	Pass	
Pyrene	mg/kg	< 0.5			0.5	Pass	
Method Blank							
Organochlorine Pesticides							
Chlordanes - Total	mg/kg	< 0.1			0.1	Pass	
4.4'-DDD	mg/kg	< 0.05			0.05	Pass	
4.4'-DDE	mg/kg	< 0.05			0.05	Pass	
4.4'-DDT	mg/kg	< 0.05			0.05	Pass	
a-BHC	mg/kg	< 0.05			0.05	Pass	
Aldrin	mg/kg	< 0.05			0.05	Pass	
b-BHC	mg/kg	< 0.05			0.05	Pass	
d-BHC	mg/kg	< 0.05			0.05	Pass	
Dieldrin	mg/kg	< 0.05			0.05	Pass	
Endosulfan I	mg/kg	< 0.05			0.05	Pass	
Endosulfan II	mg/kg	< 0.05			0.05	Pass	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Endosulfan sulphate	mg/kg	< 0.05			0.05	Pass	
Endrin	mg/kg	< 0.05			0.05	Pass	
Endrin aldehyde	mg/kg	< 0.05			0.05	Pass	
Endrin ketone	mg/kg	< 0.05			0.05	Pass	
g-BHC (Lindane)	mg/kg	< 0.05			0.05	Pass	
Heptachlor	mg/kg	< 0.05			0.05	Pass	
Heptachlor epoxide	mg/kg	< 0.05			0.05	Pass	
Hexachlorobenzene	mg/kg	< 0.05			0.05	Pass	
Methoxychlor	mg/kg	< 0.05			0.05	Pass	
Toxaphene	mg/kg	< 1			1	Pass	
Method Blank							
Polychlorinated Biphenyls							
Aroclor-1016	mg/kg	< 0.1			0.1	Pass	
Aroclor-1221	mg/kg	< 0.1			0.1	Pass	
Aroclor-1232	mg/kg	< 0.1			0.1	Pass	
Aroclor-1242	mg/kg	< 0.1			0.1	Pass	
Aroclor-1248	mg/kg	< 0.1			0.1	Pass	
Aroclor-1254	mg/kg	< 0.1			0.1	Pass	
Aroclor-1260	mg/kg	< 0.1			0.1	Pass	
Total PCB*	mg/kg	< 0.1			0.1	Pass	
Method Blank							
Phenols (Halogenated)							
2-Chlorophenol	mg/kg	< 0.5			0.5	Pass	
2.4-Dichlorophenol	mg/kg	< 0.5			0.5	Pass	
2.4.5-Trichlorophenol	mg/kg	< 1			1	Pass	
2.4.6-Trichlorophenol	mg/kg	< 1			1	Pass	
2.6-Dichlorophenol	mg/kg	< 0.5			0.5	Pass	
4-Chloro-3-methylphenol	mg/kg	< 1			1	Pass	
Pentachlorophenol	mg/kg	< 1			1	Pass	
Tetrachlorophenols - Total	mg/kg	< 10			10	Pass	
Method Blank							
Phenols (non-Halogenated)							
2-Cyclohexyl-4.6-dinitrophenol	mg/kg	< 20			20	Pass	
2-Methyl-4.6-dinitrophenol	mg/kg	< 5			5	Pass	
2-Methylphenol (o-Cresol)	mg/kg	< 0.2			0.2	Pass	
2-Nitrophenol	mg/kg	< 1			1.0	Pass	
2.4-Dimethylphenol	mg/kg	< 0.5			0.5	Pass	
2.4-Dinitrophenol	mg/kg	< 5			5	Pass	
3&4-Methylphenol (m&p-Cresol)	mg/kg	< 0.4			0.4	Pass	
4-Nitrophenol	mg/kg	< 5			5	Pass	
Dinoseb	mg/kg	< 20			20	Pass	
Phenol	mg/kg	< 0.5			0.5	Pass	
Method Blank							
Cyanide (total)	mg/kg	< 5			5	Pass	
Fluoride (Total)	mg/kg	< 100			100	Pass	
Total Organic Carbon	%	< 0.1			0.1	Pass	
Method Blank							
Heavy Metals							
Arsenic	mg/kg	< 2			2	Pass	
Cadmium	mg/kg	< 0.4			0.4	Pass	
Chromium	mg/kg	< 5			5	Pass	
Copper	mg/kg	< 5			5	Pass	
Iron	mg/kg	< 20			20	Pass	
Lead	mg/kg	< 5			5	Pass	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Mercury	mg/kg	< 0.1			0.1	Pass	
Molybdenum	mg/kg	< 5			5	Pass	
Nickel	mg/kg	< 5			5	Pass	
Selenium	mg/kg	< 2			2	Pass	
Silver	mg/kg	< 0.2			0.2	Pass	
Tin	mg/kg	< 10			10	Pass	
Zinc	mg/kg	< 5			5	Pass	
Method Blank							
Heavy Metals							
Iron (%)	%	< 0.01			0.01	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons - 1999 NEPM Fractions							
TRH C6-C9	%	90			70-130	Pass	
TRH C10-C14	%	99			70-130	Pass	
LCS - % Recovery							
BTEX							
Benzene	%	84			70-130	Pass	
Toluene	%	83			70-130	Pass	
Ethylbenzene	%	79			70-130	Pass	
m&p-Xylenes	%	78			70-130	Pass	
Xylenes - Total*	%	78			70-130	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons - 2013 NEPM Fractions							
Naphthalene	%	84			70-130	Pass	
TRH C6-C10	%	87			70-130	Pass	
TRH >C10-C16	%	96			70-130	Pass	
LCS - % Recovery							
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	%	109			70-130	Pass	
Acenaphthylene	%	111			70-130	Pass	
Anthracene	%	125			70-130	Pass	
Benz(a)anthracene	%	101			70-130	Pass	
Benzo(a)pyrene	%	108			70-130	Pass	
Benzo(b&j)fluoranthene	%	107			70-130	Pass	
Benzo(g.h.i)perylene	%	110			70-130	Pass	
Benzo(k)fluoranthene	%	125			70-130	Pass	
Chrysene	%	89			70-130	Pass	
Dibenz(a.h)anthracene	%	119			70-130	Pass	
Fluoranthene	%	110			70-130	Pass	
Fluorene	%	118			70-130	Pass	
Indeno(1.2.3-cd)pyrene	%	116			70-130	Pass	
Naphthalene	%	102			70-130	Pass	
Phenanthrene	%	125			70-130	Pass	
Pyrene	%	92			70-130	Pass	
LCS - % Recovery							
Organochlorine Pesticides							
Chlordanes - Total	%	108			70-130	Pass	
4.4'-DDD	%	120			70-130	Pass	
4.4'-DDE	%	115			70-130	Pass	
4.4'-DDT	%	125			70-130	Pass	
a-BHC	%	78			70-130	Pass	
Aldrin	%	103			70-130	Pass	
b-BHC	%	98			70-130	Pass	
d-BHC	%	100			70-130	Pass	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Dieldrin	%	104			70-130	Pass	
Endosulfan I	%	99			70-130	Pass	
Endosulfan II	%	104			70-130	Pass	
Endosulfan sulphate	%	100			70-130	Pass	
Endrin	%	111			70-130	Pass	
Endrin aldehyde	%	74			70-130	Pass	
Endrin ketone	%	95			70-130	Pass	
g-BHC (Lindane)	%	99			70-130	Pass	
Heptachlor	%	101			70-130	Pass	
Heptachlor epoxide	%	110			70-130	Pass	
Hexachlorobenzene	%	101			70-130	Pass	
Methoxychlor	%	91			70-130	Pass	
LCS - % Recovery							
Polychlorinated Biphenyls							
Aroclor-1260	%	89			70-130	Pass	
LCS - % Recovery							
Phenols (Halogenated)							
2-Chlorophenol	%	97			30-130	Pass	
2.4-Dichlorophenol	%	105			30-130	Pass	
2.4.5-Trichlorophenol	%	120			30-130	Pass	
2.4.6-Trichlorophenol	%	107			30-130	Pass	
2.6-Dichlorophenol	%	113			30-130	Pass	
4-Chloro-3-methylphenol	%	104			30-130	Pass	
Pentachlorophenol	%	101			30-130	Pass	
Tetrachlorophenols - Total	%	86			30-130	Pass	
LCS - % Recovery							
Phenols (non-Halogenated)							
2-Cyclohexyl-4.6-dinitrophenol	%	49			30-130	Pass	
2-Methyl-4.6-dinitrophenol	%	107			30-130	Pass	
2-Methylphenol (o-Cresol)	%	100			30-130	Pass	
2-Nitrophenol	%	112			30-130	Pass	
2.4-Dimethylphenol	%	104			30-130	Pass	
2.4-Dinitrophenol	%	60			30-130	Pass	
3&4-Methylphenol (m&p-Cresol)	%	103			30-130	Pass	
4-Nitrophenol	%	126			30-130	Pass	
Dinoseb	%	122			30-130	Pass	
Phenol	%	94			30-130	Pass	
LCS - % Recovery							
Cyanide (total)	%	101			70-130	Pass	
Fluoride (Total)	%	108			70-130	Pass	
% Clay	%	117			70-130	Pass	
Total Organic Carbon	%	104			70-130	Pass	
LCS - % Recovery							
Heavy Metals							
Arsenic	%	103			80-120	Pass	
Cadmium	%	97			80-120	Pass	
Chromium	%	112			80-120	Pass	
Copper	%	111			80-120	Pass	
Iron	%	110			80-120	Pass	
Lead	%	112			80-120	Pass	
Mercury	%	97			80-120	Pass	
Molybdenum	%	110			80-120	Pass	
Nickel	%	105			80-120	Pass	
Selenium	%	103			80-120	Pass	

Test			Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Silver			%	97			80-120	Pass	
Tin			%	106			80-120	Pass	
Zinc			%	105			80-120	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Spike - % Recovery									
Total Recoverable Hydrocarbons - 1999 NEPM Fractions				Result 1					
TRH C10-C14	M20-Au32375	NCP	%	117			70-130	Pass	
Spike - % Recovery									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1					
TRH >C10-C16	M20-Au32375	NCP	%	122			70-130	Pass	
Spike - % Recovery									
Polycyclic Aromatic Hydrocarbons				Result 1					
Acenaphthene	M20-Au31043	NCP	%	102			70-130	Pass	
Acenaphthylene	M20-Au31043	NCP	%	115			70-130	Pass	
Anthracene	M20-Au31043	NCP	%	77			70-130	Pass	
Benz(a)anthracene	M20-Au31043	NCP	%	113			70-130	Pass	
Benzo(a)pyrene	M20-Au31043	NCP	%	116			70-130	Pass	
Benzo(b&j)fluoranthene	M20-Au31043	NCP	%	103			70-130	Pass	
Benzo(g.h.i)perylene	M20-Au31043	NCP	%	92			70-130	Pass	
Benzo(k)fluoranthene	M20-Au31043	NCP	%	109			70-130	Pass	
Chrysene	M20-Au31043	NCP	%	108			70-130	Pass	
Dibenz(a.h)anthracene	M20-Au31043	NCP	%	107			70-130	Pass	
Fluoranthene	M20-Au31043	NCP	%	108			70-130	Pass	
Fluorene	M20-Au31043	NCP	%	125			70-130	Pass	
Indeno(1.2.3-cd)pyrene	M20-Au31043	NCP	%	101			70-130	Pass	
Naphthalene	M20-Au31043	NCP	%	111			70-130	Pass	
Phenanthrene	M20-Au31043	NCP	%	113			70-130	Pass	
Pyrene	M20-Au31043	NCP	%	118			70-130	Pass	
Spike - % Recovery									
Organochlorine Pesticides				Result 1					
Chlordanes - Total	M20-Au34289	NCP	%	94			70-130	Pass	
4.4'-DDD	M20-Au34289	NCP	%	97			70-130	Pass	
4.4'-DDE	M20-Au34289	NCP	%	93			70-130	Pass	
4.4'-DDT	M20-Au34289	NCP	%	88			70-130	Pass	
a-BHC	M20-Au34289	NCP	%	84			70-130	Pass	
Aldrin	M20-Au34289	NCP	%	86			70-130	Pass	
b-BHC	M20-Au34289	NCP	%	96			70-130	Pass	
d-BHC	M20-Au34289	NCP	%	106			70-130	Pass	
Dieldrin	M20-Au34289	NCP	%	86			70-130	Pass	
Endosulfan I	M20-Au34289	NCP	%	82			70-130	Pass	
Endosulfan II	M20-Au34289	NCP	%	81			70-130	Pass	
Endosulfan sulphate	M20-Au34289	NCP	%	77			70-130	Pass	
Endrin	M20-Au34289	NCP	%	111			70-130	Pass	
Endrin aldehyde	M20-Au34289	NCP	%	84			70-130	Pass	
Endrin ketone	M20-Au34289	NCP	%	111			70-130	Pass	
g-BHC (Lindane)	M20-Au34289	NCP	%	90			70-130	Pass	
Heptachlor	M20-Au34289	NCP	%	94			70-130	Pass	
Heptachlor epoxide	M20-Au34289	NCP	%	96			70-130	Pass	
Hexachlorobenzene	M20-Au34289	NCP	%	84			70-130	Pass	
Methoxychlor	M20-Au34289	NCP	%	79			70-130	Pass	
Spike - % Recovery									
Polychlorinated Biphenyls				Result 1					
Aroclor-1016	M20-Au22502	NCP	%	96			70-130	Pass	
Aroclor-1260	M20-Au22502	NCP	%	124			70-130	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Spike - % Recovery									
Phenols (Halogenated)				Result 1					
2-Chlorophenol	M20-Au31043	NCP	%	101			30-130	Pass	
2.4-Dichlorophenol	M20-Au31043	NCP	%	109			30-130	Pass	
2.4.5-Trichlorophenol	M20-Au31043	NCP	%	107			30-130	Pass	
2.4.6-Trichlorophenol	M20-Au31043	NCP	%	113			30-130	Pass	
2.6-Dichlorophenol	M20-Au31043	NCP	%	85			30-130	Pass	
4-Chloro-3-methylphenol	M20-Au31043	NCP	%	105			30-130	Pass	
Pentachlorophenol	M20-Au31043	NCP	%	72			30-130	Pass	
Tetrachlorophenols - Total	M20-Au31043	NCP	%	75			30-130	Pass	
Spike - % Recovery									
Phenols (non-Halogenated)				Result 1					
2-Cyclohexyl-4.6-dinitrophenol	B20-Au09889	NCP	%	102			30-130	Pass	
2-Methyl-4.6-dinitrophenol	B20-Au09889	NCP	%	100			30-130	Pass	
2-Methylphenol (o-Cresol)	M20-Au31043	NCP	%	106			30-130	Pass	
2-Nitrophenol	M20-Au31043	NCP	%	105			30-130	Pass	
2.4-Dimethylphenol	M20-Au31043	NCP	%	102			30-130	Pass	
2.4-Dinitrophenol	B20-Au09889	NCP	%	110			30-130	Pass	
3&4-Methylphenol (m&p-Cresol)	M20-Au31043	NCP	%	107			30-130	Pass	
4-Nitrophenol	M20-Au31043	NCP	%	110			30-130	Pass	
Dinoseb	M20-Au31043	NCP	%	55			30-130	Pass	
Phenol	M20-Au31043	NCP	%	97			30-130	Pass	
Spike - % Recovery									
				Result 1					
Cyanide (total)	M20-Au30660	NCP	%	85			70-130	Pass	
Fluoride (Total)	M20-My36607	NCP	%	126			70-130	Pass	
Spike - % Recovery									
Heavy Metals				Result 1					
Arsenic	M20-Au34503	NCP	%	100			75-125	Pass	
Cadmium	M20-Au34503	NCP	%	96			75-125	Pass	
Chromium	M20-Au34503	NCP	%	114			75-125	Pass	
Copper	M20-Au34503	NCP	%	107			75-125	Pass	
Lead	M20-Au34503	NCP	%	112			75-125	Pass	
Mercury	M20-Au34503	NCP	%	94			75-125	Pass	
Molybdenum	M20-Au34503	NCP	%	106			75-125	Pass	
Nickel	M20-Au34503	NCP	%	104			75-125	Pass	
Selenium	M20-Au34503	NCP	%	97			75-125	Pass	
Silver	M20-Au34503	NCP	%	98			75-125	Pass	
Tin	M20-Au34503	NCP	%	106			75-125	Pass	
Zinc	M20-Au34503	NCP	%	98			75-125	Pass	
Spike - % Recovery									
Total Recoverable Hydrocarbons - 1999 NEPM Fractions				Result 1					
TRH C6-C9	M20-Au32180	CP	%	126			70-130	Pass	
Spike - % Recovery									
BTEX				Result 1					
Benzene	M20-Au32180	CP	%	121			70-130	Pass	
Toluene	M20-Au32180	CP	%	123			70-130	Pass	
Ethylbenzene	M20-Au32180	CP	%	116			70-130	Pass	
m&p-Xylenes	M20-Au32180	CP	%	116			70-130	Pass	
o-Xylene	M20-Au32180	CP	%	120			70-130	Pass	
Xylenes - Total*	M20-Au32180	CP	%	118			70-130	Pass	
Spike - % Recovery									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1					
Naphthalene	M20-Au32180	CP	%	112			70-130	Pass	
TRH C6-C10	M20-Au32180	CP	%	124			70-130	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Duplicate									
Total Recoverable Hydrocarbons - 1999 NEPM Fractions				Result 1	Result 2	RPD			
TRH C6-C9	M20-Au32176	CP	mg/kg	< 20	< 20	<1	30%	Pass	
TRH C10-C14	M20-Au32176	CP	mg/kg	< 20	< 20	<1	30%	Pass	
TRH C15-C28	M20-Au32176	CP	mg/kg	< 50	< 50	<1	30%	Pass	
TRH C29-C36	M20-Au32176	CP	mg/kg	< 50	< 50	<1	30%	Pass	
Duplicate									
BTEX				Result 1	Result 2	RPD			
Benzene	M20-Au32176	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Toluene	M20-Au32176	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Ethylbenzene	M20-Au32176	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
m&p-Xylenes	M20-Au32176	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
o-Xylene	M20-Au32176	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Xylenes - Total*	M20-Au32176	CP	mg/kg	< 0.3	< 0.3	<1	30%	Pass	
Duplicate									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1	Result 2	RPD			
Naphthalene	M20-Au32176	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
TRH C6-C10	M20-Au32176	CP	mg/kg	< 20	< 20	<1	30%	Pass	
TRH >C10-C16	M20-Au32176	CP	mg/kg	< 50	< 50	<1	30%	Pass	
TRH >C16-C34	M20-Au32176	CP	mg/kg	< 100	< 100	<1	30%	Pass	
TRH >C34-C40	M20-Au32176	CP	mg/kg	< 100	< 100	<1	30%	Pass	
Duplicate									
Polycyclic Aromatic Hydrocarbons				Result 1	Result 2	RPD			
Acenaphthene	M20-Au32176	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Acenaphthylene	M20-Au32176	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Anthracene	M20-Au32176	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benz(a)anthracene	M20-Au32176	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(a)pyrene	M20-Au32176	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(b&j)fluoranthene	M20-Au32176	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(g.h.i)perylene	M20-Au32176	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(k)fluoranthene	M20-Au32176	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Chrysene	M20-Au32176	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Dibenz(a.h)anthracene	M20-Au32176	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Fluoranthene	M20-Au32176	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Fluorene	M20-Au32176	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Indeno(1.2.3-cd)pyrene	M20-Au32176	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Naphthalene	M20-Au32176	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Phenanthrene	M20-Au32176	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Pyrene	M20-Au32176	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Duplicate									
Organochlorine Pesticides				Result 1	Result 2	RPD			
Chlordanes - Total	M20-Au32176	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
4.4'-DDD	M20-Au32176	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
4.4'-DDE	M20-Au32176	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
4.4'-DDT	M20-Au32176	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
a-BHC	M20-Au32176	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Aldrin	M20-Au32176	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
b-BHC	M20-Au32176	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
d-BHC	M20-Au32176	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Dieldrin	M20-Au32176	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Endosulfan I	M20-Au32176	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Endosulfan II	M20-Au32176	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Endosulfan sulphate	M20-Au32176	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Endrin	M20-Au32176	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	

Duplicate									
Organochlorine Pesticides				Result 1	Result 2	RPD			
Endrin aldehyde	M20-Au32176	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Endrin ketone	M20-Au32176	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
g-BHC (Lindane)	M20-Au32176	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Heptachlor	M20-Au32176	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Heptachlor epoxide	M20-Au32176	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Hexachlorobenzene	M20-Au32176	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Methoxychlor	M20-Au32176	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Toxaphene	M20-Au31034	NCP	mg/kg	< 1	< 1	<1	30%	Pass	
Duplicate									
Polychlorinated Biphenyls				Result 1	Result 2	RPD			
Aroclor-1016	M20-Au31034	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Aroclor-1221	M20-Au31034	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Aroclor-1232	M20-Au31034	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Aroclor-1242	M20-Au31034	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Aroclor-1248	M20-Au31034	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Aroclor-1254	M20-Au31034	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Aroclor-1260	M20-Au31034	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Total PCB*	M20-Au31034	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Duplicate									
Phenols (Halogenated)				Result 1	Result 2	RPD			
2-Chlorophenol	M20-Au32176	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
2.4-Dichlorophenol	M20-Au32176	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
2.4.5-Trichlorophenol	M20-Au32176	CP	mg/kg	< 1	< 1	<1	30%	Pass	
2.4.6-Trichlorophenol	M20-Au32176	CP	mg/kg	< 1	< 1	<1	30%	Pass	
2.6-Dichlorophenol	M20-Au32176	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
4-Chloro-3-methylphenol	M20-Au32176	CP	mg/kg	< 1	< 1	<1	30%	Pass	
Pentachlorophenol	M20-Au32176	CP	mg/kg	< 1	< 1	<1	30%	Pass	
Tetrachlorophenols - Total	M20-Au32176	CP	mg/kg	< 10	< 10	<1	30%	Pass	
Duplicate									
Phenols (non-Halogenated)				Result 1	Result 2	RPD			
2-Cyclohexyl-4.6-dinitrophenol	M20-Au32176	CP	mg/kg	< 20	< 20	<1	30%	Pass	
2-Methyl-4.6-dinitrophenol	M20-Au32176	CP	mg/kg	< 5	< 5	<1	30%	Pass	
2-Methylphenol (o-Cresol)	M20-Au32176	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
2-Nitrophenol	M20-Au32176	CP	mg/kg	< 1	< 1	<1	30%	Pass	
2.4-Dimethylphenol	M20-Au32176	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
2.4-Dinitrophenol	M20-Au32176	CP	mg/kg	< 5	< 5	<1	30%	Pass	
3&4-Methylphenol (m&p-Cresol)	M20-Au32176	CP	mg/kg	< 0.4	< 0.4	<1	30%	Pass	
4-Nitrophenol	M20-Au32176	CP	mg/kg	< 5	< 5	<1	30%	Pass	
Dinoseb	M20-Au32176	CP	mg/kg	< 20	< 20	<1	30%	Pass	
Phenol	M20-Au32176	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
Cyanide (total)	M20-Au30657	NCP	mg/kg	< 5	< 5	<1	30%	Pass	
Fluoride (Total)	M20-Au32176	CP	mg/kg	< 100	< 100	<1	30%	Pass	
% Moisture	M20-Au32141	NCP	%	13	14	8.0	30%	Pass	
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Copper	M20-Au34503	NCP	mg/kg	< 5	< 5	<1	30%	Pass	
Zinc	M20-Au34503	NCP	mg/kg	< 5	< 5	<1	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
pH (1:5 Aqueous extract at 25°C as rec.)	M20-Au32179	CP	pH Units	8.6	8.6	pass	30%	Pass	
Conductivity (1:5 aqueous extract at 25°C as rec.)	M20-Au32179	CP	uS/cm	1700	1600	3.0	30%	Pass	

Duplicate									
				Result 1	Result 2	RPD			
pH (1:5 Aqueous extract at 25°C as rec.)	M20-Au32182	CP	pH Units	8.1	8.1	pass	30%	Pass	
Conductivity (1:5 aqueous extract at 25°C as rec.)	M20-Au32182	CP	uS/cm	2600	2600	1.3	30%	Pass	
pH (units)(1:5 soil:CaCl2 extract at 25°C as rec.)	M20-Au32182	CP	pH Units	8.2	8.1	pass	30%	Pass	
Total Organic Carbon	S20-Au28389	NCP	%	2.9	2.4	20	30%	Pass	
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Iron	P20-Au26683	NCP	mg/kg	29000	27000	8.0	30%	Pass	
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Iron (%)	P20-Au26683	NCP	%	2.9	2.7	8.0	30%	Pass	

Comments

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	Yes
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Qualifier Codes/Comments

Code	Description
N01	F2 is determined by arithmetically subtracting the "naphthalene" value from the ">C10-C16" value. The naphthalene value used in this calculation is obtained from volatiles (Purge & Trap analysis).
N02	Where we have reported both volatile (P&T GCMS) and semivolatile (GCMS) naphthalene data, results may not be identical. Provided correct sample handling protocols have been followed, any observed differences in results are likely to be due to procedural differences within each methodology. Results determined by both techniques have passed all QAQC acceptance criteria, and are entirely technically valid.
N04	F1 is determined by arithmetically subtracting the "Total BTEX" value from the "C6-C10" value. The "Total BTEX" value is obtained by summing the concentrations of BTEX analytes. The "C6-C10" value is obtained by quantitating against a standard of mixed aromatic/aliphatic analytes.
N07	Please note:- These two PAH isomers closely co-elute using the most contemporary analytical methods and both the reported concentration (and the TEQ) apply specifically to the total of the two co-eluting PAHs
Q15	The RPD reported passes Eurofins Environment Testing's QC - Acceptance Criteria as defined in the Internal Quality Control Review and Glossary page of this report.

Authorised By

Michael Cassidy	Analytical Services Manager
Emily Rosenberg	Senior Analyst-Metal (VIC)
Harry Bacalis	Senior Analyst-Volatile (VIC)
Jonathon Angell	Senior Analyst-Inorganic (QLD)
Joseph Edouard	Senior Analyst-Organic (VIC)
Scott Beddoes	Senior Analyst-Inorganic (VIC)

Glenn Jackson
General Manager

Final report - this Report replaces any previously issued Report

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request or please click here.

eurofins Environment Testing

Certificate of Analysis

Greencap SA P/L
12 Greenhill Road
Wayville
SA 5034

NATA Accredited
Accreditation Number 1261
Site Number 1254

Accredited for compliance with ISO/IEC 17025 – Testing
The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.

Attention:	**Dylan Burford**
Report	**739188-W**
Project name	SOIL INVESTIGATION
Project ID	J169128
Received Date	Aug 20, 2020

Client Sample ID			**RB01**	**TB01**
Sample Matrix			**Water**	**Water**
Eurofins Sample No.			**M20-Au32184**	**M20-Au32185**
Date Sampled			**Aug 20, 2020**	**Aug 20, 2020**
Test/Reference	LOR	Unit		
Heavy Metals				
Arsenic	0.001	mg/L	< 0.001	-
Cadmium	0.0002	mg/L	< 0.0002	-
Chromium	0.001	mg/L	< 0.001	-
Copper	0.001	mg/L	< 0.001	-
Lead	0.001	mg/L	< 0.001	-
Mercury	0.0001	mg/L	< 0.0001	-
Nickel	0.001	mg/L	< 0.001	-
Zinc	0.005	mg/L	< 0.005	-
BTEX				
Benzene	0.001	mg/L	-	< 0.001
Toluene	0.001	mg/L	-	< 0.001
Ethylbenzene	0.001	mg/L	-	< 0.001
m&p-Xylenes	0.002	mg/L	-	< 0.002
o-Xylene	0.001	mg/L	-	< 0.001
Xylenes - Total*	0.003	mg/L	-	< 0.003
4-Bromofluorobenzene (surr.)	1	%	-	76

Sample History

Where samples are submitted/analysed over several days, the last date of extraction and analysis is reported.
A recent review of our LIMS has resulted in the correction or clarification of some method identifications. Due to this, some of the method reference information on reports has changed. However, no substantive change has been made to our laboratory methods, and as such there is no change in the validity of current or previous results.

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
Metals M8	Melbourne	Aug 21, 2020	180 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
BTEX	Melbourne	Aug 21, 2020	14 Days
- Method: LTM-ORG-2010 TRH C6-C40			

eurofins | Environment Testing

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Phone : +61 2 9900 8400
NATA # 1261 Site # 18217

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Phone : +61 7 3902 4600
NATA # 1261 Site # 20794

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NATA # 1261
Site # 23736

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43 Detroit Drive
Rolleston, Christchurch 7675
Phone : 0800 856 450
IANZ # 1290

Company Name:	Greencap SA P/L	**Order No.:**	PO277924	**Received:**	Aug 20, 2020 5:47 PM
Address:	12 Greenhill Road Wayville SA 5034	**Report #:**	739188	**Due:**	Aug 28, 2020
		Phone:	08 8299 9955	**Priority:**	5 Day
		Fax:	08 8299 9954	**Contact Name:**	Dylan Burford
Project Name:	SOIL INVESTIGATION				
Project ID:	J169128				

Eurofins Analytical Services Manager : Michael Cassidy

Sample Detail						HOLD	pH (1:5 Aqueous extract at 25°C as rec.)	Metals M8	BTEX	Moisture Set	NEPM Screen for Soil Classification	Vic EPA Short Screen
Melbourne Laboratory - NATA Site # 1254 & 14271						X	X	X	X	X	X	X
Sydney Laboratory - NATA Site # 18217												
Brisbane Laboratory - NATA Site # 20794											X	
Perth Laboratory - NATA Site # 23736												
Newcastle Laboratory												
External Laboratory												
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**							
1	SLAG 1	Aug 20, 2020		Soil	M20-Au32176		X			X		X
2	SLAG 2	Aug 20, 2020		Soil	M20-Au32177		X	X		X		
3	SLAG 3	Aug 20, 2020		Soil	M20-Au32178		X	X		X		
4	MS 1	Aug 20, 2020		Soil	M20-Au32179		X	X		X		
5	MS 2	Aug 20, 2020		Soil	M20-Au32180		X			X		X
6	MS 3	Aug 20, 2020		Soil	M20-Au32181		X	X		X		
7	BG 1	Aug 20, 2020		Soil	M20-Au32182		X	X		X	X	
8	QC01	Aug 20, 2020		Soil	M20-Au32183			X		X		
9	RB01	Aug 20, 2020		Water	M20-Au32184			X				

eurofins Environment Testing

ABN: 50 005 085 521 web: www.eurofins.com.au email: EnviroSales@eurofins.com

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IANZ # 1290

Company Name: Greencap SA P/L
Address: 12 Greenhill Road
Wayville
SA 5034

Project Name: SOIL INVESTIGATION
Project ID: J169128

Order No.: PO277924
Report #: 739188
Phone: 08 8299 9955
Fax: 08 8299 9954

Received: Aug 20, 2020 5:47 PM
Due: Aug 28, 2020
Priority: 5 Day
Contact Name: Dylan Burford

Eurofins Analytical Services Manager : Michael Cassidy

Sample Detail						HOLD	pH (1:5 Aqueous extract at 25°C as rec.)	Metals M8	BTEX	Moisture Set	NEPM Screen for Soil Classification	Vic EPA Short Screen
Melbourne Laboratory - NATA Site # 1254 & 14271						X	X	X	X	X	X	X
Sydney Laboratory - NATA Site # 18217												
Brisbane Laboratory - NATA Site # 20794											X	
Perth Laboratory - NATA Site # 23736												
10	TB01	Aug 20, 2020		Water	M20-Au32185				X			
11	RUBBISH SP	Aug 20, 2020		Soil	M20-Au32186	X						
Test Counts						1	7	7	1	8	1	2

Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples follows guidelines delineated in the National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended May 2013 and are included in this QC report where applicable. Additional QC data may be available on request.
2. All soil/sediment/solid results are reported on a dry basis, unless otherwise stated.
3. All biota/food results are reported on a wet weight basis on the edible portion, unless otherwise stated.
4. Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
5. Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds.
6. SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
7. Samples were analysed on an 'as received' basis.
8. Information identified on this report with blue colour, indicates data provided by customer, that may have an impact on the results.
9. This report replaces any interim results previously issued.

Holding Times

Please refer to 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours prior to sample receipt deadlines as stated on the SRA.

If the Laboratory did not receive the information in the required timeframe, and regardless of any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

For VOCs containing vinyl chloride, styrene and 2-chloroethyl vinyl ether the holding time is 7 days however for all other VOCs such as BTEX or C6-10 TRH then the holding time is 14 days.

****NOTE:** pH duplicates are reported as a range NOT as RPD

Units

mg/kg: milligrams per kilogram
mg/L: milligrams per litre
ug/L: micrograms per litre
ppm: Parts per million
ppb: Parts per billion
%: Percentage
org/100mL: Organisms per 100 millilitres
NTU: Nephelometric Turbidity Units
MPN/100mL: Most Probable Number of organisms per 100 millilitres

Terms

Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
LOR	Limit of Reporting.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
LCS	Laboratory Control Sample - reported as percent recovery.
CRM	Certified Reference Material - reported as percent recovery.
Method Blank	In the case of solid samples these are performed on laboratory certified clean sands and in the case of water samples these are performed on de-ionised water.
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
USEPA	United States Environmental Protection Agency
APHA	American Public Health Association
TCLP	Toxicity Characteristic Leaching Procedure
COC	Chain of Custody
SRA	Sample Receipt Advice
QSM	US Department of Defense Quality Systems Manual Version 5.3
CP	Client Parent - QC was performed on samples pertaining to this report
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within.
TEQ	Toxic Equivalency Quotient

QC - Acceptance Criteria

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is 30% however the following acceptance guidelines are equally applicable:

Results <10 times the LOR : No Limit

Results between 10-20 times the LOR : RPD must lie between 0-50%

Results >20 times the LOR : RPD must lie between 0-30%

Surrogate Recoveries: Recoveries must lie between 20-130% Phenols & 50-150% PFASs

PFAS field samples that contain surrogate recoveries in excess of the QC limit designated in QSM 5.3 where no positive PFAS results have been reported have been reviewed and no data was affected.

WA DWER (n=10): PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

QC Data General Comments

1. Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
3. Organochlorine Pesticide analysis - where reporting LCS data, Toxaphene & Chlordane are not added to the LCS.
4. Organochlorine Pesticide analysis - where reporting Spike data, Toxaphene is not added to the Spike.
5. Total Recoverable Hydrocarbons - where reporting Spike & LCS data, a single spike of commercial Hydrocarbon products in the range of C12-C30 is added and it's Total Recovery is reported in the C10-C14 cell of the Report.
6. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling.Therefore laboratory analysis is unlikely to be completed within holding time. Analysis will begin as soon as possible after sample receipt.
7. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of Recovery the term "INT" appears against that analyte.
8. Polychlorinated Biphenyls are spiked only using Aroclor 1260 in Matrix Spikes and LCS.
9. For Matrix Spikes and LCS results a dash " -" in the report means that the specific analyte was not added to the QC sample.
10. Duplicate RPDs are calculated from raw analytical data thus it is possible to have two sets of data.

Quality Control Results

Test			Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank									
Heavy Metals									
Arsenic			mg/L	< 0.001			0.001	Pass	
Cadmium			mg/L	< 0.0002			0.0002	Pass	
Chromium			mg/L	< 0.001			0.001	Pass	
Copper			mg/L	< 0.001			0.001	Pass	
Lead			mg/L	< 0.001			0.001	Pass	
Mercury			mg/L	< 0.0001			0.0001	Pass	
Nickel			mg/L	< 0.001			0.001	Pass	
Zinc			mg/L	< 0.005			0.005	Pass	
Method Blank									
BTEX									
Benzene			mg/L	< 0.001			0.001	Pass	
Toluene			mg/L	< 0.001			0.001	Pass	
Ethylbenzene			mg/L	< 0.001			0.001	Pass	
m&p-Xylenes			mg/L	< 0.002			0.002	Pass	
o-Xylene			mg/L	< 0.001			0.001	Pass	
Xylenes - Total*			mg/L	< 0.003			0.003	Pass	
LCS - % Recovery									
Heavy Metals									
Arsenic			%	101			80-120	Pass	
Cadmium			%	99			80-120	Pass	
Chromium			%	99			80-120	Pass	
Copper			%	97			80-120	Pass	
Lead			%	99			80-120	Pass	
Mercury			%	82			80-120	Pass	
Nickel			%	99			80-120	Pass	
Zinc			%	99			80-120	Pass	
LCS - % Recovery									
BTEX									
Benzene			%	89			70-130	Pass	
Toluene			%	93			70-130	Pass	
Ethylbenzene			%	94			70-130	Pass	
m&p-Xylenes			%	94			70-130	Pass	
Xylenes - Total*			%	93			70-130	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Spike - % Recovery									
Heavy Metals				Result 1					
Arsenic	M20-Au31532	NCP	%	108			75-125	Pass	
Cadmium	M20-Au31532	NCP	%	104			75-125	Pass	
Chromium	M20-Au31532	NCP	%	103			75-125	Pass	
Copper	M20-Au31532	NCP	%	101			75-125	Pass	
Lead	M20-Au31532	NCP	%	100			75-125	Pass	
Mercury	M20-Au31532	NCP	%	98			75-125	Pass	
Nickel	M20-Au31532	NCP	%	99			75-125	Pass	
Zinc	M20-Au31532	NCP	%	98			75-125	Pass	
Spike - % Recovery									
BTEX				Result 1					
Benzene	M20-Au33169	NCP	%	93			70-130	Pass	
Toluene	M20-Au33169	NCP	%	100			70-130	Pass	
Ethylbenzene	M20-Au33169	NCP	%	99			70-130	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
m&p-Xylenes	M20-Au33169	NCP	%	99			70-130	Pass	
o-Xylene	M20-Au33169	NCP	%	95			70-130	Pass	
Xylenes - Total*	M20-Au33169	NCP	%	98			70-130	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Arsenic	M20-Au32083	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Cadmium	M20-Au32083	NCP	mg/L	< 0.0002	< 0.0002	<1	30%	Pass	
Chromium	M20-Au32083	NCP	mg/L	0.001	< 0.001	18	30%	Pass	
Copper	M20-Au32083	NCP	mg/L	0.002	< 0.001	3.0	30%	Pass	
Lead	M20-Au32083	NCP	mg/L	0.001	< 0.001	7.0	30%	Pass	
Mercury	M20-Au32083	NCP	mg/L	< 0.0001	< 0.0001	<1	30%	Pass	
Nickel	M20-Au32083	NCP	mg/L	0.005	0.005	3.0	30%	Pass	
Zinc	M20-Au32083	NCP	mg/L	0.072	0.070	6.0	30%	Pass	
Duplicate									
BTEX				Result 1	Result 2	RPD			
Benzene	M20-Au33324	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Toluene	M20-Au33324	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Ethylbenzene	M20-Au33324	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
m&p-Xylenes	M20-Au33324	NCP	mg/L	< 0.002	< 0.002	<1	30%	Pass	
o-Xylene	M20-Au33324	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Xylenes - Total*	M20-Au33324	NCP	mg/L	< 0.003	< 0.003	<1	30%	Pass	

Eurofins | Environment Testing

Comments

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	Yes
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Authorised By

Michael Cassidy	Analytical Services Manager
Emily Rosenberg	Senior Analyst-Metal (VIC)
Harry Bacalis	Senior Analyst-Volatile (VIC)

Glenn Jackson

General Manager

Final report - this Report replaces any previously issued Report

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request or please click here.

CHAIN OF CUSTODY

ALS Laboratory: *please tick* →

☐ Sydney: 277 Woodpark Rd, Smithfield NSW 2176 Ph: 02 8784 8555 E:samples.sydney@alsenviro.com
☐ Newcastle: 5 Rosegum Rd, Warabrook NSW 2304 Ph: 02 4968 9433 E:samples.newcastle@alsenviro.com
☐ Brisbane: 32 Shand St, Stafford QLD 4053 Ph: 07 3243 7222 E:samples.brisbane@alsenviro.com
☐ Townsville: 14-15 Desma Ct, Bohle QLD 4818 Ph: 07 4796 0600 E:townsville.environmental@alsenviro.com
☐ Melbourne: 2-4 Westall Rd, Springvale VIC 3171 Ph: 03 8549 9600 E:samples.melbourne@alsenviro.com
☐ Adelaide: 2-1 Burma Rd, Pooraka SA 5095 Ph: 08 8359 0890 E:adelaide@alsenviro.com
☐ Perth: 10 Hod Way, Malaga WA 6090 Ph: 08 9209 7655 E:samples.perth@alsenviro.com
☐ Launceston: 27 Wellington St, Launceston TAS 7250 Ph: 03 6331 2158 E:launceston@alsenviro.com

FREIGHT

CLIENT:	GREENCAP
OFFICE:	WAYVILLE SA
PROJECT:	SOIL INVESTIGATION 3169128
ORDER NUMBER:	TBA
PROJECT MANAGER:	DB
CONTACT PH:	0428 829 444
SAMPLER:	VB
SAMPLER MOBILE:	✓
COC emailed to ALS? (YES / NO)	YES
EDD FORMAT (or default):	
Email Reports to:	
Email Invoice to:	

TURNAROUND REQUIREMENTS: (Standard TAT may be longer for some tests e.g.. Ultra Trace Organics)
☑ Standard TAT (List due date):
☐ Non Standard or urgent TAT (List due date):

ALS QUOTE NO.:

COC SEQUENCE NUMBER (Circle)
COC: 1 2 3 4 5 6 7
OF: 1 2 3 4 5 6 7

FOR LABORATORY USE ONLY (Circle)

Custody Seal Intact?	Yes	No	N/A
Free ice / frozen ice bricks present upon receipt?	Yes	No	N/A
Random Sample Temperature on Receipt:	°C		
Other comment:			

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
VB			[signature]
DATE/TIME: 20/8/20 1405	DATE/TIME:	DATE/TIME:	DATE/TIME:

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

ALS USE ONLY	SAMPLE DETAILS MATRIX: Solid(S) Water(W)			CONTAINER INFORMATION		ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required).	Additional Information
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE (refer to codes below)	TOTAL BOTTLES		Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.
1	QC01A	20/8/20	S		1		
				TOTAL			

Environmental Division
Melbourne
Work Order Reference
EM2014571

Telephone : + 61-3-8549 9600

Received: 21/8, CO:20 Carrier: TNT
C/note: 945742092
Temp: 6.1 °C Seal: Y/N
Ice / Icebricks / NA

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; AP - Airfreight Unpreserved Plastic
V = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass;
Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.

Chain of Custody - Greencap Adelaide
Ph. 8299 9955

GREENCAP

Client :	AA Granite	Date :	20/08/2020
Project :	Soil Investigation	Sampled by :	Varun Bhagwat
Project Manager :	Dylan Burford	Sampler Mobile :	0428 829 444
Job No. :	J169128	Purchase Order :	PO277925
Location :	Wallaroo Plain Rd, Wallaroo	T/Around	***STANDARD TAT***

Please email results to:	Dylan.Burford@greencap.com.au	Varun.Bhagwat@greencap.com.au

Relinquished by: VB 20/8/20	Recieved by:	Relinquished by:	Received by:
Signature & date	*Signature & date*	*Signature & date*	*Signature & date*

Field ID	Depth	Sampled BM 24/8	Matrixl (Soil, Water, Vapour, etc)	250ml Soil Jar	40ml Vials (HCL preserved)	100ml Glass Amber (semi-volatile)	60ml Plastic (Nitric Acid Preserved)	60ml Plastic Nturients (h_2SO4)	125ml Plastic (unpreserved)	60ml Ferrous Iron (HCL)	60ml Plastic - Cyanide/Hex Cr (NaOH)	250ml Plastic (PFOS/PFOA)	Testing		W2 - Metals									Hold
QC01A	1	20/8/2020 10/08/2020	S	1											X									
Totals				1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0

Environmental

SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order	: **EM2014571**		
Client	: **GREENCAP-NAA PTY LTD**	Laboratory	: Environmental Division Melbourne
Contact	: MR DYLAN BURFORD	Contact	: Peter Ravlic
Address	:	Address	: 4 Westall Rd Springvale VIC Australia 3171
E-mail	: dylan.burford@greencap.com.au	E-mail	: peter.ravlic@alsglobal.com
Telephone	: +61 08 8299 9955	Telephone	: +6138549 9645
Facsimile	: +61 08 8362 9776	Facsimile	: +61-3-8549 9626
Project	: J169128	Page	: 1 of 2
Order number	: PO277925	Quote number	: EM2018ADEENV0002 (EN/333 - secondary work only)
C-O-C number	: ----	QC Level	: NEPM 2013 B3 & ALS QC Standard
Site	: Wallaroo Plain Rd, Wallaroo		
Sampler	: VARUN BHAGWAT		

Dates

Date Samples Received	: 21-Aug-2020 10:20	Issue Date	: 24-Aug-2020
Client Requested Due Date	: 28-Aug-2020	Scheduled Reporting Date	: **28-Aug-2020**

Delivery Details

Mode of Delivery	: Carrier	Security Seal	: Intact.
No. of coolers/boxes	: 1	Temperature	: 6.1°C - Ice present
Receipt Detail	:	No. of samples received / analysed	: 1 / 1

General Comments

- This report contains the following information:
  - Sample Container(s)/Preservation Non-Compliances
  - Summary of Sample(s) and Requested Analysis
  - Proactive Holding Time Report
  - Requested Deliverables
- **Sample received in non-ALS container.**
- **Please direct any queries related to sample condition / numbering / breakages to Client Services.**
- Sample Disposal - Aqueous (3 weeks), Solid (2 months) from receipt of samples.
- **Analytical work for this work order will be conducted at ALS Springvale.**
- **Please refer to the Proactive Holding Time Report table below which summarises breaches of recommended holding times that have occurred prior to samples/instructions being received at the laboratory. The absence of this summary table indicates that all samples have been received within the recommended holding times for the analysis requested.**
- Please be aware that APHA/NEPM recommends water and soil samples be chilled to less than or equal to 6°C for chemical analysis, and less than or equal to 10°C but unfrozen for Microbiological analysis. Where samples are received above this temperature, it should be taken into consideration when interpreting results. Refer to ALS EnviroMail 85 for ALS recommendations of the best practice for chilling samples after sampling and for maintaining a cool temperature during transit.

Sample Container(s)/Preservation Non-Compliances

All comparisons are made against pretreatment/preservation AS, APHA, USEPA standards.

- **No sample container / preservation non-compliance exists.**

Summary of Sample(s) and Requested Analysis

Some items described below may be part of a laboratory process necessary for the execution of client requested tasks. Packages may contain additional analyses, such as the determination of moisture content and preparation tasks, that are included in the package.
If no sampling time is provided, the sampling time will default 00:00 on the date of sampling. If no sampling date is provided, the sampling date will be assumed by the laboratory and displayed in brackets without a time component

Matrix: **SOIL**

Laboratory sample ID	*Client sampling date / time*	*Client sample ID*	SOIL - EA055-103 Moisture Content	SOIL - S-02 8 Metals (incl. Digestion)
EM2014571-001	20-Aug-2020 00:00	QC01A	✓	✓

Proactive Holding Time Report

Sample(s) have been received within the recommended holding times for the requested analysis.

Requested Deliverables

ALL ACCOUNTS		
- A4 - AU Tax Invoice (INV)	Email	ap@greencap.com.au
DYLAN BURFORD		
- *AU Certificate of Analysis - NATA (COA)	Email	dylan.burford@greencap.com.au
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	dylan.burford@greencap.com.au
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	dylan.burford@greencap.com.au
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	dylan.burford@greencap.com.au
- Chain of Custody (CoC) (COC)	Email	dylan.burford@greencap.com.au
- EDI Format - ENMRG (ENMRG)	Email	dylan.burford@greencap.com.au
- EDI Format - ESDAT (ESDAT)	Email	dylan.burford@greencap.com.au
VARUN BHAGWAT		
- *AU Certificate of Analysis - NATA (COA)	Email	varun.bhagwat@greencap.com.au
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	varun.bhagwat@greencap.com.au
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	varun.bhagwat@greencap.com.au
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	varun.bhagwat@greencap.com.au
- Chain of Custody (CoC) (COC)	Email	varun.bhagwat@greencap.com.au
- EDI Format - ENMRG (ENMRG)	Email	varun.bhagwat@greencap.com.au
- EDI Format - ESDAT (ESDAT)	Email	varun.bhagwat@greencap.com.au

ALS Environmental

QUALITY CONTROL REPORT

Work Order	: **EM2014571**		Page	: 1 of 3
Client	: **GREENCAP-NAA PTY LTD**		Laboratory	: Environmental Division Melbourne
Contact	: MR DYLAN BURFORD		Contact	: Peter Ravlic
Address	:		Address	: 4 Westall Rd Springvale VIC Australia 3171
Telephone	: +61 08 8299 9955		Telephone	: +6138549 9645
Project	: J169128		Date Samples Received	: 21-Aug-2020
Order number	: PO277925		Date Analysis Commenced	: 24-Aug-2020
C-O-C number	: ----		Issue Date	: 26-Aug-2020
Sampler	: VARUN BHAGWAT			
Site	: Wallaroo Plain Rd, Wallaroo			
Quote number	: EN/333 - secondary work only			
No. of samples received	: 1			
No. of samples analysed	: 1			

NATA
Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Dilani Fernando	Senior Inorganic Chemist	Melbourne Inorganics, Springvale, VIC

General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis. Where the LOR of a reported result differs from standard LOR, this may be due to high

Key : Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
RPD = Relative Percentage Difference
\# = Indicates failed QC

Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR: No Limit; Result between 10 and 20 times LOR: 0% - 50%; Result > 20 times LOR: 0% - 20%.

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EG005(ED093)T: Total Metals by ICP-AES (QC Lot: 3215243)									
EM2014550-011	Anonymous	EG005T: Cadmium	7440-43-9	1	mg/kg	<1	<1	0.00	No Limit
		EG005T: Chromium	7440-47-3	2	mg/kg	15	16	0.00	No Limit
		EG005T: Nickel	7440-02-0	2	mg/kg	27	30	12.7	0% - 50%
		EG005T: Arsenic	7440-38-2	5	mg/kg	343	299	13.8	0% - 20%
		EG005T: Copper	7440-50-8	5	mg/kg	129	148	13.5	0% - 20%
		EG005T: Lead	7439-92-1	5	mg/kg	132	109	19.3	0% - 20%
		EG005T: Zinc	7440-66-6	5	mg/kg	101	92	9.20	0% - 20%
EM2014550-020	Anonymous	EG005T: Cadmium	7440-43-9	1	mg/kg	<1	<1	0.00	No Limit
		EG005T: Chromium	7440-47-3	2	mg/kg	23	20	15.0	0% - 50%
		EG005T: Nickel	7440-02-0	2	mg/kg	12	14	15.1	No Limit
		EG005T: Arsenic	7440-38-2	5	mg/kg	7	8	14.4	No Limit
		EG005T: Copper	7440-50-8	5	mg/kg	22	22	0.00	No Limit
		EG005T: Lead	7439-92-1	5	mg/kg	122	134	9.79	0% - 20%
		EG005T: Zinc	7440-66-6	5	mg/kg	73	80	8.40	0% - 50%
EA055: Moisture Content (Dried @ 105-110°C) (QC Lot: 3215296)									
EM2014552-001	Anonymous	EA055: Moisture Content	----	0.1	%	26.7	26.0	2.40	0% - 20%
EG035T: Total Recoverable Mercury by FIMS (QC Lot: 3215244)									
EM2014550-011	Anonymous	EG035T: Mercury	7439-97-6	0.1	mg/kg	0.2	0.2	0.00	No Limit
EM2014550-020	Anonymous	EG035T: Mercury	7439-97-6	0.1	mg/kg	0.1	0.1	0.00	No Limit

Method Blank (MB) and Laboratory Control Spike (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Spike (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: **SOIL**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EG005(ED093)T: Total Metals by ICP-AES (QCLot: 3215243)								
EG005T: Arsenic	7440-38-2	5	mg/kg	<5	21.7 mg/kg	107	78.5	107
EG005T: Cadmium	7440-43-9	1	mg/kg	<1	4.64 mg/kg	98.7	76.2	108
EG005T: Chromium	7440-47-3	2	mg/kg	<2	43.9 mg/kg	103	77.7	110
EG005T: Copper	7440-50-8	5	mg/kg	<5	32 mg/kg	101	78.1	108
EG005T: Lead	7439-92-1	5	mg/kg	<5	40 mg/kg	104	78.4	106
EG005T: Nickel	7440-02-0	2	mg/kg	<2	55 mg/kg	108	79.9	109
EG005T: Zinc	7440-66-6	5	mg/kg	<5	60.8 mg/kg	110	79.1	110
EG035T: Total Recoverable Mercury by FIMS (QCLot: 3215244)								
EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	2.57 mg/kg	94.2	76.9	110

Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

Sub-Matrix: **SOIL**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EG005(ED093)T: Total Metals by ICP-AES (QCLot: 3215243)							
EM2014550-012	Anonymous	EG005T: Arsenic	7440-38-2	50 mg/kg	# 65.3	78.0	124
EM2014550-012	Anonymous	EG005T: Cadmium	7440-43-9	50 mg/kg	101	84.0	116
		EG005T: Chromium	7440-47-3	50 mg/kg	101	79.0	121
		EG005T: Copper	7440-50-8	250 mg/kg	100	80.0	120
		EG005T: Lead	7439-92-1	250 mg/kg	94.2	80.0	120
		EG005T: Nickel	7440-02-0	50 mg/kg	99.9	78.0	120
		EG005T: Zinc	7440-66-6	250 mg/kg	96.8	80.0	120
EG035T: Total Recoverable Mercury by FIMS (QCLot: 3215244)							
EM2014550-012	Anonymous	EG035T: Mercury	7439-97-6	0.5 mg/kg	85.6	76.0	116

ALS Environmental

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: **EM2014571**	Page	: 1 of 4
Client	: **GREENCAP-NAA PTY LTD**	Laboratory	: Environmental Division Melbourne
Contact	: MR DYLAN BURFORD	Telephone	: +6138549 9645
Project	: J169128	Date Samples Received	: 21-Aug-2020
Site	: Wallaroo Plain Rd, Wallaroo	Issue Date	: 26-Aug-2020
Sampler	: VARUN BHAGWAT	No. of samples received	: 1
Order number	: PO277925	No. of samples analysed	: 1

This report is automatically generated by the ALS LIMS through interpretation of the ALS Quality Control Report and several Quality Assurance parameters measured by ALS. This automated reporting highlights any non-conformances, facilitates faster and more accurate data validation and is designed to assist internal expert and external Auditor review. Many components of this report contribute to the overall DQO assessment and reporting for guideline compliance.

Brief method summaries and references are also provided to assist in traceability.

Summary of Outliers

Outliers : Quality Control Samples

This report highlights outliers flagged in the Quality Control (QC) Report.

- **NO Method Blank value outliers occur.**
- **NO Duplicate outliers occur.**
- **NO Laboratory Control outliers occur.**
- **Matrix Spike outliers exist - please see following pages for full details.**
- **For all regular sample matrices, NO surrogate recovery outliers occur.**

Outliers : Analysis Holding Time Compliance

- **NO Analysis Holding Time Outliers exist.**

Outliers : Frequency of Quality Control Samples

- **NO Quality Control Sample Frequency Outliers exist.**

Outliers : Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **SOIL**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Matrix Spike (MS) Recoveries							
EG005(ED093)T: Total Metals by ICP-AES	EM2014550--012	Anonymous	**Arsenic**	7440-38-2	65.3 %	78.0-124%	**Recovery less than lower data quality objective**

Analysis Holding Time Compliance

If samples are identified below as having been analysed or extracted outside of recommended holding times, this should be taken into consideration when interpreting results.

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times (referencing USEPA SW 846, APHA, AS and NEPM) based on the sample container provided. Dates reported represent first date of extraction or analysis and preclude subsequent dilutions and reruns. A listing of breaches (if any) is provided herein.

Holding time for leachate methods (e.g. TCLP) vary according to the analytes reported. Assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These are: organics 14 days, mercury 28 days & other metals 180 days. A recorded breach does not guarantee a breach for all non-volatile parameters.

Holding times for ***VOC in soils*** vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive or Vinyl Chloride and Styrene are not key analytes of interest/concern.

Matrix: **SOIL**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method	*Sample Date*	*Extraction / Preparation*			*Analysis*		
Container / Client Sample ID(s)		*Date extracted*	*Due for extraction*	*Evaluation*	*Date analysed*	*Due for analysis*	*Evaluation*
EA055: Moisture Content (Dried @ 105-110°C)							
Soil Glass Jar - Unpreserved (EA055) QC01A	**20-Aug-2020**	----	----	----	**24-Aug-2020**	03-Sep-2020	✓
EG005(ED093)T: Total Metals by ICP-AES							
Soil Glass Jar - Unpreserved (EG005T) QC01A	**20-Aug-2020**	**24-Aug-2020**	16-Feb-2021	✓	**24-Aug-2020**	16-Feb-2021	✓
EG035T: Total Recoverable Mercury by FIMS							
Soil Glass Jar - Unpreserved (EG035T) QC01A	**20-Aug-2020**	**24-Aug-2020**	17-Sep-2020	✓	**25-Aug-2020**	17-Sep-2020	✓

Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(were) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **SOIL**

Evaluation: × = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Laboratory Duplicates (DUP)							
Moisture Content	EA055	1	3	**33.33**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	2	16	**12.50**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	2	17	**11.76**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Total Mercury by FIMS	EG035T	1	16	**6.25**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	1	17	**5.88**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Total Mercury by FIMS	EG035T	1	16	**6.25**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	1	17	**5.88**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Total Mercury by FIMS	EG035T	1	16	**6.25**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	2	17	**11.76**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard

Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	*Method*	*Matrix*	*Method Descriptions*
Moisture Content	EA055	SOIL	In house: A gravimetric procedure based on weight loss over a 12 hour drying period at 105-110 degrees C. This method is compliant with NEPM Schedule B(3).
Total Metals by ICP-AES	EG005T	SOIL	In house: Referenced to APHA 3120; USEPA SW 846 - 6010. Metals are determined following an appropriate acid digestion of the soil. The ICPAES technique ionises samples in a plasma, emitting a characteristic spectrum based on metals present. Intensities at selected wavelengths are compared against those of matrix matched standards. This method is compliant with NEPM Schedule B(3)
Total Mercury by FIMS	EG035T	SOIL	In house: Referenced to AS 3550, APHA 3112 Hg - B (Flow-injection (SnCl2) (Cold Vapour generation) AAS) FIM-AAS is an automated flameless atomic absorption technique. Mercury in solids are determined following an appropriate acid digestion. Ionic mercury is reduced online to atomic mercury vapour by SnCl2 which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM Schedule B(3)

Preparation Methods	*Method*	*Matrix*	*Method Descriptions*
Hot Block Digest for metals in soils sediments and sludges	EN69	SOIL	In house: Referenced to USEPA 200.2. Hot Block Acid Digestion 1.0g of sample is heated with Nitric and Hydrochloric acids, then cooled. Peroxide is added and samples heated and cooled again before being filtered and bulked to volume for analysis. Digest is appropriate for determination of selected metals in sludge, sediments, and soils. This method is compliant with NEPM Schedule B(3).

CERTIFICATE OF ANALYSIS

Work Order	: **EM2014571**	Page	: 1 of 2
Client	: **GREENCAP-NAA PTY LTD**	Laboratory	: Environmental Division Melbourne
Contact	: MR DYLAN BURFORD	Contact	: Peter Ravlic
Address	:	Address	: 4 Westall Rd Springvale VIC Australia 3171
Telephone	: +61 08 8299 9955	Telephone	: +6138549 9645
Project	: J169128	Date Samples Received	: 21-Aug-2020 10:20
Order number	: PO277925	Date Analysis Commenced	: 24-Aug-2020
C-O-C number	: ----	Issue Date	: 26-Aug-2020 12:06
Sampler	: VARUN BHAGWAT		
Site	: Wallaroo Plain Rd, Wallaroo		
Quote number	: EN/333 - secondary work only		
No. of samples received	: 1		
No. of samples analysed	: 1		

Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Dilani Fernando	Senior Inorganic Chemist	Melbourne Inorganics, Springvale, VIC

General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

- EG005T: EM2014550 #12, Poor matrix spike recovery for Arsenic due to sample matrix. Confirmed by re-extraction and re-analysis.

Analytical Results

Sub-Matrix: **SOIL** (Matrix: **SOIL**)			*Client sample ID*	**QC01A**	----	----	----	----
			Client sampling date / time	20-Aug-2020 00:00	----	----	----	----
Compound	*CAS Number*	*LOR*	*Unit*	**EM2014571-001**	--------	--------	--------	--------
				Result	----	----	----	----
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	1.0	%	**1.6**	----	----	----	----
EG005(ED093)T: Total Metals by ICP-AES								
Arsenic	7440-38-2	5	mg/kg	**6**	----	----	----	----
Cadmium	7440-43-9	1	mg/kg	<1	----	----	----	----
Chromium	7440-47-3	2	mg/kg	**14**	----	----	----	----
Copper	7440-50-8	5	mg/kg	**4090**	----	----	----	----
Lead	7439-92-1	5	mg/kg	**126**	----	----	----	----
Nickel	7440-02-0	2	mg/kg	**97**	----	----	----	----
Zinc	7440-66-6	5	mg/kg	**2630**	----	----	----	----
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	<0.1	----	----	----	----

Australia

Melbourne
6 Monterey Road
Dandenong South VIC 3175
Phone : +61 3 8564 5000
NATA # 1261
Site # 1254 & 14271

Sydney
Unit F3, Building F
16 Mars Road
Lane Cove West NSW 2066
Phone : +61 2 9900 8400
NATA # 1261 Site # 18217

Brisbane
1/21 Smallwood Place
Murarrie QLD 4172
Phone : +61 7 3902 4600
NATA # 1261 Site # 20794

Perth
2/91 Leach Highway
Kewdale WA 6105
Phone : +61 8 9251 9600
NATA # 1261
Site # 23736

Newcastle
4/52 Industrial Drive
Mayfield East NSW 2304
PO Box 60 Wickham 2293
Phone : +61 2 4968 8448

New Zealand

Auckland
35 O'Rorke Road
Penrose, Auckland 1061
Phone : +64 9 526 45 51
IANZ # 1327

Christchurch
43 Detroit Drive
Rolleston, Christchurch 7675
Phone : 0800 856 450
IANZ # 1290

Sample Receipt Advice

Company name:	Greencap SA P/L
Contact name:	Varun Bhagwat
Project name:	SOIL INVESTIGATION
Project ID:	J169128
Turnaround time:	5 Day
Date/Time received	Aug 31, 2020 4:10 PM
Eurofins reference	741018

Sample Information

- ✓ A detailed list of analytes logged into our LIMS, is included in the attached summary table.
- ✓ All samples have been received as described on the above COC.
- ✓ COC has been completed correctly.
- ✓ Attempt to chill was evident.
- ✓ Appropriately preserved sample containers have been used.
- ✓ All samples were received in good condition.
- ✓ Samples have been provided with adequate time to commence analysis in accordance with the relevant holding times.
- ✓ Appropriate sample containers have been used.
- ✓ Sample containers for volatile analysis received with zero headspace.
- ✗ Split sample sent to requested external lab.
- ✗ Some samples have been subcontracted.
- N/A Custody Seals intact (if used).

Notes

Contact

If you have any questions with respect to these samples, please contact your Analytical Services Manager:

Michael Cassidy on phone : +61 3 8564 5000 or by email: MichaelCassidy@eurofins.com

Results will be delivered electronically via email to Varun Bhagwat - Varun.Bhagwat@greencap.com.au.

Note: A copy of these results will also be delivered to the general Greencap SA P/L email address.

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Certificate of Analysis

Greencap SA P/L
12 Greenhill Road
Wayville
SA 5034

NATA Accredited
Accreditation Number 1261
Site Number 1254

Accredited for compliance with ISO/IEC 17025 – Testing
The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.

Attention: **Varun Bhagwat**

Report	**741018-L**
Project name	SOIL INVESTIGATION
Project ID	J169128
Received Date	Aug 31, 2020

Client Sample ID			**SLAG 1**	**SLAG 1**
Sample Matrix			**AUS Leachate - pH 5.0**	**AUS Leachate - Reagent Water**
Eurofins Sample No.			**M20-Au50229**	**M20-Au50230**
Date Sampled			**Aug 20, 2020**	**Aug 20, 2020**
Test/Reference	LOR	Unit		
Heavy Metals				
Arsenic	0.01	mg/L	< 0.01	< 0.01
Cadmium	0.01	mg/L	< 0.01	< 0.005
Chromium	0.01	mg/L	< 0.01	< 0.01
Copper	0.01	mg/L	2.4	0.56
Lead	0.01	mg/L	0.04	0.02
Mercury	0.001	mg/L	< 0.001	< 0.001
Nickel	0.01	mg/L	0.05	0.02
Zinc	0.01	mg/L	0.84	0.17
AUS Leaching Procedure				
Leachate Fluid[C01]		comment	1.0	4.0
pH (initial)	0.1	pH Units	N/A	N/A
pH (Leachate fluid)	0.1	pH Units	5.0	6.1
pH (off)	0.1	pH Units	5.4	9.7

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Sample History

Where samples are submitted/analysed over several days, the last date of extraction and analysis is reported.
A recent review of our LIMS has resulted in the correction or clarification of some method identifications. Due to this, some of the method reference information on reports has changed. However, no substantive change has been made to our laboratory methods, and as such there is no change in the validity of current or previous results.

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
Metals M8	Melbourne	Aug 31, 2020	180 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
- Method:			
AUS Leaching Procedure			
pH (initial)	Melbourne	Aug 31, 2020	0 Days
- Method: LTM-GEN-7010 Leaching Procedure for Soils & Solid Wastes			
pH (Leachate fluid)	Melbourne	Aug 31, 2020	0 Days
- Method: LTM-GEN-7010 Leaching Procedure for Soils & Solid Wastes			
pH (off)	Melbourne	Aug 31, 2020	0 Days
- Method: LTM-GEN-7010 Leaching Procedure for Soils & Solid Wastes			

Company Name:	Greencap SA P/L	**Order No.:**	PO278196	**Received:**	Aug 31, 2020 4:10 PM
Address:	12 Greenhill Road Wayville SA 5034	**Report #:**	741018	**Due:**	Sep 7, 2020
		Phone:	08 8299 9955	**Priority:**	5 Day
		Fax:	08 8299 9954	**Contact Name:**	Varun Bhagwat
Project Name:	SOIL INVESTIGATION				
Project ID:	J169128				

Eurofins Analytical Services Manager : Michael Cassidy

Sample Detail						AUS Leaching Procedure	Metals M8
Melbourne Laboratory - NATA Site # 1254 & 14271						X	X
Sydney Laboratory - NATA Site # 18217							
Brisbane Laboratory - NATA Site # 20794							
Perth Laboratory - NATA Site # 23736							
Newcastle Laboratory							
External Laboratory							
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**		
1	SLAG 1	Aug 20, 2020		AUS Leachate - pH 5.0	M20-Au50229	X	X
2	SLAG 1	Aug 20, 2020		AUS Leachate - Reagent Water	M20-Au50230	X	X
Test Counts						2	2

Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples follows guidelines delineated in the National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended May 2013 and are included in this QC report where applicable. Additional QC data may be available on request.
2. All soil/sediment/solid results are reported on a dry basis, unless otherwise stated.
3. All biota/food results are reported on a wet weight basis on the edible portion, unless otherwise stated.
4. Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
5. Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds.
6. SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
7. Samples were analysed on an 'as received' basis.
8. Information identified on this report with blue colour, indicates data provided by customer, that may have an impact on the results.
9. This report replaces any interim results previously issued.

Holding Times

Please refer to 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours prior to sample receipt deadlines as stated on the SRA.

If the Laboratory did not receive the information in the required timeframe, and regardless of any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

For VOCs containing vinyl chloride, styrene and 2-chloroethyl vinyl ether the holding time is 7 days however for all other VOCs such as BTEX or C6-10 TRH then the holding time is 14 days.

****NOTE:** pH duplicates are reported as a range NOT as RPD

Units

mg/kg: milligrams per kilogram	**mg/L:** milligrams per litre	**ug/L:** micrograms per litre
ppm: Parts per million	**ppb:** Parts per billion	**%:** Percentage
org/100mL: Organisms per 100 millilitres	**NTU:** Nephelometric Turbidity Units	**MPN/100mL:** Most Probable Number of organisms per 100 millilitres

Terms

Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
LOR	Limit of Reporting.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
LCS	Laboratory Control Sample - reported as percent recovery.
CRM	Certified Reference Material - reported as percent recovery.
Method Blank	In the case of solid samples these are performed on laboratory certified clean sands and in the case of water samples these are performed on de-ionised water.
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
USEPA	United States Environmental Protection Agency
APHA	American Public Health Association
TCLP	Toxicity Characteristic Leaching Procedure
COC	Chain of Custody
SRA	Sample Receipt Advice
QSM	US Department of Defense Quality Systems Manual Version 5.3
CP	Client Parent - QC was performed on samples pertaining to this report
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within.
TEQ	Toxic Equivalency Quotient

QC - Acceptance Criteria

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is 30% however the following acceptance guidelines are equally applicable:

Results <10 times the LOR : No Limit

Results between 10-20 times the LOR : RPD must lie between 0-50%

Results >20 times the LOR : RPD must lie between 0-30%

Surrogate Recoveries: Recoveries must lie between 20-130% Phenols & 50-150% PFASs

PFAS field samples that contain surrogate recoveries in excess of the QC limit designated in QSM 5.3 where no positive PFAS results have been reported have been reviewed and no data was affected.

WA DWER (n=10): PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

QC Data General Comments

1. Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
3. Organochlorine Pesticide analysis - where reporting LCS data, Toxaphene & Chlordane are not added to the LCS.
4. Organochlorine Pesticide analysis - where reporting Spike data, Toxaphene is not added to the Spike.
5. Total Recoverable Hydrocarbons - where reporting Spike & LCS data, a single spike of commercial Hydrocarbon products in the range of C12-C30 is added and it's Total Recovery is reported in the C10-C14 cell of the Report.
6. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling.Therefore laboratory analysis is unlikely to be completed within holding time. Analysis will begin as soon as possible after sample receipt.
7. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of Recovery the term "INT" appears against that analyte.
8. Polychlorinated Biphenyls are spiked only using Aroclor 1260 in Matrix Spikes and LCS.
9. For Matrix Spikes and LCS results a dash " -" in the report means that the specific analyte was not added to the QC sample.
10. Duplicate RPDs are calculated from raw analytical data thus it is possible to have two sets of data.

Environment Testing

Quality Control Results

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank									
Heavy Metals									
Arsenic			mg/L	< 0.01			0.01	Pass	
Cadmium			mg/L	< 0.01			0.01	Pass	
Chromium			mg/L	< 0.01			0.01	Pass	
Copper			mg/L	< 0.01			0.01	Pass	
Lead			mg/L	< 0.01			0.01	Pass	
Mercury			mg/L	< 0.001			0.001	Pass	
Nickel			mg/L	< 0.01			0.01	Pass	
Zinc			mg/L	< 0.01			0.01	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Spike - % Recovery									
Heavy Metals				Result 1					
Arsenic	M20-Au50268	NCP	%	98			75-125	Pass	
Cadmium	M20-Au50268	NCP	%	96			75-125	Pass	
Chromium	M20-Au50268	NCP	%	92			75-125	Pass	
Copper	M20-Au50268	NCP	%	96			75-125	Pass	
Lead	M20-Au50268	NCP	%	93			75-125	Pass	
Mercury	M20-Au50268	NCP	%	93			75-125	Pass	
Nickel	M20-Au50268	NCP	%	96			75-125	Pass	
Zinc	M20-Au50268	NCP	%	98			75-125	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Arsenic	M20-Au50268	NCP	mg/L	< 0.01	< 0.01	<1	30%	Pass	
Cadmium	M20-Au50268	NCP	mg/L	< 0.01	< 0.01	<1	30%	Pass	
Chromium	M20-Au50268	NCP	mg/L	< 0.01	< 0.01	<1	30%	Pass	
Copper	M20-Au50268	NCP	mg/L	0.03	0.03	3.0	30%	Pass	
Lead	M20-Au50268	NCP	mg/L	0.05	0.05	2.0	30%	Pass	
Mercury	M20-Au50268	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Nickel	M20-Au50268	NCP	mg/L	0.02	0.02	11	30%	Pass	
Zinc	M20-Au50268	NCP	mg/L	0.66	0.66	1.0	30%	Pass	

Comments

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	Yes
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Qualifier Codes/Comments

Code	Description
C01	Leachate Fluid Key: 1 - pH 5.0; 2 - pH 2.9; 3 - pH 9.2; 4 - Reagent (DI) water; 5 - Client sample, 6 - other

Authorised By

Michael Cassidy	Analytical Services Manager
Emily Rosenberg	Senior Analyst-Metal (VIC)

Glenn Jackson
General Manager

Final report - this Report replaces any previously issued Report

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request or please click here.

GREENCAP
Going Further in Managing Risk

Preliminary Site Investigation

AustralAsian Granite

72 Wallaroo Plain Road, Wallaroo

APPENDIX H MUD ENVIRONMENTAL – SOIL CLASSIFICATION REPORT

MUD
ENVIRONMENTAL

SOIL CLASSIFICATION

Monopoly Property Group

72 Wallaroo Plain Road, Wallaroo,
South Australia

25 June 2020

Mud Ref.: ME-328.R1.0

DOCUMENT DISTRIBUTION

Date	Rev	Recipient	No. of copies	
			PDF	Hard copy
25 June 2020	0	Monopoly Property Group	1	
		Mud Environmental Pty Ltd	1 (File)	
File: //Mud/Projects/ME-328 MPG Wallaroo Fill/Report/ME-328.R1.0 MPG Wallaroo Fill 250520.docx				

Report approved by:

Adrian Webber
B.E.(CE) CEnvP SC
Director

TABLE OF CONTENTS

TABLES

APPENDICES

EXECUTIVE SUMMARY

Mud Environmental was engaged by Monopoly Property Group (MPG) to undertake an in-situ soil assessment, including soil sampling and testing, of approximately 32,000m³ of soils currently stockpiled on private property at 72 Wallaroo Plain Road, Wallaroo, South Australia ('the site').

It is understood that:

- Up to 10,000m³ of suitable soils are needed by MPG for use as fill materials at the Wallaroo Shores redevelopment, located at Wallaroo, South Australia.
- A local farmer has a large volume of soil stockpiled on private property approximately 2.5km to the north-east of the Wallaroo Shores redevelopment, which was reportedly generated from the original construction of the Wallaroo Marina in the late 1990's.
- The stockpile is currently closed and no additional materials will be added.
- The soil materials stockpiled at the site require chemical and physical classification to determine if selected soil materials could be suitable for potential re-use by MPG at the Wallaroo Shores redevelopment in accordance with EPA requirements.

Therefore, the objectives of the soil classification were to:

- Collect a sufficient number of representative samples of stockpiled soils for chemical testing, in order to classify up to 10,000m³ of the stockpiled soil materials for potential removal from site and re-use; and
- Log the materials encountered to assess the physical nature of the materials.

A total of 135 representative samples of stockpiled soil materials were collected from 32 individual test pit locations in accordance with relevant protocols on 6-7 May 2020, with a total of 52 primary soil samples selected for laboratory analyses for a range of chemical substances common in imported fill and natural soils in South Australia.

The findings of the stockpiled soil investigations in relation to the soil materials encountered were:

- Various soil materials were encountered across the site, with the majority of the stockpile dominated by clayey and sandy fill materials. It is understood that the stockpiled soils were originally generated from the construction of the Wallaroo Marina in the late 1990's.
- Trace inclusions of slag were observed within the majority of test pits, both in the uppermost FILL 1 soil layer (23 out of 32 locations), as well as at varying depths in the subsurface within the FILL 4 soil layer (20 out of 32 test pit locations). Slag inclusions were not observed in any other layers of fill materials excavated within the stockpile assessment area at the site.
- PID results in all samples were low and all below or equal to 0.2ppm, which indicates that the potential for significant volatile contamination was low.
- No potentially asbestos containing materials were observed during test pitting activities.
- Naturally occurring mineralogical inert inclusions greater than 100mm were observed both on the surface of the stockpile and in a number of test pits excavated, and consisted of mainly of sandstone and calcareous rocks/boulders up to 300mm-500mm in size. These oversized natural inclusions were observed predominantly within the FILL 1, FILL 4 and FILL 9 layers. While minor quantities of mineralogical inclusions greater than 100mm were also occasionally noted within other layers of fill materials within the stockpile, these were observed in trace quantities only.
- As the FILL 3 layer was observed to consist of a firm, high plasticity clay, and this should be considered if the FILL 3 soil materials are deemed suitable for potential re-use within the Wallaroo Shores redevelopment.

The findings of the stockpiled soil investigations in relation to the chemical and physical status of the soils assessed at the site were:

- Of the 52 primary soil samples analysed, all soil analytical results were reported below the Waste Fill criteria in all samples except for:

    - Concentrations of copper in four samples collected from the FILL 3 clay layer (TP7_0.3-0.4, TP8_0.2-0.3, TP17_0.2-0.3 and TP28_0.7-0.8), all of which were above Waste Fill criteria but below the Intermediate criteria.
    - Concentrations of zinc in one sample collected from the FILL 3 clay layer (TP8_0.2-0.3 and FILL 3 clay layer) which was above Waste Fill criteria but below the Intermediate criteria.
- Due to the isolated chemical exceedances of copper and zinc as reported above, a statistical analyses of the relevant copper and zinc data sets was completed using US EPA ProUCL software. The statistical analyses was completed in the context of the data sets representing both one body of soil (i.e. all soil samples from all layers), as well as in the context of a separate homogenous FILL 3 clay layer (i.e. only considering soil samples collected from this layer of soil). The results of the statistical interpretations of the copper and zinc data sets for both of these scenarios were considered to comply with the Waste Fill criteria adopted for the site.
- On the basis of the reported chemical results, statistical interpretations, and physical characteristics, **the stockpiled soils tested from the layers of fill materials designated as FILL 2, FILL 3, FILL 5, FILL 6, FILL 7 and FILL 8 are all classified as Waste Fill.** The location of these materials is shown in **Figure 3.**
- Given the absence of any laboratory analytical testing, possible aesthetic concerns associated with the presence of slag, and the prevalence of inert mineralogical physical non-conformances, **the fill materials designated as the FILL 1, FILL 4 and FILL 9 layers do not currently meet the physical criteria for Waste Fill and are not considered suitable for consideration as potential re-use materials.**

Based on the above findings, the following recommendations are made:

- Any stockpiled soil materials (classified as **Waste Fill**) containing more than trace levels of inert mineralogical or non-mineralogical oversized inclusions (>100mm) must be processed by MPG prior to / during loading out activities in order to remove any physical non-conformances before the materials can be re-used at the proposed receiving site (Wallaroo Shores redevelopment).
- If during loading and/or stockpile re-use activities more than trace levels of slag and/or are identified within any soils from the stockpile currently classified as **Waste Fill** and earmarked for re-use, these soil materials should be segregated from the remainder of the stockpiled soil materials and must remain on-site.
- If during loading and/or stockpile re-use activities more than trace levels of slag are identified within any soils from the stockpile currently classified as **Waste Fill** and earmarked for re-use, these soil materials should be segregated from the remainder of the stockpiled soil materials and must remain on-site.
- All soils are to be removed from the site must be managed in accordance with relevant EPA guidelines and/or requirements of waste or recycling depots authorised by the EPA.
- Should any unforeseen materials be identified during excavation works, it is recommended that these soils are quarantined and advice is sought from an appropriately qualified environmental consultant.

This report and the opinions expressed above are subject to the limitations presented in **Section 4**. It is important that the reader make themselves aware of these limitations.

Preliminary Site Investigation

AustralAsian Granite

72 Wallaroo Plain Road, Wallaroo

APPENDIX I EPA – SITE AUDIT CONTAMINATION REPORTS – CHARLES TERRACE, WALLAROO

Site Contamination Audit Report

Commercial Development Area, Former IFL Site,
Charles Terrace, Wallaroo, South Australia

Prepared for:
Incitec Pivot Limited

Prepared by:
Australian Environmental Auditors Pty Ltd

Date:
21 January 2014

Project Number:
EA0043

EPA Assigned Reference:
60240

AUSTRALIAN
ENVIRONMENTAL AUDITORS

21 January 2014 Our Ref: EA0043

Environmental Manager (Asia Pacific)
Incitec Pivot Limited
3 - 7 Francis Street
Port Adelaide SA 5015

Attention: Mathew Walker

Re: Site Contamination Audit Report
Commercial Development Area, Former IFL Site, Charles Terrace, Wallaroo, South Australia

I have pleasure in submitting this Site Contamination Audit Report (SCAR) and attached Site Contamination Audit Statement (SCAS) for the property identified as: Commercial Development Area, Former IFL Site, Charles Terrace, Wallaroo, South Australia (the Site). The Site forms part (34,779 m^2) of a larger property (approximately 23 ha) which was formerly used for smelting and fertilizer production/distribution (the Larger Property).

The SCAR was produced in accordance with the Environment Protection Act (1993) and the Environment Protection (Water Quality) Policy (2003) and other relevant SA EPA regulations and guidelines. The Audit was undertaken in general accordance with SA EPA (2010) *Guidelines for the Site Contamination Audit System*.

The Audit was originally commissioned by Mr Scott Nairn of Incitec Pivot Limited (IPL) to assess the suitability of the Site for high density residential (minimal access to soil) and commercial/industrial land-uses. It is understood that the audit requirement for the Larger Property was initially triggered by informal communications between IPL and the Environment Protection Authority (EPA). The audit requirement for the Site was then triggered by a development approval for the whole Site with conditions issued by the District Council of the Copper Coast (340/D070/08).

Please note that the original SCAR and SCAS (dated 7 May 2012) has been withdrawn and replaced by a version dated 21 October 2013 and then a version dated 21 January 2014 (i.e. this Report). The reasons for the later withdrawal were to address an EPA administrative review (update and clarifications regarding the Environment Management Plan (EMP)). It is noted that the amendments do not alter the conclusions or audit outcomes. Please note that I have issued a copy of the SCAS and EMP to the District Council of the Copper Coast as per EPA requirements.

Thank you for the opportunity to conduct this Audit. Please call me on (02) 4015 7900 if you have any questions.

Yours faithfully
Australian Environmental Auditors Pty Ltd

Phillip Hitchcock
Site Contamination Auditor (accredited pursuant to Division 4 of Part 10A of the Environment Protection Act 1993, No. 2009014)

DATE	DOCUMENT VERSION	SUBMITTED TO
7 May 2012	60240_SCAR_001	SA EPA, Incitec Pivot Ltd
7 May 2012	60240_SCAR_001	SA EPA, Incitec Pivot Ltd, District Council of the Copper Coast
21 October 2013	60240_SCAR_001A	SA EPA, Incitec Pivot Ltd
21 October 2013	60240_SCAS_001A	SA EPA, Incitec Pivot Ltd, District Council of the Copper Coast
21 January 2014	60240_SCAR_001B	SA EPA, Incitec Pivot Ltd
21 January 2014	60240_SCAS_001B	SA EPA, Incitec Pivot Ltd, District Council of the Copper Coast

Maitland
No 282 High St,
Maitland NSW 2320
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Mount Waverley VIC 3149
T 03 8542 7500
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PO Box 87, Glenelg SA 5045
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Perth
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West Perth WA 6005
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W environmental-auditors.com.au
ABN 84 161 362 214
ACN 161 362 214

SITE CONTAMINATION AUDIT SYSTEM
SITE CONTAMINATION AUDIT STATEMENT

INSTRUCTIONS

Requirements relating to site contamination audit statements are prescribed in the *Environment Protection Regulations 2009* (the Regulations) and include the following:

Regulation 67—Site contamination audit report summary and statement

(1) A site contamination audit report required under section 103Z(4)(a) and (b)(i) of the Act[1] must include a summary of the findings of the site contamination audit to which it relates that—

(a) is in the form set out in Schedule 3 clause 8 for site contamination audit statements; and

(b) is certified by the responsible auditor in accordance with the directions contained in the form set out in Schedule 3 clause 8.

(2) A site contamination audit statement required under section 103Z(4)(b)(ii) of the Act in relation to a site contamination audit must comprise—

(a) a copy of the summary in the site contamination audit report relating to the audit and itself be certified by the responsible auditor in accordance with the directions contained in the form set out in Schedule 3 clause 8; or

(b) a photocopy, faxed copy or electronic copy of the summary as certified by the responsible auditor in accordance with the directions contained in the form set out in Schedule 3 clause 8.

Audit reports and audit statements are required to be provided to the EPA under section 103Z(4) of the Act, which requires that:

103Z—Requirements relating to site contamination audits

(4) A site contamination auditor must, on the completion of each site contamination audit for which the auditor is the responsible auditor—

(a) provide a site contamination audit report to the person who commissioned the audit; and

(b) at the same time, provide—

(i) a site contamination audit report to the Authority; and

(ii) a site contamination audit statement to the council for the area in which the land to which the audit relates is situated and any prescribed body[2].

Penalty: Division 5 fine.

Refer to the most recent version of the EPA publication *Site contamination: Guidelines for the site contamination audit system*, for further information regarding audit reports and audit statements.

Please ensure that all sections of the form are completed, requested information and attachments (where necessary) are provided and labelled as indicated. Please do not modify the form and do not write within the areas for EPA USE ONLY.

Site contamination audit statements must be included in the relevant site contamination audit reports, and be sent to:

Manager, Site Contamination Branch
Environment Protection Authority
GPO Box 2607
Adelaide SA 5001

For any enquiries or questions relating to the site contamination audit system, contact the EPA Site Contamination Branch on:

Telephone: (08) 8204 2004 Email: <epainfo@epa.sa.gov.au>

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[1] *Environment Protection Act 1993.*

[2] Refer to Regulation 68 of the Environment Protection Regulations 2009 regarding prescribed bodies.

EPA GENI Reference

(EPA use only)

SITE CONTAMINATION AUDIT STATEMENT

(under section 103Z of the *Environment Protection Act 1993*)

This statement contains the summary of the findings of the site contamination audit set out in the site contamination audit report titled:

Site Contamination Audit Report.
Commercial Development Area, Former IFL Site, Charles Terrace, Wallaroo, South Australia.

(referred to in this form as '*the report*')

dated: **21 January 2014**

SECTION A: AUDITOR DETAILS	
Name of auditor*:	Phillip Hitchcock
Auditor's accreditation number:	2009014
Name of auditor's company or business:	Australian Environmental Auditors Pty Ltd
SECTION B: AUDIT SITE DETAILS	
Auditor's project reference:	EA0043
EPA reference:	60240
Name of audit site [*if applicable*]:	Commercial Development Area, Former IFL Site
Address of audit site:	Charles Terrace, Wallaroo, SA
Name of council for area in which audit site is situated [*if within council area*]:	District Council of the Copper Coast
Provide the following particulars** relating to the relevant land and the audit: ** *If insufficient space, details may be annexed to this form.*	
- certificates of title of all the relevant land and an indication of whether the audit site comprises **all or part only** of the land shown on or described in the certificates of title	CT6059/237 (Deposited Plan 82762) CT6059/239 (Deposited Plan 82762) CT6059/240 (Deposited Plan 82762) CT6059/240 (Deposited Plan 82762) (Refer to **Annexure B**)
- details sufficient to identify the location of the land, including section or allotment numbers, area and hundred and AMG co-ordinates (GDA 94, UTM 53 and 54)	Allotment 2005 Deposited Plan 82762, CT6059/237 Allotment 2007 Deposited Plan 82762, CT6059/239 Allotment 2008 Deposited Plan 82762, CT6059/240 Allotment 2009 Deposited Plan 82762, CT6059/240 Longitude 137.6262445 Latitude -33.9286806

- if the audit site comprises part only of the land described in the certificates of title, or if there is no certificate of title for the land comprising the audit site— survey plans prepared by a licensed surveyor	NA
- audit plans indicating the location and extent of the audit site (which must comply with the guidelines issued by the EPA from time to time) Plan attached (Refer to **Annexure A**)	
SECTION C: AUDIT DETAILS	
Name of owner of audit site:	Top Australia Ltd (fully owned subsidiary of Incitec Pivot Limited)
Name of occupier of audit site:	Vacant
Name, postal address and position of person who commissioned audit:	Mr Scott Nairn Incitec Pivot Limited 3 - 7 Francis Street Port Adelaide SA 5015
Indicate authority of person who commissioned audit:	EPA Yes ☐ No ☒ Owner Yes ☒ No ☐ Occupier Yes ☐ No ☒ Developer Yes ☐ No ☒ Other [*please specify*]
Indicate reasons for audit [*indicate all reasons*]:	Required under the Development Act 1993 Yes ☒ No ☐ Required under the Environment Protection Act 1993 Yes ☐ No ☒ Other [*please specify*]
If audit was required under the Environment Protection Act 1993, provide EPA reference number:	NA
Indicate audit purposes [*indicate all purposes*]:	Determining the nature and extent of any site contamination present or remaining on or below the surface of the site Yes ☒ No ☐ Determining the suitability of the site for a sensitive use or another use or range of uses Yes ☒ No ☐ Determining what remediation is or remains necessary for a specified use or range of uses Yes ☒ No ☐ [*NB: an audit may be required for all of the above purposes*.]

If audit was required for development plan consent under the *Development Act 1993*, provide:

Name of relevant planning authority:	District Council of the Copper Coast
Development application number [if known]:	(340/D070/08)
Site zoning:	Town Centre and Town Centre (Wallaroo Historic Conservation Area)
Proposed site use:	High Density Residential, Commercial/Industrial Use

Date of commencement of audit:	25 March 2010
Date of notification of commencement of audit to EPA:	31 March 2010
Date of completion of audit:	21 January 2014

** Please note that the original SCAR and SCAS (dated 7 May 2012) has been withdrawn and replaced by a version dated 21 October 2013 and then a version dated 21 January 2014. The reasons for the later withdrawal were to address an EPA administrative review (update and clarifications regarding the Environment Management Plan (EMP)). It is noted that the amendments do not alter the conclusions or audit outcomes. Please note that I have issued a copy of the SCAS and EMP to the District Council of the Copper Coast as per EPA requirements.*

SUMMARY OF FINDINGS

1) Auditor's Findings

The Site represents part of the Larger Property, which was historically used as a smelting facility and fertilizer production/storage facility. The Auditor considers that historical activities within the Site have been adequately defined.

Soil and groundwater contamination issues at the Site are predominantly limited to metals and nutrients (groundwater only). The Auditor considers that contamination conditions at the Site have been adequately assessed.

A large scale Environmental Risk Assessment (ERA) process has identified that groundwater contamination from the Larger Property is not posing unacceptable risks to marine dependent ecosystems, human consumers of aquatic foods from the marine environment or human users of the marine environment (i.e. primary contact recreation exposure).. However, the beneficial use of Primary Contact Recreation is impacted on-site and therefore site contamination exists.

A DRA process completed after the preparation of the ERA has identified that a Remediation to The Extent Necessary (RTEN) opinion in not required.

Earthworks have been completed including: i) excavation of slag and metals impacted fill/soil; ii) screening of excavated materials and slag from other portions of the Larger Property; iii) mixing screened slag/soil/fill with an alkaline mixture to reduce metals leachability; and iv) replacement of the material over the Site under geotechnical control. Clean fill materials were also imported to provide an earthen bund around the Site.

The Site is currently covered by compacted slag/fill or an earthen bund. The compacted fill will need to be capped to allow high density residential use with minimal access to soil or commercial/industrial uses. The final Environmental Management Plan (EMP) (dated 17 January 2014, Rev 8, (FINAL) and attached to this Statement as **Annexure C**) provides a framework for the construction and ongoing maintenance of this capping as well as remnant groundwater contamination.

Based on the extent of the investigations and adequacy, quality and completeness of the assessment works, the Auditor considers that there is minimal uncertainty regarding the assessments completed at the Site.

The following provides an assessment of the audit outcomes against the audit objectives:

- *Section 3(1), b, i: 'The nature and extent of any site contamination present or remaining on or below the surface of the site."*

  Considering Section 5(B) of the EP Act, the Auditor considers that site contamination exists on the basis that:

  - chemicals have been detected above background concentrations as a result of an activity at the Site;
  - the presence of these chemical substances has resulted in:
    - potential harm to the health or safety of human beings that is not trivial;
    - potential harm to water that is not trivial.

  In determining whether or not site contamination exists, the Auditor has considered the following beneficial uses:

  - Land – Protection of human health, protection of the environment, buildings and structures, aesthetics and non-site contamination issues;
  - Waters – Aquatic ecosystems, potable use, recreation and aesthetics, industrial use, human health in non-use scenarios and buildings and structures.

  The Auditor is satisfied that the nature and extent of site contamination has been adequately defined. Significant soil contamination issues are predominantly limited to elevated metals concentrations in slag/fill/soil material across the majority of the Site. Significant groundwater contamination issues are limited to elevated metals and nutrients concentrations, which are generally lower than the portion of the Larger Property which receives groundwater flow from the Site.

  The slag/fill/soil across the majority of the Site poses a significant phytotoxic risk and a significant risk to human health under a residential with minimal access to soil (high density developments) and commercial/industrial exposure scenarios.

  An ERA process has demonstrated the groundwater contamination across the Larger Property does not pose significant risks to the marine environment.

- *Section 3(1), b, ii: 'The suitability of the site for a sensitive use or another use or range of uses.'*

  The Auditor considers that the Site is suitable for restricted use, those being residential with minimal access to soil (high density development) and commercial/industrial uses, with conditions on the use of land and waters.

The Auditor has only considered residential with minimal access to soil (high density developments) and commercial/industrial uses of land as part of the Audit. The restrictions on these uses are detailed below:

- For **high density residential use**, the existence of a 50 mm clean fill layer (with similar characteristics to clay) across the Site followed by a slab thickness of 150 mm and a concrete density of at least 2.35 t/m^3 OR a marker layer, at least 1 m of certified clean fill (i.e. 'Waste Fill') and 0.1 m of concrete (minimum density of 2.35 t/m^3) shall be placed between the stabilised soils and the final site surface;
- For **commercial/industrial use** a marker layer and at least 0.5 m of certified clean fill (i.e. 'Waste Fill') material OR a marker layer and impermeable robust pavements (concrete, bitumen, pavers or similar) of at least 75 mm in thickness shall be placed over the stabilised slag;
- A restriction on the construction of basements unless approved as part of specific Human Health Risk Assessment;
- Where planting or landscaping areas are required, the area is to be excavated to at least 1 m depth and reinstated with an impermeable marking layer and suitable growing media (i.e. 'Waste Fill'). Plants are to be selected so that the root zone does not penetrate into the underlying stabilised soils; and
- Groundwater must not be extracted for any purpose other than monitoring or groundwater contamination management.

- *Section 3(1), b, iii: 'What remediation is or remains necessary for a specific use or range of uses.'*

Site contamination exists at the Site and remediation is necessary to allow residential with minimal access to soil and commercial/industrial uses.

The remediation which is necessary to allow residential with minimal access to soil (high density development) and commercial/industrial uses is detailed in the final EMP. The final EMP (dated 17 January 2014, Ref: SG101835 RP04, Rev 8, (FINAL)) and attached to this Statement as **Annexure C**) includes a number of management requirements, including:

- For **high density residential use**, the existence of a 50 mm clean fill layer (with similar characteristics to clay) across the Site followed by a slab thickness of 150 mm and a concrete density of at least 2.35 t/m^3 OR a marker layer, at least 1 m of certified clean fill (i.e. 'Waste Fill') and 0.1 m of concrete (minimum density of 2.35 t/m^3) shall be placed between the stabilised soils and the final site surface;
- For **commercial/industrial use** a marker layer and at least 0.5 m of certified clean fill (i.e. 'Waste Fill') material OR a marker layer and impermeable robust pavements (concrete, bitumen, pavers or similar) of at least 75 mm in thickness shall be placed over the stabilised slag;
- A restriction on the construction of basements unless approved as part of specific Human Health Risk Assessment;
- Underground services are to be installed with a marker layer (i.e. para webbing) to separate backfilled and stabilised soils followed by at least 0.5 m of certified clean fill (i.e. 'Waste Fill') placed around the services (above, below and sides);

- o Any excavated or imported materials must be sampled, classified by an Environmental Consultant and managed in accordance with relevant EPA guidelines;
- o Management conditions include yearly inspection of slabs, bitumen by the site occupier, restriction on planting and excavations and maintaining records of inspections, repair and excavations; and
- o Groundwater must not be extracted for any purpose other than monitoring or groundwater contamination management.

Due to the widespread presence of metals and contaminated stabilised slag/fill/soil, the Site is not suitable for more sensitive uses (e.g. residential with access to soils). Significant remediation activities would be required to render the Site suitable for uses more sensitive than residential with minimal access to soil (fully and permanently paved or sealed yard space such as flats or apartments) and commercial/industrial.

For the Site to be considered suitable for uses more sensitive than residential with minimal access to soil and commercial/industrial the contaminated slag/soil/fill would require removal.

The restrictions for the use of the Site are limited to: i) preventing exposure to contaminated slag/fill/soil through the construction and maintenance of appropriate capping layers; and, ii) preventing exposure to contaminated groundwater through an administrative control (i.e. no groundwater extraction for any purpose other than monitoring or contaminant management).

The final EMP (dated 17 January 2014, Rev 8, (FINAL) and attached to this Statement as **Annexure C**) will provide future owners/occupiers of the Site with an awareness of the restrictions noted above.

2) Audit Conditions

Planning and Development

i. Any residential area with minimal access to soil (high density developments) and commercial/industrial developments at the Site must only be approved subject to implementation of the final EMP, which is referenced below:

   JBS&G Pty Ltd (17 January 2014) Incitec Pivot Limited Environmental Management Plan, Commercial Development Area, Charles Street, Wallaroo (ref: SG101835 RP04, Rev 8 (FINAL)), refer to **Annexure C**;

ii. A Site Contamination Auditor must confirm in writing that the final EMP has been implemented prior to initial occupation of the Site for high density residential development with minimal access to soil and/or commercial/industrial uses.

Environmental Monitoring

No ongoing environmental monitoring is considered to be warranted at the Site, refer to SCAR for discussion.

Site Management

iii. Due to the presence of contaminated soil/fill/slag and contaminated groundwater, the management measures detailed in the final EMP (refer to **Annexure C**) must be implemented in order to allow residential with minimal access to soil and commercial/industrial use. A copy of the final EMP (refer to **Annexure C**) must be provided to all future occupiers of the property as well as any persons involved in works which may involve disturbance of contaminated slag/fill/soil.

Water Restrictions

iv. Groundwater is contaminated with metals and nutrients to the extent that groundwater extraction must be prohibited for any purpose other than monitoring or groundwater contamination management.

Recommendations to EPA Regarding Groundwater Extraction

Given the residual groundwater contamination, it is recommended that EPA consider declaring a prohibition or restriction zone to restrict groundwater extraction from the water table aquifer in the hydraulic downgradient direction under Section 103S of the Environment Protection Act 1993.

Other Recommendations

This Report is accurate at the time it was prepared based on the information which was available. It is recommended that users of this Report conduct their own investigations regarding the potential for contamination at the Site after the issue of this Report.

This Report will be reviewed by EPA for administrative purposes at some time following receipt. EPA aim to complete these reviews within 21 days following receipt, however, delays can occur. It is recommended that the findings of this Report are not relied upon until EPA has completed and documented its review.

Any soil/fill materials which are exported/imported as part of the future use of the Site should be classified, handled and managed in accordance with relevant EPA guidelines.

A copy of the SCAS and SCAR should be provided to future owners of the property.

CERTIFICATION OF COPY OF SUMMARY FINDINGS

I certify that the summary of findings contained within or annexed to this statement represents a true and accurate summary of the findings of the site contamination audit set out in the report.

Signed*

Dated: 21 January 2014

** This form must be completed and signed by the 'responsible auditor', being, under the Environment Protection Act 1993 and the Environment Protection Regulations 2009, the auditor who personally carried out or directly supervised the work involved in the audit.*

This site contamination audit statement must be lodged, on completion of the audit, with the council for the area in which the audit site is situated and any prescribed body (see regulation 68 of the Environment Protection Regulations 2009).

The report (including the summary of findings) will be recorded in the public register kept by the EPA under section 109 of the Environment Protection Act 1993.

LIST OF ANNEXURES

ANNEXURE A **Site Location Plan**

ANNEXURE B **Survey and Allotment Plan**

ANNEXURE C **Environmental Management Plan (17 January 2014)**

Preliminary Site Investigation
AustralAsian Granite
72 Wallaroo Plain Road, Wallaroo

APPENDIX J RBCA FORMULA AND RESULTS

This is the formula for steady state attenuation along the centreline of a dissolved phase plume, taken from the ASTM Technical Standard E 1739

$$C = C_{source} \exp\left[\frac{x}{2\alpha_x}\left[1-\sqrt{\left(1+\frac{4\lambda\alpha_x}{u_{d.\max}}\right)}\right]\right]\left[erf\left[\frac{S_w}{4\sqrt{\alpha_y x}}\right]\right]\left[erf\left[\frac{S_d}{4\sqrt{\alpha_z x}}\right]\right]$$

Where

$$u_{d.\max} = \left[\frac{Ki}{n_e Rc}\right]$$

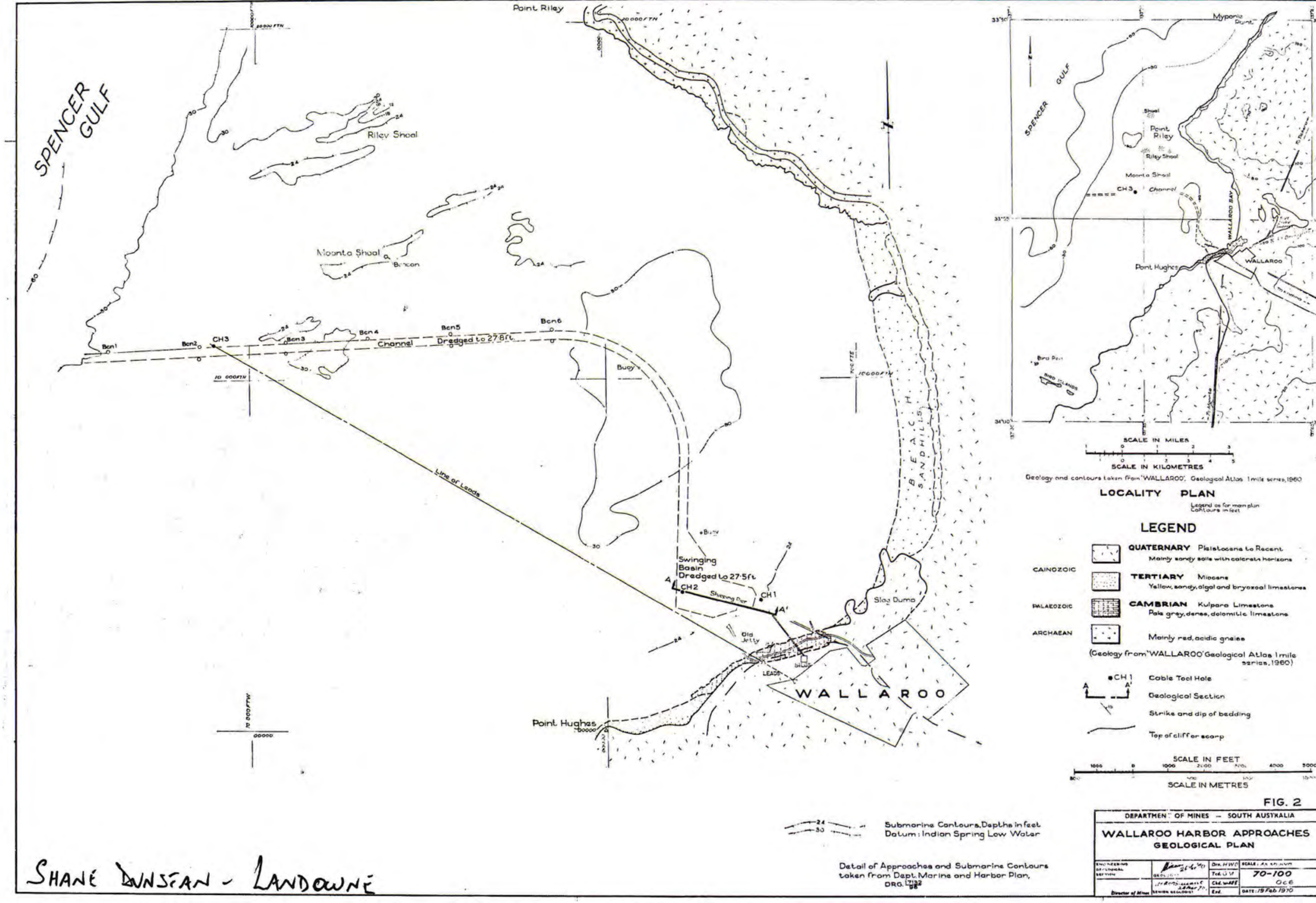
C_{source}	=	dissolved hydrocarbon concentration in dissolved plume source area [g/cm^3-H_2O]
x	=	distance along centreline from downgradient edge of dissolved plume source zone (m)
α_x	=	longitudinal dispersivity (m)
λ	=	first-order degradation constant (d^{-1})
$u_{d.\max}$	=	maximum transport rate of dissolved plume (m/day)
S_w	=	source width (perpendicular to flow in the horizontal plane) (m)
α_y	=	transverse dispersivity (m)
S_d	=	source width (perpendicular to flow in the vertical plane (m)
α_z	=	vertical dispersivity (m)
K	=	hydraulic conductivity (m/s)
i	=	hydraulic gradient
n_e	=	effective porosity
Rc	=	Retardation factor

Concentration at Source, C_0 (mg/L)	Distance to Nearest Discharge Point (m)	Retardation Coefficient	First Order Degradation Constant (day^{-1})	Source Width, S_w (m)	Source Thickness, S_d (m)	Longitudinal Dispersivity, a_x (m)	Trasverse Dispersivity, a_y (m)	Vertical Dispersivity, a_z (m)	$S_w/(4(a_yx)^{1/2})$	Y = $erf[S_w/(4(a_yx)^{1/2})]$	$S_d/(4(a_zx)^{1/2})$	Z = $erf[S_d/(4(a_zx)^{1/2})]$	Steady State Concentration at Discharge Point, C = C_0XYZ (mg/L)
Copper													
1.5	1800	1	0.00E+00	120	0.5	180	18	1.8	0.1667	0.1863	0.0022	0.0025	0.0007
1.5	1600	1	0.00E+00	120	0.5	160	16	1.6	0.1875	0.2091	0.0025	0.0028	0.0009
1.5	1400	1	0.00E+00	120	0.5	140	14	1.4	0.2143	0.2381	0.0028	0.0032	0.0011
1.5	1200	1	0.00E+00	120	0.5	120	12	1.2	0.2500	0.2763	0.0033	0.0037	0.0015
1.5	1000	1	0.00E+00	120	0.5	100	10	1	0.3000	0.3286	0.0040	0.0045	0.0022
1.5	800	1	0.00E+00	120	0.5	80	8	0.8	0.3750	0.4041	0.0049	0.0056	0.0034
1.5	600	1	0.00E+00	120	0.5	60	6	0.6	0.5000	0.5205	0.0066	0.0074	0.0058
1.5	400	1	0.00E+00	120	0.5	40	4	0.4	0.7500	0.7112	0.0099	0.0112	0.0119
1.5	200	1	0.00E+00	120	0.5	20	2	0.2	1.5000	0.9661	0.0198	0.0223	0.0323
1.5	100	1	0.00E+00	120	0.5	10	1	0.1	3.0000	1.0000	0.0395	0.0446	0.0669
1.5	50	1	0.00E+00	120	0.5	5	0.5	0.05	6.0000	1.0000	0.0791	0.0890	0.1335
1.5	20	1	0.00E+00	120	0.5	2	0.2	0.02	15.0000	1.0000	0.1976	0.2201	0.3302
1.5	2	1	0.00E+00	120	0.5	0.2	0.02	0.002	150.0000	1.0000	1.9764	0.9948	1.4922
Lead													
0.03	1800	1	0.00E+00	120	0.5	180	18	1.8	0.1667	0.1863	0.0022	0.0025	0.0000
0.03	1600	1	0.00E+00	120	0.5	160	16	1.6	0.1875	0.2091	0.0025	0.0028	0.0000
0.03	1400	1	0.00E+00	120	0.5	140	14	1.4	0.2143	0.2381	0.0028	0.0032	0.0000
0.03	1200	1	0.00E+00	120	0.5	120	12	1.2	0.2500	0.2763	0.0033	0.0037	0.0000
0.03	1000	1	0.00E+00	120	0.5	100	10	1	0.3000	0.3286	0.0040	0.0045	0.0000
0.03	800	1	0.00E+00	120	0.5	80	8	0.8	0.3750	0.4041	0.0049	0.0056	0.0001
0.03	600	1	0.00E+00	120	0.5	60	6	0.6	0.5000	0.5205	0.0066	0.0074	0.0001
0.03	400	1	0.00E+00	120	0.5	40	4	0.4	0.7500	0.7112	0.0099	0.0112	0.0002
0.03	200	1	0.00E+00	120	0.5	20	2	0.2	1.5000	0.9661	0.0198	0.0223	0.0006
0.03	100	1	0.00E+00	120	0.5	10	1	0.1	3.0000	1.0000	0.0395	0.0446	0.0013
0.03	50	1	0.00E+00	120	0.5	5	0.5	0.05	6.0000	1.0000	0.0791	0.0890	0.0027
0.03	20	1	0.00E+00	120	0.5	2	0.2	0.02	15.0000	1.0000	0.1976	0.2201	0.0066
0.03	2	1	0.00E+00	120	0.5	0.2	0.02	0.002	150.0000	1.0000	1.9764	0.9948	0.0298
Zinc													
0.51	1800	1	0.00E+00	120	0.5	180	18	1.8	0.1667	0.1863	0.0022	0.0025	0.0002
0.51	1600	1	0.00E+00	120	0.5	160	16	1.6	0.1875	0.2091	0.0025	0.0028	0.0003
0.51	1400	1	0.00E+00	120	0.5	140	14	1.4	0.2143	0.2381	0.0028	0.0032	0.0004
0.51	1200	1	0.00E+00	120	0.5	120	12	1.2	0.2500	0.2763	0.0033	0.0037	0.0005
0.51	1000	1	0.00E+00	120	0.5	100	10	1	0.3000	0.3286	0.0040	0.0045	0.0007
0.51	800	1	0.00E+00	120	0.5	80	8	0.8	0.3750	0.4041	0.0049	0.0056	0.0011
0.51	600	1	0.00E+00	120	0.5	60	6	0.6	0.5000	0.5205	0.0066	0.0074	0.0020
0.51	400	1	0.00E+00	120	0.5	40	4	0.4	0.7500	0.7112	0.0099	0.0112	0.0040
0.51	200	1	0.00E+00	120	0.5	20	2	0.2	1.5000	0.9661	0.0198	0.0223	0.0110
0.51	100	1	0.00E+00	120	0.5	10	1	0.1	3.0000	1.0000	0.0395	0.0446	0.0227
0.51	50	1	0.00E+00	120	0.5	5	0.5	0.05	6.0000	1.0000	0.0791	0.0890	0.0454
0.51	20	1	0.00E+00	120	0.5	2	0.2	0.02	15.0000	1.0000	0.1976	0.2201	0.1123
0.51	2	1	0.00E+00	120	0.5	0.2	0.02	0.002	150.0000	1.0000	1.9764	0.9948	0.5074

Attachment 6

Wallaroo Harbor approaches – geological plan 1970

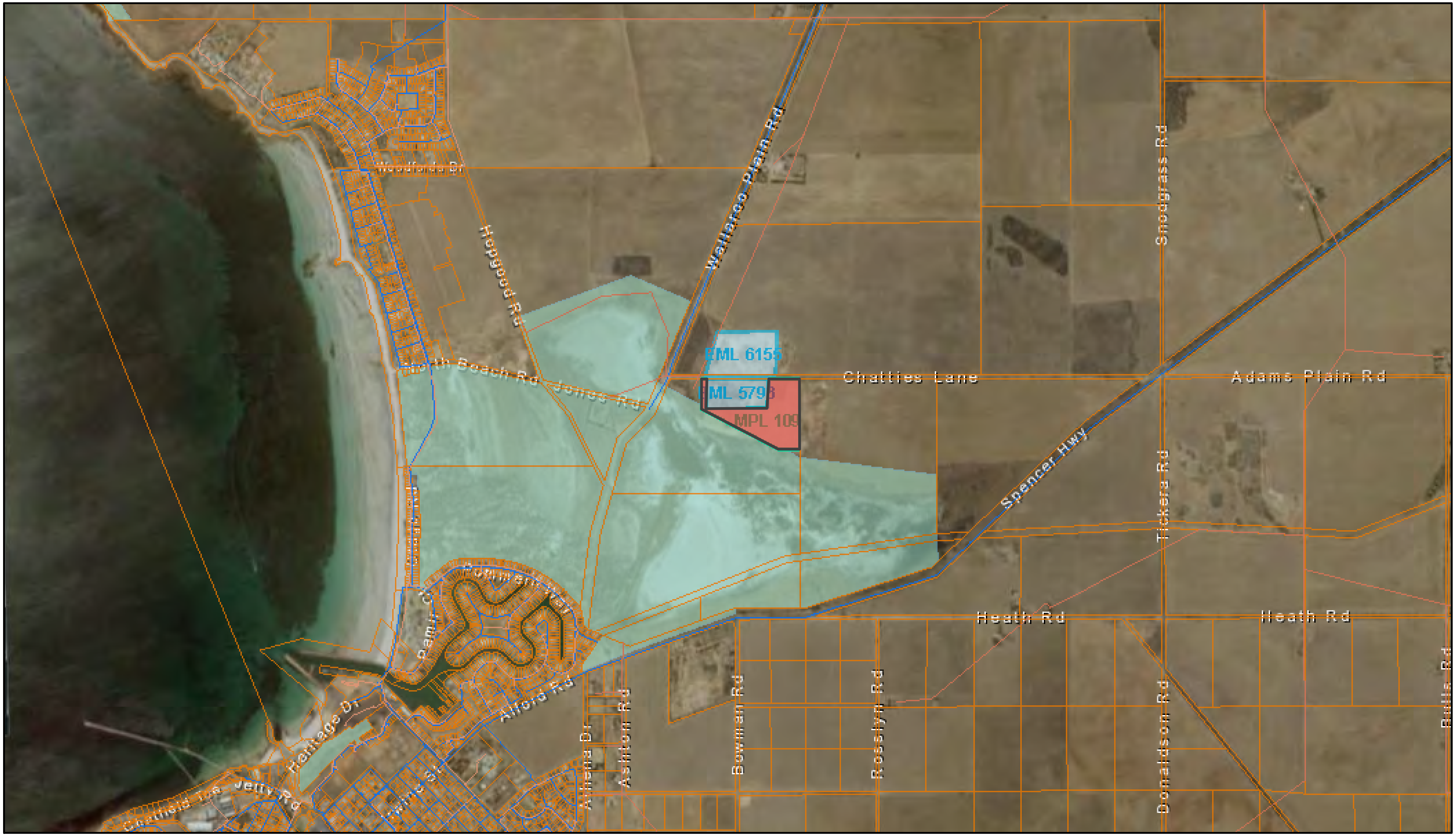
FIG.2


SPENCER GULF
Point Riley
Riley Shoal
Moonta Shoal
Beacon
Bcn1
Bcn2
CH3
Bcn3
Bcn4
Bcn5
Bcn6
Channel
Dredged to 27.8ft
Buoy
Line of Leads
Swinging Basin Dredged to 27.5ft
CH2
CH1
Old Jetty
Slag Dump
BEACH
SANDHILLS
WALLAROO
Point Hughes
LOCALITY PLAN
Mypona Point
Point Riley
Riley Shoal
Moonta Shoal
Channel
WALLAROO BAY
WALLAROO
Point Hughes
Bird Point
BIRD ISLANDS
SCALE IN MILES
SCALE IN KILOMETRES
Geology and contours taken from 'WALLAROO', Geological Atlas 1 mile series, 1960
Legend as for main plan
Contours in feet
LEGEND
CAINOZOIC
QUATERNARY Pleistocene to Recent
Mainly sandy soils with calcrete horizons
TERTIARY Miocene
Yellow, sandy, algal and bryozoal limestones
PALAEOZOIC
CAMBRIAN Kulpara Limestone
Pale grey, dense, dolomitic limestone
ARCHAEAN
Mainly red, acidic gneiss
(Geology from 'WALLAROO' Geological Atlas 1 mile series, 1960)
Cable Tool Hole
Geological Section
Strike and dip of bedding
Top of cliff or scarp
SCALE IN FEET
SCALE IN METRES
Submarine Contours, Depths in feet
Datum: Indian Spring Low Water
Detail of Approaches and Submarine Contours taken from Dept. Marine and Harbor Plan, DRG. 17132/58
FIG. 2
DEPARTMENT OF MINES – SOUTH AUSTRALIA
WALLAROO HARBOR APPROACHES
GEOLOGICAL PLAN
70-100
DATE: 19 Feb 1970
SHANE DUNSTAN - LANDOWNE

Attachment 7

Planning and design code conservation map

Planning and Design Code - Conservation



November 22, 2022

N

1:36,112

0 0.25 0.5 1 mi

0 0.4 0.8 1.6 km

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SOUTH AUSTRALIA

Government of South Australia

Attachment 8

Aboriginal heritage search response letter

Government of South Australia

Terry Menadue
Macro Environmental Solutions
2A Austin Avenue
Athelstone 5076 South Australia

Dear Terry

Thank you for the search request dated 10 Nov 2022. The search was based on the tenement MPL 109. Your reference is 4186.

I advise that the central archive, which includes the Register of Aboriginal Sites and Objects (the Register), administered by Aboriginal Affairs and Reconciliation (AAR), has no entries for Aboriginal sites within 500m of this location.

The applicant is advised that sites, objects or remains may exist in the proposed development area, even though the Register does not identify them. All Aboriginal sites and objects are protected under the *Aboriginal Heritage Act 1988* (the Act), whether they are listed in the central archive or not. Land within 200 metres of a watercourse (for example the River Murray and its overflow areas) in particular, may contain Aboriginal sites and objects.

Pursuant to the Act, it is an offence to damage, disturb or interfere with any Aboriginal site, object or remains (registered or not) without the authority of the Premier. If the planned activity is likely to damage, disturb or interfere with a site, object or remains, authorisation of the activity must be first obtained from the Premier under Section 23 of the Act. Section 20 of the Act requires that any Aboriginal sites, objects or remains, discovered on the land, need to be reported to the Premier. Penalties apply for failure to comply with the Act. It should be noted that this Aboriginal heritage advice has not addressed any relevant obligations pursuant to the *Native Title Act 1993*.

Please be aware in this area there are Aboriginal groups/organisations/traditional owners that may have an interest. These may include:

Narungga Nations Aboriginal Corporation
Chairperson: Ann Newchurch
Address: C/- South Australian Native Title Services Level 4 345 King William Street ADELAIDE SA 5000
Telephone: 0458440313
Email: annewchurch@hotmail.com
Contact Officer: Tim Graham
Telephone: 0459868558
Email: TimG@nativetitlesa.org info@nativetitlesa.org

If you require further information, please contact the Aboriginal Heritage Team on telephone (08) 8303 0738 or send to our generic email address AAR.HeritageSites@sa.gov.au

Yours sincerely,

HERITAGE INFORMATION TEAM
ABORIGINAL AFFAIRS & RECONCILIATION

12 December 2022

Attachment 9

Local conservation areas and areas restricted from mineral production

Local conservation areas and areas restricted from mineral production

November 24, 2022

N

1:144,448

0 1 2 4 mi

0 1.5 3 6 km

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SOUTH AUSTRALIA

Government of South Australia

Attachment 10

Mud Environmental soil classification report 2020

MUD
ENVIRONMENTAL

SOIL CLASSIFICATION

Monopoly Property Group

72 Wallaroo Plain Road, Wallaroo,
South Australia

25 June 2020

Mud Ref.: ME-328.R1.0

DOCUMENT DISTRIBUTION

Date	Rev	Recipient	No. of copies	
			PDF	Hard copy
25 June 2020	0	Monopoly Property Group	1	
		Mud Environmental Pty Ltd	1 (File)	
File: //Mud/Projects/ME-328 MPG Wallaroo Fill/Report/ME-328.R1.0 MPG Wallaroo Fill 250520.docx				

Report approved by:

Adrian Webber
B.E.(CE) CEnvP SC
Director

Where issued as a hard copy report by Mud Environmental, the report is printed on 100% percent recycled card / paper and vegetable based inks (soy and linseed oil)

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APPENDICES

EXECUTIVE SUMMARY

Mud Environmental was engaged by Monopoly Property Group (MPG) to undertake an in-situ soil assessment, including soil sampling and testing, of approximately 32,000m³ of soils currently stockpiled on private property at 72 Wallaroo Plain Road, Wallaroo, South Australia ('the site').

It is understood that:

- Up to 10,000m³ of suitable soils are needed by MPG for use as fill materials at the Wallaroo Shores redevelopment, located at Wallaroo, South Australia.
- A local farmer has a large volume of soil stockpiled on private property approximately 2.5km to the north-east of the Wallaroo Shores redevelopment, which was reportedly generated from the original construction of the Wallaroo Marina in the late 1990's.
- The stockpile is currently closed and no additional materials will be added.
- The soil materials stockpiled at the site require chemical and physical classification to determine if selected soil materials could be suitable for potential re-use by MPG at the Wallaroo Shores redevelopment in accordance with EPA requirements.

Therefore, the objectives of the soil classification were to:

- Collect a sufficient number of representative samples of stockpiled soils for chemical testing, in order to classify up to 10,000m³ of the stockpiled soil materials for potential removal from site and re-use; and
- Log the materials encountered to assess the physical nature of the materials.

A total of 135 representative samples of stockpiled soil materials were collected from 32 individual test pit locations in accordance with relevant protocols on 6-7 May 2020, with a total of 52 primary soil samples selected for laboratory analyses for a range of chemical substances common in imported fill and natural soils in South Australia.

The findings of the stockpiled soil investigations in relation to the soil materials encountered were:

- Various soil materials were encountered across the site, with the majority of the stockpile dominated by clayey and sandy fill materials. It is understood that the stockpiled soils were originally generated from the construction of the Wallaroo Marina in the late 1990's.
- Trace inclusions of slag were observed within the majority of test pits, both in the uppermost FILL 1 soil layer (23 out of 32 locations), as well as at varying depths in the subsurface within the FILL 4 soil layer (20 out of 32 test pit locations). Slag inclusions were not observed in any other layers of fill materials excavated within the stockpile assessment area at the site.
- PID results in all samples were low and all below or equal to 0.2ppm, which indicates that the potential for significant volatile contamination was low.
- No potentially asbestos containing materials were observed during test pitting activities.
- Naturally occurring mineralogical inert inclusions greater than 100mm were observed both on the surface of the stockpile and in a number of test pits excavated, and consisted of mainly of sandstone and calcareous rocks/boulders up to 300mm-500mm in size. These oversized natural inclusions were observed predominantly within the FILL 1, FILL 4 and FILL 9 layers. While minor quantities of mineralogical inclusions greater than 100mm were also occasionally noted within other layers of fill materials within the stockpile, these were observed in trace quantities only.
- As the FILL 3 layer was observed to consist of a firm, high plasticity clay, and this should be considered if the FILL 3 soil materials are deemed suitable for potential re-use within the Wallaroo Shores redevelopment.

The findings of the stockpiled soil investigations in relation to the chemical and physical status of the soils assessed at the site were:

- Of the 52 primary soil samples analysed, all soil analytical results were reported below the Waste Fill criteria in all samples except for:

- Concentrations of copper in four samples collected from the FILL 3 clay layer (TP7_0.3-0.4, TP8_0.2-0.3, TP17_0.2-0.3 and TP28_0.7-0.8), all of which were above Waste Fill criteria but below the Intermediate criteria.
- Concentrations of zinc in one sample collected from the FILL 3 clay layer (TP8_0.2-0.3 and FILL 3 clay layer) which was above Waste Fill criteria but below the Intermediate criteria.

- Due to the isolated chemical exceedances of copper and zinc as reported above, a statistical analyses of the relevant copper and zinc data sets was completed using US EPA ProUCL software. The statistical analyses was completed in the context of the data sets representing both one body of soil (i.e. all soil samples from all layers), as well as in the context of a separate homogenous FILL 3 clay layer (i.e. only considering soil samples collected from this layer of soil). The results of the statistical interpretations of the copper and zinc data sets for both of these scenarios were considered to comply with the Waste Fill criteria adopted for the site.
- On the basis of the reported chemical results, statistical interpretations, and physical characteristics, **the stockpiled soils tested from the layers of fill materials designated as FILL 2, FILL 3, FILL 5, FILL 6, FILL 7 and FILL 8 are all classified as Waste Fill.** The location of these materials is shown in **Figure 3.**
- Given the absence of any laboratory analytical testing, possible aesthetic concerns associated with the presence of slag, and the prevalence of inert mineralogical physical non-conformances, **the fill materials designated as the FILL 1, FILL 4 and FILL 9 layers do not currently meet the physical criteria for Waste Fill and are not considered suitable for consideration as potential re-use materials.**

Based on the above findings, the following recommendations are made:

- Any stockpiled soil materials (classified as **Waste Fill**) containing more than trace levels of inert mineralogical or non-mineralogical oversized inclusions (>100mm) must be processed by MPG prior to / during loading out activities in order to remove any physical non-conformances before the materials can be re-used at the proposed receiving site (Wallaroo Shores redevelopment).
- If during loading and/or stockpile re-use activities more than trace levels of slag and/or are identified within any soils from the stockpile currently classified as **Waste Fill** and earmarked for re-use, these soil materials should be segregated from the remainder of the stockpiled soil materials and must remain on-site.
- If during loading and/or stockpile re-use activities more than trace levels of slag are identified within any soils from the stockpile currently classified as **Waste Fill** and earmarked for re-use, these soil materials should be segregated from the remainder of the stockpiled soil materials and must remain on-site.
- All soils are to be removed from the site must be managed in accordance with relevant EPA guidelines and/or requirements of waste or recycling depots authorised by the EPA.
- Should any unforeseen materials be identified during excavation works, it is recommended that these soils are quarantined and advice is sought from an appropriately qualified environmental consultant.

This report and the opinions expressed above are subject to the limitations presented in **Section 4**. It is important that the reader make themselves aware of these limitations.

1 INTRODUCTION

Mud Environmental was engaged by Monopoly Property Group (MPG) to undertake an in-situ soil assessment, including soil sampling and testing, of approximately 32,000m^3 of soils currently stockpiled on private property at 72 Wallaroo Plain Road, Wallaroo, South Australia (‘the site’).

The location of the site and layout of the stockpile soils is shown on **Figure 1** in **Appendix A**.

1.1 Project Understanding + Background Information

It is understood that:

- Up to 10,000m^3 of suitable soils are needed by MPG for use as fill materials at the Wallaroo Shores redevelopment, located at Wallaroo, South Australia.
- A local farmer has a large volume of soil stockpiled on private property approximately 2.5km to the north-east of the Wallaroo Shores redevelopment, which was reportedly generated from the original construction of the Wallaroo Marina in the late 1990’s.
- The stockpile is currently closed and no additional materials will be added.

A brief site walkover was completed by a Mud Environmental representative on 21 May 2019 to inspect the nature and extent of the stockpiled soils, and to determine if they were consistent with soil materials sourced from the historical dredging of the nearby Wallaroo Marina. Although some minor inclusions of slag were noted across parts of the stockpile surface during the site walkover, most of the stockpiled materials observed appeared to consist of natural sands containing varying degrees of shells and shell fragments.

Based on the site walkover observations, it was determined that the composition and extent of the stockpiled soil materials was consistent with that of dredged marine sediments. As such, it was considered that if the best of the stockpiled materials were selected, they may potentially be suitable for re-use at the Wallaroo Shores redevelopment.

1.2 Objectives

It is understood that the stockpiled soils at the site require chemical and physical classification to determine if selected soil materials could be suitable for potential re-use by MPG at the Wallaroo Shores redevelopment in accordance with EPA requirements.

Therefore, the objectives of the soil classification were to:

- Collect a sufficient number of representative samples of stockpiled soils for chemical testing, in order to classify up to 10,000m^3 of the stockpiled soil materials for potential removal from site and re-use; and
- Log the materials encountered to assess the physical nature of the materials.

1.3 Regulatory Context

In South Australia, soil materials that meet the chemical and physical definition for 'Waste Fill' as defined in the *Environment Protection Regulations, 2009*[1] are more commonly known as 'Clean Fill'. These materials can in most cases be re-used without restriction and do not incur additional costs above typical civil and transport costs.

Where the materials exceed the chemical criteria for Waste Fill, but meet the Intermediate criteria as defined in the *SA Waste Disposal Information Sheet*[2] then there are opportunities for re-use under certain conditions (refer to the *Waste Derived Fill Standard*[3] for more detail), or the materials must be disposed to an EPA licenced facility. Intermediate materials incur additional re-use or disposal costs above typical civil and transport costs.

Materials that exceed the Intermediate criteria (i.e. Low Level Contaminated Waste or High Level Contaminated Waste) must be disposed to an EPA licenced facility. Low Level and High Level materials incur additional disposal costs above typical civil and transport costs.

---

[1] http://www.legislation.sa.gov.au/LZ/C/R/ENVIRONMENT%20PROTECTION%20REGULATIONS%202009.aspx
[2] http://www.epa.sa.gov.au/xstd_files/Waste/Information%20sheet/current_waste_criteria.pdf
[3] http://www.epa.sa.gov.au/xstd_files/Waste/Guideline/standard_wdf.pdf

2 SOIL CLASSIFICATION

2.1 Methodology

The works were undertaken with reference to the following guideline documents:

1. Schedule B(2) of the *National Environment Protection (Assessment of Site Contamination) Measure*, 1999 as amended 2013[4] (ASC NEPM);
2. Australian Standard AS4482.1-2005 '*Guide to the investigation and sampling of sites with potentially contaminated soil, Part 1: Non-volatile and semi-volatile compounds*';
3. Appendix 3 of the SA EPA '*Waste Derived Fill Standard'*[3] (WDF Standard); and
4. EPA Victoria (2010) '*Industrial Waste Resource Guidelines, Sampling and Analysis: Soil Sampling*'[5]

2.2 Approach

The following approach was implemented:

- A Job Safety and Environmental Analysis (JSEA) was completed and implemented for the stockpiled soil assessment works.
- A portion of the stockpile was identified for assessment which was estimated to have a footprint of approximately 16,000m^2.
- Using a backhoe, a total of 32 grid-based test pits spaced and staked at 20m intervals were excavated across the stockpile assessment area to depths of approximately 2.0m as follows:
  - Western Section – 14 x test pits (TP01 to TP14); and
  - Eastern Section – 18 test pits (TP15 to TP32).
- Based on test pit excavation depths of 2.0m across a stockpile assessment area of ~16,000m2, the total volume of stockpiled soils assessed as part of this investigation is estimated to be in the order of 32,000m^3 (noting that only ~10,000m^3 is required to be classified for potential re-use).
- Cross-sections of the stockpile were then generated from test-pit transects, with lateral and vertical spatial information on the soil profiles across the stockpile used to determine approximate volume contributions of each fill layer across the stockpile assessment areas.
- A total of 135 primary soil samples were collected from across the 32 excavated test pits, with 52 primary soil samples selected for laboratory analyses for a range of chemical substances common in imported fill and natural soils in South Australia.
- Based on the physical appearance, soil characteristics, accessibility, and estimated volume extent, the soils considered most likely to be suitable for potential importation to site were the FILL 2, FILL 3, FILL 5, FILL 6, FILL 7 and FILL 8 layers.
- No laboratory testing of soil samples collected from the FILL 1, FILL 4 and FILL 9 layers was undertaken due to one or more of the following reasons:
  - The presence of slag in soils was considered unlikely to be aesthetically suitable for the proposed re-use purpose;
  - The prevalence of rocks/boulders >100mm in size is not consistent with the physical characteristics of soils required to meet the Waste Fill physical criteria.
  - Where the FILL 1 and/or FILL 4 layers were present as the uppermost soil layers to depths of 0.5m or greater (e.g. TP1, TP2, TP4, TP21), underlying soil samples were not selected for testing due to the need to remove extensive overburden soils prior to accessing potentially suitable underlying soil materials at these locations
- On the above basis, laboratory testing targeted to those soil types considered most likely to be suitable for re-use by MPG at the Wallaroo Shores redevelopment site as follows:
  - 42 x individual samples were submitted for metals;
  - 18 x individual samples were submitted for TPH, BTEX, PAHs and OCPs; and
  - 10 x individual samples were submitted for a SA Waste Screen.
- The specific analyses for each sample are shown on the soil results summary tables included in **Appendix B,** with soil results compared to SA EPA waste classification criteria.

[4] http://www.scew.gov.au/nepms/assessment-site-contamination
[5] http://www.epa.vic.gov.au/~/media/publications/iwrg702.pdf

- A calibrated photoionisation detector (PID) was used to screen for volatile contaminants (refer to test pit logs presented in **Appendix D** for PID results).
- The materials encountered were logged and sampled for environmental testing. Site photographs were recorded and are included in **Appendix E**.
- All soil samples were collected in laboratory supplied 250mL soil jars with Teflon lined lids. Samples were retained in a chilled cool box prior to transport to the laboratory in Melbourne under Chain of Custody procedures.
- Soil samples were analysed at ALS Environmental who is a NATA accredited laboratory for all analyses conducted.

2.3 Soil Assessment Criteria

The chemical and physical data obtained as part of the soil classification were compared to the following soil assessment criteria.

Table 1 – Soil Assessment Criteria

Classification	Reference	Chemical Criteria	Physical Criteria
Waste Fill	Environment Protection Regulations, 2009[1]	Various total criteria – refer to summary results table in **Appendix A**	Waste fill means waste consisting of clay, concrete, rock, sand, soil, or other inert mineralogical matter in pieces not exceeding 100 millimetres in length … (but does not include waste consisting of or containing asbestos or bitumen)
Intermediate	SA Waste Disposal Information Sheet[2]	Various total and leachable criteria – refer to summary results table in **Appendix A**	For re-use as Waste Derived Fill (refer to Waste Derived Fill Standard): ▪ WDF must consist of clay, concrete, rock, sand, soil, or other inert mineralogical matter. It may contain bitumen but must not include asbestos or other wastes. For disposal (refer to EPA licence for waste facility): ▪ Less than 200mm in diameter; and ▪ Not containing significant organic material such as timber, vegetable matter or other waste materials.
Low Level Contaminated Waste		Various total and leachable criteria – refer to summary results table in **Appendix A**	Typically, waste facility dependant as not often defined in EPA licences.

2.4 Results

2.4.1 Summary of Materials Encountered – Field Observations

Various soil materials were encountered within test pits excavated across the stockpile assessment area are documented in the test pit logs included in **Appendix D**.

The locations of all test pits excavated across the stockpile assessment area are illustrated on **Figure 2** in **Appendix A**.

The fill materials observed within the stockpile were considerably heterogenous, with a general summary of each layer of soil materials encountered provided in the table below.

Table 2 – Summary of Soil Materials Encountered

Layer	Description
FILL 1	SAND, clayey, gravelly, fine to coarse grained sands, **calcareous & sandstone gravels + boulders up to 300mm**, trace shells, **trace slag,** moist, orange-brown.
FILL 2	SAND, fine to coarse grained, rounded sandstone and mudstone gravels to 50mm, shells & shell fragments throughout, moist, pale yellow-brown.
FILL 3	CLAY, sandy, medium to high plasticity, firm, blocky, some grey mottling, low moisture, orange-brown to red-brown
FILL 4	SAND, clayey, gravelly, **sandstone boulders up to 500mm**, trace shells, **trace slag**, moist, light-brown.
FILL 5	CLAY, sandy, low to medium plasticity, calcareous gravels throughout, trace shells, moist, orange-brown.
FILL 6	CLAY, sandy, medium plasticity, fine calcareous gravels and shell fragments throughout, some mottling, moist, pale yellow-brown
FILL 7	SAND, clayey, fine-grained, moist, pale orange-brown.
FILL 8	SAND, fine to medium grained, shells present, moist, light-brown.
FILL 9	SAND, fine to medium grained, calcareous, trace shells, **boulders up to 300mm**, low moisture, pale red-pink.

Trace inclusions of slag were observed within the majority of test pits, both in the uppermost FILL 1 soil layer (23 out of 32 locations), as well as at varying depths in the subsurface within the FILL 4 soil layer (20 out of 32 test pit locations). Slag inclusions were not observed in any other layers of fill materials excavated within the stockpile assessment area at the site.

PID results in all samples were low and all below or equal to 0.2ppm, which indicates that the potential for significant volatile contamination was low.

No potentially asbestos containing materials were observed during test pitting activities.

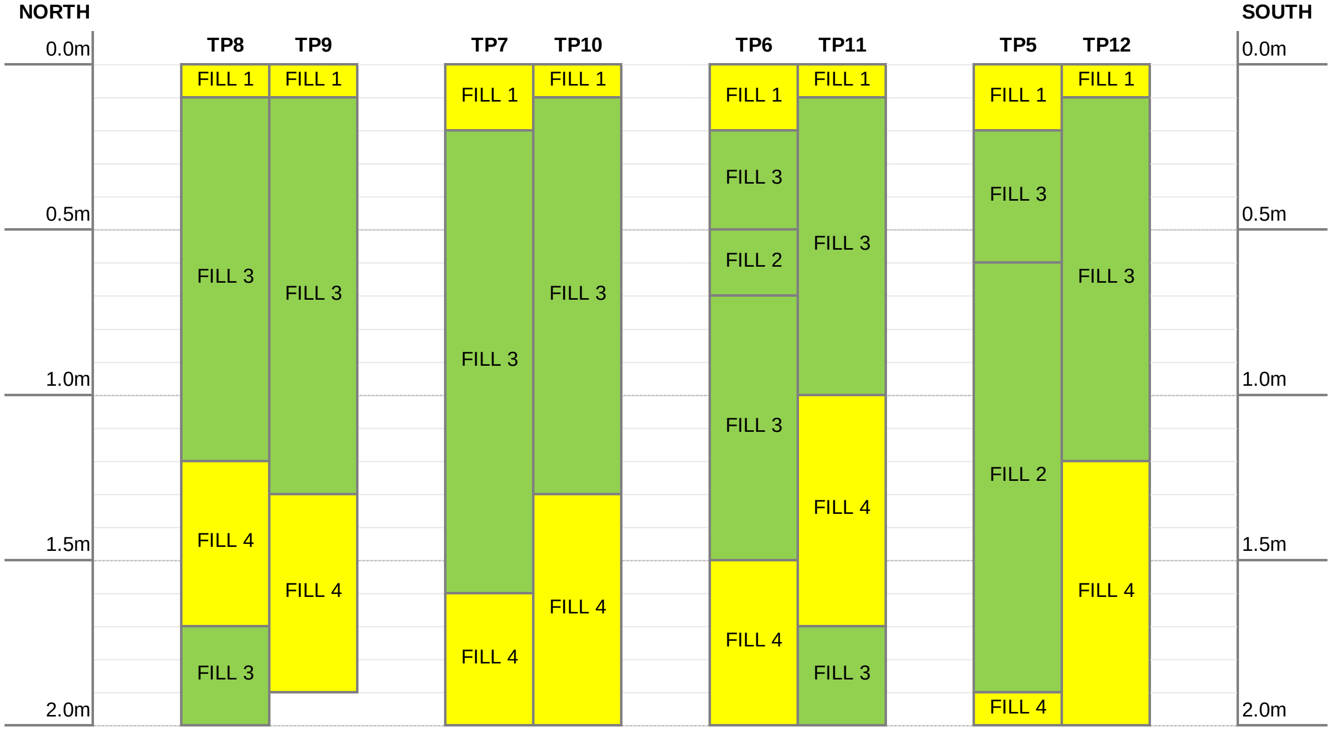
Naturally occurring mineralogical inert inclusions greater than 100mm were observed both on the surface of the stockpile and in a number of test pits excavated, and consisted of mainly of sandstone and calcareous rocks/boulders up to 300mm-500mm in size. These oversized natural inclusions were observed predominantly within the FILL 1, FILL 4 and FILL 9 layers. While minor quantities of mineralogical inclusions greater than 100mm were also occasionally noted within other layers of fill materials within the stockpile, these were observed in trace quantities only.

A schematic representation of the above materials encountered is provided in two cross-sections included overleaf, which illustrate soil lithology's along north-south alignments within the eastern and western portions of the stockpile assessment areas at the site.

It is important to note that the FILL 3 layer was observed to consist of a firm, high plasticity clay. This should be considered if the FILL 3 soil materials are deemed suitable for potential re-use based on a comparison of soil analytical results against the adopted chemical and physical soil assessment criteria outlined herein.

Photographs of soil materials encountered during test pitting and stockpile assessment activities are provided in **Appendix E**.

SCHEMATIC CROSS-SECTION A-A' ON WESTERN SIDE OF SITE



LEGEND

- Soils classified as Waste Fill
- Soils not tested and/or slag/ash/cinders and/or significant rock inclusions >100mm
- Chemical result(s) exeeding adopted Waste FIll criteria

FILL 1 SAND, clayey, gravelly, fine to coarse grained sands, **calcareous & sandstone gravels + boulders up to 300mm**, trace shells, **trace slag,** moist, orange-brown.

FILL 2 SAND, fine to coarse grained, rounded sandstone and mudstone gravels to 50mm, shells & shell fragments throughout, moist, pale yellow-brown.

FILL 3 CLAY, sandy, medium to high plasticity, firm, blocky, some grey mottling, low moisture, orange-brown to red-brown

FILL 4 SAND, clayey, gravelly, **sandstone boulders up to 500mm**, trace shells, **trace slag**, moist, light-brown.

FILL 5 CLAY, sandy, low to medium plasticity, calcareous gravels throughout, trace shells, moist, orange-brown.

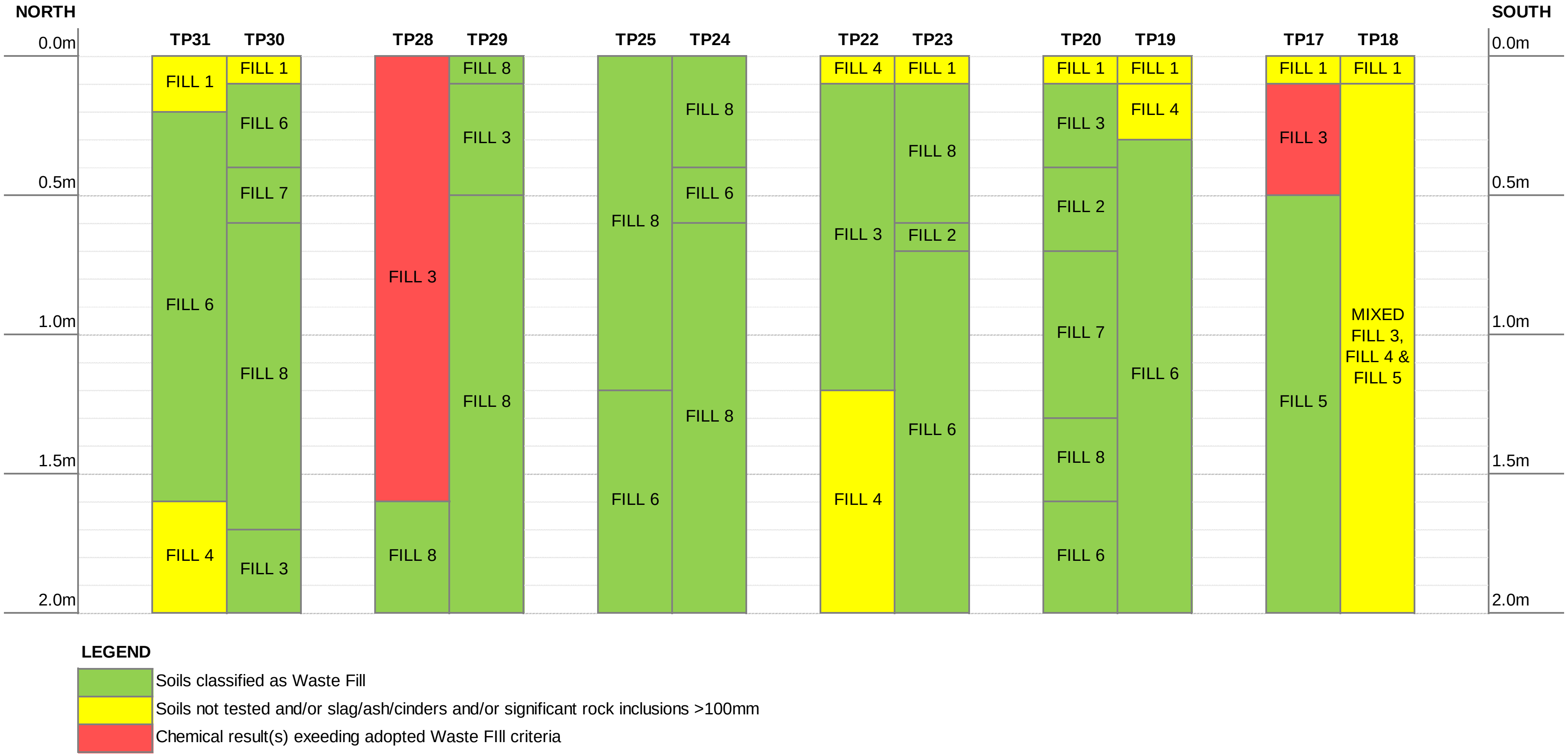
FILL 6 CLAY, sandy, medium plasticity, fine calcareous gravels and shell fragments throughout, some mottling, moist, pale yellow-brown

FILL 7 SAND, clayey, fine-grained, moist, pale orange-brown.

FILL 8 SAND, fine to medium grained, shells present, moist, light-brown.

FILL 9 SAND, fine to medium grained, calcareous, trace shells, **boulders up to 300mm**, low moisture, pale red-pink.

SCHEMATIC CROSS-SECTION B-B' ON EASTERN SIDE OF SITE



FILL 1 SAND, clayey, gravelly, fine to coarse grained sands, **calcareous & sandstone gravels + boulders up to 300mm**, trace shells, **trace slag,** moist, orange-brown.

FILL 2 SAND, fine to coarse grained, rounded sandstone and mudstone gravels to 50mm, shells & shell fragments throughout, moist, pale yellow-brown.

FILL 3 CLAY, sandy, medium to high plasticity, firm, blocky, some grey mottling, low moisture, orange-brown to red-brown

FILL 4 SAND, clayey, gravelly, **sandstone boulders up to 500mm**, trace shells, **trace slag**, moist, light-brown.

FILL 5 CLAY, sandy, low to medium plasticity, calcareous gravels throughout, trace shells, moist, orange-brown.

FILL 6 CLAY, sandy, medium plasticity, fine calcareous gravels and shell fragments throughout, some mottling, moist, pale yellow-brown

FILL 7 SAND, clayey, fine-grained, moist, pale orange-brown.

FILL 8 SAND, fine to medium grained, shells present, moist, light-brown.

FILL 9 SAND, fine to medium grained, calcareous, trace shells, **boulders up to 300mm**, low moisture, pale red-pink.

2.4.2 Chemical Testing

Summary tables of the chemical results are also included in **Appendix B**, which highlight any exceedances of the assessment criteria for both total and leachable concentrations.

The laboratory Certificates of Analysis and Chain of Custody Documentation are included in **Appendix C**.

Soil analytical results were compared to the adopted criteria summarised in **Section 2.3** above, with chemical concentrations reported below the Waste Fill criteria in all samples except for the following:

- TP7_0.3-0.4 (FILL 3 clay layer) reported a copper concentration of 62mg/kg which marginally exceeds the Waste Fill criteria for copper of 60mg/kg.
- TP8_0.2-0.3 (FILL 3 clay layer) reported a copper concentration of 64mg/kg which marginally exceeds the Waste Fill criteria for copper of 60mg/kg.
- TP8_0.2-0.3 (FILL 3 clay layer) reported a zinc concentration of 456mg/kg which exceeds the Waste Fill criteria for zinc of 200mg/kg.
- TP17_0.2-0.3 (FILL 3 clay layer) reported a copper concentration of 169mg/kg which exceeds the Waste Fill criteria for copper of 60mg/kg.
- TP28_0.7-0.8 (FILL 3 clay layer) reported a copper concentration of 172mg/kg which exceeds the Waste Fill criteria for copper of 60mg/kg.

Given the above isolated chemical exceedances of copper and zinc, a statistical analyses of the relevant copper and zinc data sets was completed using US EPA ProUCL software. It should be noted that the following data was excluded from the US EPA ProUCL statistical interpretation:

- TP17_0.2-0.3 (FILL 3 clay layer) reported a copper concentration of 169 mg/kg which is greater than 2.5 times the Waste Fill criteria value for copper of 60 mg/kg; and
- TP28_0.7-0.8 (FILL 3 clay layer) reported a copper concentration of 172 mg/kg which is greater than 2.5 times the Waste Fill criteria value for copper of 60 mg/kg.

Assuming one body of soil (i.e. including soil results from samples across all fill layers tested), the results of the statistical interpretation of the copper and zinc data sets (where n = 50) indicated the following:

Copper
- Maximum = 64mg/kg is less than 2.5 x the Waste Fill criteria of 60mg/kg for copper;
- 95% UCL = 24.48mg/kg is less than 1 x the Waste Fill criteria of 60mg/kg for copper; and
- Standard Deviation = 15.04mg/kg is less than 0.5 x the Waste Fill criteria of 60mg/kg for copper.

Zinc
- Maximum = 456mg/kg is less than 2.5 x the Waste Fill criteria of 200mg/kg for zinc;
- 95% UCL = 81.58mg/kg is less than 1 x the Waste Fill criteria of 200mg/kg for zinc; and
- Standard Deviation = 70.95mg/kg is less than 0.5 x the Waste Fill criteria of 200mg/kg for zinc.

As the copper and zinc exceedances of Waste Fill criteria as reported above were limited to the FILL 3 clay layer, in order to remove any ambiguity in relation to the statistical interpretation of the entire body of soil, a statistical analyses was also completed on soil samples collected from the FILL 3 clay layer only.

The results of the statistical interpretation of the copper and zinc data sets (where n = 23) only considering the FILL 3 clay layer indicated the following:

Copper
- Maximum = 64mg/kg is less than 2.5 x the Waste Fill criteria of 60mg/kg for copper;
- 95% UCL = 32.75mg/kg is less than 1 x the Waste Fill criteria of 60mg/kg for copper; and
- Standard Deviation = 17.78mg/kg is less than 0.5 x the Waste Fill criteria of 60mg/kg for copper.

Zinc
- Maximum = 456mg/kg is less than 2.5 x the Waste Fill criteria of 200mg/kg for zinc;
- 95% UCL = 143.2mg/kg is less than 1 x the Waste Fill criteria of 200mg/kg for zinc; and
- Standard Deviation = 94.65mg/kg is less than 0.5 x the Waste Fill criteria of 200mg/kg for zinc.

The copper and zinc data sets have been considered in the context of one body of soil as well as a separate homogenous FILL 3 clay layer, with both statistical interpretation outputs considered to comply with the Waste Fill criteria adopted for the site.

On the basis of the reported chemical results, statistical interpretations, and physical characteristics, the stockpiled soils tested from the layers of fill materials designated as FILL 2, FILL 3, FILL 5, FILL 6, FILL 7 and FILL 8 are all classified as **Waste Fill**.

Given the absence of any laboratory analytical testing, possible aesthetic concerns associated with the presence of slag, and the prevalence of inert mineralogical physical non-conformances which do not currently meet the physical criteria for Waste Fill, the fill materials designated as the FILL 1, FILL 4 and FILL 9 layers are currently unsuitable for consideration as potential re-use materials.

2.4.3 Quality Assurance / Quality Control

The soil data validation is presented in **Appendix F**. In summary, it is considered that the field and laboratory QA/QC measures implemented provide confidence that the data collected is reliable for the purpose of this assessment.

3 CONCLUSIONS + RECOMMENDATIONS

The findings of the stockpiled soil investigations in relation to the soil materials encountered were:

- Various soil materials were encountered across the site, with the majority of the stockpile dominated by clayey and sandy fill materials. It is understood that the stockpiled soils were originally generated from the construction of the Wallaroo Marina in the late 1990's.
- Trace inclusions of slag were observed within the majority of test pits, both in the uppermost FILL 1 soil layer (23 out of 32 locations), as well as at varying depths in the subsurface within the FILL 4 soil layer (20 out of 32 test pit locations). Slag inclusions were not observed in any other layers of fill materials excavated within the stockpile assessment area at the site.
- PID results in all samples were low and all below or equal to 0.2ppm, which indicates that the potential for significant volatile contamination was low.
- No potentially asbestos containing materials were observed during test pitting activities.
- Naturally occurring mineralogical inert inclusions greater than 100mm were observed both on the surface of the stockpile and in a number of test pits excavated, and consisted of mainly of sandstone and calcareous rocks/boulders up to 300mm-500mm in size. These oversized natural inclusions were observed predominantly within the FILL 1, FILL 4 and FILL 9 layers. While minor quantities of mineralogical inclusions greater than 100mm were also occasionally noted within other layers of fill materials within the stockpile, these were observed in trace quantities only.
- As the FILL 3 layer was observed to consist of a firm, high plasticity clay, and this should be considered if the FILL 3 soil materials are deemed suitable for potential re-use within the Wallaroo Shores redevelopment.

The findings of the stockpiled soil investigations in relation to the chemical and physical status of the soils assessed at the site were:

- Of the 52 primary soil samples analysed, all soil analytical results were reported below the Waste Fill criteria in all samples except for:
  - Concentrations of copper in four samples collected from the FILL 3 clay layer (TP7_0.3-0.4, TP8_0.2-0.3, TP17_0.2-0.3 and TP28_0.7-0.8), all of which were above Waste Fill criteria but below the Intermediate criteria.
  - Concentrations of zinc in one sample collected from the FILL 3 clay layer (TP8_0.2-0.3 and FILL 3 clay layer) which was above Waste Fill criteria but below the Intermediate criteria.
- Due to the isolated chemical exceedances of copper and zinc as reported above, a statistical analyses of the relevant copper and zinc data sets was completed using US EPA ProUCL software. The statistical analyses was completed in the context of the data sets representing both one body of soil (i.e. all soil samples from all layers), as well as in the context of a separate homogenous FILL 3 clay layer (i.e. only considering soil samples collected from this layer of soil). The results of the statistical interpretations of the copper and zinc data sets for both of these scenarios were considered to comply with the Waste Fill criteria adopted for the site.
- On the basis of the reported chemical results, statistical interpretations, and physical characteristics, **the stockpiled soils tested from the layers of fill materials designated as FILL 2, FILL 3, FILL 5, FILL 6, FILL 7 and FILL 8 are all classified as Waste Fill.** The location of these materials is shown in **Figure 3.**
- Given the absence of any laboratory analytical testing, possible aesthetic concerns associated with the presence of slag, and the prevalence of inert mineralogical physical non-conformances, **the fill materials designated as the FILL 1, FILL 4 and FILL 9 layers do not currently meet the physical criteria for Waste Fill and are not considered suitable for consideration as potential re-use materials.**

Based on the above findings, the following recommendations are made:

- Any stockpiled soil materials (classified as **Waste Fill**) containing more than trace levels of inert mineralogical or non-mineralogical oversized inclusions (>100mm) must be processed by MPG prior to / during loading out activities in order to remove any physical non-conformances before the materials can be re-used at the proposed receiving site (Wallaroo Shores redevelopment).
- If during loading and/or stockpile re-use activities more than trace levels of slag and/or are identified within any soils from the stockpile currently classified as **Waste Fill** and earmarked for

re-use, these soil materials should be segregated from the remainder of the stockpiled soil materials and must remain on-site.

- If during loading and/or stockpile re-use activities more than trace levels of slag are identified within any soils from the stockpile currently classified as **Waste Fill** and earmarked for re-use, these soil materials should be segregated from the remainder of the stockpiled soil materials and must remain on-site.
- All soils are to be removed from the site must be managed in accordance with relevant EPA guidelines and/or requirements of waste or recycling depots authorised by the EPA.
- Should any unforeseen materials be identified during excavation works, it is recommended that these soils are quarantined and advice is sought from an appropriately qualified environmental consultant.

This report and the opinions expressed above are subject to the limitations presented in **Section 4**. It is important that the reader make themselves aware of these limitations.

4 LIMITATIONS

Scope of Services

This Preliminary Soil Classification ('the report') has been prepared in accordance with the scope of services set out in the contract, or as otherwise agreed, between Monopoly Property Group and Mud Environmental ('scope of services'). In some circumstances the scope of services may have been limited by a range of factors such as time, budget, access and/or site constraints.

Reliance on Data

In preparing the report, Mud Environmental has relied upon data, surveys, analyses, designs, plans and other information provided by Monopoly Property Group and other individuals and organisations, most of which are referred to in the report ('the data'). Except as otherwise stated in the report, Mud Environmental has not verified the accuracy or completeness of the data. To the extent that the statements, opinions, facts, information, conclusions and/or recommendations in the report ('conclusions') are based in whole or part on the data, those conclusions are contingent upon the accuracy and completeness of the data. Mud Environmental will not be liable in relation to incorrect conclusions should any data, information or condition be incorrect or have been concealed, withheld, misrepresented or otherwise not fully disclosed to Mud Environmental.

Soil Classification Conclusions

In accordance with the scope of services, Mud Environmental has relied upon the data and has conducted environmental investigations in the preparation of the report. The nature and extent of the investigations is described in the report.

On all sites, varying degrees of non-uniformity of the vertical and horizontal soil and / or groundwater conditions are encountered. Hence no investigation can eliminate the possibility that monitoring or testing results are not totally representative of soil and/or groundwater conditions encountered. The conclusions are based upon the data and the environmental field monitoring and/or testing and are therefore indicative of the environmental condition of the site at the time of preparing the report, including the presence or otherwise of contamination.

Also, it should be recognised that site conditions, including the extent and concentration of contaminants, can change with time.

Within the limitations imposed by the scope of services, the monitoring, testing, sampling and preparation of this report have been undertaken and performed in a professional manner, in accordance with generally accepted practices and using a degree of skill and care ordinarily exercised by reputable environmental consultants under similar circumstances. No other warranty, expressed or implied, is made.

Report for Benefit of Monopoly Property Group

The report has been prepared for the benefit of Monopoly Property Group and no other party. Mud Environmental assumes no responsibility and will not be liable to any other person or organisation for or in relation to any matter dealt with or conclusions expressed in the report, or for any loss or damage suffered by any other person or organisation arising from matters dealt with or conclusions expressed in the report (including without limitation matters arising from any negligent act or omission of Mud Environmental or for any loss or damage suffered by any other party relying upon the matters dealt with or conclusions expressed in the report). Other parties should not rely upon the report or the accuracy or completeness of any conclusions and should make their own enquiries and obtain independent advice in relation to such matters.

Other Limitations

Mud Environmental will not be liable to update or revise the report to take into account any events or emergent circumstances or facts occurring or becoming apparent after the date of the report.

APPENDIX A

Figures

MUD ENVIRONMENTAL

Project:	Soil Classification 72 Wallaroo Plain Road Wallaroo, SA
Client:	Monopoly Property Group
Mud Ref.:	ME-328
Revision:	1

FIGURE 1

SITE LOCATION + STOCKPILE LAYOUT PLAN

Scale: 1:4,000 A3

N

0 100 200
Meters

Coord. Sys.: MGA Zone 54 (GDA 94)

LEGEND

Stockpile Assessment Areas

Stockpile Extent

Image: https://maps.sa.gov.au/SAPPA/

File: C:\Mud\Projects\ME-328 MPG Wallaroo Fill\Baseplan

MUD ENVIRONMENTAL

Project:	Soil Classification 72 Wallaroo Plain Road Wallaroo, SA
Client:	Monopoly Property Group
Mud Ref.:	ME-328
Revision:	1

FIGURE 1

STOCKPILE ASSESSMENT AREAS + TEST PIT LOCATION PLAN

Scale: 1:2,000 A3

N

0 50 100
Meters

Coord. Sys.: MGA Zone 54 (GDA 94)

LEGEND

Test Pit

Soil materials either not tested and/or considered unsuitable for re-use as Waste Fill due to the presence of slag/cinders/ash and/or significant rock inclusions >100mm, and/or exceedances of Waste Fill chemical criteria.

Selected soil materials classified as Waste Fill and possibly viable for extraction and and re-use (refer analytical results tables and test pit logs for further information).

Stockpile Assessment Areas

Stockpile Extent

Image: https://maps.sa.gov.au/SAPPA/

File: C:\Mud\Projects\ME-328 MPG Wallaroo Fill\Baseplan

Point	Easting	Northing	Point	Easting	Northing
A	190,579	6,242,865	M	190,509	6,242,737
B	190,540	6,242,858	N	190,510	6,242,754
C	190,571	6,242,844	O	190,549	6,242,757
D	190,595	6,242,838	P	190,476	6,242,764
E	190,590	6,242,817	Q	190,475	6,242,740
F	190,566	6,242,823	R	190,337	6,242,872
G	190,544	6,242,825	S	190,292	6,242,839
H	190,609	6,242,768	T	190,318	6,242,827
I	190,584	6,242,774	U	190,300	6,242,785
J	190,579	6,242,750	V	190,309	6,242,807
K	190,542	6,242,734	W	190,286	6,242,817
L	190,601	6,242,720			

MUD ENVIRONMENTAL

Project:	Soil Classification 72 Wallaroo Plain Road Wallaroo, SA
Client:	Monopoly Property Group
Mud Ref.:	ME-328
Revision:	1

FIGURE 3

SITE LOCATION + STOCKPILE LAYOUT PLAN

Scale: 1:2,000 A3

N

0 50 100
Meters

Coord. Sys.: MGA Zone 54 (GDA 94)

LEGEND

Test Pit

Soil materials either not tested and/or considered unsuitable for re-use as Waste Fill due to the presence of slag/cinders/ash and/or significant rock inclusions >100mm, and/or exceedances of Waste Fill chemical criteria

Selected soil materials classified as Waste Fill and possibly viable for extraction and re-use (refer analytical results tables and test pit logs for further information

Stockpile Extent

Excavation Extent GPS Location

Exceeds Waste Fill Criteria

Meets Waste Fill Criteria

Image: https://maps.sa.gov.au/SAPPA/

File: C:\Mud\Projects\ME-328 MPG Wallaroo Fill\Baseplan

APPENDIX B

Soil Analytical Results Tables + US EPA ProUCL Statistical Outputs

TABLE 1
ME-328 MPG WALLAROO FILL
SUMMARY OF SOIL RESULTS COMPARED TO SA EPA WASTE CLASSIFICATION CRITERIA + QC RESULTS

MUD ENVIRONMENTAL

					Metals															TPH				
Sample ID	Laboratory Batch	Date	Soil Type / Description	Moisture Content	Arsenic	Barium	Beryllium	Cadmium	Chromium (hexavalent)	Chromium (III+VI)	Cobalt	Copper	Iron	Lead	Manganese	Mercury	Nickel	Silver	Zinc	C6-C9	C10-C14	C15-C28	C29-C36	C10-C36 (Sum of total)
TOTAL CONCENTRATIONS																								
Units				*%*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*
Limit of Reporting (LOR)				*1*	*5*	*10*	*1*	*1*	*0.5*	*2*	*2*	*5*	*50*	*5*	*5*	*0.1*	*2*	*2*	*5*	*10*	*50*	*100*	*100*	*50*
SA EPA Waste Fill					20	300	20	3	1		170	60		300	500	1	60		200	65				1,000
SA EPA Intermediate					200		40	30	200		170[#1]	2,000		1,200	6,000	30	600		14,000	100[#1]				1,000[#1]
SA EPA Low-Level Contaminated Waste (LLCW)					750		150	60	750		1,000[#1]	7,500		5,000	10,000	110	3,000		50,000	1,000[#1]				10,000[#1]
TP3_0.5-0.6	EM2007842	06-May-2020	FILL 2: SAND, gravelly, shells present, pale-yellow-brown	**9.3**	**11**			<1		**7**		**7**		<5		<0.1	**3**		**17**					
TP3_0.8-0.9	EM2007842	06-May-2020	FILL 2: SAND, gravelly, shells present, pale-yellow-brown	**11.0**	**11**			<1		**6**		<5		<5		<0.1	**2**		**11**	<10	<50	<100	<100	<50
TP5_0.2-0.3	EM2007842	06-May-2020	FILL 3: CLAY, sandy, med-high plasticity, some grey mottling, red-brown / orange-brown	**18.2**	<5			<1		**21**		**7**		<5		<0.1	**5**		**15**					
TP5_0.7-0.8	EM2007842	06-May-2020	FILL 2: SAND, gravelly, shells present, pale-yellow-brown	**12.4**	**9**			<1		**9**		**5**		<5		<0.1	**3**		**14**	<10	<50	<100	<100	<50
TP5_1.0-1.2	EM2007842	06-May-2020	FILL 2: SAND, gravelly, shells present, pale-yellow-brown	**7.3**	**12**	**20**	<1	<1	<0.5	**6**	<2	<5	**3,950**	<5	**81**	<0.1	**2**	<2	**11**	<10	<50	<100	<100	<50
TP5_1.4-1.6	EM2007842	06-May-2020	FILL 2: SAND, gravelly, shells present, pale-yellow-brown	**11.2**	**8**			<1		**8**		<5		<5		<0.1	**3**		**13**					
TP6_0.3-0.4	EM2007842	06-May-2020	FILL 3: CLAY, sandy, med-high plasticity, some grey mottling, red-brown / orange-brown	**17.3**	**8**			<1		**19**		**13**		**15**		<0.1	**5**		**31**	<10	<50	<100	<100	<50
TP6_0.6-0.7	EM2007842	06-May-2020	FILL 2: SAND, gravelly, shells present, pale-yellow-brown	**11.1**	**7**			<1		**11**		**41**		**6**		<0.1	**4**		**38**					
TP6_0.8-0.9	EM2007842	06-May-2020	FILL 3: CLAY, sandy, med-high plasticity, some grey mottling, red-brown / orange-brown	**16.5**	**8**			<1		**21**		**17**		**77**		**0.2**	**4**		**132**					
TP7_0.3-0.4	EM2007842	06-May-2020	FILL 3: CLAY, sandy, med-high plasticity, some grey mottling, red-brown / orange-brown	**13.8**	**8**			<1		**21**		**62**		**10**		<0.1	**6**		**107**					
TP7_0.7-0.8	EM2007842	06-May-2020	FILL 3: CLAY, sandy, med-high plasticity, some grey mottling, red-brown / orange-brown	**18.5**	**14**	**70**	<1	<1	<0.5	**24**	**3**	**12**	**28,500**	**41**	**52**	<0.1	**5**	<2	**60**	<10	<50	<100	<100	<50
TP8_0.2-0.3	EM2007842	06-May-2020	FILL 3: CLAY, sandy, med-high plasticity, some grey mottling, red-brown / orange-brown	**14.7**	**11**			**2**		**18**		**64**		**271**		**0.7**	**6**		**456**	<10	<50	<100	<100	<50
TP8_0.6-0.7	EM2007842	06-May-2020	FILL 3: CLAY, sandy, med-high plasticity, some grey mottling, red-brown / orange-brown	**20.8**	<5	**90**	<1	<1	<0.5	**20**	<2	**6**	**16,300**	<5	**15**	<0.1	**2**	<2	**6**	<10	<50	<100	<100	<50
TP8_1.0-1.1	EM2007842	06-May-2020	FILL 3: CLAY, sandy, med-high plasticity, some grey mottling, red-brown / orange-brown	**18.5**	**10**			<1		**25**		**9**		**21**		<0.1	**4**		**51**					
TP9_0.2-0.3	EM2007842	06-May-2020	FILL 3: CLAY, sandy, med-high plasticity, some grey mottling, red-brown / orange-brown	**18.3**	**6**	**40**	<1	<1	<0.5	**20**	<2	**6**	**18,300**	**22**	**26**	<0.1	**3**	<2	**100**	<10	<50	<100	<100	<50
TP9_0.6-0.7	EM2007842	06-May-2020	FILL 3: CLAY, sandy, med-high plasticity, some grey mottling, red-brown / orange-brown	**13.8**	**8**			<1		**23**		**13**		**6**		<0.1	**4**		**22**	<10	<50	<100	<100	<50
TP9_1.0-1.1	EM2007842	06-May-2020	FILL 3: CLAY, sandy, med-high plasticity, some grey mottling, red-brown / orange-brown	**18.0**	**6**			<1		**20**		**9**		**107**		**0.2**	**4**		**109**					
TP10_0.2-0.3	EM2007842	06-May-2020	FILL 3: CLAY, sandy, med-high plasticity, some grey mottling, red-brown / orange-brown	**16.4**	**8**			<1		**19**		**20**		**13**		<0.1	**5**		**39**					
TP10_0.7-0.8	EM2007842	06-May-2020	FILL 3: CLAY, sandy, med-high plasticity, some grey mottling, red-brown / orange-brown	**18.8**	**13**			<1		**16**		<5		<5		<0.1	**4**		**8**	<10	<50	<100	<100	<50
TP11_0.2-0.3	EM2007842	06-May-2020	FILL 3: CLAY, sandy, med-high plasticity, some grey mottling, red-brown / orange-brown	**1.3**	**6**			<1		**14**		**50**		**7**		<0.1	**5**		**45**					
TP11_0.6-0.7	EM2007842	06-May-2020	FILL 3: CLAY, sandy, med-high plasticity, some grey mottling, red-brown / orange-brown	**19.6**	**8**			<1		**19**		**7**		**6**		<0.1	**4**		**12**	<10	<50	<100	<100	<50
TP12_0.2-0.3	EM2007842	06-May-2020	FILL 3: CLAY, sandy, med-high plasticity, some grey mottling, red-brown / orange-brown	**10.7**	**7**			<1		**9**		**9**		<5		<0.1	**4**		**24**					
TP12_0.6-0.7	EM2007842	06-May-2020	FILL 3: CLAY, sandy, med-high plasticity, some grey mottling, red-brown / orange-brown	**16.7**	<5	**90**	<1	<1	<0.5	**18**	<2	**7**	**15,700**	<5	**34**	<0.1	**3**	<2	**12**	<10	<50	<100	<100	<50
TP13_0.1-0.2	EM2007842	07-May-2020	FILL 3: CLAY, sandy, med-high plasticity, some grey mottling, red-brown / orange-brown	**24.0**	**6**			<1		**19**		**9**		<5		<0.1	**3**		**9**					
TP14_0.1-0.2	EM2007842	07-May-2020	FILL 2: SAND, gravelly, shells present, pale-yellow-brown	**7.8**	**10**			<1		**6**		<5		<5		<0.1	**2**		**12**					
TP14_0.5-0.6	EM2007842	07-May-2020	FILL 2: SAND, gravelly, shells present, pale-yellow-brown	**8.1**	**11**			<1		**6**		<5		<5		<0.1	**2**		**10**	<10	<50	<100	<100	<50
TP16_0.1-0.2	EM2007842	07-May-2020	FILL 3: CLAY, sandy, med-high plasticity, some grey mottling, red-brown / orange-brown	**21.0**	**6**			<1		**15**		**8**		<5		<0.1	**3**		**15**					
TP16_0.4-0.5	EM2007842	07-May-2020	FILL 3: CLAY, sandy, med-high plasticity, some grey mottling, red-brown / orange-brown	**18.2**	**8**			<1		**21**		**7**		<5		<0.1	**5**		**17**	<10	<50	<100	<100	<50
TP17_0.2-0.3	EM2007842	07-May-2020	FILL 3: CLAY, sandy, med-high plasticity, some grey mottling, red-brown / orange-brown	**17.1**	**10**			<1		**16**		**169**		**15**		<0.1	**10**		**147**					
TP17_0.6-0.7	EM2007842	07-May-2020	FILL 5: CLAY, sndy, calcareous, low-med plasticity, trace shells, orange-brown	**13.0**	**9**	**80**	<1	<1	<0.5	**17**	**6**	**23**	**15,300**	**6**	**69**	<0.1	**6**	<2	**31**	<10	<50	<100	<100	<50
TP17_1.0-1.1	EM2007842	07-May-2020	FILL 5: CLAY, sndy, calcareous, low-med plasticity, trace shells, orange-brown	**16.7**	**8**			<1		**16**		**10**		**6**		<0.1	**5**		**16**	<10	<50	<100	<100	<50
TP20_0.5-0.6	EM2007842	07-May-2020	FILL 2: SAND, gravelly, shells present, pale-yellow-brown	**11.5**	<5			<1		**10**		<5		<5		<0.1	**5**		**17**					
TP20_0.8-0.9	EM2007842	07-May-2020	FILL 7: SAND, clayey, fine-grained, pale orange-brown	**8.4**	<5			<1		**6**		**6**		<5		<0.1	**3**		**13**	<10	<50	<100	<100	<50
TP22_0.2-0.3	EM2007842	07-May-2020	FILL 3: CLAY, sandy, med-high plasticity, some grey mottling, red-brown / orange-brown	**17.2**	**6**			<1		**19**		**7**		<5		<0.1	**5**		**17**	<10	<50	<100	<100	<50
TP22_0.6-0.7	EM2007842	07-May-2020	FILL 3: CLAY, sandy, med-high plasticity, some grey mottling, red-brown / orange-brown	**16.9**	**7**			<1		**20**		**7**		**6**		<0.1	**6**		**18**					
TP23_0.8-0.9	EM2007842	07-May-2020	FILL 6: CLAY, sandy, med. plasticity, fine calcareous gravels + shells, pale yellow-brown	**5.9**	<5			<1		**5**		<5		<5		<0.1	<2		**11**	<10	<50	<100	<100	<50
TP24_0.1-0.2	EM2007842	07-May-2020	FILL 8: SAND, fine to medium grained, shells present, light-brown	**10.3**	**12**			<1		**8**		**5**		<5		<0.1	**4**		**6**					
TP24_0.7-0.8	EM2007842	07-May-2020	FILL 8: SAND, fine to medium grained, shells present, light-brown	**11.2**	**6**			<1		**7**		<5		<5		<0.1	**3**		**6**	<10	<50	<100	<100	<50
TP24_1.2-1.3	EM2007842	07-May-2020	FILL 8: SAND, fine to medium grained, shells present, light-brown	**10.2**	**8**			<1		**8**		**5**		<5		<0.1	**4**		**6**					
TP25_0.1-0.2	EM2007842	07-May-2020	FILL 8: SAND, fine to medium grained, shells present, light-brown	**9.7**	<5	**50**	<1	<1	<0.5	**8**	**3**	**7**	**5,460**	<5	**73**	<0.1	**5**	<2	**7**	<10	<50	<100	<100	<50
TP25_0.5-0.6	EM2007842	07-May-2020	FILL 8: SAND, fine to medium grained, shells present, light-brown	**11.9**	**7**			<1		**14**		**21**		<5		<0.1	**5**		**18**	<10	<50	<100	<100	<50
TP25_1.3-1.4	EM2007842	07-May-2020	FILL 6: CLAY, sandy, med. plasticity, fine calcareous gravels + shells, pale yellow-brown	**10.9**	**6**			<1		**8**		<5		<5		<0.1	**4**		**8**					
TP27_0.2-0.3	EM2007842	07-May-2020	FILL 6: CLAY, sandy, med. plasticity, fine calcareous gravels + shells, pale yellow-brown	**14.2**	**7**			<1		**15**		**9**		<5		<0.1	**7**		**14**	<10	<50	<100	<100	<50
TP27_1.2-1.3	EM2007842	07-May-2020	FILL 8: SAND, fine to medium grained, shells present, light-brown	**11.1**	**5**			<1		**8**		<5		<5		<0.1	**3**		**7**					
TP28_0.1-0.2	EM2007842	07-May-2020	FILL 3: CLAY, sandy, med-high plasticity, some grey mottling, red-brown / orange-brown	**16.9**	**8**	**110**	<1	<1	<0.5	**25**	<2	**8**	**32,400**	<5	**42**	<0.1	**4**	<2	**11**	<10	<50	<100	<100	<50
TP28_0.7-0.8	EM2007842	07-May-2020	FILL 3: CLAY, sandy, med-high plasticity, some grey mottling, red-brown / orange-brown	**13.8**	**7**			<1		**21**		**172**		**16**		<0.1	**8**		**164**	<10	<50	<100	<100	<50
TP29_0.6-0.7	EM2007842	07-May-2020	FILL 8: SAND, fine to medium grained, shells present, light-brown	**7.6**	**8**	**50**	<1	<1	<0.5	**10**	**5**	**6**	**7,930**	<5	**126**	<0.1	**6**	<2	**10**	<10	<50	<100	<100	<50
TP29_1.1-1.2	EM2007842	07-May-2020	FILL 8: SAND, fine to medium grained, shells present, light-brown	**7.1**	**7**			<1		**6**		<5		<5		<0.1	**3**		<5					
TP30_0.7-0.8	EM2007842	07-May-2020	FILL 8: SAND, fine to medium grained, shells present, light-brown	**7.5**	**7**			<1		**10**		**7**		<5		<0.1	**6**		**9**					
TP30_1.1-1.2	EM2007842	07-May-2020	FILL 8: SAND, fine to medium grained, shells present, light-brown	**9.1**	**12**			<1		**8**		**6**		<5		<0.1	**6**		**7**	<10	<50	<100	<100	<50
TP31_0.3-0.4	EM2007842	07-May-2020	FILL 6: CLAY, sandy, med. plasticity, fine calcareous gravels + shells, pale yellow-brown	**9.9**	**12**	**40**	<1	<1	<0.5	**8**	**8**	**6**	**8,150**	<5	**93**	<0.1	**6**	<2	**7**	<10	<50	<100	<100	<50
TP31_0.8-0.9	EM2007842	07-May-2020	FILL 6: CLAY, sandy, med. plasticity, fine calcareous gravels + shells, pale yellow-brown	**8.2**	**11**			<1		**8**		**5**		<5		<0.1	**6**		**6**					

NOTES

[#1] Leach testing not reqd if total conc < value for category

Sample exceeds Waste Fill criteria for one or more chemicals

TABLE 1
ME-328 MPG WALLAROO FILL
SUMMARY OF SOIL RESULTS COMPARED TO SA EPA WASTE CLASSIFICATION CRITERIA + QC RESULTS

MUD ENVIRONMENTAL

					Metals															TPH				
Sample ID	Laboratory Batch	Date	Soil Type / Description	Moisture Content	Arsenic	Barium	Beryllium	Cadmium	Chromium (hexavalent)	Chromium (III+VI)	Cobalt	Copper	Iron	Lead	Manganese	Mercury	Nickel	Silver	Zinc	C6-C9	C10-C14	C15-C28	C29-C36	C10-C36 (Sum of total)
TOTAL CONCENTRATIONS																								
Units				*%*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*
Limit of Reporting (LOR)				*1*	*5*	*10*	*1*	*1*	*0.5*	*2*	*2*	*5*	*50*	*5*	*5*	*0.1*	*2*	*2*	*5*	*10*	*50*	*100*	*100*	*50*
SA EPA Waste Fill					20	300	20	3	1		170	60		300	500	1	60		200	65				1,000
SA EPA Intermediate					200		40	30	200		170[#1]	2,000		1,200	6,000	30	600		14,000	100[#1]				1,000[#1]
SA EPA Low-Level Contaminated Waste (LLCW)					750		150	60	750		1,000[#1]	7,500		5,000	10,000	110	3,000		50,000	1,000[#1]				10,000[#1]
QC RESULTS																								
TP6_0.3-0.4	EM2007842	06-May-2020	FILL 3: CLAY, sandy, med-high plasticity, some grey mottling, red-brown / orange-brown	**17.3**	**8**			<1		**19**		**13**		**15**		<0.1	**5**		**31**	<10	<50	<100	<100	<50
QC10	EM2007842	06-May-2020	Intra-laboratory replicate of TP6_0.3-0.4	**17**	**8**			<1		**21**		**9**		**15**		<0.1	**4**		**32**	<10	<50	<100	<100	<50
Relative Percentage Difference (RPD, %)				2%	0%			NC		10%		36%		0%		NC	22%		3%	NC	NC	NC	NC	NC
TP10_0.2-0.3	EM2007842	06-May-2020	FILL 3: CLAY, sandy, med-high plasticity, some grey mottling, red-brown / orange-brown	**16.4**	**8**			<1		**19**		**20**		**13**		<0.1	**5**		**39**					
QC12	EM2007842	06-May-2020	Intra-laboratory replicate of TP10_0.2-0.3	**12.2**	**7**			<1		**15**		**13**		**83**		**0.3**	**4**		**129**					
Relative Percentage Difference (RPD, %)				29%	13%			NC		24%		42%		146%		NC	22%		107%					
TP12_0.6-0.7	EM2007842	06-May-2020	FILL 3: CLAY, sandy, med-high plasticity, some grey mottling, red-brown / orange-brown	**16.7**	<5	**90**	<1	<1	<0.5	**18**	<2	**7**	**15,700**	<5	**34**	<0.1	**3**	<2	**12**	<10	<50	<100	<100	<50
QC13	EM2007842	06-May-2020	Intra-laboratory replicate of TP12_0.6-0.7	**17.2**	**6**	**80**	<1	<1	<0.5	**20**	**4**	**12**	**21,500**	<5	**53**	<0.1	**5**	<2	**20**	<10	<50	<100	<100	<50
Relative Percentage Difference (RPD, %)				3%	NC	12%	NC	NC	NC	11%	NC	53%	31%	NC	44%	NC	50%	NC	50%	NC	NC	NC	NC	NC
TP17_1.0-1.1	EM2007842	07-May-2020	FILL 5: CLAY, sndy, calcareous, low-med plasticity, trace shells, orange-brown	**16.7**	**8**			<1		**16**		**10**		**6**		<0.1	**5**		**16**	<10	<50	<100	<100	<50
QC15	EM2007842	07-May-2020	Intra-laboratory replicate of TP17_1.0-1.1	**13.4**	**12**			<1		**17**		**35**		**16**		<0.1	**7**		**48**	<10	<50	<100	<100	<50
Relative Percentage Difference (RPD, %)				22%	40%			NC		6%		111%		91%		NC	33%		100%	NC	NC	NC	NC	NC
TP30_0.7-0.8	EM2007842	07-May-2020	FILL 8: SAND, fine to medium grained, shells present, light-brown	**7.5**	**7**			<1		**10**		**7**		<5		<0.1	**6**		**9**					
QC17	EM2007842	07-May-2020	Intra-laboratory replicate of TP30_0.7-0.8	**9.1**	**10**			<1		**8**		**6**		<5		<0.1	**6**		**7**					
Relative Percentage Difference (RPD, %)				19%	35%			NC		22%		15%		NC		NC	0%		25%					
TP31_0.8-0.9	EM2007842	07-May-2020	FILL 6: CLAY, sandy, med. plasticity, fine calcareous gravels + shells, pale yellow-brown	**8.2**	**11**			<1		**8**		**5**		<5		<0.1	**6**		**6**					
QC18	EM2007842	07-May-2020	Intra-laboratory replicate of TP31_0.8-0.9	**8.7**	**11**			<1		**8**		**5**		<5		<0.1	**6**		**7**					
Relative Percentage Difference (RPD, %)				6%	0%			NC		0%		0%		NC		NC	0%		15%					
QC1	EM2007842	06-May-2020	Trip Blank (µg/L)																	<20				

NOTES

[#1] Leach testing not reqd if total conc < value for category

Sample exceeds Waste Fill criteria for one or more chemicals

TABLE 1
ME-328 MPG WALLAROO FILL
SUMMARY OF SOIL RESULTS COMPARED TO SA EPA WASTE CLASSIFICATION CRITERIA + QC RESULTS

MUD ENVIRONMENTAL

TOTAL CONCENTRATIONS

Sample ID	Laboratory Batch	Date	Soil Type / Description	BTEX				PAH																
				Benzene	Toluene	Ethylbenzene	Xylene Total	Acenaphthene	Acenaphthylene	Anthracene	Benz(a)anthracene	Benzo(a) pyrene	Benzo(b+j)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	Chrysene	Dibenz(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-c,d)pyrene	Naphthalene	Phenanthrene	Pyrene	PAHs (Sum of total)
Units				*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*
Limit of Reporting (LOR)				*0.2*	*0.5*	*0.5*	*0.5*	*0.5*	*0.5*	*0.5*	*0.5*	*0.5*	*0.5*	*0.5*	*0.5*	*0.5*	*0.5*	*0.5*	*0.5*	*0.5*	*0.5*	*0.5*	*0.5*	*0.5*
SA EPA Waste Fill				1	1.4	3.1	14					1												5
SA EPA Intermediate				5[#1]	50[#1]	100[#1]	180[#1]					2[#1]												40[#1]
SA EPA Low-Level Contaminated Waste (LLCW)				15	500	1,000	1,800					5												200[#1]
TP3_0.5-0.6	EM2007842	06-May-2020	FILL 2: SAND, gravelly, shells present, pale-yellow-brown																					
TP3_0.8-0.9	EM2007842	06-May-2020	FILL 2: SAND, gravelly, shells present, pale-yellow-brown	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
TP5_0.2-0.3	EM2007842	06-May-2020	FILL 3: CLAY, sandy, med-high plasticity, some grey mottling, red-brown / orange-brown																					
TP5_0.7-0.8	EM2007842	06-May-2020	FILL 2: SAND, gravelly, shells present, pale-yellow-brown	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
TP5_1.0-1.2	EM2007842	06-May-2020	FILL 2: SAND, gravelly, shells present, pale-yellow-brown	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
TP5_1.4-1.6	EM2007842	06-May-2020	FILL 2: SAND, gravelly, shells present, pale-yellow-brown																					
TP6_0.3-0.4	EM2007842	06-May-2020	FILL 3: CLAY, sandy, med-high plasticity, some grey mottling, red-brown / orange-brown	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
TP6_0.6-0.7	EM2007842	06-May-2020	FILL 2: SAND, gravelly, shells present, pale-yellow-brown																					
TP6_0.8-0.9	EM2007842	06-May-2020	FILL 3: CLAY, sandy, med-high plasticity, some grey mottling, red-brown / orange-brown																					
TP7_0.3-0.4	EM2007842	06-May-2020	FILL 3: CLAY, sandy, med-high plasticity, some grey mottling, red-brown / orange-brown																					
TP7_0.7-0.8	EM2007842	06-May-2020	FILL 3: CLAY, sandy, med-high plasticity, some grey mottling, red-brown / orange-brown	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
TP8_0.2-0.3	EM2007842	06-May-2020	FILL 3: CLAY, sandy, med-high plasticity, some grey mottling, red-brown / orange-brown	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
TP8_0.6-0.7	EM2007842	06-May-2020	FILL 3: CLAY, sandy, med-high plasticity, some grey mottling, red-brown / orange-brown	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
TP8_1.0-1.1	EM2007842	06-May-2020	FILL 3: CLAY, sandy, med-high plasticity, some grey mottling, red-brown / orange-brown																					
TP9_0.2-0.3	EM2007842	06-May-2020	FILL 3: CLAY, sandy, med-high plasticity, some grey mottling, red-brown / orange-brown	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
TP9_0.6-0.7	EM2007842	06-May-2020	FILL 3: CLAY, sandy, med-high plasticity, some grey mottling, red-brown / orange-brown	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
TP9_1.0-1.1	EM2007842	06-May-2020	FILL 3: CLAY, sandy, med-high plasticity, some grey mottling, red-brown / orange-brown																					
TP10_0.2-0.3	EM2007842	06-May-2020	FILL 3: CLAY, sandy, med-high plasticity, some grey mottling, red-brown / orange-brown																					
TP10_0.7-0.8	EM2007842	06-May-2020	FILL 3: CLAY, sandy, med-high plasticity, some grey mottling, red-brown / orange-brown	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
TP11_0.2-0.3	EM2007842	06-May-2020	FILL 3: CLAY, sandy, med-high plasticity, some grey mottling, red-brown / orange-brown																					
TP11_0.6-0.7	EM2007842	06-May-2020	FILL 3: CLAY, sandy, med-high plasticity, some grey mottling, red-brown / orange-brown	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
TP12_0.2-0.3	EM2007842	06-May-2020	FILL 3: CLAY, sandy, med-high plasticity, some grey mottling, red-brown / orange-brown																					
TP12_0.6-0.7	EM2007842	06-May-2020	FILL 3: CLAY, sandy, med-high plasticity, some grey mottling, red-brown / orange-brown	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
TP13_0.1-0.2	EM2007842	07-May-2020	FILL 3: CLAY, sandy, med-high plasticity, some grey mottling, red-brown / orange-brown																					
TP14_0.1-0.2	EM2007842	07-May-2020	FILL 2: SAND, gravelly, shells present, pale-yellow-brown																					
TP14_0.5-0.6	EM2007842	07-May-2020	FILL 2: SAND, gravelly, shells present, pale-yellow-brown	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
TP16_0.1-0.2	EM2007842	07-May-2020	FILL 3: CLAY, sandy, med-high plasticity, some grey mottling, red-brown / orange-brown																					
TP16_0.4-0.5	EM2007842	07-May-2020	FILL 3: CLAY, sandy, med-high plasticity, some grey mottling, red-brown / orange-brown	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
TP17_0.2-0.3	EM2007842	07-May-2020	FILL 3: CLAY, sandy, med-high plasticity, some grey mottling, red-brown / orange-brown																					
TP17_0.6-0.7	EM2007842	07-May-2020	FILL 5: CLAY, sndy, calcareous, low-med plasticity, trace shells, orange-brown	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
TP17_1.0-1.1	EM2007842	07-May-2020	FILL 5: CLAY, sndy, calcareous, low-med plasticity, trace shells, orange-brown	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
TP20_0.5-0.6	EM2007842	07-May-2020	FILL 2: SAND, gravelly, shells present, pale-yellow-brown																					
TP20_0.8-0.9	EM2007842	07-May-2020	FILL 7: SAND, clayey, fine-grained, pale orange-brown	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
TP22_0.2-0.3	EM2007842	07-May-2020	FILL 3: CLAY, sandy, med-high plasticity, some grey mottling, red-brown / orange-brown	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
TP22_0.6-0.7	EM2007842	07-May-2020	FILL 3: CLAY, sandy, med-high plasticity, some grey mottling, red-brown / orange-brown																					
TP23_0.8-0.9	EM2007842	07-May-2020	FILL 6: CLAY, sandy, med. plasticity, fine calcareous gravels + shells, pale yellow-brown	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
TP24_0.1-0.2	EM2007842	07-May-2020	FILL 8: SAND, fine to medium grained, shells present, light-brown																					
TP24_0.7-0.8	EM2007842	07-May-2020	FILL 8: SAND, fine to medium grained, shells present, light-brown	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
TP24_1.2-1.3	EM2007842	07-May-2020	FILL 8: SAND, fine to medium grained, shells present, light-brown																					
TP25_0.1-0.2	EM2007842	07-May-2020	FILL 8: SAND, fine to medium grained, shells present, light-brown	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
TP25_0.5-0.6	EM2007842	07-May-2020	FILL 8: SAND, fine to medium grained, shells present, light-brown	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
TP25_1.3-1.4	EM2007842	07-May-2020	FILL 6: CLAY, sandy, med. plasticity, fine calcareous gravels + shells, pale yellow-brown																					
TP27_0.2-0.3	EM2007842	07-May-2020	FILL 6: CLAY, sandy, med. plasticity, fine calcareous gravels + shells, pale yellow-brown	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
TP27_1.2-1.3	EM2007842	07-May-2020	FILL 8: SAND, fine to medium grained, shells present, light-brown																					
TP28_0.1-0.2	EM2007842	07-May-2020	FILL 3: CLAY, sandy, med-high plasticity, some grey mottling, red-brown / orange-brown	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
TP28_0.7-0.8	EM2007842	07-May-2020	FILL 3: CLAY, sandy, med-high plasticity, some grey mottling, red-brown / orange-brown	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
TP29_0.6-0.7	EM2007842	07-May-2020	FILL 8: SAND, fine to medium grained, shells present, light-brown	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
TP29_1.1-1.2	EM2007842	07-May-2020	FILL 8: SAND, fine to medium grained, shells present, light-brown																					
TP30_0.7-0.8	EM2007842	07-May-2020	FILL 8: SAND, fine to medium grained, shells present, light-brown																					
TP30_1.1-1.2	EM2007842	07-May-2020	FILL 8: SAND, fine to medium grained, shells present, light-brown	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
TP31_0.3-0.4	EM2007842	07-May-2020	FILL 6: CLAY, sandy, med. plasticity, fine calcareous gravels + shells, pale yellow-brown	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
TP31_0.8-0.9	EM2007842	07-May-2020	FILL 6: CLAY, sandy, med. plasticity, fine calcareous gravels + shells, pale yellow-brown																					

NOTES

[#1] Leach testing not reqd if total conc < value for category

Sample exceeds Waste Fill criteria for one or more chemicals

TABLE 1
ME-328 MPG WALLAROO FILL
SUMMARY OF SOIL RESULTS COMPARED TO SA EPA WASTE CLASSIFICATION CRITERIA + QC RESULTS

MUD ENVIRONMENTAL

Sample ID	Laboratory Batch	Date	Soil Type / Description	BTEX				PAH																
				Benzene	Toluene	Ethylbenzene	Xylene Total	Acenaphthene	Acenaphthylene	Anthracene	Benz(a)anthracene	Benzo(a) pyrene	Benzo(b+j)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	Chrysene	Dibenz(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-c,d)pyrene	Naphthalene	Phenanthrene	Pyrene	PAHs (Sum of total)
TOTAL CONCENTRATIONS																								
Units				*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*
Limit of Reporting (LOR)				*0.2*	*0.5*	*0.5*	*0.5*	*0.5*	*0.5*	*0.5*	*0.5*	*0.5*	*0.5*	*0.5*	*0.5*	*0.5*	*0.5*	*0.5*	*0.5*	*0.5*	*0.5*	*0.5*	*0.5*	*0.5*
SA EPA Waste Fill				1	1.4	3.1	14					1												5
SA EPA Intermediate				5[#1]	50[#1]	100[#1]	180[#1]					2[#1]												40[#1]
SA EPA Low-Level Contaminated Waste (LLCW)				15	500	1,000	1,800					5												200[#1]
QC RESULTS																								
TP6_0.3-0.4	EM2007842	06-May-2020	FILL 3: CLAY, sandy, med-high plasticity, some grey mottling, red-brown / orange-brown	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
QC10	EM2007842	06-May-2020	Intra-laboratory replicate of TP6_0.3-0.4	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Relative Percentage Difference (RPD, %)				NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
TP10_0.2-0.3	EM2007842	06-May-2020	FILL 3: CLAY, sandy, med-high plasticity, some grey mottling, red-brown / orange-brown																					
QC12	EM2007842	06-May-2020	Intra-laboratory replicate of TP10_0.2-0.3																					
Relative Percentage Difference (RPD, %)																								
TP12_0.6-0.7	EM2007842	06-May-2020	FILL 3: CLAY, sandy, med-high plasticity, some grey mottling, red-brown / orange-brown	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
QC13	EM2007842	06-May-2020	Intra-laboratory replicate of TP12_0.6-0.7	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Relative Percentage Difference (RPD, %)				NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
TP17_1.0-1.1	EM2007842	07-May-2020	FILL 5: CLAY, sndy, calcareous, low-med plasticity, trace shells, orange-brown	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
QC15	EM2007842	07-May-2020	Intra-laboratory replicate of TP17_1.0-1.1	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Relative Percentage Difference (RPD, %)				NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
TP30_0.7-0.8	EM2007842	07-May-2020	FILL 8: SAND, fine to medium grained, shells present, light-brown																					
QC17	EM2007842	07-May-2020	Intra-laboratory replicate of TP30_0.7-0.8																					
Relative Percentage Difference (RPD, %)																								
TP31_0.8-0.9	EM2007842	07-May-2020	FILL 6: CLAY, sandy, med. plasticity, fine calcareous gravels + shells, pale yellow-brown																					
QC18	EM2007842	07-May-2020	Intra-laboratory replicate of TP31_0.8-0.9																					
Relative Percentage Difference (RPD, %)																								
QC1	EM2007842	06-May-2020	Trip Blank (µg/L)	<1	<2	<2	<2														<5			

NOTES

[#1] Leach testing not reqd if total conc < value for category

Sample exceeds Waste Fill criteria for one or more chemicals

TABLE 1
ME-328 MPG WALLAROO FILL
SUMMARY OF SOIL RESULTS COMPARED TO SA EPA WASTE CLASSIFICATION CRITERIA + QC RESULTS

MUD ENVIRONMENTAL

Sample ID	Laboratory Batch	Date	Soil Type / Description	Organochlorine Pesticides																							
				4,4-DDE	a-BHC	Aldrin	Aldrin + Dieldrin	b-BHC	Chlordane	Chlordane (cis)	Chlordane (trans)	d-BHC	DDD	DDT	DDT+DDE+DDD	Dieldrin	Endosulfan	Endosulfan I	Endosulfan II	Endosulfan sulphate	Endrin	Endrin aldehyde	Endrin ketone	g-BHC (Lindane)	Heptachlor	Heptachlor epoxide	Methoxychlor
TOTAL CONCENTRATIONS																											
Units				*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*
Limit of Reporting (LOR)				*0.05*	*0.05*	*0.05*	*0.05*	*0.05*	*0.05*	*0.05*	*0.05*	*0.05*	*0.05*	*0.2*	*0.05*	*0.05*	*0.05*	*0.05*	*0.05*	*0.05*	*0.05*	*0.05*	*0.05*	*0.05*	*0.05*	*0.05*	*0.2*
SA EPA Waste Fill							2		2					2											2		
SA EPA Intermediate							2[#1]		2[#1]					2[#1]											2[#1]		
SA EPA Low-Level Contaminated Waste (LLCW)							50		50					50											50		
TP3_0.5-0.6	EM2007842	06-May-2020	FILL 2: SAND, gravelly, shells present, pale-yellow-brown																								
TP3_0.8-0.9	EM2007842	06-May-2020	FILL 2: SAND, gravelly, shells present, pale-yellow-brown	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2
TP5_0.2-0.3	EM2007842	06-May-2020	FILL 3: CLAY, sandy, med-high plasticity, some grey mottling, red-brown / orange-brown																								
TP5_0.7-0.8	EM2007842	06-May-2020	FILL 2: SAND, gravelly, shells present, pale-yellow-brown	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2
TP5_1.0-1.2	EM2007842	06-May-2020	FILL 2: SAND, gravelly, shells present, pale-yellow-brown	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2
TP5_1.4-1.6	EM2007842	06-May-2020	FILL 2: SAND, gravelly, shells present, pale-yellow-brown																								
TP6_0.3-0.4	EM2007842	06-May-2020	FILL 3: CLAY, sandy, med-high plasticity, some grey mottling, red-brown / orange-brown	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2
TP6_0.6-0.7	EM2007842	06-May-2020	FILL 2: SAND, gravelly, shells present, pale-yellow-brown																								
TP6_0.8-0.9	EM2007842	06-May-2020	FILL 3: CLAY, sandy, med-high plasticity, some grey mottling, red-brown / orange-brown																								
TP7_0.3-0.4	EM2007842	06-May-2020	FILL 3: CLAY, sandy, med-high plasticity, some grey mottling, red-brown / orange-brown																								
TP7_0.7-0.8	EM2007842	06-May-2020	FILL 3: CLAY, sandy, med-high plasticity, some grey mottling, red-brown / orange-brown	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2
TP8_0.2-0.3	EM2007842	06-May-2020	FILL 3: CLAY, sandy, med-high plasticity, some grey mottling, red-brown / orange-brown	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2
TP8_0.6-0.7	EM2007842	06-May-2020	FILL 3: CLAY, sandy, med-high plasticity, some grey mottling, red-brown / orange-brown	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2
TP8_1.0-1.1	EM2007842	06-May-2020	FILL 3: CLAY, sandy, med-high plasticity, some grey mottling, red-brown / orange-brown																								
TP9_0.2-0.3	EM2007842	06-May-2020	FILL 3: CLAY, sandy, med-high plasticity, some grey mottling, red-brown / orange-brown	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2
TP9_0.6-0.7	EM2007842	06-May-2020	FILL 3: CLAY, sandy, med-high plasticity, some grey mottling, red-brown / orange-brown	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2
TP9_1.0-1.1	EM2007842	06-May-2020	FILL 3: CLAY, sandy, med-high plasticity, some grey mottling, red-brown / orange-brown																								
TP10_0.2-0.3	EM2007842	06-May-2020	FILL 3: CLAY, sandy, med-high plasticity, some grey mottling, red-brown / orange-brown																								
TP10_0.7-0.8	EM2007842	06-May-2020	FILL 3: CLAY, sandy, med-high plasticity, some grey mottling, red-brown / orange-brown	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2
TP11_0.2-0.3	EM2007842	06-May-2020	FILL 3: CLAY, sandy, med-high plasticity, some grey mottling, red-brown / orange-brown																								
TP11_0.6-0.7	EM2007842	06-May-2020	FILL 3: CLAY, sandy, med-high plasticity, some grey mottling, red-brown / orange-brown	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2
TP12_0.2-0.3	EM2007842	06-May-2020	FILL 3: CLAY, sandy, med-high plasticity, some grey mottling, red-brown / orange-brown																								
TP12_0.6-0.7	EM2007842	06-May-2020	FILL 3: CLAY, sandy, med-high plasticity, some grey mottling, red-brown / orange-brown	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2
TP13_0.1-0.2	EM2007842	07-May-2020	FILL 3: CLAY, sandy, med-high plasticity, some grey mottling, red-brown / orange-brown																								
TP14_0.1-0.2	EM2007842	07-May-2020	FILL 2: SAND, gravelly, shells present, pale-yellow-brown																								
TP14_0.5-0.6	EM2007842	07-May-2020	FILL 2: SAND, gravelly, shells present, pale-yellow-brown	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2
TP16_0.1-0.2	EM2007842	07-May-2020	FILL 3: CLAY, sandy, med-high plasticity, some grey mottling, red-brown / orange-brown																								
TP16_0.4-0.5	EM2007842	07-May-2020	FILL 3: CLAY, sandy, med-high plasticity, some grey mottling, red-brown / orange-brown	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2
TP17_0.2-0.3	EM2007842	07-May-2020	FILL 3: CLAY, sandy, med-high plasticity, some grey mottling, red-brown / orange-brown																								
TP17_0.6-0.7	EM2007842	07-May-2020	FILL 5: CLAY, sndy, calcareous, low-med plasticity, trace shells, orange-brown	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2
TP17_1.0-1.1	EM2007842	07-May-2020	FILL 5: CLAY, sndy, calcareous, low-med plasticity, trace shells, orange-brown	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2
TP20_0.5-0.6	EM2007842	07-May-2020	FILL 2: SAND, gravelly, shells present, pale-yellow-brown																								
TP20_0.8-0.9	EM2007842	07-May-2020	FILL 7: SAND, clayey, fine-grained, pale orange-brown	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2
TP22_0.2-0.3	EM2007842	07-May-2020	FILL 3: CLAY, sandy, med-high plasticity, some grey mottling, red-brown / orange-brown	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2
TP22_0.6-0.7	EM2007842	07-May-2020	FILL 3: CLAY, sandy, med-high plasticity, some grey mottling, red-brown / orange-brown																								
TP23_0.8-0.9	EM2007842	07-May-2020	FILL 6: CLAY, sandy, med. plasticity, fine calcareous gravels + shells, pale yellow-brown	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2
TP24_0.1-0.2	EM2007842	07-May-2020	FILL 8: SAND, fine to medium grained, shells present, light-brown																								
TP24_0.7-0.8	EM2007842	07-May-2020	FILL 8: SAND, fine to medium grained, shells present, light-brown	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2
TP24_1.2-1.3	EM2007842	07-May-2020	FILL 8: SAND, fine to medium grained, shells present, light-brown																								
TP25_0.1-0.2	EM2007842	07-May-2020	FILL 8: SAND, fine to medium grained, shells present, light-brown	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2
TP25_0.5-0.6	EM2007842	07-May-2020	FILL 8: SAND, fine to medium grained, shells present, light-brown	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2
TP25_1.3-1.4	EM2007842	07-May-2020	FILL 6: CLAY, sandy, med. plasticity, fine calcareous gravels + shells, pale yellow-brown																								
TP27_0.2-0.3	EM2007842	07-May-2020	FILL 6: CLAY, sandy, med. plasticity, fine calcareous gravels + shells, pale yellow-brown	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2
TP27_1.2-1.3	EM2007842	07-May-2020	FILL 8: SAND, fine to medium grained, shells present, light-brown																								
TP28_0.1-0.2	EM2007842	07-May-2020	FILL 3: CLAY, sandy, med-high plasticity, some grey mottling, red-brown / orange-brown	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2
TP28_0.7-0.8	EM2007842	07-May-2020	FILL 3: CLAY, sandy, med-high plasticity, some grey mottling, red-brown / orange-brown	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2
TP29_0.6-0.7	EM2007842	07-May-2020	FILL 8: SAND, fine to medium grained, shells present, light-brown	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2
TP29_1.1-1.2	EM2007842	07-May-2020	FILL 8: SAND, fine to medium grained, shells present, light-brown																								
TP30_0.7-0.8	EM2007842	07-May-2020	FILL 8: SAND, fine to medium grained, shells present, light-brown																								
TP30_1.1-1.2	EM2007842	07-May-2020	FILL 8: SAND, fine to medium grained, shells present, light-brown	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2
TP31_0.3-0.4	EM2007842	07-May-2020	FILL 6: CLAY, sandy, med. plasticity, fine calcareous gravels + shells, pale yellow-brown	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2
TP31_0.8-0.9	EM2007842	07-May-2020	FILL 6: CLAY, sandy, med. plasticity, fine calcareous gravels + shells, pale yellow-brown																								

NOTES

[#1] Leach testing not reqd if total conc < value for category

Sample exceeds Waste Fill criteria for one or more chemicals

TABLE 1
ME-328 MPG WALLAROO FILL
SUMMARY OF SOIL RESULTS COMPARED TO SA EPA WASTE CLASSIFICATION CRITERIA + QC RESULTS

MUD ENVIRONMENTAL

Sample ID	Laboratory Batch	Date	Soil Type / Description	Organochlorine Pesticides																							
				4,4-DDE	a-BHC	Aldrin	Aldrin + Dieldrin	b-BHC	Chlordane	Chlordane (cis)	Chlordane (trans)	d-BHC	DDD	DDT	DDT+DDE+DDD	Dieldrin	Endosulfan	Endosulfan I	Endosulfan II	Endosulfan sulphate	Endrin	Endrin aldehyde	Endrin ketone	g-BHC (Lindane)	Heptachlor	Heptachlor epoxide	Methoxychlor
TOTAL CONCENTRATIONS																											
Units				*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*
Limit of Reporting (LOR)				*0.05*	*0.05*	*0.05*	*0.05*	*0.05*	*0.05*	*0.05*	*0.05*	*0.05*	*0.05*	*0.2*	*0.05*	*0.05*	*0.05*	*0.05*	*0.05*	*0.05*	*0.05*	*0.05*	*0.05*	*0.05*	*0.05*	*0.05*	*0.2*
SA EPA Waste Fill							2		2					2											2		
SA EPA Intermediate							2[#1]		2[#1]					2[#1]											2[#1]		
SA EPA Low-Level Contaminated Waste (LLCW)							50		50					50											50		
QC RESULTS																											
TP6_0.3-0.4	EM2007842	06-May-2020	FILL 3: CLAY, sandy, med-high plasticity, some grey mottling, red-brown / orange-brown	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2
QC10	EM2007842	06-May-2020	Intra-laboratory replicate of TP6_0.3-0.4	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2
Relative Percentage Difference (RPD, %)				NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
TP10_0.2-0.3	EM2007842	06-May-2020	FILL 3: CLAY, sandy, med-high plasticity, some grey mottling, red-brown / orange-brown																								
QC12	EM2007842	06-May-2020	Intra-laboratory replicate of TP10_0.2-0.3																								
Relative Percentage Difference (RPD, %)																											
TP12_0.6-0.7	EM2007842	06-May-2020	FILL 3: CLAY, sandy, med-high plasticity, some grey mottling, red-brown / orange-brown	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2
QC13	EM2007842	06-May-2020	Intra-laboratory replicate of TP12_0.6-0.7	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2
Relative Percentage Difference (RPD, %)				NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
TP17_1.0-1.1	EM2007842	07-May-2020	FILL 5: CLAY, sndy, calcareous, low-med plasticity, trace shells, orange-brown	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2
QC15	EM2007842	07-May-2020	Intra-laboratory replicate of TP17_1.0-1.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2
Relative Percentage Difference (RPD, %)				NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
TP30_0.7-0.8	EM2007842	07-May-2020	FILL 8: SAND, fine to medium grained, shells present, light-brown																								
QC17	EM2007842	07-May-2020	Intra-laboratory replicate of TP30_0.7-0.8																								
Relative Percentage Difference (RPD, %)																											
TP31_0.8-0.9	EM2007842	07-May-2020	FILL 6: CLAY, sandy, med. plasticity, fine calcareous gravels + shells, pale yellow-brown																								
QC18	EM2007842	07-May-2020	Intra-laboratory replicate of TP31_0.8-0.9																								
Relative Percentage Difference (RPD, %)																											
QC1	EM2007842	06-May-2020	Trip Blank (µg/L)																								

NOTES

[#1] Leach testing not reqd if total conc < value for category

Sample exceeds Waste Fill criteria for one or more chemicals

TABLE 1
ME-328 MPG WALLAROO FILL
SUMMARY OF SOIL RESULTS COMPARED TO SA EPA WASTE CLASSIFICATION CRITERIA + QC RESULTS

MUD ENVIRONMENTAL

				Phenols													PCBs		
Sample ID	Laboratory Batch	Date	Soil Type / Description	3&4-Methylphenol (m&p-cresol)	2,4,5-Trichlorophenol	2,4,6-Trichlorophenol	2,4-Dichlorophenol	2,4-Dimethylphenol	2,6-Dichlorophenol	2-Chlorophenol	2-Methylphenol	2-Nitrophenol	4-chloro-3-methylphenol	Pentachlorophenol	Phenol	Phenolics Total	PCBs (Sum of total)	Tetrachloroethene	Cyanide Total
TOTAL CONCENTRATIONS																			
Units				*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*
Limit of Reporting (LOR)				*1*	*0.5*	*0.5*	*0.5*	*0.5*	*0.5*	*0.5*	*0.5*	*0.5*	*0.5*	*2*	*0.5*	*0.5*	*0.1*	*0.5*	*1*
SA EPA Waste Fill																0.5	2		500
SA EPA Intermediate																17,000[#1]	2[#1]	14[#1]	1,000
SA EPA Low-Level Contaminated Waste (LLCW)																50,000	50[#1]	25.2	3,500
TP3_0.5-0.6	EM2007842	06-May-2020	FILL 2: SAND, gravelly, shells present, pale-yellow-brown																
TP3_0.8-0.9	EM2007842	06-May-2020	FILL 2: SAND, gravelly, shells present, pale-yellow-brown																
TP5_0.2-0.3	EM2007842	06-May-2020	FILL 3: CLAY, sandy, med-high plasticity, some grey mottling, red-brown / orange-brown																
TP5_0.7-0.8	EM2007842	06-May-2020	FILL 2: SAND, gravelly, shells present, pale-yellow-brown																
TP5_1.0-1.2	EM2007842	06-May-2020	FILL 2: SAND, gravelly, shells present, pale-yellow-brown	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<2	<0.5	<0.5	<0.1	<0.5	<1
TP5_1.4-1.6	EM2007842	06-May-2020	FILL 2: SAND, gravelly, shells present, pale-yellow-brown																
TP6_0.3-0.4	EM2007842	06-May-2020	FILL 3: CLAY, sandy, med-high plasticity, some grey mottling, red-brown / orange-brown																
TP6_0.6-0.7	EM2007842	06-May-2020	FILL 2: SAND, gravelly, shells present, pale-yellow-brown																
TP6_0.8-0.9	EM2007842	06-May-2020	FILL 3: CLAY, sandy, med-high plasticity, some grey mottling, red-brown / orange-brown																
TP7_0.3-0.4	EM2007842	06-May-2020	FILL 3: CLAY, sandy, med-high plasticity, some grey mottling, red-brown / orange-brown																
TP7_0.7-0.8	EM2007842	06-May-2020	FILL 3: CLAY, sandy, med-high plasticity, some grey mottling, red-brown / orange-brown	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<2	<0.5	<0.5	<0.1	<0.5	<1
TP8_0.2-0.3	EM2007842	06-May-2020	FILL 3: CLAY, sandy, med-high plasticity, some grey mottling, red-brown / orange-brown																
TP8_0.6-0.7	EM2007842	06-May-2020	FILL 3: CLAY, sandy, med-high plasticity, some grey mottling, red-brown / orange-brown	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<2	<0.5	<0.5	<0.1	<0.5	<1
TP8_1.0-1.1	EM2007842	06-May-2020	FILL 3: CLAY, sandy, med-high plasticity, some grey mottling, red-brown / orange-brown																
TP9_0.2-0.3	EM2007842	06-May-2020	FILL 3: CLAY, sandy, med-high plasticity, some grey mottling, red-brown / orange-brown	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<2	<0.5	<0.5	<0.1	<0.5	<1
TP9_0.6-0.7	EM2007842	06-May-2020	FILL 3: CLAY, sandy, med-high plasticity, some grey mottling, red-brown / orange-brown																
TP9_1.0-1.1	EM2007842	06-May-2020	FILL 3: CLAY, sandy, med-high plasticity, some grey mottling, red-brown / orange-brown																
TP10_0.2-0.3	EM2007842	06-May-2020	FILL 3: CLAY, sandy, med-high plasticity, some grey mottling, red-brown / orange-brown																
TP10_0.7-0.8	EM2007842	06-May-2020	FILL 3: CLAY, sandy, med-high plasticity, some grey mottling, red-brown / orange-brown																
TP11_0.2-0.3	EM2007842	06-May-2020	FILL 3: CLAY, sandy, med-high plasticity, some grey mottling, red-brown / orange-brown																
TP11_0.6-0.7	EM2007842	06-May-2020	FILL 3: CLAY, sandy, med-high plasticity, some grey mottling, red-brown / orange-brown																
TP12_0.2-0.3	EM2007842	06-May-2020	FILL 3: CLAY, sandy, med-high plasticity, some grey mottling, red-brown / orange-brown																
TP12_0.6-0.7	EM2007842	06-May-2020	FILL 3: CLAY, sandy, med-high plasticity, some grey mottling, red-brown / orange-brown	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<2	<0.5	<0.5	<0.1	<0.5	<1
TP13_0.1-0.2	EM2007842	07-May-2020	FILL 3: CLAY, sandy, med-high plasticity, some grey mottling, red-brown / orange-brown																
TP14_0.1-0.2	EM2007842	07-May-2020	FILL 2: SAND, gravelly, shells present, pale-yellow-brown																
TP14_0.5-0.6	EM2007842	07-May-2020	FILL 2: SAND, gravelly, shells present, pale-yellow-brown																
TP16_0.1-0.2	EM2007842	07-May-2020	FILL 3: CLAY, sandy, med-high plasticity, some grey mottling, red-brown / orange-brown																
TP16_0.4-0.5	EM2007842	07-May-2020	FILL 3: CLAY, sandy, med-high plasticity, some grey mottling, red-brown / orange-brown																
TP17_0.2-0.3	EM2007842	07-May-2020	FILL 3: CLAY, sandy, med-high plasticity, some grey mottling, red-brown / orange-brown																
TP17_0.6-0.7	EM2007842	07-May-2020	FILL 5: CLAY, sndy, calcareous, low-med plasticity, trace shells, orange-brown	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<2	<0.5	<0.5	<0.1	<0.5	<1
TP17_1.0-1.1	EM2007842	07-May-2020	FILL 5: CLAY, sndy, calcareous, low-med plasticity, trace shells, orange-brown																
TP20_0.5-0.6	EM2007842	07-May-2020	FILL 2: SAND, gravelly, shells present, pale-yellow-brown																
TP20_0.8-0.9	EM2007842	07-May-2020	FILL 7: SAND, clayey, fine-grained, pale orange-brown																
TP22_0.2-0.3	EM2007842	07-May-2020	FILL 3: CLAY, sandy, med-high plasticity, some grey mottling, red-brown / orange-brown																
TP22_0.6-0.7	EM2007842	07-May-2020	FILL 3: CLAY, sandy, med-high plasticity, some grey mottling, red-brown / orange-brown																
TP23_0.8-0.9	EM2007842	07-May-2020	FILL 6: CLAY, sandy, med. plasticity, fine calcareous gravels + shells, pale yellow-brown																
TP24_0.1-0.2	EM2007842	07-May-2020	FILL 8: SAND, fine to medium grained, shells present, light-brown																
TP24_0.7-0.8	EM2007842	07-May-2020	FILL 8: SAND, fine to medium grained, shells present, light-brown																
TP24_1.2-1.3	EM2007842	07-May-2020	FILL 8: SAND, fine to medium grained, shells present, light-brown																
TP25_0.1-0.2	EM2007842	07-May-2020	FILL 8: SAND, fine to medium grained, shells present, light-brown	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<2	<0.5	<0.5	<0.1	<0.5	<1
TP25_0.5-0.6	EM2007842	07-May-2020	FILL 8: SAND, fine to medium grained, shells present, light-brown																
TP25_1.3-1.4	EM2007842	07-May-2020	FILL 6: CLAY, sandy, med. plasticity, fine calcareous gravels + shells, pale yellow-brown																
TP27_0.2-0.3	EM2007842	07-May-2020	FILL 6: CLAY, sandy, med. plasticity, fine calcareous gravels + shells, pale yellow-brown																
TP27_1.2-1.3	EM2007842	07-May-2020	FILL 8: SAND, fine to medium grained, shells present, light-brown																
TP28_0.1-0.2	EM2007842	07-May-2020	FILL 3: CLAY, sandy, med-high plasticity, some grey mottling, red-brown / orange-brown	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<2	<0.5	<0.5	<0.1	<0.5	<1
TP28_0.7-0.8	EM2007842	07-May-2020	FILL 3: CLAY, sandy, med-high plasticity, some grey mottling, red-brown / orange-brown																
TP29_0.6-0.7	EM2007842	07-May-2020	FILL 8: SAND, fine to medium grained, shells present, light-brown	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<2	<0.5	<0.5	<0.1	<0.5	<1
TP29_1.1-1.2	EM2007842	07-May-2020	FILL 8: SAND, fine to medium grained, shells present, light-brown																
TP30_0.7-0.8	EM2007842	07-May-2020	FILL 8: SAND, fine to medium grained, shells present, light-brown																
TP30_1.1-1.2	EM2007842	07-May-2020	FILL 8: SAND, fine to medium grained, shells present, light-brown																
TP31_0.3-0.4	EM2007842	07-May-2020	FILL 6: CLAY, sandy, med. plasticity, fine calcareous gravels + shells, pale yellow-brown	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<2	<0.5	<0.5	<0.1	<0.5	<1
TP31_0.8-0.9	EM2007842	07-May-2020	FILL 6: CLAY, sandy, med. plasticity, fine calcareous gravels + shells, pale yellow-brown																

NOTES

[#1] Leach testing not reqd if total conc < value for category

Sample exceeds Waste Fill criteria for one or more chemicals

TABLE 1
ME-328 MPG WALLAROO FILL
SUMMARY OF SOIL RESULTS COMPARED TO SA EPA WASTE CLASSIFICATION CRITERIA + QC RESULTS

MUD ENVIRONMENTAL

				Phenols													PCBs		
Sample ID	Laboratory Batch	Date	Soil Type / Description	3&4-Methylphenol (m&p-cresol)	2,4,5-Trichlorophenol	2,4,6-Trichlorophenol	2,4-Dichlorophenol	2,4-Dimethylphenol	2,6-Dichlorophenol	2-Chlorophenol	2-Methylphenol	2-Nitrophenol	4-chloro-3-methylphenol	Pentachlorophenol	Phenol	Phenolics Total	PCBs (Sum of total)	Tetrachloroethene	Cyanide Total
TOTAL CONCENTRATIONS																			
Units				*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*
Limit of Reporting (LOR)				*1*	*0.5*	*0.5*	*0.5*	*0.5*	*0.5*	*0.5*	*0.5*	*0.5*	*0.5*	*2*	*0.5*	*0.5*	*0.1*	*0.5*	*1*
SA EPA Waste Fill																0.5	2		500
SA EPA Intermediate																17,000[#1]	2[#1]	14[#1]	1,000
SA EPA Low-Level Contaminated Waste (LLCW)																50,000	50[#1]	25.2	3,500
QC RESULTS																			
TP6_0.3-0.4	EM2007842	06-May-2020	FILL 3: CLAY, sandy, med-high plasticity, some grey mottling, red-brown / orange-brown																
QC10	EM2007842	06-May-2020	Intra-laboratory replicate of TP6_0.3-0.4																
Relative Percentage Difference (RPD, %)																			
TP10_0.2-0.3	EM2007842	06-May-2020	FILL 3: CLAY, sandy, med-high plasticity, some grey mottling, red-brown / orange-brown																
QC12	EM2007842	06-May-2020	Intra-laboratory replicate of TP10_0.2-0.3																
Relative Percentage Difference (RPD, %)																			
TP12_0.6-0.7	EM2007842	06-May-2020	FILL 3: CLAY, sandy, med-high plasticity, some grey mottling, red-brown / orange-brown	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<2	<0.5	<0.5	<0.1	<0.5	<1
QC13	EM2007842	06-May-2020	Intra-laboratory replicate of TP12_0.6-0.7	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<2	<0.5	<0.5	<0.1	<0.5	<1
Relative Percentage Difference (RPD, %)				NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
TP17_1.0-1.1	EM2007842	07-May-2020	FILL 5: CLAY, sndy, calcareous, low-med plasticity, trace shells, orange-brown																
QC15	EM2007842	07-May-2020	Intra-laboratory replicate of TP17_1.0-1.1																
Relative Percentage Difference (RPD, %)																			
TP30_0.7-0.8	EM2007842	07-May-2020	FILL 8: SAND, fine to medium grained, shells present, light-brown																
QC17	EM2007842	07-May-2020	Intra-laboratory replicate of TP30_0.7-0.8																
Relative Percentage Difference (RPD, %)																			
TP31_0.8-0.9	EM2007842	07-May-2020	FILL 6: CLAY, sandy, med. plasticity, fine calcareous gravels + shells, pale yellow-brown																
QC18	EM2007842	07-May-2020	Intra-laboratory replicate of TP31_0.8-0.9																
Relative Percentage Difference (RPD, %)																			
QC1	EM2007842	06-May-2020	Trip Blank (µg/L)																

NOTES

[#1] Leach testing not reqd if total conc < value for category

Sample exceeds Waste Fill criteria for one or more chemicals

	A	B	C	D	E	F	G	H	I	J	K	L
1	Nonparametric UCL Statistics for Uncensored Full Data Sets											

User Selected Options	
Date/Time of Computation	ProUCL 5.121/05/2020 1:52:58 PM
From File	WorkSheet.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Copper

General Statistics

Total Number of Observations	38	Number of Distinct Observations	16
		Number of Missing Observations	12
Minimum	5	Mean	13.84
Maximum	64	Median	7.5
SD	15.04	Std. Error of Mean	2.44
Coefficient of Variation	1.087	Skewness	2.49
Mean of logged Data	2.307	SD of logged Data	0.704

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution (0.05)

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	17.96	95% Adjusted-CLT UCL (Chen-1995)	18.91
		95% Modified-t UCL (Johnson-1978)	18.12

Nonparametric Distribution Free UCLs

95% CLT UCL	17.86	95% Jackknife UCL	17.96
95% Standard Bootstrap UCL	17.92	95% Bootstrap-t UCL	20.41
95% Hall's Bootstrap UCL	18.45	95% Percentile Bootstrap UCL	18.11
95% BCA Bootstrap UCL	18.79		
90% Chebyshev(Mean, Sd) UCL	21.16	95% Chebyshev(Mean, Sd) UCL	24.48
97.5% Chebyshev(Mean, Sd) UCL	29.08	99% Chebyshev(Mean, Sd) UCL	38.12

Suggested UCL to Use

95% Chebyshev (Mean, Sd) UCL	24.48

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician

Nonparametric UCL Statistics for Uncensored Full Data Sets

User Selected Options	
Date/Time of Computation	ProUCL 5.121/05/2020 2:20:28 PM
From File	WorkSheet_a.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Copper - FILL 3 only

General Statistics

Total Number of Observations	22	Number of Distinct Observations	11
		Number of Missing Observations	1
Minimum	6	Mean	16.23
Maximum	64	Median	9
SD	17.78	Std. Error of Mean	3.79
Coefficient of Variation	1.095	Skewness	2.181
Mean of logged Data	2.448	SD of logged Data	0.732

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution (0.05)

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	22.75	95% Adjusted-CLT UCL (Chen-1995)	24.34
		95% Modified-t UCL (Johnson-1978)	23.04

Nonparametric Distribution Free UCLs

95% CLT UCL	22.46	95% Jackknife UCL	22.75
95% Standard Bootstrap UCL	22.3	95% Bootstrap-t UCL	26.9
95% Hall's Bootstrap UCL	22.08	95% Percentile Bootstrap UCL	22.68
95% BCA Bootstrap UCL	24.32		
90% Chebyshev(Mean, Sd) UCL	27.6	95% Chebyshev(Mean, Sd) UCL	32.75
97.5% Chebyshev(Mean, Sd) UCL	39.9	99% Chebyshev(Mean, Sd) UCL	53.94

Suggested UCL to Use

95% Chebyshev (Mean, Sd) UCL	32.75

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician

Nonparametric UCL Statistics for Uncensored Full Data Sets

User Selected Options	
Date/Time of Computation	ProUCL 5.121/05/2020 2:23:14 PM
From File	WorkSheet_b.xls
Full Precision	OFF
Confidence Coefficient	95%
umber of Bootstrap Operations	2000

ZINC

General Statistics

Total Number of Observations	51	Number of Distinct Observations	28
		Number of Missing Observations	1
Minimum	6	Mean	38.27
Maximum	456	Median	14
SD	70.95	Std. Error of Mean	9.935
Coefficient of Variation	1.854	Skewness	4.499
Mean of logged Data	2.941	SD of logged Data	1.026

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution (0.05)

Assuming Normal Distribution

95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	54.92	95% Adjusted-CLT UCL (Chen-1995)	61.3
		95% Modified-t UCL (Johnson-1978)	55.97

Nonparametric Distribution Free UCLs

95% CLT UCL	54.62	95% Jackknife UCL	54.92
95% Standard Bootstrap UCL	54.37	95% Bootstrap-t UCL	71.73
95% Hall's Bootstrap UCL	117.3	95% Percentile Bootstrap UCL	55.43
95% BCA Bootstrap UCL	61.71		
90% Chebyshev(Mean, Sd) UCL	68.08	95% Chebyshev(Mean, Sd) UCL	81.58
97.5% Chebyshev(Mean, Sd) UCL	100.3	99% Chebyshev(Mean, Sd) UCL	137.1

Suggested UCL to Use

95% Chebyshev (Mean, Sd) UCL	81.58

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician

	A	B	C	D	E	F	G	H	I	J	K	L
1	Lognormal UCL Statistics for Uncensored Full Data Sets											
2												
3	User Selected Options											
4	Date/Time of Computation			ProUCL 5.121/05/2020 2:35:21 PM								
5	From File			WorkSheet_c.xls								
6	Full Precision			OFF								
7	Confidence Coefficient			95%								
8	mber of Bootstrap Operations			2000								
9												
10												
11	ZINC - FILL 3 only											
12												
13	General Statistics											
14	Total Number of Observations					23	Number of Distinct Observations					20
15							Number of Missing Observations					0
16	Minimum					6	Mean					57.22
17	Maximum					456	Median					22
18	SD					94.65	Std. Error of Mean					19.74
19	Coefficient of Variation					1.654	Skewness					3.703
20												
21	Lognormal GOF Test											
22	Shapiro Wilk Test Statistic					0.942	Shapiro Wilk Lognormal GOF Test					
23	5% Shapiro Wilk Critical Value					0.914	Data appear Lognormal at 5% Significance Level					
24	Lilliefors Test Statistic					0.15	Lilliefors Lognormal GOF Test					
25	5% Lilliefors Critical Value					0.18	Data appear Lognormal at 5% Significance Level					
26	Data appear Lognormal at 5% Significance Level											
27												
28	Logged Statistics											
29	Minimum of Logged Data					1.792	Mean of logged Data					3.373
30	Maximum of Logged Data					6.122	SD of logged Data					1.083
31												
32	Lognormal Maximum likelihood Estimates (MLEs)											
33	MLE Mean					52.43	MLE Standard Deviation					78.29
34	MLE Median					29.17	MLE Skewness					7.811
35	MLE Coefficient of Variation					1.493	80% MLE Quantile					72.57
36	90% MLE Quantile					116.8	95% MLE Quantile					173.2
37	99% MLE Quantile					362.2						
38												
39	Lognormal Minimum Variance Unbiased Estimates (MVUEs)											
40	MVUE Mean					50.48	MVUE SD					66.11
41	MVUE Median					28.44	MVUE SEM					13.07
42												
43	Assuming Lognormal Distribution											
44	95% H-UCL					96.36	90% Chebyshev (MVUE) UCL					89.68
45	95% Chebyshev (MVUE) UCL					107.4	97.5% Chebyshev (MVUE) UCL					132.1
46	99% Chebyshev (MVUE) UCL					180.5						
47												
48	Nonparametric Distribution Free UCLs											
49	95% CLT UCL					89.68	95% Jackknife UCL					91.11
50	95% Standard Bootstrap UCL					88.94	95% Bootstrap-t UCL					141.4
51	95% Hall's Bootstrap UCL					205.5	95% Percentile Bootstrap UCL					93.65
52	95% BCA Bootstrap UCL					109.3						
53	90% Chebyshev(Mean, Sd) UCL					116.4	95% Chebyshev(Mean, Sd) UCL					143.2
54	97.5% Chebyshev(Mean, Sd) UCL					180.5	99% Chebyshev(Mean, Sd) UCL					253.6
55												
56	Suggested UCL to Use											
57	95% Chebyshev (Mean, Sd) UCL					143.2						
58												
59	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
60	Recommendations are based upon data size, data distribution, and skewness.											
61	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
62	owever, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statisticia											
63												

APPENDIX C

Laboratory Certificates of Analysis & Chain of Custody Documentation

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **EM2007842**	Page	:
Client	: **MUD ENVIRONMENTAL PTY LTD**	Laboratory	: Environmental Division Melbourne
Contact	: TRENT GRAY	Contact	: Kieren Burns
Address	: PO Box 80 HENLEY BEACH SOUTH AUSTRALIA 5022	Address	: 4 Westall Rd Springvale VIC Australia 3171
Telephone	: ----	Telephone	: +61881625130
Project	: ME-328	Date Samples Received	: 12-May-2020 10:15
Order number	: ----	Date Analysis Commenced	: 13-May-2020
C-O-C number	: ----	Issue Date	: 15-May-2020 18:49
Sampler	: ----		
Site	: Wallaroo Fill		
Quote number	: ADBQ/004/19 Primary Work Only		
No. of samples received	: 155		
No. of samples analysed	: 59		

NATA
Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Arenie Vijayaratnam	Non-Metals Team Leader	Melbourne Inorganics, Springvale, VIC
Bronwyn Sheen	Assistant Laboratory Manager	Melbourne Organics, Springvale, VIC
Nancy Wang	2IC Organic Chemist	Melbourne Organics, Springvale, VIC
Nikki Stepniewski	Senior Inorganic Instrument Chemist	Melbourne Inorganics, Springvale, VIC

General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

- Benzo(a)pyrene Toxicity Equivalent Quotient (TEQ) per the NEPM (2013) is the sum total of the concentration of the eight carcinogenic PAHs multiplied by their Toxicity Equivalence Factor (TEF) relative to Benzo(a)pyrene. TEF values are provided in brackets as follows: Benz(a)anthracene (0.1), Chrysene (0.01), Benzo(b+j) & Benzo(k)fluoranthene (0.1), Benzo(a)pyrene (1.0), Indeno(1.2.3.cd)pyrene (0.1), Dibenz(a.h)anthracene (1.0), Benzo(g.h.i)perylene (0.01). Less than LOR results for 'TEQ Zero' are treated as zero, for 'TEQ 1/2LOR' are treated as half the reported LOR, and for 'TEQ LOR' are treated as being equal to the reported LOR. Note: TEQ 1/2LOR and TEQ LOR will calculate as 0.6mg/Kg and 1.2mg/Kg respectively for samples with non-detects for all of the eight TEQ PAHs.

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	TP3_0.5-0.6	TP3_0.8-0.9	TP5_0.2-0.3	TP5_0.7-0.8	TP5_1.0-1.2
			Client sampling date / time	06-May-2020 00:00	06-May-2020 00:00	06-May-2020 00:00	06-May-2020 00:00	06-May-2020 00:00
Compound	CAS Number	LOR	Unit	EM2007842-015	EM2007842-016	EM2007842-029	EM2007842-031	EM2007842-032
				Result	Result	Result	Result	Result
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	1.0	%	9.3	11.0	18.2	12.4	7.3
EG005(ED093)T: Total Metals by ICP-AES								
Barium	7440-39-3	10	mg/kg	----	----	----	----	20
Beryllium	7440-41-7	1	mg/kg	----	----	----	----	<1
Cobalt	7440-48-4	2	mg/kg	----	----	----	----	<2
Iron	7439-89-6	50	mg/kg	----	----	----	----	3950
Manganese	7439-96-5	5	mg/kg	----	----	----	----	81
Silver	7440-22-4	2	mg/kg	----	----	----	----	<2
Arsenic	7440-38-2	5	mg/kg	11	11	<5	9	12
Cadmium	7440-43-9	1	mg/kg	<1	<1	<1	<1	<1
Chromium	7440-47-3	2	mg/kg	7	6	21	9	6
Copper	7440-50-8	5	mg/kg	7	<5	7	5	<5
Lead	7439-92-1	5	mg/kg	<5	<5	<5	<5	<5
Nickel	7440-02-0	2	mg/kg	3	2	5	3	2
Zinc	7440-66-6	5	mg/kg	17	11	15	14	11
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
EG048: Hexavalent Chromium (Alkaline Digest)								
Hexavalent Chromium	18540-29-9	0.5	mg/kg	----	----	----	----	<0.5
EK026SF: Total CN by Segmented Flow Analyser								
Total Cyanide	57-12-5	1	mg/kg	----	----	----	----	<1
EP066: Polychlorinated Biphenyls (PCB)								
Total Polychlorinated biphenyls	----	0.1	mg/kg	----	----	----	----	<0.1
EP068A: Organochlorine Pesticides (OC)								
alpha-BHC	319-84-6	0.05	mg/kg	----	<0.05	----	<0.05	<0.05
Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	----	<0.05	----	<0.05	<0.05
beta-BHC	319-85-7	0.05	mg/kg	----	<0.05	----	<0.05	<0.05
gamma-BHC	58-89-9	0.05	mg/kg	----	<0.05	----	<0.05	<0.05
delta-BHC	319-86-8	0.05	mg/kg	----	<0.05	----	<0.05	<0.05
Heptachlor	76-44-8	0.05	mg/kg	----	<0.05	----	<0.05	<0.05
Aldrin	309-00-2	0.05	mg/kg	----	<0.05	----	<0.05	<0.05
Heptachlor epoxide	1024-57-3	0.05	mg/kg	----	<0.05	----	<0.05	<0.05
^ Total Chlordane (sum)	----	0.05	mg/kg	----	<0.05	----	<0.05	<0.05
trans-Chlordane	5103-74-2	0.05	mg/kg	----	<0.05	----	<0.05	<0.05

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	TP3_0.5-0.6	TP3_0.8-0.9	TP5_0.2-0.3	TP5_0.7-0.8	TP5_1.0-1.2
			Client sampling date / time	06-May-2020 00:00	06-May-2020 00:00	06-May-2020 00:00	06-May-2020 00:00	06-May-2020 00:00
Compound	CAS Number	LOR	Unit	EM2007842-015	EM2007842-016	EM2007842-029	EM2007842-031	EM2007842-032
				Result	Result	Result	Result	Result
EP068A: Organochlorine Pesticides (OC) - Continued								
alpha-Endosulfan	959-98-8	0.05	mg/kg	----	<0.05	----	<0.05	<0.05
cis-Chlordane	5103-71-9	0.05	mg/kg	----	<0.05	----	<0.05	<0.05
Dieldrin	60-57-1	0.05	mg/kg	----	<0.05	----	<0.05	<0.05
4.4`-DDE	72-55-9	0.05	mg/kg	----	<0.05	----	<0.05	<0.05
Endrin	72-20-8	0.05	mg/kg	----	<0.05	----	<0.05	<0.05
beta-Endosulfan	33213-65-9	0.05	mg/kg	----	<0.05	----	<0.05	<0.05
^ Endosulfan (sum)	115-29-7	0.05	mg/kg	----	<0.05	----	<0.05	<0.05
4.4`-DDD	72-54-8	0.05	mg/kg	----	<0.05	----	<0.05	<0.05
Endrin aldehyde	7421-93-4	0.05	mg/kg	----	<0.05	----	<0.05	<0.05
Endosulfan sulfate	1031-07-8	0.05	mg/kg	----	<0.05	----	<0.05	<0.05
4.4`-DDT	50-29-3	0.2	mg/kg	----	<0.2	----	<0.2	<0.2
Endrin ketone	53494-70-5	0.05	mg/kg	----	<0.05	----	<0.05	<0.05
Methoxychlor	72-43-5	0.2	mg/kg	----	<0.2	----	<0.2	<0.2
^ Sum of Aldrin + Dieldrin	309-00-2/60-57-1	0.05	mg/kg	----	<0.05	----	<0.05	<0.05
^ Sum of DDD + DDE + DDT	72-54-8/72-55-9/50-2	0.05	mg/kg	----	<0.05	----	<0.05	<0.05
EP074E: Halogenated Aliphatic Compounds								
Tetrachloroethene	127-18-4	0.5	mg/kg	----	----	----	----	<0.5
EP075(SIM)A: Phenolic Compounds								
Phenol	108-95-2	0.5	mg/kg	----	----	----	----	<0.5
2-Chlorophenol	95-57-8	0.5	mg/kg	----	----	----	----	<0.5
2-Methylphenol	95-48-7	0.5	mg/kg	----	----	----	----	<0.5
3- & 4-Methylphenol	1319-77-3	1	mg/kg	----	----	----	----	<1
2-Nitrophenol	88-75-5	0.5	mg/kg	----	----	----	----	<0.5
2.4-Dimethylphenol	105-67-9	0.5	mg/kg	----	----	----	----	<0.5
2.4-Dichlorophenol	120-83-2	0.5	mg/kg	----	----	----	----	<0.5
2.6-Dichlorophenol	87-65-0	0.5	mg/kg	----	----	----	----	<0.5
4-Chloro-3-methylphenol	59-50-7	0.5	mg/kg	----	----	----	----	<0.5
2.4.6-Trichlorophenol	88-06-2	0.5	mg/kg	----	----	----	----	<0.5
2.4.5-Trichlorophenol	95-95-4	0.5	mg/kg	----	----	----	----	<0.5
Pentachlorophenol	87-86-5	2	mg/kg	----	----	----	----	<2
^ Sum of Phenols	----	0.5	mg/kg	----	----	----	----	<0.5
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	0.5	mg/kg	----	<0.5	----	<0.5	<0.5

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	TP3_0.5-0.6	TP3_0.8-0.9	TP5_0.2-0.3	TP5_0.7-0.8	TP5_1.0-1.2
			Client sampling date / time	06-May-2020 00:00	06-May-2020 00:00	06-May-2020 00:00	06-May-2020 00:00	06-May-2020 00:00
Compound	CAS Number	LOR	Unit	EM2007842-015	EM2007842-016	EM2007842-029	EM2007842-031	EM2007842-032
				Result	Result	Result	Result	Result
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued								
Acenaphthylene	208-96-8	0.5	mg/kg	----	<0.5	----	<0.5	<0.5
Acenaphthene	83-32-9	0.5	mg/kg	----	<0.5	----	<0.5	<0.5
Fluorene	86-73-7	0.5	mg/kg	----	<0.5	----	<0.5	<0.5
Phenanthrene	85-01-8	0.5	mg/kg	----	<0.5	----	<0.5	<0.5
Anthracene	120-12-7	0.5	mg/kg	----	<0.5	----	<0.5	<0.5
Fluoranthene	206-44-0	0.5	mg/kg	----	<0.5	----	<0.5	<0.5
Pyrene	129-00-0	0.5	mg/kg	----	<0.5	----	<0.5	<0.5
Benz(a)anthracene	56-55-3	0.5	mg/kg	----	<0.5	----	<0.5	<0.5
Chrysene	218-01-9	0.5	mg/kg	----	<0.5	----	<0.5	<0.5
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	----	<0.5	----	<0.5	<0.5
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	----	<0.5	----	<0.5	<0.5
Benzo(a)pyrene	50-32-8	0.5	mg/kg	----	<0.5	----	<0.5	<0.5
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	----	<0.5	----	<0.5	<0.5
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	----	<0.5	----	<0.5	<0.5
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	----	<0.5	----	<0.5	<0.5
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg	----	<0.5	----	<0.5	<0.5
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg	----	<0.5	----	<0.5	<0.5
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg	----	**0.6**	----	**0.6**	**0.6**
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg	----	**1.2**	----	**1.2**	**1.2**
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	10	mg/kg	----	<10	----	<10	<10
C10 - C14 Fraction	----	50	mg/kg	----	<50	----	<50	<50
C15 - C28 Fraction	----	100	mg/kg	----	<100	----	<100	<100
C29 - C36 Fraction	----	100	mg/kg	----	<100	----	<100	<100
^ C10 - C36 Fraction (sum)	----	50	mg/kg	----	<50	----	<50	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
C6 - C10 Fraction	C6_C10	10	mg/kg	----	<10	----	<10	<10
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg	----	<10	----	<10	<10
>C10 - C16 Fraction	----	50	mg/kg	----	<50	----	<50	<50
>C16 - C34 Fraction	----	100	mg/kg	----	<100	----	<100	<100
>C34 - C40 Fraction	----	100	mg/kg	----	<100	----	<100	<100
^ >C10 - C40 Fraction (sum)	----	50	mg/kg	----	<50	----	<50	<50
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	50	mg/kg	----	<50	----	<50	<50

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	TP3_0.5-0.6	TP3_0.8-0.9	TP5_0.2-0.3	TP5_0.7-0.8	TP5_1.0-1.2
			Client sampling date / time	06-May-2020 00:00	06-May-2020 00:00	06-May-2020 00:00	06-May-2020 00:00	06-May-2020 00:00
Compound	CAS Number	LOR	Unit	EM2007842-015	EM2007842-016	EM2007842-029	EM2007842-031	EM2007842-032
				Result	Result	Result	Result	Result
EP080: BTEXN								
Benzene	71-43-2	0.2	mg/kg	----	<0.2	----	<0.2	<0.2
Toluene	108-88-3	0.5	mg/kg	----	<0.5	----	<0.5	<0.5
Ethylbenzene	100-41-4	0.5	mg/kg	----	<0.5	----	<0.5	<0.5
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	----	<0.5	----	<0.5	<0.5
ortho-Xylene	95-47-6	0.5	mg/kg	----	<0.5	----	<0.5	<0.5
^ Sum of BTEX	----	0.2	mg/kg	----	<0.2	----	<0.2	<0.2
^ Total Xylenes	----	0.5	mg/kg	----	<0.5	----	<0.5	<0.5
Naphthalene	91-20-3	1	mg/kg	----	<1	----	<1	<1
EP066S: PCB Surrogate								
Decachlorobiphenyl	2051-24-3	0.1	%	----	----	----	----	94.2
EP068S: Organochlorine Pesticide Surrogate								
Dibromo-DDE	21655-73-2	0.05	%	----	85.6	----	88.2	85.8
EP068T: Organophosphorus Pesticide Surrogate								
DEF	78-48-8	0.05	%	----	61.7	----	62.0	62.9
EP074S: VOC Surrogates								
1.2-Dichloroethane-D4	17060-07-0	0.5	%	----	----	----	----	72.3
Toluene-D8	2037-26-5	0.5	%	----	----	----	----	79.3
4-Bromofluorobenzene	460-00-4	0.5	%	----	----	----	----	81.4
EP075(SIM)S: Phenolic Compound Surrogates								
Phenol-d6	13127-88-3	0.5	%	----	96.8	----	99.6	91.5
2-Chlorophenol-D4	93951-73-6	0.5	%	----	101	----	104	94.8
2.4.6-Tribromophenol	118-79-6	0.5	%	----	71.0	----	70.7	66.5
EP075(SIM)T: PAH Surrogates								
2-Fluorobiphenyl	321-60-8	0.5	%	----	103	----	106	97.6
Anthracene-d10	1719-06-8	0.5	%	----	98.3	----	102	92.5
4-Terphenyl-d14	1718-51-0	0.5	%	----	94.3	----	97.3	88.6
EP080S: TPH(V)/BTEX Surrogates								
1.2-Dichloroethane-D4	17060-07-0	0.2	%	----	72.6	----	82.6	67.2
Toluene-D8	2037-26-5	0.2	%	----	75.6	----	87.7	78.3
4-Bromofluorobenzene	460-00-4	0.2	%	----	96.0	----	119	94.2

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	TP5_1.4-1.6	TP6_0.3-0.4	QC10	TP6_0.6-0.7	TP6_0.8-0.9
			Client sampling date / time	06-May-2020 00:00	06-May-2020 00:00	06-May-2020 00:00	06-May-2020 00:00	06-May-2020 00:00
Compound	CAS Number	LOR	Unit	EM2007842-033	EM2007842-037	EM2007842-038	EM2007842-039	EM2007842-040
				Result	Result	Result	Result	Result
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	1.0	%	11.2	17.3	17.0	11.1	16.5
EG005(ED093)T: Total Metals by ICP-AES								
Arsenic	7440-38-2	5	mg/kg	8	8	8	7	8
Cadmium	7440-43-9	1	mg/kg	<1	<1	<1	<1	<1
Chromium	7440-47-3	2	mg/kg	8	19	21	11	21
Copper	7440-50-8	5	mg/kg	<5	13	9	41	17
Lead	7439-92-1	5	mg/kg	<5	15	15	6	77
Nickel	7440-02-0	2	mg/kg	3	5	4	4	4
Zinc	7440-66-6	5	mg/kg	13	31	32	38	132
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	0.2
EP068A: Organochlorine Pesticides (OC)								
alpha-BHC	319-84-6	0.05	mg/kg	----	<0.05	<0.05	----	----
Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	----	<0.05	<0.05	----	----
beta-BHC	319-85-7	0.05	mg/kg	----	<0.05	<0.05	----	----
gamma-BHC	58-89-9	0.05	mg/kg	----	<0.05	<0.05	----	----
delta-BHC	319-86-8	0.05	mg/kg	----	<0.05	<0.05	----	----
Heptachlor	76-44-8	0.05	mg/kg	----	<0.05	<0.05	----	----
Aldrin	309-00-2	0.05	mg/kg	----	<0.05	<0.05	----	----
Heptachlor epoxide	1024-57-3	0.05	mg/kg	----	<0.05	<0.05	----	----
^ Total Chlordane (sum)	----	0.05	mg/kg	----	<0.05	<0.05	----	----
trans-Chlordane	5103-74-2	0.05	mg/kg	----	<0.05	<0.05	----	----
alpha-Endosulfan	959-98-8	0.05	mg/kg	----	<0.05	<0.05	----	----
cis-Chlordane	5103-71-9	0.05	mg/kg	----	<0.05	<0.05	----	----
Dieldrin	60-57-1	0.05	mg/kg	----	<0.05	<0.05	----	----
4.4`-DDE	72-55-9	0.05	mg/kg	----	<0.05	<0.05	----	----
Endrin	72-20-8	0.05	mg/kg	----	<0.05	<0.05	----	----
beta-Endosulfan	33213-65-9	0.05	mg/kg	----	<0.05	<0.05	----	----
^ Endosulfan (sum)	115-29-7	0.05	mg/kg	----	<0.05	<0.05	----	----
4.4`-DDD	72-54-8	0.05	mg/kg	----	<0.05	<0.05	----	----
Endrin aldehyde	7421-93-4	0.05	mg/kg	----	<0.05	<0.05	----	----
Endosulfan sulfate	1031-07-8	0.05	mg/kg	----	<0.05	<0.05	----	----
4.4`-DDT	50-29-3	0.2	mg/kg	----	<0.2	<0.2	----	----
Endrin ketone	53494-70-5	0.05	mg/kg	----	<0.05	<0.05	----	----

Analytical Results

Sub-Matrix: SOIL
(Matrix: SOIL)

Compound	CAS Number	LOR	Unit	TP5_1.4-1.6	TP6_0.3-0.4	QC10	TP6_0.6-0.7	TP6_0.8-0.9
Client sampling date / time				06-May-2020 00:00	06-May-2020 00:00	06-May-2020 00:00	06-May-2020 00:00	06-May-2020 00:00
				EM2007842-033	EM2007842-037	EM2007842-038	EM2007842-039	EM2007842-040
				Result	Result	Result	Result	Result
EP068A: Organochlorine Pesticides (OC) - Continued								
Methoxychlor	72-43-5	0.2	mg/kg	----	<0.2	<0.2	----	----
^ Sum of Aldrin + Dieldrin	309-00-2/60-57-1	0.05	mg/kg	----	<0.05	<0.05	----	----
^ Sum of DDD + DDE + DDT	72-54-8/72-55-9/50-2	0.05	mg/kg	----	<0.05	<0.05	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	0.5	mg/kg	----	<0.5	<0.5	----	----
Acenaphthylene	208-96-8	0.5	mg/kg	----	<0.5	<0.5	----	----
Acenaphthene	83-32-9	0.5	mg/kg	----	<0.5	<0.5	----	----
Fluorene	86-73-7	0.5	mg/kg	----	<0.5	<0.5	----	----
Phenanthrene	85-01-8	0.5	mg/kg	----	<0.5	<0.5	----	----
Anthracene	120-12-7	0.5	mg/kg	----	<0.5	<0.5	----	----
Fluoranthene	206-44-0	0.5	mg/kg	----	<0.5	<0.5	----	----
Pyrene	129-00-0	0.5	mg/kg	----	<0.5	<0.5	----	----
Benz(a)anthracene	56-55-3	0.5	mg/kg	----	<0.5	<0.5	----	----
Chrysene	218-01-9	0.5	mg/kg	----	<0.5	<0.5	----	----
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	----	<0.5	<0.5	----	----
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	----	<0.5	<0.5	----	----
Benzo(a)pyrene	50-32-8	0.5	mg/kg	----	<0.5	<0.5	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	----	<0.5	<0.5	----	----
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	----	<0.5	<0.5	----	----
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	----	<0.5	<0.5	----	----
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg	----	<0.5	<0.5	----	----
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg	----	<0.5	<0.5	----	----
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg	----	**0.6**	**0.6**	----	----
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg	----	**1.2**	**1.2**	----	----
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	10	mg/kg	----	<10	<10	----	----
C10 - C14 Fraction	----	50	mg/kg	----	<50	<50	----	----
C15 - C28 Fraction	----	100	mg/kg	----	<100	<100	----	----
C29 - C36 Fraction	----	100	mg/kg	----	<100	<100	----	----
^ C10 - C36 Fraction (sum)	----	50	mg/kg	----	<50	<50	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
C6 - C10 Fraction	C6_C10	10	mg/kg	----	<10	<10	----	----
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg	----	<10	<10	----	----

Analytical Results

Sub-Matrix: **SOIL** (Matrix: **SOIL**)			Client sample ID	**TP5_1.4-1.6**	**TP6_0.3-0.4**	**QC10**	**TP6_0.6-0.7**	**TP6_0.8-0.9**
			Client sampling date / time	06-May-2020 00:00	06-May-2020 00:00	06-May-2020 00:00	06-May-2020 00:00	06-May-2020 00:00
Compound	*CAS Number*	*LOR*	*Unit*	**EM2007842-033**	**EM2007842-037**	**EM2007842-038**	**EM2007842-039**	**EM2007842-040**
				Result	Result	Result	Result	Result
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Continued								
>C10 - C16 Fraction	----	50	mg/kg	----	<50	<50	----	----
>C16 - C34 Fraction	----	100	mg/kg	----	<100	<100	----	----
>C34 - C40 Fraction	----	100	mg/kg	----	<100	<100	----	----
^ **>C10 - C40 Fraction (sum)**	----	50	mg/kg	----	<50	<50	----	----
^ **>C10 - C16 Fraction minus Naphthalene (F2)**	----	50	mg/kg	----	<50	<50	----	----
EP080: BTEXN								
Benzene	71-43-2	0.2	mg/kg	----	<0.2	<0.2	----	----
Toluene	108-88-3	0.5	mg/kg	----	<0.5	<0.5	----	----
Ethylbenzene	100-41-4	0.5	mg/kg	----	<0.5	<0.5	----	----
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	----	<0.5	<0.5	----	----
ortho-Xylene	95-47-6	0.5	mg/kg	----	<0.5	<0.5	----	----
^ **Sum of BTEX**	----	0.2	mg/kg	----	<0.2	<0.2	----	----
^ **Total Xylenes**	----	0.5	mg/kg	----	<0.5	<0.5	----	----
Naphthalene	91-20-3	1	mg/kg	----	<1	<1	----	----
EP068S: Organochlorine Pesticide Surrogate								
Dibromo-DDE	21655-73-2	0.05	%	----	**87.2**	**86.1**	----	----
EP068T: Organophosphorus Pesticide Surrogate								
DEF	78-48-8	0.05	%	----	**67.5**	**68.7**	----	----
EP075(SIM)S: Phenolic Compound Surrogates								
Phenol-d6	13127-88-3	0.5	%	----	**94.6**	**93.0**	----	----
2-Chlorophenol-D4	93951-73-6	0.5	%	----	**98.3**	**96.3**	----	----
2.4.6-Tribromophenol	118-79-6	0.5	%	----	**69.3**	**63.4**	----	----
EP075(SIM)T: PAH Surrogates								
2-Fluorobiphenyl	321-60-8	0.5	%	----	**101**	**96.3**	----	----
Anthracene-d10	1719-06-8	0.5	%	----	**95.8**	**94.1**	----	----
4-Terphenyl-d14	1718-51-0	0.5	%	----	**92.8**	**90.3**	----	----
EP080S: TPH(V)/BTEX Surrogates								
1.2-Dichloroethane-D4	17060-07-0	0.2	%	----	**83.0**	**79.7**	----	----
Toluene-D8	2037-26-5	0.2	%	----	**84.6**	**82.0**	----	----
4-Bromofluorobenzene	460-00-4	0.2	%	----	**110**	**102**	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	TP7_0.3-0.4	TP7_0.7-0.8	TP8_0.2-0.3	TP8_0.6-0.7	TP8_1.0-1.1
			Client sampling date / time	06-May-2020 00:00	06-May-2020 00:00	06-May-2020 00:00	06-May-2020 00:00	06-May-2020 00:00
Compound	CAS Number	LOR	Unit	EM2007842-044	EM2007842-045	EM2007842-050	EM2007842-051	EM2007842-053
				Result	Result	Result	Result	Result
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	1.0	%	13.8	18.5	14.7	20.8	18.5
EG005(ED093)T: Total Metals by ICP-AES								
Barium	7440-39-3	10	mg/kg	----	70	----	90	----
Beryllium	7440-41-7	1	mg/kg	----	<1	----	<1	----
Cobalt	7440-48-4	2	mg/kg	----	3	----	<2	----
Iron	7439-89-6	50	mg/kg	----	28500	----	16300	----
Manganese	7439-96-5	5	mg/kg	----	52	----	15	----
Silver	7440-22-4	2	mg/kg	----	<2	----	<2	----
Arsenic	7440-38-2	5	mg/kg	8	14	11	<5	10
Cadmium	7440-43-9	1	mg/kg	<1	<1	2	<1	<1
Chromium	7440-47-3	2	mg/kg	21	24	18	20	25
Copper	7440-50-8	5	mg/kg	62	12	64	6	9
Lead	7439-92-1	5	mg/kg	10	41	271	<5	21
Nickel	7440-02-0	2	mg/kg	6	5	6	2	4
Zinc	7440-66-6	5	mg/kg	107	60	456	6	51
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	0.7	<0.1	<0.1
EG048: Hexavalent Chromium (Alkaline Digest)								
Hexavalent Chromium	18540-29-9	0.5	mg/kg	----	<0.5	----	<0.5	----
EK026SF: Total CN by Segmented Flow Analyser								
Total Cyanide	57-12-5	1	mg/kg	----	<1	----	<1	----
EP066: Polychlorinated Biphenyls (PCB)								
Total Polychlorinated biphenyls	----	0.1	mg/kg	----	<0.1	----	<0.1	----
EP068A: Organochlorine Pesticides (OC)								
alpha-BHC	319-84-6	0.05	mg/kg	----	<0.05	<0.05	<0.05	----
Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	----	<0.05	<0.05	<0.05	----
beta-BHC	319-85-7	0.05	mg/kg	----	<0.05	<0.05	<0.05	----
gamma-BHC	58-89-9	0.05	mg/kg	----	<0.05	<0.05	<0.05	----
delta-BHC	319-86-8	0.05	mg/kg	----	<0.05	<0.05	<0.05	----
Heptachlor	76-44-8	0.05	mg/kg	----	<0.05	<0.05	<0.05	----
Aldrin	309-00-2	0.05	mg/kg	----	<0.05	<0.05	<0.05	----
Heptachlor epoxide	1024-57-3	0.05	mg/kg	----	<0.05	<0.05	<0.05	----
^ Total Chlordane (sum)	----	0.05	mg/kg	----	<0.05	<0.05	<0.05	----
trans-Chlordane	5103-74-2	0.05	mg/kg	----	<0.05	<0.05	<0.05	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	TP7_0.3-0.4	TP7_0.7-0.8	TP8_0.2-0.3	TP8_0.6-0.7	TP8_1.0-1.1
			Client sampling date / time	06-May-2020 00:00	06-May-2020 00:00	06-May-2020 00:00	06-May-2020 00:00	06-May-2020 00:00
Compound	CAS Number	LOR	Unit	EM2007842-044	EM2007842-045	EM2007842-050	EM2007842-051	EM2007842-053
				Result	Result	Result	Result	Result
EP068A: Organochlorine Pesticides (OC) - Continued								
alpha-Endosulfan	959-98-8	0.05	mg/kg	----	<0.05	<0.05	<0.05	----
cis-Chlordane	5103-71-9	0.05	mg/kg	----	<0.05	<0.05	<0.05	----
Dieldrin	60-57-1	0.05	mg/kg	----	<0.05	<0.05	<0.05	----
4.4`-DDE	72-55-9	0.05	mg/kg	----	<0.05	<0.05	<0.05	----
Endrin	72-20-8	0.05	mg/kg	----	<0.05	<0.05	<0.05	----
beta-Endosulfan	33213-65-9	0.05	mg/kg	----	<0.05	<0.05	<0.05	----
^ Endosulfan (sum)	115-29-7	0.05	mg/kg	----	<0.05	<0.05	<0.05	----
4.4`-DDD	72-54-8	0.05	mg/kg	----	<0.05	<0.05	<0.05	----
Endrin aldehyde	7421-93-4	0.05	mg/kg	----	<0.05	<0.05	<0.05	----
Endosulfan sulfate	1031-07-8	0.05	mg/kg	----	<0.05	<0.05	<0.05	----
4.4`-DDT	50-29-3	0.2	mg/kg	----	<0.2	<0.2	<0.2	----
Endrin ketone	53494-70-5	0.05	mg/kg	----	<0.05	<0.05	<0.05	----
Methoxychlor	72-43-5	0.2	mg/kg	----	<0.2	<0.2	<0.2	----
^ Sum of Aldrin + Dieldrin	309-00-2/60-57-1	0.05	mg/kg	----	<0.05	<0.05	<0.05	----
^ Sum of DDD + DDE + DDT	72-54-8/72-55-9/50-2	0.05	mg/kg	----	<0.05	<0.05	<0.05	----
EP074E: Halogenated Aliphatic Compounds								
Tetrachloroethene	127-18-4	0.5	mg/kg	----	<0.5	----	<0.5	----
EP075(SIM)A: Phenolic Compounds								
Phenol	108-95-2	0.5	mg/kg	----	<0.5	----	<0.5	----
2-Chlorophenol	95-57-8	0.5	mg/kg	----	<0.5	----	<0.5	----
2-Methylphenol	95-48-7	0.5	mg/kg	----	<0.5	----	<0.5	----
3- & 4-Methylphenol	1319-77-3	1	mg/kg	----	<1	----	<1	----
2-Nitrophenol	88-75-5	0.5	mg/kg	----	<0.5	----	<0.5	----
2.4-Dimethylphenol	105-67-9	0.5	mg/kg	----	<0.5	----	<0.5	----
2.4-Dichlorophenol	120-83-2	0.5	mg/kg	----	<0.5	----	<0.5	----
2.6-Dichlorophenol	87-65-0	0.5	mg/kg	----	<0.5	----	<0.5	----
4-Chloro-3-methylphenol	59-50-7	0.5	mg/kg	----	<0.5	----	<0.5	----
2.4.6-Trichlorophenol	88-06-2	0.5	mg/kg	----	<0.5	----	<0.5	----
2.4.5-Trichlorophenol	95-95-4	0.5	mg/kg	----	<0.5	----	<0.5	----
Pentachlorophenol	87-86-5	2	mg/kg	----	<2	----	<2	----
^ Sum of Phenols	----	0.5	mg/kg	----	<0.5	----	<0.5	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	0.5	mg/kg	----	<0.5	<0.5	<0.5	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	TP7_0.3-0.4	TP7_0.7-0.8	TP8_0.2-0.3	TP8_0.6-0.7	TP8_1.0-1.1
			Client sampling date / time	06-May-2020 00:00	06-May-2020 00:00	06-May-2020 00:00	06-May-2020 00:00	06-May-2020 00:00
Compound	CAS Number	LOR	Unit	EM2007842-044	EM2007842-045	EM2007842-050	EM2007842-051	EM2007842-053
				Result	Result	Result	Result	Result
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued								
Acenaphthylene	208-96-8	0.5	mg/kg	----	<0.5	<0.5	<0.5	----
Acenaphthene	83-32-9	0.5	mg/kg	----	<0.5	<0.5	<0.5	----
Fluorene	86-73-7	0.5	mg/kg	----	<0.5	<0.5	<0.5	----
Phenanthrene	85-01-8	0.5	mg/kg	----	<0.5	<0.5	<0.5	----
Anthracene	120-12-7	0.5	mg/kg	----	<0.5	<0.5	<0.5	----
Fluoranthene	206-44-0	0.5	mg/kg	----	<0.5	<0.5	<0.5	----
Pyrene	129-00-0	0.5	mg/kg	----	<0.5	<0.5	<0.5	----
Benz(a)anthracene	56-55-3	0.5	mg/kg	----	<0.5	<0.5	<0.5	----
Chrysene	218-01-9	0.5	mg/kg	----	<0.5	<0.5	<0.5	----
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	----	<0.5	<0.5	<0.5	----
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	----	<0.5	<0.5	<0.5	----
Benzo(a)pyrene	50-32-8	0.5	mg/kg	----	<0.5	<0.5	<0.5	----
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	----	<0.5	<0.5	<0.5	----
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	----	<0.5	<0.5	<0.5	----
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	----	<0.5	<0.5	<0.5	----
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg	----	<0.5	<0.5	<0.5	----
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg	----	<0.5	<0.5	<0.5	----
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg	----	**0.6**	**0.6**	**0.6**	----
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg	----	**1.2**	**1.2**	**1.2**	----
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	10	mg/kg	----	<10	<10	<10	----
C10 - C14 Fraction	----	50	mg/kg	----	<50	<50	<50	----
C15 - C28 Fraction	----	100	mg/kg	----	<100	<100	<100	----
C29 - C36 Fraction	----	100	mg/kg	----	<100	<100	<100	----
^ C10 - C36 Fraction (sum)	----	50	mg/kg	----	<50	<50	<50	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
C6 - C10 Fraction	C6_C10	10	mg/kg	----	<10	<10	<10	----
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg	----	<10	<10	<10	----
>C10 - C16 Fraction	----	50	mg/kg	----	<50	<50	<50	----
>C16 - C34 Fraction	----	100	mg/kg	----	<100	<100	<100	----
>C34 - C40 Fraction	----	100	mg/kg	----	<100	<100	<100	----
^ >C10 - C40 Fraction (sum)	----	50	mg/kg	----	<50	<50	<50	----
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	50	mg/kg	----	<50	<50	<50	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	TP7_0.3-0.4	TP7_0.7-0.8	TP8_0.2-0.3	TP8_0.6-0.7	TP8_1.0-1.1
			Client sampling date / time	06-May-2020 00:00	06-May-2020 00:00	06-May-2020 00:00	06-May-2020 00:00	06-May-2020 00:00
Compound	CAS Number	LOR	Unit	EM2007842-044	EM2007842-045	EM2007842-050	EM2007842-051	EM2007842-053
				Result	Result	Result	Result	Result
EP080: BTEXN								
Benzene	71-43-2	0.2	mg/kg	----	<0.2	<0.2	<0.2	----
Toluene	108-88-3	0.5	mg/kg	----	<0.5	<0.5	<0.5	----
Ethylbenzene	100-41-4	0.5	mg/kg	----	<0.5	<0.5	<0.5	----
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	----	<0.5	<0.5	<0.5	----
ortho-Xylene	95-47-6	0.5	mg/kg	----	<0.5	<0.5	<0.5	----
^ Sum of BTEX	----	0.2	mg/kg	----	<0.2	<0.2	<0.2	----
^ Total Xylenes	----	0.5	mg/kg	----	<0.5	<0.5	<0.5	----
Naphthalene	91-20-3	1	mg/kg	----	<1	<1	<1	----
EP066S: PCB Surrogate								
Decachlorobiphenyl	2051-24-3	0.1	%	----	**92.6**	----	**94.6**	----
EP068S: Organochlorine Pesticide Surrogate								
Dibromo-DDE	21655-73-2	0.05	%	----	**85.6**	**89.0**	**87.5**	----
EP068T: Organophosphorus Pesticide Surrogate								
DEF	78-48-8	0.05	%	----	**68.9**	**73.6**	**73.6**	----
EP074S: VOC Surrogates								
1.2-Dichloroethane-D4	17060-07-0	0.5	%	----	**82.3**	----	**80.2**	----
Toluene-D8	2037-26-5	0.5	%	----	**92.8**	----	**86.8**	----
4-Bromofluorobenzene	460-00-4	0.5	%	----	**96.4**	----	**90.7**	----
EP075(SIM)S: Phenolic Compound Surrogates								
Phenol-d6	13127-88-3	0.5	%	----	**90.5**	**97.2**	**95.2**	----
2-Chlorophenol-D4	93951-73-6	0.5	%	----	**92.5**	**100.0**	**97.2**	----
2.4.6-Tribromophenol	118-79-6	0.5	%	----	**64.7**	**69.7**	**62.6**	----
EP075(SIM)T: PAH Surrogates								
2-Fluorobiphenyl	321-60-8	0.5	%	----	**93.9**	**100**	**96.4**	----
Anthracene-d10	1719-06-8	0.5	%	----	**90.3**	**96.2**	**90.0**	----
4-Terphenyl-d14	1718-51-0	0.5	%	----	**86.6**	**92.4**	**91.4**	----
EP080S: TPH(V)/BTEX Surrogates								
1.2-Dichloroethane-D4	17060-07-0	0.2	%	----	**76.5**	**83.4**	**74.6**	----
Toluene-D8	2037-26-5	0.2	%	----	**91.5**	**85.0**	**85.6**	----
4-Bromofluorobenzene	460-00-4	0.2	%	----	**111**	**108**	**103**	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	TP9_0.2-0.3	TP9_0.6-0.7	TP9_1.0-1.1	TP10_0.2-0.3	QC12
			Client sampling date / time	06-May-2020 00:00	06-May-2020 00:00	06-May-2020 00:00	06-May-2020 00:00	06-May-2020 00:00
Compound	CAS Number	LOR	Unit	EM2007842-057	EM2007842-058	EM2007842-059	EM2007842-062	EM2007842-063
				Result	Result	Result	Result	Result
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	1.0	%	18.3	13.8	18.0	16.4	12.2
EG005(ED093)T: Total Metals by ICP-AES								
Barium	7440-39-3	10	mg/kg	40	----	----	----	----
Beryllium	7440-41-7	1	mg/kg	<1	----	----	----	----
Cobalt	7440-48-4	2	mg/kg	<2	----	----	----	----
Iron	7439-89-6	50	mg/kg	18300	----	----	----	----
Manganese	7439-96-5	5	mg/kg	26	----	----	----	----
Silver	7440-22-4	2	mg/kg	<2	----	----	----	----
Arsenic	7440-38-2	5	mg/kg	6	8	6	8	7
Cadmium	7440-43-9	1	mg/kg	<1	<1	<1	<1	<1
Chromium	7440-47-3	2	mg/kg	20	23	20	19	15
Copper	7440-50-8	5	mg/kg	6	13	9	20	13
Lead	7439-92-1	5	mg/kg	22	6	107	13	83
Nickel	7440-02-0	2	mg/kg	3	4	4	5	4
Zinc	7440-66-6	5	mg/kg	100	22	109	39	129
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	0.2	<0.1	0.3
EG048: Hexavalent Chromium (Alkaline Digest)								
Hexavalent Chromium	18540-29-9	0.5	mg/kg	<0.5	----	----	----	----
EK026SF: Total CN by Segmented Flow Analyser								
Total Cyanide	57-12-5	1	mg/kg	<1	----	----	----	----
EP066: Polychlorinated Biphenyls (PCB)								
Total Polychlorinated biphenyls	----	0.1	mg/kg	<0.1	----	----	----	----
EP068A: Organochlorine Pesticides (OC)								
alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05	----	----	----
Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	<0.05	<0.05	----	----	----
beta-BHC	319-85-7	0.05	mg/kg	<0.05	<0.05	----	----	----
gamma-BHC	58-89-9	0.05	mg/kg	<0.05	<0.05	----	----	----
delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05	----	----	----
Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05	----	----	----
Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05	----	----	----
Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05	----	----	----
^ Total Chlordane (sum)	----	0.05	mg/kg	<0.05	<0.05	----	----	----
trans-Chlordane	5103-74-2	0.05	mg/kg	<0.05	<0.05	----	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	TP9_0.2-0.3	TP9_0.6-0.7	TP9_1.0-1.1	TP10_0.2-0.3	QC12
			Client sampling date / time	06-May-2020 00:00	06-May-2020 00:00	06-May-2020 00:00	06-May-2020 00:00	06-May-2020 00:00
Compound	CAS Number	LOR	Unit	EM2007842-057	EM2007842-058	EM2007842-059	EM2007842-062	EM2007842-063
				Result	Result	Result	Result	Result
EP068A: Organochlorine Pesticides (OC) - Continued								
alpha-Endosulfan	959-98-8	0.05	mg/kg	<0.05	<0.05	----	----	----
cis-Chlordane	5103-71-9	0.05	mg/kg	<0.05	<0.05	----	----	----
Dieldrin	60-57-1	0.05	mg/kg	<0.05	<0.05	----	----	----
4.4`-DDE	72-55-9	0.05	mg/kg	<0.05	<0.05	----	----	----
Endrin	72-20-8	0.05	mg/kg	<0.05	<0.05	----	----	----
beta-Endosulfan	33213-65-9	0.05	mg/kg	<0.05	<0.05	----	----	----
^ Endosulfan (sum)	115-29-7	0.05	mg/kg	<0.05	<0.05	----	----	----
4.4`-DDD	72-54-8	0.05	mg/kg	<0.05	<0.05	----	----	----
Endrin aldehyde	7421-93-4	0.05	mg/kg	<0.05	<0.05	----	----	----
Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	<0.05	----	----	----
4.4`-DDT	50-29-3	0.2	mg/kg	<0.2	<0.2	----	----	----
Endrin ketone	53494-70-5	0.05	mg/kg	<0.05	<0.05	----	----	----
Methoxychlor	72-43-5	0.2	mg/kg	<0.2	<0.2	----	----	----
^ Sum of Aldrin + Dieldrin	309-00-2/60-57-1	0.05	mg/kg	<0.05	<0.05	----	----	----
^ Sum of DDD + DDE + DDT	72-54-8/72-55-9/50-2	0.05	mg/kg	<0.05	<0.05	----	----	----
EP074E: Halogenated Aliphatic Compounds								
Tetrachloroethene	127-18-4	0.5	mg/kg	<0.5	----	----	----	----
EP075(SIM)A: Phenolic Compounds								
Phenol	108-95-2	0.5	mg/kg	<0.5	----	----	----	----
2-Chlorophenol	95-57-8	0.5	mg/kg	<0.5	----	----	----	----
2-Methylphenol	95-48-7	0.5	mg/kg	<0.5	----	----	----	----
3- & 4-Methylphenol	1319-77-3	1	mg/kg	<1	----	----	----	----
2-Nitrophenol	88-75-5	0.5	mg/kg	<0.5	----	----	----	----
2.4-Dimethylphenol	105-67-9	0.5	mg/kg	<0.5	----	----	----	----
2.4-Dichlorophenol	120-83-2	0.5	mg/kg	<0.5	----	----	----	----
2.6-Dichlorophenol	87-65-0	0.5	mg/kg	<0.5	----	----	----	----
4-Chloro-3-methylphenol	59-50-7	0.5	mg/kg	<0.5	----	----	----	----
2.4.6-Trichlorophenol	88-06-2	0.5	mg/kg	<0.5	----	----	----	----
2.4.5-Trichlorophenol	95-95-4	0.5	mg/kg	<0.5	----	----	----	----
Pentachlorophenol	87-86-5	2	mg/kg	<2	----	----	----	----
^ Sum of Phenols	----	0.5	mg/kg	<0.5	----	----	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	----	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	TP9_0.2-0.3	TP9_0.6-0.7	TP9_1.0-1.1	TP10_0.2-0.3	QC12
			Client sampling date / time	06-May-2020 00:00	06-May-2020 00:00	06-May-2020 00:00	06-May-2020 00:00	06-May-2020 00:00
Compound	CAS Number	LOR	Unit	EM2007842-057	EM2007842-058	EM2007842-059	EM2007842-062	EM2007842-063
				Result	Result	Result	Result	Result
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued								
Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	----	----	----
Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	----	----	----
Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	----	----	----
Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5	----	----	----
Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	----	----	----
Fluoranthene	206-44-0	0.5	mg/kg	<0.5	<0.5	----	----	----
Pyrene	129-00-0	0.5	mg/kg	<0.5	<0.5	----	----	----
Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	<0.5	----	----	----
Chrysene	218-01-9	0.5	mg/kg	<0.5	<0.5	----	----	----
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	<0.5	----	----	----
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	<0.5	----	----	----
Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	----	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	----	----	----
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	----	----	----
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	<0.5	----	----	----
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg	<0.5	<0.5	----	----	----
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg	<0.5	<0.5	----	----	----
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg	**0.6**	**0.6**	----	----	----
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg	**1.2**	**1.2**	----	----	----
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	10	mg/kg	<10	<10	----	----	----
C10 - C14 Fraction	----	50	mg/kg	<50	<50	----	----	----
C15 - C28 Fraction	----	100	mg/kg	<100	<100	----	----	----
C29 - C36 Fraction	----	100	mg/kg	<100	<100	----	----	----
^ C10 - C36 Fraction (sum)	----	50	mg/kg	<50	<50	----	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	----	----	----
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg	<10	<10	----	----	----
>C10 - C16 Fraction	----	50	mg/kg	<50	<50	----	----	----
>C16 - C34 Fraction	----	100	mg/kg	<100	<100	----	----	----
>C34 - C40 Fraction	----	100	mg/kg	<100	<100	----	----	----
^ >C10 - C40 Fraction (sum)	----	50	mg/kg	<50	<50	----	----	----
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	50	mg/kg	<50	<50	----	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	TP9_0.2-0.3	TP9_0.6-0.7	TP9_1.0-1.1	TP10_0.2-0.3	QC12
			Client sampling date / time	06-May-2020 00:00	06-May-2020 00:00	06-May-2020 00:00	06-May-2020 00:00	06-May-2020 00:00
Compound	CAS Number	LOR	Unit	EM2007842-057	EM2007842-058	EM2007842-059	EM2007842-062	EM2007842-063
				Result	Result	Result	Result	Result
EP080: BTEXN								
Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	----	----	----
Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	----	----	----
Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	----	----	----
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	----	----	----
ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	----	----	----
^ Sum of BTEX	----	0.2	mg/kg	<0.2	<0.2	----	----	----
^ Total Xylenes	----	0.5	mg/kg	<0.5	<0.5	----	----	----
Naphthalene	91-20-3	1	mg/kg	<1	<1	----	----	----
EP066S: PCB Surrogate								
Decachlorobiphenyl	2051-24-3	0.1	%	**108**	----	----	----	----
EP068S: Organochlorine Pesticide Surrogate								
Dibromo-DDE	21655-73-2	0.05	%	**87.5**	**81.9**	----	----	----
EP068T: Organophosphorus Pesticide Surrogate								
DEF	78-48-8	0.05	%	**72.9**	**68.1**	----	----	----
EP074S: VOC Surrogates								
1.2-Dichloroethane-D4	17060-07-0	0.5	%	**80.0**	----	----	----	----
Toluene-D8	2037-26-5	0.5	%	**90.8**	----	----	----	----
4-Bromofluorobenzene	460-00-4	0.5	%	**91.8**	----	----	----	----
EP075(SIM)S: Phenolic Compound Surrogates								
Phenol-d6	13127-88-3	0.5	%	**92.7**	**89.0**	----	----	----
2-Chlorophenol-D4	93951-73-6	0.5	%	**95.8**	**92.0**	----	----	----
2.4.6-Tribromophenol	118-79-6	0.5	%	**60.0**	**56.8**	----	----	----
EP075(SIM)T: PAH Surrogates								
2-Fluorobiphenyl	321-60-8	0.5	%	**96.8**	**90.9**	----	----	----
Anthracene-d10	1719-06-8	0.5	%	**89.5**	**88.2**	----	----	----
4-Terphenyl-d14	1718-51-0	0.5	%	**90.6**	**84.8**	----	----	----
EP080S: TPH(V)/BTEX Surrogates								
1.2-Dichloroethane-D4	17060-07-0	0.2	%	**74.2**	**82.3**	----	----	----
Toluene-D8	2037-26-5	0.2	%	**89.6**	**84.6**	----	----	----
4-Bromofluorobenzene	460-00-4	0.2	%	**106**	**105**	----	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	TP10_0.7-0.8	TP11_0.2-0.3	TP11_0.6-0.7	TP12_0.2-0.3	TP12_0.6-0.7
			Client sampling date / time	06-May-2020 00:00	06-May-2020 00:00	06-May-2020 00:00	06-May-2020 00:00	06-May-2020 00:00
Compound	CAS Number	LOR	Unit	EM2007842-064	EM2007842-068	EM2007842-069	EM2007842-074	EM2007842-075
				Result	Result	Result	Result	Result
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	1.0	%	18.8	1.3	19.6	10.7	16.7
EG005(ED093)T: Total Metals by ICP-AES								
Barium	7440-39-3	10	mg/kg	----	----	----	----	90
Beryllium	7440-41-7	1	mg/kg	----	----	----	----	<1
Cobalt	7440-48-4	2	mg/kg	----	----	----	----	<2
Iron	7439-89-6	50	mg/kg	----	----	----	----	15700
Manganese	7439-96-5	5	mg/kg	----	----	----	----	34
Silver	7440-22-4	2	mg/kg	----	----	----	----	<2
Arsenic	7440-38-2	5	mg/kg	13	6	8	7	<5
Cadmium	7440-43-9	1	mg/kg	<1	<1	<1	<1	<1
Chromium	7440-47-3	2	mg/kg	16	14	19	9	18
Copper	7440-50-8	5	mg/kg	<5	50	7	9	7
Lead	7439-92-1	5	mg/kg	<5	7	6	<5	<5
Nickel	7440-02-0	2	mg/kg	4	5	4	4	3
Zinc	7440-66-6	5	mg/kg	8	45	12	24	12
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
EG048: Hexavalent Chromium (Alkaline Digest)								
Hexavalent Chromium	18540-29-9	0.5	mg/kg	----	----	----	----	<0.5
EK026SF: Total CN by Segmented Flow Analyser								
Total Cyanide	57-12-5	1	mg/kg	----	----	----	----	<1
EP066: Polychlorinated Biphenyls (PCB)								
Total Polychlorinated biphenyls	----	0.1	mg/kg	----	----	----	----	<0.1
EP068A: Organochlorine Pesticides (OC)								
alpha-BHC	319-84-6	0.05	mg/kg	<0.05	----	<0.05	----	<0.05
Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	<0.05	----	<0.05	----	<0.05
beta-BHC	319-85-7	0.05	mg/kg	<0.05	----	<0.05	----	<0.05
gamma-BHC	58-89-9	0.05	mg/kg	<0.05	----	<0.05	----	<0.05
delta-BHC	319-86-8	0.05	mg/kg	<0.05	----	<0.05	----	<0.05
Heptachlor	76-44-8	0.05	mg/kg	<0.05	----	<0.05	----	<0.05
Aldrin	309-00-2	0.05	mg/kg	<0.05	----	<0.05	----	<0.05
Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	----	<0.05	----	<0.05
^ Total Chlordane (sum)	----	0.05	mg/kg	<0.05	----	<0.05	----	<0.05
trans-Chlordane	5103-74-2	0.05	mg/kg	<0.05	----	<0.05	----	<0.05

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	TP10_0.7-0.8	TP11_0.2-0.3	TP11_0.6-0.7	TP12_0.2-0.3	TP12_0.6-0.7
			Client sampling date / time	06-May-2020 00:00	06-May-2020 00:00	06-May-2020 00:00	06-May-2020 00:00	06-May-2020 00:00
Compound	CAS Number	LOR	Unit	EM2007842-064	EM2007842-068	EM2007842-069	EM2007842-074	EM2007842-075
				Result	Result	Result	Result	Result
EP068A: Organochlorine Pesticides (OC) - Continued								
alpha-Endosulfan	959-98-8	0.05	mg/kg	<0.05	----	<0.05	----	<0.05
cis-Chlordane	5103-71-9	0.05	mg/kg	<0.05	----	<0.05	----	<0.05
Dieldrin	60-57-1	0.05	mg/kg	<0.05	----	<0.05	----	<0.05
4.4`-DDE	72-55-9	0.05	mg/kg	<0.05	----	<0.05	----	<0.05
Endrin	72-20-8	0.05	mg/kg	<0.05	----	<0.05	----	<0.05
beta-Endosulfan	33213-65-9	0.05	mg/kg	<0.05	----	<0.05	----	<0.05
^ Endosulfan (sum)	115-29-7	0.05	mg/kg	<0.05	----	<0.05	----	<0.05
4.4`-DDD	72-54-8	0.05	mg/kg	<0.05	----	<0.05	----	<0.05
Endrin aldehyde	7421-93-4	0.05	mg/kg	<0.05	----	<0.05	----	<0.05
Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	----	<0.05	----	<0.05
4.4`-DDT	50-29-3	0.2	mg/kg	<0.2	----	<0.2	----	<0.2
Endrin ketone	53494-70-5	0.05	mg/kg	<0.05	----	<0.05	----	<0.05
Methoxychlor	72-43-5	0.2	mg/kg	<0.2	----	<0.2	----	<0.2
^ Sum of Aldrin + Dieldrin	309-00-2/60-57-1	0.05	mg/kg	<0.05	----	<0.05	----	<0.05
^ Sum of DDD + DDE + DDT	72-54-8/72-55-9/50-2	0.05	mg/kg	<0.05	----	<0.05	----	<0.05
EP074E: Halogenated Aliphatic Compounds								
Tetrachloroethene	127-18-4	0.5	mg/kg	----	----	----	----	<0.5
EP075(SIM)A: Phenolic Compounds								
Phenol	108-95-2	0.5	mg/kg	----	----	----	----	<0.5
2-Chlorophenol	95-57-8	0.5	mg/kg	----	----	----	----	<0.5
2-Methylphenol	95-48-7	0.5	mg/kg	----	----	----	----	<0.5
3- & 4-Methylphenol	1319-77-3	1	mg/kg	----	----	----	----	<1
2-Nitrophenol	88-75-5	0.5	mg/kg	----	----	----	----	<0.5
2.4-Dimethylphenol	105-67-9	0.5	mg/kg	----	----	----	----	<0.5
2.4-Dichlorophenol	120-83-2	0.5	mg/kg	----	----	----	----	<0.5
2.6-Dichlorophenol	87-65-0	0.5	mg/kg	----	----	----	----	<0.5
4-Chloro-3-methylphenol	59-50-7	0.5	mg/kg	----	----	----	----	<0.5
2.4.6-Trichlorophenol	88-06-2	0.5	mg/kg	----	----	----	----	<0.5
2.4.5-Trichlorophenol	95-95-4	0.5	mg/kg	----	----	----	----	<0.5
Pentachlorophenol	87-86-5	2	mg/kg	----	----	----	----	<2
^ Sum of Phenols	----	0.5	mg/kg	----	----	----	----	<0.5
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	0.5	mg/kg	<0.5	----	<0.5	----	<0.5

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	TP10_0.7-0.8	TP11_0.2-0.3	TP11_0.6-0.7	TP12_0.2-0.3	TP12_0.6-0.7
			Client sampling date / time	06-May-2020 00:00	06-May-2020 00:00	06-May-2020 00:00	06-May-2020 00:00	06-May-2020 00:00
Compound	CAS Number	LOR	Unit	EM2007842-064	EM2007842-068	EM2007842-069	EM2007842-074	EM2007842-075
				Result	Result	Result	Result	Result
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued								
Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	----	<0.5	----	<0.5
Acenaphthene	83-32-9	0.5	mg/kg	<0.5	----	<0.5	----	<0.5
Fluorene	86-73-7	0.5	mg/kg	<0.5	----	<0.5	----	<0.5
Phenanthrene	85-01-8	0.5	mg/kg	<0.5	----	<0.5	----	<0.5
Anthracene	120-12-7	0.5	mg/kg	<0.5	----	<0.5	----	<0.5
Fluoranthene	206-44-0	0.5	mg/kg	<0.5	----	<0.5	----	<0.5
Pyrene	129-00-0	0.5	mg/kg	<0.5	----	<0.5	----	<0.5
Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	----	<0.5	----	<0.5
Chrysene	218-01-9	0.5	mg/kg	<0.5	----	<0.5	----	<0.5
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	----	<0.5	----	<0.5
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	----	<0.5	----	<0.5
Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	----	<0.5	----	<0.5
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	----	<0.5	----	<0.5
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	----	<0.5	----	<0.5
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	----	<0.5	----	<0.5
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg	<0.5	----	<0.5	----	<0.5
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg	<0.5	----	<0.5	----	<0.5
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg	**0.6**	----	**0.6**	----	**0.6**
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg	**1.2**	----	**1.2**	----	**1.2**
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	10	mg/kg	<10	----	<10	----	<10
C10 - C14 Fraction	----	50	mg/kg	<50	----	<50	----	<50
C15 - C28 Fraction	----	100	mg/kg	<100	----	<100	----	<100
C29 - C36 Fraction	----	100	mg/kg	<100	----	<100	----	<100
^ C10 - C36 Fraction (sum)	----	50	mg/kg	<50	----	<50	----	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
C6 - C10 Fraction	C6_C10	10	mg/kg	<10	----	<10	----	<10
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg	<10	----	<10	----	<10
>C10 - C16 Fraction	----	50	mg/kg	<50	----	<50	----	<50
>C16 - C34 Fraction	----	100	mg/kg	<100	----	<100	----	<100
>C34 - C40 Fraction	----	100	mg/kg	<100	----	<100	----	<100
^ >C10 - C40 Fraction (sum)	----	50	mg/kg	<50	----	<50	----	<50
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	50	mg/kg	<50	----	<50	----	<50

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	TP10_0.7-0.8	TP11_0.2-0.3	TP11_0.6-0.7	TP12_0.2-0.3	TP12_0.6-0.7
			Client sampling date / time	06-May-2020 00:00	06-May-2020 00:00	06-May-2020 00:00	06-May-2020 00:00	06-May-2020 00:00
Compound	CAS Number	LOR	Unit	EM2007842-064	EM2007842-068	EM2007842-069	EM2007842-074	EM2007842-075
				Result	Result	Result	Result	Result
EP080: BTEXN								
Benzene	71-43-2	0.2	mg/kg	<0.2	----	<0.2	----	<0.2
Toluene	108-88-3	0.5	mg/kg	<0.5	----	<0.5	----	<0.5
Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	----	<0.5	----	<0.5
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	----	<0.5	----	<0.5
ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	----	<0.5	----	<0.5
^ Sum of BTEX	----	0.2	mg/kg	<0.2	----	<0.2	----	<0.2
^ Total Xylenes	----	0.5	mg/kg	<0.5	----	<0.5	----	<0.5
Naphthalene	91-20-3	1	mg/kg	<1	----	<1	----	<1
EP066S: PCB Surrogate								
Decachlorobiphenyl	2051-24-3	0.1	%	----	----	----	----	**94.1**
EP068S: Organochlorine Pesticide Surrogate								
Dibromo-DDE	21655-73-2	0.05	%	**86.5**	----	**84.0**	----	**86.8**
EP068T: Organophosphorus Pesticide Surrogate								
DEF	78-48-8	0.05	%	**68.5**	----	**68.7**	----	**69.3**
EP074S: VOC Surrogates								
1.2-Dichloroethane-D4	17060-07-0	0.5	%	----	----	----	----	**88.2**
Toluene-D8	2037-26-5	0.5	%	----	----	----	----	**93.2**
4-Bromofluorobenzene	460-00-4	0.5	%	----	----	----	----	**92.9**
EP075(SIM)S: Phenolic Compound Surrogates								
Phenol-d6	13127-88-3	0.5	%	**91.9**	----	**88.3**	----	**95.1**
2-Chlorophenol-D4	93951-73-6	0.5	%	**94.4**	----	**90.2**	----	**97.6**
2.4.6-Tribromophenol	118-79-6	0.5	%	**61.2**	----	**55.7**	----	**59.8**
EP075(SIM)T: PAH Surrogates								
2-Fluorobiphenyl	321-60-8	0.5	%	**94.2**	----	**91.4**	----	**96.8**
Anthracene-d10	1719-06-8	0.5	%	**91.7**	----	**88.0**	----	**94.2**
4-Terphenyl-d14	1718-51-0	0.5	%	**87.6**	----	**83.4**	----	**89.0**
EP080S: TPH(V)/BTEX Surrogates								
1.2-Dichloroethane-D4	17060-07-0	0.2	%	**77.2**	----	**82.8**	----	**82.0**
Toluene-D8	2037-26-5	0.2	%	**80.7**	----	**86.6**	----	**92.0**
4-Bromofluorobenzene	460-00-4	0.2	%	**102**	----	**110**	----	**107**

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	QC13	TP13_0.1-0.2	TP14_0.1-0.2	TP14_0.5-0.6	TP16_0.1-0.2
			Client sampling date / time	06-May-2020 00:00	07-May-2020 00:00	07-May-2020 00:00	07-May-2020 00:00	07-May-2020 00:00
Compound	CAS Number	LOR	Unit	EM2007842-076	EM2007842-081	EM2007842-083	EM2007842-084	EM2007842-089
				Result	Result	Result	Result	Result
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	1.0	%	17.2	24.0	7.8	8.1	21.0
EG005(ED093)T: Total Metals by ICP-AES								
Barium	7440-39-3	10	mg/kg	80	----	----	----	----
Beryllium	7440-41-7	1	mg/kg	<1	----	----	----	----
Cobalt	7440-48-4	2	mg/kg	4	----	----	----	----
Iron	7439-89-6	50	mg/kg	21500	----	----	----	----
Manganese	7439-96-5	5	mg/kg	53	----	----	----	----
Silver	7440-22-4	2	mg/kg	<2	----	----	----	----
Arsenic	7440-38-2	5	mg/kg	6	6	10	11	6
Cadmium	7440-43-9	1	mg/kg	<1	<1	<1	<1	<1
Chromium	7440-47-3	2	mg/kg	20	19	6	6	15
Copper	7440-50-8	5	mg/kg	12	9	<5	<5	8
Lead	7439-92-1	5	mg/kg	<5	<5	<5	<5	<5
Nickel	7440-02-0	2	mg/kg	5	3	2	2	3
Zinc	7440-66-6	5	mg/kg	20	9	12	10	15
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
EG048: Hexavalent Chromium (Alkaline Digest)								
Hexavalent Chromium	18540-29-9	0.5	mg/kg	<0.5	----	----	----	----
EK026SF: Total CN by Segmented Flow Analyser								
Total Cyanide	57-12-5	1	mg/kg	<1	----	----	----	----
EP066: Polychlorinated Biphenyls (PCB)								
Total Polychlorinated biphenyls	----	0.1	mg/kg	<0.1	----	----	----	----
EP068A: Organochlorine Pesticides (OC)								
alpha-BHC	319-84-6	0.05	mg/kg	<0.05	----	----	<0.05	----
Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	<0.05	----	----	<0.05	----
beta-BHC	319-85-7	0.05	mg/kg	<0.05	----	----	<0.05	----
gamma-BHC	58-89-9	0.05	mg/kg	<0.05	----	----	<0.05	----
delta-BHC	319-86-8	0.05	mg/kg	<0.05	----	----	<0.05	----
Heptachlor	76-44-8	0.05	mg/kg	<0.05	----	----	<0.05	----
Aldrin	309-00-2	0.05	mg/kg	<0.05	----	----	<0.05	----
Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	----	----	<0.05	----
^ Total Chlordane (sum)	----	0.05	mg/kg	<0.05	----	----	<0.05	----
trans-Chlordane	5103-74-2	0.05	mg/kg	<0.05	----	----	<0.05	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	QC13	TP13_0.1-0.2	TP14_0.1-0.2	TP14_0.5-0.6	TP16_0.1-0.2
			Client sampling date / time	06-May-2020 00:00	07-May-2020 00:00	07-May-2020 00:00	07-May-2020 00:00	07-May-2020 00:00
Compound	CAS Number	LOR	Unit	EM2007842-076	EM2007842-081	EM2007842-083	EM2007842-084	EM2007842-089
				Result	Result	Result	Result	Result
EP068A: Organochlorine Pesticides (OC) - Continued								
alpha-Endosulfan	959-98-8	0.05	mg/kg	<0.05	----	----	<0.05	----
cis-Chlordane	5103-71-9	0.05	mg/kg	<0.05	----	----	<0.05	----
Dieldrin	60-57-1	0.05	mg/kg	<0.05	----	----	<0.05	----
4.4`-DDE	72-55-9	0.05	mg/kg	<0.05	----	----	<0.05	----
Endrin	72-20-8	0.05	mg/kg	<0.05	----	----	<0.05	----
beta-Endosulfan	33213-65-9	0.05	mg/kg	<0.05	----	----	<0.05	----
^ Endosulfan (sum)	115-29-7	0.05	mg/kg	<0.05	----	----	<0.05	----
4.4`-DDD	72-54-8	0.05	mg/kg	<0.05	----	----	<0.05	----
Endrin aldehyde	7421-93-4	0.05	mg/kg	<0.05	----	----	<0.05	----
Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	----	----	<0.05	----
4.4`-DDT	50-29-3	0.2	mg/kg	<0.2	----	----	<0.2	----
Endrin ketone	53494-70-5	0.05	mg/kg	<0.05	----	----	<0.05	----
Methoxychlor	72-43-5	0.2	mg/kg	<0.2	----	----	<0.2	----
^ Sum of Aldrin + Dieldrin	309-00-2/60-57-1	0.05	mg/kg	<0.05	----	----	<0.05	----
^ Sum of DDD + DDE + DDT	72-54-8/72-55-9/50-2	0.05	mg/kg	<0.05	----	----	<0.05	----
EP074E: Halogenated Aliphatic Compounds								
Tetrachloroethene	127-18-4	0.5	mg/kg	<0.5	----	----	----	----
EP075(SIM)A: Phenolic Compounds								
Phenol	108-95-2	0.5	mg/kg	<0.5	----	----	----	----
2-Chlorophenol	95-57-8	0.5	mg/kg	<0.5	----	----	----	----
2-Methylphenol	95-48-7	0.5	mg/kg	<0.5	----	----	----	----
3- & 4-Methylphenol	1319-77-3	1	mg/kg	<1	----	----	----	----
2-Nitrophenol	88-75-5	0.5	mg/kg	<0.5	----	----	----	----
2.4-Dimethylphenol	105-67-9	0.5	mg/kg	<0.5	----	----	----	----
2.4-Dichlorophenol	120-83-2	0.5	mg/kg	<0.5	----	----	----	----
2.6-Dichlorophenol	87-65-0	0.5	mg/kg	<0.5	----	----	----	----
4-Chloro-3-methylphenol	59-50-7	0.5	mg/kg	<0.5	----	----	----	----
2.4.6-Trichlorophenol	88-06-2	0.5	mg/kg	<0.5	----	----	----	----
2.4.5-Trichlorophenol	95-95-4	0.5	mg/kg	<0.5	----	----	----	----
Pentachlorophenol	87-86-5	2	mg/kg	<2	----	----	----	----
^ Sum of Phenols	----	0.5	mg/kg	<0.5	----	----	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	0.5	mg/kg	<0.5	----	----	<0.5	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	QC13	TP13_0.1-0.2	TP14_0.1-0.2	TP14_0.5-0.6	TP16_0.1-0.2
			Client sampling date / time	06-May-2020 00:00	07-May-2020 00:00	07-May-2020 00:00	07-May-2020 00:00	07-May-2020 00:00
Compound	CAS Number	LOR	Unit	EM2007842-076	EM2007842-081	EM2007842-083	EM2007842-084	EM2007842-089
				Result	Result	Result	Result	Result
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued								
Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	----	----	<0.5	----
Acenaphthene	83-32-9	0.5	mg/kg	<0.5	----	----	<0.5	----
Fluorene	86-73-7	0.5	mg/kg	<0.5	----	----	<0.5	----
Phenanthrene	85-01-8	0.5	mg/kg	<0.5	----	----	<0.5	----
Anthracene	120-12-7	0.5	mg/kg	<0.5	----	----	<0.5	----
Fluoranthene	206-44-0	0.5	mg/kg	<0.5	----	----	<0.5	----
Pyrene	129-00-0	0.5	mg/kg	<0.5	----	----	<0.5	----
Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	----	----	<0.5	----
Chrysene	218-01-9	0.5	mg/kg	<0.5	----	----	<0.5	----
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	----	----	<0.5	----
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	----	----	<0.5	----
Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	----	----	<0.5	----
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	----	----	<0.5	----
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	----	----	<0.5	----
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	----	----	<0.5	----
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg	<0.5	----	----	<0.5	----
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg	<0.5	----	----	<0.5	----
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg	**0.6**	----	----	**0.6**	----
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg	**1.2**	----	----	**1.2**	----
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	10	mg/kg	<10	----	----	<10	----
C10 - C14 Fraction	----	50	mg/kg	<50	----	----	<50	----
C15 - C28 Fraction	----	100	mg/kg	<100	----	----	<100	----
C29 - C36 Fraction	----	100	mg/kg	<100	----	----	<100	----
^ C10 - C36 Fraction (sum)	----	50	mg/kg	<50	----	----	<50	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
C6 - C10 Fraction	C6_C10	10	mg/kg	<10	----	----	<10	----
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg	<10	----	----	<10	----
>C10 - C16 Fraction	----	50	mg/kg	<50	----	----	<50	----
>C16 - C34 Fraction	----	100	mg/kg	<100	----	----	<100	----
>C34 - C40 Fraction	----	100	mg/kg	<100	----	----	<100	----
^ >C10 - C40 Fraction (sum)	----	50	mg/kg	<50	----	----	<50	----
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	50	mg/kg	<50	----	----	<50	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	QC13	TP13_0.1-0.2	TP14_0.1-0.2	TP14_0.5-0.6	TP16_0.1-0.2
			Client sampling date / time	06-May-2020 00:00	07-May-2020 00:00	07-May-2020 00:00	07-May-2020 00:00	07-May-2020 00:00
Compound	CAS Number	LOR	Unit	EM2007842-076	EM2007842-081	EM2007842-083	EM2007842-084	EM2007842-089
				Result	Result	Result	Result	Result
EP080: BTEXN								
Benzene	71-43-2	0.2	mg/kg	<0.2	----	----	<0.2	----
Toluene	108-88-3	0.5	mg/kg	<0.5	----	----	<0.5	----
Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	----	----	<0.5	----
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	----	----	<0.5	----
ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	----	----	<0.5	----
^ Sum of BTEX	----	0.2	mg/kg	<0.2	----	----	<0.2	----
^ Total Xylenes	----	0.5	mg/kg	<0.5	----	----	<0.5	----
Naphthalene	91-20-3	1	mg/kg	<1	----	----	<1	----
EP066S: PCB Surrogate								
Decachlorobiphenyl	2051-24-3	0.1	%	93.9	----	----	----	----
EP068S: Organochlorine Pesticide Surrogate								
Dibromo-DDE	21655-73-2	0.05	%	84.8	----	----	84.5	----
EP068T: Organophosphorus Pesticide Surrogate								
DEF	78-48-8	0.05	%	68.4	----	----	67.2	----
EP074S: VOC Surrogates								
1.2-Dichloroethane-D4	17060-07-0	0.5	%	80.1	----	----	----	----
Toluene-D8	2037-26-5	0.5	%	90.8	----	----	----	----
4-Bromofluorobenzene	460-00-4	0.5	%	97.0	----	----	----	----
EP075(SIM)S: Phenolic Compound Surrogates								
Phenol-d6	13127-88-3	0.5	%	94.2	----	----	92.6	----
2-Chlorophenol-D4	93951-73-6	0.5	%	96.6	----	----	95.8	----
2.4.6-Tribromophenol	118-79-6	0.5	%	65.5	----	----	56.4	----
EP075(SIM)T: PAH Surrogates								
2-Fluorobiphenyl	321-60-8	0.5	%	96.6	----	----	94.8	----
Anthracene-d10	1719-06-8	0.5	%	93.8	----	----	87.7	----
4-Terphenyl-d14	1718-51-0	0.5	%	89.7	----	----	90.0	----
EP080S: TPH(V)/BTEX Surrogates								
1.2-Dichloroethane-D4	17060-07-0	0.2	%	74.4	----	----	82.4	----
Toluene-D8	2037-26-5	0.2	%	89.6	----	----	86.0	----
4-Bromofluorobenzene	460-00-4	0.2	%	110	----	----	108	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	TP16_0.4-0.5	TP17_0.2-0.3	TP17_0.6-0.7	TP17_1.0-1.1	QC15
			Client sampling date / time	07-May-2020 00:00	07-May-2020 00:00	07-May-2020 00:00	07-May-2020 00:00	07-May-2020 00:00
Compound	CAS Number	LOR	Unit	EM2007842-090	EM2007842-093	EM2007842-094	EM2007842-095	EM2007842-096
				Result	Result	Result	Result	Result
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	1.0	%	18.2	17.1	13.0	16.7	13.4
EG005(ED093)T: Total Metals by ICP-AES								
Barium	7440-39-3	10	mg/kg	----	----	80	----	----
Beryllium	7440-41-7	1	mg/kg	----	----	<1	----	----
Cobalt	7440-48-4	2	mg/kg	----	----	6	----	----
Iron	7439-89-6	50	mg/kg	----	----	15300	----	----
Manganese	7439-96-5	5	mg/kg	----	----	69	----	----
Silver	7440-22-4	2	mg/kg	----	----	<2	----	----
Arsenic	7440-38-2	5	mg/kg	8	10	9	8	12
Cadmium	7440-43-9	1	mg/kg	<1	<1	<1	<1	<1
Chromium	7440-47-3	2	mg/kg	21	16	17	16	17
Copper	7440-50-8	5	mg/kg	7	169	23	10	35
Lead	7439-92-1	5	mg/kg	<5	15	6	6	16
Nickel	7440-02-0	2	mg/kg	5	10	6	5	7
Zinc	7440-66-6	5	mg/kg	17	147	31	16	48
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
EG048: Hexavalent Chromium (Alkaline Digest)								
Hexavalent Chromium	18540-29-9	0.5	mg/kg	----	----	<0.5	----	----
EK026SF: Total CN by Segmented Flow Analyser								
Total Cyanide	57-12-5	1	mg/kg	----	----	<1	----	----
EP066: Polychlorinated Biphenyls (PCB)								
Total Polychlorinated biphenyls	----	0.1	mg/kg	----	----	<0.1	----	----
EP068A: Organochlorine Pesticides (OC)								
alpha-BHC	319-84-6	0.05	mg/kg	<0.05	----	<0.05	<0.05	<0.05
Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	<0.05	----	<0.05	<0.05	<0.05
beta-BHC	319-85-7	0.05	mg/kg	<0.05	----	<0.05	<0.05	<0.05
gamma-BHC	58-89-9	0.05	mg/kg	<0.05	----	<0.05	<0.05	<0.05
delta-BHC	319-86-8	0.05	mg/kg	<0.05	----	<0.05	<0.05	<0.05
Heptachlor	76-44-8	0.05	mg/kg	<0.05	----	<0.05	<0.05	<0.05
Aldrin	309-00-2	0.05	mg/kg	<0.05	----	<0.05	<0.05	<0.05
Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	----	<0.05	<0.05	<0.05
^ Total Chlordane (sum)	----	0.05	mg/kg	<0.05	----	<0.05	<0.05	<0.05
trans-Chlordane	5103-74-2	0.05	mg/kg	<0.05	----	<0.05	<0.05	<0.05

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	TP16_0.4-0.5	TP17_0.2-0.3	TP17_0.6-0.7	TP17_1.0-1.1	QC15
			Client sampling date / time	07-May-2020 00:00	07-May-2020 00:00	07-May-2020 00:00	07-May-2020 00:00	07-May-2020 00:00
Compound	CAS Number	LOR	Unit	EM2007842-090	EM2007842-093	EM2007842-094	EM2007842-095	EM2007842-096
				Result	Result	Result	Result	Result
EP068A: Organochlorine Pesticides (OC) - Continued								
alpha-Endosulfan	959-98-8	0.05	mg/kg	<0.05	----	<0.05	<0.05	<0.05
cis-Chlordane	5103-71-9	0.05	mg/kg	<0.05	----	<0.05	<0.05	<0.05
Dieldrin	60-57-1	0.05	mg/kg	<0.05	----	<0.05	<0.05	<0.05
4.4`-DDE	72-55-9	0.05	mg/kg	<0.05	----	<0.05	<0.05	<0.05
Endrin	72-20-8	0.05	mg/kg	<0.05	----	<0.05	<0.05	<0.05
beta-Endosulfan	33213-65-9	0.05	mg/kg	<0.05	----	<0.05	<0.05	<0.05
^ Endosulfan (sum)	115-29-7	0.05	mg/kg	<0.05	----	<0.05	<0.05	<0.05
4.4`-DDD	72-54-8	0.05	mg/kg	<0.05	----	<0.05	<0.05	<0.05
Endrin aldehyde	7421-93-4	0.05	mg/kg	<0.05	----	<0.05	<0.05	<0.05
Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	----	<0.05	<0.05	<0.05
4.4`-DDT	50-29-3	0.2	mg/kg	<0.2	----	<0.2	<0.2	<0.2
Endrin ketone	53494-70-5	0.05	mg/kg	<0.05	----	<0.05	<0.05	<0.05
Methoxychlor	72-43-5	0.2	mg/kg	<0.2	----	<0.2	<0.2	<0.2
^ Sum of Aldrin + Dieldrin	309-00-2/60-57-1	0.05	mg/kg	<0.05	----	<0.05	<0.05	<0.05
^ Sum of DDD + DDE + DDT	72-54-8/72-55-9/50-2	0.05	mg/kg	<0.05	----	<0.05	<0.05	<0.05
EP074E: Halogenated Aliphatic Compounds								
Tetrachloroethene	127-18-4	0.5	mg/kg	----	----	<0.5	----	----
EP075(SIM)A: Phenolic Compounds								
Phenol	108-95-2	0.5	mg/kg	----	----	<0.5	----	----
2-Chlorophenol	95-57-8	0.5	mg/kg	----	----	<0.5	----	----
2-Methylphenol	95-48-7	0.5	mg/kg	----	----	<0.5	----	----
3- & 4-Methylphenol	1319-77-3	1	mg/kg	----	----	<1	----	----
2-Nitrophenol	88-75-5	0.5	mg/kg	----	----	<0.5	----	----
2.4-Dimethylphenol	105-67-9	0.5	mg/kg	----	----	<0.5	----	----
2.4-Dichlorophenol	120-83-2	0.5	mg/kg	----	----	<0.5	----	----
2.6-Dichlorophenol	87-65-0	0.5	mg/kg	----	----	<0.5	----	----
4-Chloro-3-methylphenol	59-50-7	0.5	mg/kg	----	----	<0.5	----	----
2.4.6-Trichlorophenol	88-06-2	0.5	mg/kg	----	----	<0.5	----	----
2.4.5-Trichlorophenol	95-95-4	0.5	mg/kg	----	----	<0.5	----	----
Pentachlorophenol	87-86-5	2	mg/kg	----	----	<2	----	----
^ Sum of Phenols	----	0.5	mg/kg	----	----	<0.5	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	0.5	mg/kg	<0.5	----	<0.5	<0.5	<0.5

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	TP16_0.4-0.5	TP17_0.2-0.3	TP17_0.6-0.7	TP17_1.0-1.1	QC15
			Client sampling date / time	07-May-2020 00:00	07-May-2020 00:00	07-May-2020 00:00	07-May-2020 00:00	07-May-2020 00:00
Compound	CAS Number	LOR	Unit	EM2007842-090	EM2007842-093	EM2007842-094	EM2007842-095	EM2007842-096
				Result	Result	Result	Result	Result
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued								
Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	----	<0.5	<0.5	<0.5
Acenaphthene	83-32-9	0.5	mg/kg	<0.5	----	<0.5	<0.5	<0.5
Fluorene	86-73-7	0.5	mg/kg	<0.5	----	<0.5	<0.5	<0.5
Phenanthrene	85-01-8	0.5	mg/kg	<0.5	----	<0.5	<0.5	<0.5
Anthracene	120-12-7	0.5	mg/kg	<0.5	----	<0.5	<0.5	<0.5
Fluoranthene	206-44-0	0.5	mg/kg	<0.5	----	<0.5	<0.5	<0.5
Pyrene	129-00-0	0.5	mg/kg	<0.5	----	<0.5	<0.5	<0.5
Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	----	<0.5	<0.5	<0.5
Chrysene	218-01-9	0.5	mg/kg	<0.5	----	<0.5	<0.5	<0.5
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	----	<0.5	<0.5	<0.5
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	----	<0.5	<0.5	<0.5
Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	----	<0.5	<0.5	<0.5
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	----	<0.5	<0.5	<0.5
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	----	<0.5	<0.5	<0.5
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	----	<0.5	<0.5	<0.5
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg	<0.5	----	<0.5	<0.5	<0.5
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg	<0.5	----	<0.5	<0.5	<0.5
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg	**0.6**	----	**0.6**	**0.6**	**0.6**
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg	**1.2**	----	**1.2**	**1.2**	**1.2**
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	10	mg/kg	<10	----	<10	<10	<10
C10 - C14 Fraction	----	50	mg/kg	<50	----	<50	<50	<50
C15 - C28 Fraction	----	100	mg/kg	<100	----	<100	<100	<100
C29 - C36 Fraction	----	100	mg/kg	<100	----	<100	<100	<100
^ C10 - C36 Fraction (sum)	----	50	mg/kg	<50	----	<50	<50	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
C6 - C10 Fraction	C6_C10	10	mg/kg	<10	----	<10	<10	<10
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg	<10	----	<10	<10	<10
>C10 - C16 Fraction	----	50	mg/kg	<50	----	<50	<50	<50
>C16 - C34 Fraction	----	100	mg/kg	<100	----	<100	<100	<100
>C34 - C40 Fraction	----	100	mg/kg	<100	----	<100	<100	<100
^ >C10 - C40 Fraction (sum)	----	50	mg/kg	<50	----	<50	<50	<50
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	50	mg/kg	<50	----	<50	<50	<50

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	TP16_0.4-0.5	TP17_0.2-0.3	TP17_0.6-0.7	TP17_1.0-1.1	QC15
			Client sampling date / time	07-May-2020 00:00	07-May-2020 00:00	07-May-2020 00:00	07-May-2020 00:00	07-May-2020 00:00
Compound	CAS Number	LOR	Unit	EM2007842-090	EM2007842-093	EM2007842-094	EM2007842-095	EM2007842-096
				Result	Result	Result	Result	Result
EP080: BTEXN								
Benzene	71-43-2	0.2	mg/kg	<0.2	----	<0.2	<0.2	<0.2
Toluene	108-88-3	0.5	mg/kg	<0.5	----	<0.5	<0.5	<0.5
Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	----	<0.5	<0.5	<0.5
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	----	<0.5	<0.5	<0.5
ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	----	<0.5	<0.5	<0.5
^ Sum of BTEX	----	0.2	mg/kg	<0.2	----	<0.2	<0.2	<0.2
^ Total Xylenes	----	0.5	mg/kg	<0.5	----	<0.5	<0.5	<0.5
Naphthalene	91-20-3	1	mg/kg	<1	----	<1	<1	<1
EP066S: PCB Surrogate								
Decachlorobiphenyl	2051-24-3	0.1	%	----	----	**92.9**	----	----
EP068S: Organochlorine Pesticide Surrogate								
Dibromo-DDE	21655-73-2	0.05	%	**81.8**	----	**85.6**	**80.7**	**82.8**
EP068T: Organophosphorus Pesticide Surrogate								
DEF	78-48-8	0.05	%	**67.4**	----	**73.5**	**70.6**	**71.6**
EP074S: VOC Surrogates								
1.2-Dichloroethane-D4	17060-07-0	0.5	%	----	----	**85.2**	----	----
Toluene-D8	2037-26-5	0.5	%	----	----	**90.4**	----	----
4-Bromofluorobenzene	460-00-4	0.5	%	----	----	**95.4**	----	----
EP075(SIM)S: Phenolic Compound Surrogates								
Phenol-d6	13127-88-3	0.5	%	**94.3**	----	**93.2**	**88.4**	**87.6**
2-Chlorophenol-D4	93951-73-6	0.5	%	**96.4**	----	**95.6**	**91.1**	**90.5**
2.4.6-Tribromophenol	118-79-6	0.5	%	**58.6**	----	**64.0**	**60.4**	**57.4**
EP075(SIM)T: PAH Surrogates								
2-Fluorobiphenyl	321-60-8	0.5	%	**95.7**	----	**95.7**	**90.4**	**92.2**
Anthracene-d10	1719-06-8	0.5	%	**89.9**	----	**91.5**	**88.2**	**85.1**
4-Terphenyl-d14	1718-51-0	0.5	%	**92.2**	----	**88.2**	**84.4**	**79.6**
EP080S: TPH(V)/BTEX Surrogates								
1.2-Dichloroethane-D4	17060-07-0	0.2	%	**81.0**	----	**79.3**	**80.5**	**75.1**
Toluene-D8	2037-26-5	0.2	%	**87.2**	----	**89.2**	**88.3**	**78.8**
4-Bromofluorobenzene	460-00-4	0.2	%	**109**	----	**108**	**112**	**82.6**

Analytical Results

Sub-Matrix: **SOIL** (Matrix: **SOIL**)			Client sample ID	**TP20_0.5-0.6**	**TP20_0.8-0.9**	**TP22_0.2-0.3**	**TP22_0.6-0.7**	**TP23_0.8-0.9**
			Client sampling date / time	07-May-2020 00:00	07-May-2020 00:00	07-May-2020 00:00	07-May-2020 00:00	07-May-2020 00:00
Compound	CAS Number	LOR	Unit	**EM2007842-105**	**EM2007842-106**	**EM2007842-113**	**EM2007842-114**	**EM2007842-119**
				Result	Result	Result	Result	Result
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	1.0	%	**11.5**	**8.4**	**17.2**	**16.9**	**5.9**
EG005(ED093)T: Total Metals by ICP-AES								
Arsenic	7440-38-2	5	mg/kg	<5	<5	**6**	**7**	<5
Cadmium	7440-43-9	1	mg/kg	<1	<1	<1	<1	<1
Chromium	7440-47-3	2	mg/kg	**10**	**6**	**19**	**20**	**5**
Copper	7440-50-8	5	mg/kg	<5	**6**	**7**	**7**	<5
Lead	7439-92-1	5	mg/kg	<5	<5	<5	**6**	<5
Nickel	7440-02-0	2	mg/kg	**5**	**3**	**5**	**6**	<2
Zinc	7440-66-6	5	mg/kg	**17**	**13**	**17**	**18**	**11**
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
EP068A: Organochlorine Pesticides (OC)								
alpha-BHC	319-84-6	0.05	mg/kg	----	<0.05	<0.05	----	<0.05
Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	----	<0.05	<0.05	----	<0.05
beta-BHC	319-85-7	0.05	mg/kg	----	<0.05	<0.05	----	<0.05
gamma-BHC	58-89-9	0.05	mg/kg	----	<0.05	<0.05	----	<0.05
delta-BHC	319-86-8	0.05	mg/kg	----	<0.05	<0.05	----	<0.05
Heptachlor	76-44-8	0.05	mg/kg	----	<0.05	<0.05	----	<0.05
Aldrin	309-00-2	0.05	mg/kg	----	<0.05	<0.05	----	<0.05
Heptachlor epoxide	1024-57-3	0.05	mg/kg	----	<0.05	<0.05	----	<0.05
^ **Total Chlordane (sum)**	----	0.05	mg/kg	----	<0.05	<0.05	----	<0.05
trans-Chlordane	5103-74-2	0.05	mg/kg	----	<0.05	<0.05	----	<0.05
alpha-Endosulfan	959-98-8	0.05	mg/kg	----	<0.05	<0.05	----	<0.05
cis-Chlordane	5103-71-9	0.05	mg/kg	----	<0.05	<0.05	----	<0.05
Dieldrin	60-57-1	0.05	mg/kg	----	<0.05	<0.05	----	<0.05
4.4`-DDE	72-55-9	0.05	mg/kg	----	<0.05	<0.05	----	<0.05
Endrin	72-20-8	0.05	mg/kg	----	<0.05	<0.05	----	<0.05
beta-Endosulfan	33213-65-9	0.05	mg/kg	----	<0.05	<0.05	----	<0.05
^ **Endosulfan (sum)**	115-29-7	0.05	mg/kg	----	<0.05	<0.05	----	<0.05
4.4`-DDD	72-54-8	0.05	mg/kg	----	<0.05	<0.05	----	<0.05
Endrin aldehyde	7421-93-4	0.05	mg/kg	----	<0.05	<0.05	----	<0.05
Endosulfan sulfate	1031-07-8	0.05	mg/kg	----	<0.05	<0.05	----	<0.05
4.4`-DDT	50-29-3	0.2	mg/kg	----	<0.2	<0.2	----	<0.2
Endrin ketone	53494-70-5	0.05	mg/kg	----	<0.05	<0.05	----	<0.05

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)

Compound	CAS Number	LOR	Unit	TP20_0.5-0.6	TP20_0.8-0.9	TP22_0.2-0.3	TP22_0.6-0.7	TP23_0.8-0.9
Client sampling date / time				07-May-2020 00:00	07-May-2020 00:00	07-May-2020 00:00	07-May-2020 00:00	07-May-2020 00:00
				EM2007842-105	EM2007842-106	EM2007842-113	EM2007842-114	EM2007842-119
				Result	Result	Result	Result	Result
EP068A: Organochlorine Pesticides (OC) - Continued								
Methoxychlor	72-43-5	0.2	mg/kg	----	<0.2	<0.2	----	<0.2
^ Sum of Aldrin + Dieldrin	309-00-2/60-57-1	0.05	mg/kg	----	<0.05	<0.05	----	<0.05
^ Sum of DDD + DDE + DDT	72-54-8/72-55-9/50-2	0.05	mg/kg	----	<0.05	<0.05	----	<0.05
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	0.5	mg/kg	----	<0.5	<0.5	----	<0.5
Acenaphthylene	208-96-8	0.5	mg/kg	----	<0.5	<0.5	----	<0.5
Acenaphthene	83-32-9	0.5	mg/kg	----	<0.5	<0.5	----	<0.5
Fluorene	86-73-7	0.5	mg/kg	----	<0.5	<0.5	----	<0.5
Phenanthrene	85-01-8	0.5	mg/kg	----	<0.5	<0.5	----	<0.5
Anthracene	120-12-7	0.5	mg/kg	----	<0.5	<0.5	----	<0.5
Fluoranthene	206-44-0	0.5	mg/kg	----	<0.5	<0.5	----	<0.5
Pyrene	129-00-0	0.5	mg/kg	----	<0.5	<0.5	----	<0.5
Benz(a)anthracene	56-55-3	0.5	mg/kg	----	<0.5	<0.5	----	<0.5
Chrysene	218-01-9	0.5	mg/kg	----	<0.5	<0.5	----	<0.5
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	----	<0.5	<0.5	----	<0.5
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	----	<0.5	<0.5	----	<0.5
Benzo(a)pyrene	50-32-8	0.5	mg/kg	----	<0.5	<0.5	----	<0.5
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	----	<0.5	<0.5	----	<0.5
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	----	<0.5	<0.5	----	<0.5
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	----	<0.5	<0.5	----	<0.5
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg	----	<0.5	<0.5	----	<0.5
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg	----	<0.5	<0.5	----	<0.5
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg	----	**0.6**	**0.6**	----	**0.6**
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg	----	**1.2**	**1.2**	----	**1.2**
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	10	mg/kg	----	<10	<10	----	<10
C10 - C14 Fraction	----	50	mg/kg	----	<50	<50	----	<50
C15 - C28 Fraction	----	100	mg/kg	----	<100	<100	----	<100
C29 - C36 Fraction	----	100	mg/kg	----	<100	<100	----	<100
^ C10 - C36 Fraction (sum)	----	50	mg/kg	----	<50	<50	----	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
C6 - C10 Fraction	C6_C10	10	mg/kg	----	<10	<10	----	<10
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg	----	<10	<10	----	<10

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	TP20_0.5-0.6	TP20_0.8-0.9	TP22_0.2-0.3	TP22_0.6-0.7	TP23_0.8-0.9
			Client sampling date / time	07-May-2020 00:00	07-May-2020 00:00	07-May-2020 00:00	07-May-2020 00:00	07-May-2020 00:00
Compound	CAS Number	LOR	Unit	EM2007842-105	EM2007842-106	EM2007842-113	EM2007842-114	EM2007842-119
				Result	Result	Result	Result	Result
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Continued								
>C10 - C16 Fraction	----	50	mg/kg	----	<50	<50	----	<50
>C16 - C34 Fraction	----	100	mg/kg	----	<100	<100	----	<100
>C34 - C40 Fraction	----	100	mg/kg	----	<100	<100	----	<100
^ >C10 - C40 Fraction (sum)	----	50	mg/kg	----	<50	<50	----	<50
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	50	mg/kg	----	<50	<50	----	<50
EP080: BTEXN								
Benzene	71-43-2	0.2	mg/kg	----	<0.2	<0.2	----	<0.2
Toluene	108-88-3	0.5	mg/kg	----	<0.5	<0.5	----	<0.5
Ethylbenzene	100-41-4	0.5	mg/kg	----	<0.5	<0.5	----	<0.5
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	----	<0.5	<0.5	----	<0.5
ortho-Xylene	95-47-6	0.5	mg/kg	----	<0.5	<0.5	----	<0.5
^ Sum of BTEX	----	0.2	mg/kg	----	<0.2	<0.2	----	<0.2
^ Total Xylenes	----	0.5	mg/kg	----	<0.5	<0.5	----	<0.5
Naphthalene	91-20-3	1	mg/kg	----	<1	<1	----	<1
EP068S: Organochlorine Pesticide Surrogate								
Dibromo-DDE	21655-73-2	0.05	%	----	82.9	87.0	----	83.5
EP068T: Organophosphorus Pesticide Surrogate								
DEF	78-48-8	0.05	%	----	68.7	77.0	----	74.2
EP075(SIM)S: Phenolic Compound Surrogates								
Phenol-d6	13127-88-3	0.5	%	----	93.7	92.8	----	94.3
2-Chlorophenol-D4	93951-73-6	0.5	%	----	94.2	93.3	----	94.7
2.4.6-Tribromophenol	118-79-6	0.5	%	----	54.2	53.9	----	55.4
EP075(SIM)T: PAH Surrogates								
2-Fluorobiphenyl	321-60-8	0.5	%	----	110	109	----	111
Anthracene-d10	1719-06-8	0.5	%	----	104	105	----	102
4-Terphenyl-d14	1718-51-0	0.5	%	----	98.0	101	----	97.4
EP080S: TPH(V)/BTEX Surrogates								
1.2-Dichloroethane-D4	17060-07-0	0.2	%	----	88.0	85.6	----	85.6
Toluene-D8	2037-26-5	0.2	%	----	87.4	88.2	----	87.8
4-Bromofluorobenzene	460-00-4	0.2	%	----	107	111	----	109

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	TP24_0.1-0.2	TP24_0.7-0.8	TP24_1.2-1.3	TP25_0.1-0.2	TP25_0.5-0.6
			Client sampling date / time	07-May-2020 00:00	07-May-2020 00:00	07-May-2020 00:00	07-May-2020 00:00	07-May-2020 00:00
Compound	CAS Number	LOR	Unit	EM2007842-121	EM2007842-124	EM2007842-125	EM2007842-127	EM2007842-128
				Result	Result	Result	Result	Result
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	1.0	%	10.3	11.2	10.2	9.7	11.9
EG005(ED093)T: Total Metals by ICP-AES								
Barium	7440-39-3	10	mg/kg	----	----	----	50	----
Beryllium	7440-41-7	1	mg/kg	----	----	----	<1	----
Cobalt	7440-48-4	2	mg/kg	----	----	----	3	----
Iron	7439-89-6	50	mg/kg	----	----	----	5460	----
Manganese	7439-96-5	5	mg/kg	----	----	----	73	----
Silver	7440-22-4	2	mg/kg	----	----	----	<2	----
Arsenic	7440-38-2	5	mg/kg	12	6	8	<5	7
Cadmium	7440-43-9	1	mg/kg	<1	<1	<1	<1	<1
Chromium	7440-47-3	2	mg/kg	8	7	8	8	14
Copper	7440-50-8	5	mg/kg	5	<5	5	7	21
Lead	7439-92-1	5	mg/kg	<5	<5	<5	<5	<5
Nickel	7440-02-0	2	mg/kg	4	3	4	5	5
Zinc	7440-66-6	5	mg/kg	6	6	6	7	18
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
EG048: Hexavalent Chromium (Alkaline Digest)								
Hexavalent Chromium	18540-29-9	0.5	mg/kg	----	----	----	<0.5	----
EK026SF: Total CN by Segmented Flow Analyser								
Total Cyanide	57-12-5	1	mg/kg	----	----	----	<1	----
EP066: Polychlorinated Biphenyls (PCB)								
Total Polychlorinated biphenyls	----	0.1	mg/kg	----	----	----	<0.1	----
EP068A: Organochlorine Pesticides (OC)								
alpha-BHC	319-84-6	0.05	mg/kg	----	<0.05	----	<0.05	<0.05
Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	----	<0.05	----	<0.05	<0.05
beta-BHC	319-85-7	0.05	mg/kg	----	<0.05	----	<0.05	<0.05
gamma-BHC	58-89-9	0.05	mg/kg	----	<0.05	----	<0.05	<0.05
delta-BHC	319-86-8	0.05	mg/kg	----	<0.05	----	<0.05	<0.05
Heptachlor	76-44-8	0.05	mg/kg	----	<0.05	----	<0.05	<0.05
Aldrin	309-00-2	0.05	mg/kg	----	<0.05	----	<0.05	<0.05
Heptachlor epoxide	1024-57-3	0.05	mg/kg	----	<0.05	----	<0.05	<0.05
^ Total Chlordane (sum)	----	0.05	mg/kg	----	<0.05	----	<0.05	<0.05
trans-Chlordane	5103-74-2	0.05	mg/kg	----	<0.05	----	<0.05	<0.05

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	TP24_0.1-0.2	TP24_0.7-0.8	TP24_1.2-1.3	TP25_0.1-0.2	TP25_0.5-0.6
			Client sampling date / time	07-May-2020 00:00	07-May-2020 00:00	07-May-2020 00:00	07-May-2020 00:00	07-May-2020 00:00
Compound	CAS Number	LOR	Unit	EM2007842-121	EM2007842-124	EM2007842-125	EM2007842-127	EM2007842-128
				Result	Result	Result	Result	Result
EP068A: Organochlorine Pesticides (OC) - Continued								
alpha-Endosulfan	959-98-8	0.05	mg/kg	----	<0.05	----	<0.05	<0.05
cis-Chlordane	5103-71-9	0.05	mg/kg	----	<0.05	----	<0.05	<0.05
Dieldrin	60-57-1	0.05	mg/kg	----	<0.05	----	<0.05	<0.05
4.4`-DDE	72-55-9	0.05	mg/kg	----	<0.05	----	<0.05	<0.05
Endrin	72-20-8	0.05	mg/kg	----	<0.05	----	<0.05	<0.05
beta-Endosulfan	33213-65-9	0.05	mg/kg	----	<0.05	----	<0.05	<0.05
^ Endosulfan (sum)	115-29-7	0.05	mg/kg	----	<0.05	----	<0.05	<0.05
4.4`-DDD	72-54-8	0.05	mg/kg	----	<0.05	----	<0.05	<0.05
Endrin aldehyde	7421-93-4	0.05	mg/kg	----	<0.05	----	<0.05	<0.05
Endosulfan sulfate	1031-07-8	0.05	mg/kg	----	<0.05	----	<0.05	<0.05
4.4`-DDT	50-29-3	0.2	mg/kg	----	<0.2	----	<0.2	<0.2
Endrin ketone	53494-70-5	0.05	mg/kg	----	<0.05	----	<0.05	<0.05
Methoxychlor	72-43-5	0.2	mg/kg	----	<0.2	----	<0.2	<0.2
^ Sum of Aldrin + Dieldrin	309-00-2/60-57-1	0.05	mg/kg	----	<0.05	----	<0.05	<0.05
^ Sum of DDD + DDE + DDT	72-54-8/72-55-9/50-2	0.05	mg/kg	----	<0.05	----	<0.05	<0.05
EP074E: Halogenated Aliphatic Compounds								
Tetrachloroethene	127-18-4	0.5	mg/kg	----	----	----	<0.5	----
EP075(SIM)A: Phenolic Compounds								
Phenol	108-95-2	0.5	mg/kg	----	----	----	<0.5	----
2-Chlorophenol	95-57-8	0.5	mg/kg	----	----	----	<0.5	----
2-Methylphenol	95-48-7	0.5	mg/kg	----	----	----	<0.5	----
3- & 4-Methylphenol	1319-77-3	1	mg/kg	----	----	----	<1	----
2-Nitrophenol	88-75-5	0.5	mg/kg	----	----	----	<0.5	----
2.4-Dimethylphenol	105-67-9	0.5	mg/kg	----	----	----	<0.5	----
2.4-Dichlorophenol	120-83-2	0.5	mg/kg	----	----	----	<0.5	----
2.6-Dichlorophenol	87-65-0	0.5	mg/kg	----	----	----	<0.5	----
4-Chloro-3-methylphenol	59-50-7	0.5	mg/kg	----	----	----	<0.5	----
2.4.6-Trichlorophenol	88-06-2	0.5	mg/kg	----	----	----	<0.5	----
2.4.5-Trichlorophenol	95-95-4	0.5	mg/kg	----	----	----	<0.5	----
Pentachlorophenol	87-86-5	2	mg/kg	----	----	----	<2	----
^ Sum of Phenols	----	0.5	mg/kg	----	----	----	<0.5	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	0.5	mg/kg	----	<0.5	----	<0.5	<0.5

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	TP24_0.1-0.2	TP24_0.7-0.8	TP24_1.2-1.3	TP25_0.1-0.2	TP25_0.5-0.6
			Client sampling date / time	07-May-2020 00:00	07-May-2020 00:00	07-May-2020 00:00	07-May-2020 00:00	07-May-2020 00:00
Compound	CAS Number	LOR	Unit	EM2007842-121	EM2007842-124	EM2007842-125	EM2007842-127	EM2007842-128
				Result	Result	Result	Result	Result
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued								
Acenaphthylene	208-96-8	0.5	mg/kg	----	<0.5	----	<0.5	<0.5
Acenaphthene	83-32-9	0.5	mg/kg	----	<0.5	----	<0.5	<0.5
Fluorene	86-73-7	0.5	mg/kg	----	<0.5	----	<0.5	<0.5
Phenanthrene	85-01-8	0.5	mg/kg	----	<0.5	----	<0.5	<0.5
Anthracene	120-12-7	0.5	mg/kg	----	<0.5	----	<0.5	<0.5
Fluoranthene	206-44-0	0.5	mg/kg	----	<0.5	----	<0.5	<0.5
Pyrene	129-00-0	0.5	mg/kg	----	<0.5	----	<0.5	<0.5
Benz(a)anthracene	56-55-3	0.5	mg/kg	----	<0.5	----	<0.5	<0.5
Chrysene	218-01-9	0.5	mg/kg	----	<0.5	----	<0.5	<0.5
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	----	<0.5	----	<0.5	<0.5
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	----	<0.5	----	<0.5	<0.5
Benzo(a)pyrene	50-32-8	0.5	mg/kg	----	<0.5	----	<0.5	<0.5
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	----	<0.5	----	<0.5	<0.5
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	----	<0.5	----	<0.5	<0.5
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	----	<0.5	----	<0.5	<0.5
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg	----	<0.5	----	<0.5	<0.5
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg	----	<0.5	----	<0.5	<0.5
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg	----	**0.6**	----	**0.6**	**0.6**
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg	----	**1.2**	----	**1.2**	**1.2**
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	10	mg/kg	----	<10	----	<10	<10
C10 - C14 Fraction	----	50	mg/kg	----	<50	----	<50	<50
C15 - C28 Fraction	----	100	mg/kg	----	<100	----	<100	<100
C29 - C36 Fraction	----	100	mg/kg	----	<100	----	<100	<100
^ C10 - C36 Fraction (sum)	----	50	mg/kg	----	<50	----	<50	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
C6 - C10 Fraction	C6_C10	10	mg/kg	----	<10	----	<10	<10
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg	----	<10	----	<10	<10
>C10 - C16 Fraction	----	50	mg/kg	----	<50	----	<50	<50
>C16 - C34 Fraction	----	100	mg/kg	----	<100	----	<100	<100
>C34 - C40 Fraction	----	100	mg/kg	----	<100	----	<100	<100
^ >C10 - C40 Fraction (sum)	----	50	mg/kg	----	<50	----	<50	<50
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	50	mg/kg	----	----	----	<50	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	TP24_0.1-0.2	TP24_0.7-0.8	TP24_1.2-1.3	TP25_0.1-0.2	TP25_0.5-0.6
			Client sampling date / time	07-May-2020 00:00	07-May-2020 00:00	07-May-2020 00:00	07-May-2020 00:00	07-May-2020 00:00
Compound	CAS Number	LOR	Unit	EM2007842-121	EM2007842-124	EM2007842-125	EM2007842-127	EM2007842-128
				Result	Result	Result	Result	Result
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Continued								
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	50	mg/kg	----	<50	----	----	<50
EP080: BTEXN								
Benzene	71-43-2	0.2	mg/kg	----	<0.2	----	<0.2	<0.2
Toluene	108-88-3	0.5	mg/kg	----	<0.5	----	<0.5	<0.5
Ethylbenzene	100-41-4	0.5	mg/kg	----	<0.5	----	<0.5	<0.5
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	----	<0.5	----	<0.5	<0.5
ortho-Xylene	95-47-6	0.5	mg/kg	----	<0.5	----	<0.5	<0.5
^ Sum of BTEX	----	0.2	mg/kg	----	<0.2	----	<0.2	<0.2
^ Total Xylenes	----	0.5	mg/kg	----	<0.5	----	<0.5	<0.5
Naphthalene	91-20-3	1	mg/kg	----	<1	----	<1	<1
EP066S: PCB Surrogate								
Decachlorobiphenyl	2051-24-3	0.1	%	----	----	----	89.9	----
EP068S: Organochlorine Pesticide Surrogate								
Dibromo-DDE	21655-73-2	0.05	%	----	86.1	----	83.2	86.3
EP068T: Organophosphorus Pesticide Surrogate								
DEF	78-48-8	0.05	%	----	71.3	----	74.5	76.0
EP074S: VOC Surrogates								
1.2-Dichloroethane-D4	17060-07-0	0.5	%	----	----	----	92.2	----
Toluene-D8	2037-26-5	0.5	%	----	----	----	95.6	----
4-Bromofluorobenzene	460-00-4	0.5	%	----	----	----	99.5	----
EP075(SIM)S: Phenolic Compound Surrogates								
Phenol-d6	13127-88-3	0.5	%	----	94.8	----	93.9	95.9
2-Chlorophenol-D4	93951-73-6	0.5	%	----	95.6	----	94.6	97.0
2.4.6-Tribromophenol	118-79-6	0.5	%	----	53.1	----	55.8	58.4
EP075(SIM)T: PAH Surrogates								
2-Fluorobiphenyl	321-60-8	0.5	%	----	112	----	112	120
Anthracene-d10	1719-06-8	0.5	%	----	106	----	106	107
4-Terphenyl-d14	1718-51-0	0.5	%	----	100	----	98.6	102
EP080S: TPH(V)/BTEX Surrogates								
1.2-Dichloroethane-D4	17060-07-0	0.2	%	----	84.6	----	85.8	81.1
Toluene-D8	2037-26-5	0.2	%	----	86.8	----	94.4	82.4
4-Bromofluorobenzene	460-00-4	0.2	%	----	109	----	112	104

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	TP25_1.3-1.4	TP27_0.2-0.3	TP27_1.2-1.3	TP28_0.1-0.2	TP28_0.7-0.8
			Client sampling date / time	07-May-2020 00:00	07-May-2020 00:00	07-May-2020 00:00	07-May-2020 00:00	07-May-2020 00:00
Compound	CAS Number	LOR	Unit	EM2007842-130	EM2007842-133	EM2007842-135	EM2007842-137	EM2007842-138
				Result	Result	Result	Result	Result
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	1.0	%	10.9	14.2	11.1	16.9	13.8
EG005(ED093)T: Total Metals by ICP-AES								
Barium	7440-39-3	10	mg/kg	----	----	----	110	----
Beryllium	7440-41-7	1	mg/kg	----	----	----	<1	----
Cobalt	7440-48-4	2	mg/kg	----	----	----	<2	----
Iron	7439-89-6	50	mg/kg	----	----	----	32400	----
Manganese	7439-96-5	5	mg/kg	----	----	----	42	----
Silver	7440-22-4	2	mg/kg	----	----	----	<2	----
Arsenic	7440-38-2	5	mg/kg	6	7	5	8	7
Cadmium	7440-43-9	1	mg/kg	<1	<1	<1	<1	<1
Chromium	7440-47-3	2	mg/kg	8	15	8	25	21
Copper	7440-50-8	5	mg/kg	<5	9	<5	8	172
Lead	7439-92-1	5	mg/kg	<5	<5	<5	<5	16
Nickel	7440-02-0	2	mg/kg	4	7	3	4	8
Zinc	7440-66-6	5	mg/kg	8	14	7	11	164
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
EG048: Hexavalent Chromium (Alkaline Digest)								
Hexavalent Chromium	18540-29-9	0.5	mg/kg	----	----	----	<0.5	----
EK026SF: Total CN by Segmented Flow Analyser								
Total Cyanide	57-12-5	1	mg/kg	----	----	----	<1	----
EP066: Polychlorinated Biphenyls (PCB)								
Total Polychlorinated biphenyls	----	0.1	mg/kg	----	----	----	<0.1	----
EP068A: Organochlorine Pesticides (OC)								
alpha-BHC	319-84-6	0.05	mg/kg	----	<0.05	----	<0.05	<0.05
Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	----	<0.05	----	<0.05	<0.05
beta-BHC	319-85-7	0.05	mg/kg	----	<0.05	----	<0.05	<0.05
gamma-BHC	58-89-9	0.05	mg/kg	----	<0.05	----	<0.05	<0.05
delta-BHC	319-86-8	0.05	mg/kg	----	<0.05	----	<0.05	<0.05
Heptachlor	76-44-8	0.05	mg/kg	----	<0.05	----	<0.05	<0.05
Aldrin	309-00-2	0.05	mg/kg	----	<0.05	----	<0.05	<0.05
Heptachlor epoxide	1024-57-3	0.05	mg/kg	----	<0.05	----	<0.05	<0.05
^ Total Chlordane (sum)	----	0.05	mg/kg	----	<0.05	----	<0.05	<0.05
trans-Chlordane	5103-74-2	0.05	mg/kg	----	<0.05	----	<0.05	<0.05

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	TP25_1.3-1.4	TP27_0.2-0.3	TP27_1.2-1.3	TP28_0.1-0.2	TP28_0.7-0.8
			Client sampling date / time	07-May-2020 00:00	07-May-2020 00:00	07-May-2020 00:00	07-May-2020 00:00	07-May-2020 00:00
Compound	CAS Number	LOR	Unit	EM2007842-130	EM2007842-133	EM2007842-135	EM2007842-137	EM2007842-138
				Result	Result	Result	Result	Result
EP068A: Organochlorine Pesticides (OC) - Continued								
alpha-Endosulfan	959-98-8	0.05	mg/kg	----	<0.05	----	<0.05	<0.05
cis-Chlordane	5103-71-9	0.05	mg/kg	----	<0.05	----	<0.05	<0.05
Dieldrin	60-57-1	0.05	mg/kg	----	<0.05	----	<0.05	<0.05
4.4`-DDE	72-55-9	0.05	mg/kg	----	<0.05	----	<0.05	<0.05
Endrin	72-20-8	0.05	mg/kg	----	<0.05	----	<0.05	<0.05
beta-Endosulfan	33213-65-9	0.05	mg/kg	----	<0.05	----	<0.05	<0.05
^ Endosulfan (sum)	115-29-7	0.05	mg/kg	----	<0.05	----	<0.05	<0.05
4.4`-DDD	72-54-8	0.05	mg/kg	----	<0.05	----	<0.05	<0.05
Endrin aldehyde	7421-93-4	0.05	mg/kg	----	<0.05	----	<0.05	<0.05
Endosulfan sulfate	1031-07-8	0.05	mg/kg	----	<0.05	----	<0.05	<0.05
4.4`-DDT	50-29-3	0.2	mg/kg	----	<0.2	----	<0.2	<0.2
Endrin ketone	53494-70-5	0.05	mg/kg	----	<0.05	----	<0.05	<0.05
Methoxychlor	72-43-5	0.2	mg/kg	----	<0.2	----	<0.2	<0.2
^ Sum of Aldrin + Dieldrin	309-00-2/60-57-1	0.05	mg/kg	----	<0.05	----	<0.05	<0.05
^ Sum of DDD + DDE + DDT	72-54-8/72-55-9/50-2	0.05	mg/kg	----	<0.05	----	<0.05	<0.05
EP074E: Halogenated Aliphatic Compounds								
Tetrachloroethene	127-18-4	0.5	mg/kg	----	----	----	<0.5	----
EP075(SIM)A: Phenolic Compounds								
Phenol	108-95-2	0.5	mg/kg	----	----	----	<0.5	----
2-Chlorophenol	95-57-8	0.5	mg/kg	----	----	----	<0.5	----
2-Methylphenol	95-48-7	0.5	mg/kg	----	----	----	<0.5	----
3- & 4-Methylphenol	1319-77-3	1	mg/kg	----	----	----	<1	----
2-Nitrophenol	88-75-5	0.5	mg/kg	----	----	----	<0.5	----
2.4-Dimethylphenol	105-67-9	0.5	mg/kg	----	----	----	<0.5	----
2.4-Dichlorophenol	120-83-2	0.5	mg/kg	----	----	----	<0.5	----
2.6-Dichlorophenol	87-65-0	0.5	mg/kg	----	----	----	<0.5	----
4-Chloro-3-methylphenol	59-50-7	0.5	mg/kg	----	----	----	<0.5	----
2.4.6-Trichlorophenol	88-06-2	0.5	mg/kg	----	----	----	<0.5	----
2.4.5-Trichlorophenol	95-95-4	0.5	mg/kg	----	----	----	<0.5	----
Pentachlorophenol	87-86-5	2	mg/kg	----	----	----	<2	----
^ Sum of Phenols	----	0.5	mg/kg	----	----	----	<0.5	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	0.5	mg/kg	----	<0.5	----	<0.5	<0.5

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	TP25_1.3-1.4	TP27_0.2-0.3	TP27_1.2-1.3	TP28_0.1-0.2	TP28_0.7-0.8
			Client sampling date / time	07-May-2020 00:00	07-May-2020 00:00	07-May-2020 00:00	07-May-2020 00:00	07-May-2020 00:00
Compound	CAS Number	LOR	Unit	EM2007842-130	EM2007842-133	EM2007842-135	EM2007842-137	EM2007842-138
				Result	Result	Result	Result	Result
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued								
Acenaphthylene	208-96-8	0.5	mg/kg	----	<0.5	----	<0.5	<0.5
Acenaphthene	83-32-9	0.5	mg/kg	----	<0.5	----	<0.5	<0.5
Fluorene	86-73-7	0.5	mg/kg	----	<0.5	----	<0.5	<0.5
Phenanthrene	85-01-8	0.5	mg/kg	----	<0.5	----	<0.5	<0.5
Anthracene	120-12-7	0.5	mg/kg	----	<0.5	----	<0.5	<0.5
Fluoranthene	206-44-0	0.5	mg/kg	----	<0.5	----	<0.5	<0.5
Pyrene	129-00-0	0.5	mg/kg	----	<0.5	----	<0.5	<0.5
Benz(a)anthracene	56-55-3	0.5	mg/kg	----	<0.5	----	<0.5	<0.5
Chrysene	218-01-9	0.5	mg/kg	----	<0.5	----	<0.5	<0.5
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	----	<0.5	----	<0.5	<0.5
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	----	<0.5	----	<0.5	<0.5
Benzo(a)pyrene	50-32-8	0.5	mg/kg	----	<0.5	----	<0.5	<0.5
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	----	<0.5	----	<0.5	<0.5
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	----	<0.5	----	<0.5	<0.5
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	----	<0.5	----	<0.5	<0.5
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg	----	<0.5	----	<0.5	<0.5
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg	----	<0.5	----	<0.5	<0.5
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg	----	**0.6**	----	**0.6**	**0.6**
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg	----	**1.2**	----	**1.2**	**1.2**
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	10	mg/kg	----	<10	----	<10	<10
C10 - C14 Fraction	----	50	mg/kg	----	<50	----	<50	<50
C15 - C28 Fraction	----	100	mg/kg	----	<100	----	<100	<100
C29 - C36 Fraction	----	100	mg/kg	----	<100	----	<100	<100
^ C10 - C36 Fraction (sum)	----	50	mg/kg	----	<50	----	<50	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
C6 - C10 Fraction	C6_C10	10	mg/kg	----	<10	----	<10	<10
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg	----	<10	----	<10	<10
>C10 - C16 Fraction	----	50	mg/kg	----	<50	----	<50	<50
>C16 - C34 Fraction	----	100	mg/kg	----	<100	----	<100	<100
>C34 - C40 Fraction	----	100	mg/kg	----	<100	----	<100	<100
^ >C10 - C40 Fraction (sum)	----	50	mg/kg	----	<50	----	<50	<50
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	50	mg/kg	----	<50	----	<50	<50

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	TP25_1.3-1.4	TP27_0.2-0.3	TP27_1.2-1.3	TP28_0.1-0.2	TP28_0.7-0.8
			Client sampling date / time	07-May-2020 00:00	07-May-2020 00:00	07-May-2020 00:00	07-May-2020 00:00	07-May-2020 00:00
Compound	CAS Number	LOR	Unit	EM2007842-130	EM2007842-133	EM2007842-135	EM2007842-137	EM2007842-138
				Result	Result	Result	Result	Result
EP080: BTEXN								
Benzene	71-43-2	0.2	mg/kg	----	<0.2	----	<0.2	<0.2
Toluene	108-88-3	0.5	mg/kg	----	<0.5	----	<0.5	<0.5
Ethylbenzene	100-41-4	0.5	mg/kg	----	<0.5	----	<0.5	<0.5
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	----	<0.5	----	<0.5	<0.5
ortho-Xylene	95-47-6	0.5	mg/kg	----	<0.5	----	<0.5	<0.5
^ Sum of BTEX	----	0.2	mg/kg	----	<0.2	----	<0.2	<0.2
^ Total Xylenes	----	0.5	mg/kg	----	<0.5	----	<0.5	<0.5
Naphthalene	91-20-3	1	mg/kg	----	<1	----	<1	<1
EP066S: PCB Surrogate								
Decachlorobiphenyl	2051-24-3	0.1	%	----	----	----	91.8	----
EP068S: Organochlorine Pesticide Surrogate								
Dibromo-DDE	21655-73-2	0.05	%	----	83.3	----	83.6	82.8
EP068T: Organophosphorus Pesticide Surrogate								
DEF	78-48-8	0.05	%	----	59.8	----	69.7	71.6
EP074S: VOC Surrogates								
1.2-Dichloroethane-D4	17060-07-0	0.5	%	----	----	----	83.9	----
Toluene-D8	2037-26-5	0.5	%	----	----	----	92.5	----
4-Bromofluorobenzene	460-00-4	0.5	%	----	----	----	95.6	----
EP075(SIM)S: Phenolic Compound Surrogates								
Phenol-d6	13127-88-3	0.5	%	----	94.4	----	95.6	91.1
2-Chlorophenol-D4	93951-73-6	0.5	%	----	94.2	----	96.5	90.6
2.4.6-Tribromophenol	118-79-6	0.5	%	----	51.3	----	57.2	52.4
EP075(SIM)T: PAH Surrogates								
2-Fluorobiphenyl	321-60-8	0.5	%	----	110	----	111	108
Anthracene-d10	1719-06-8	0.5	%	----	105	----	106	103
4-Terphenyl-d14	1718-51-0	0.5	%	----	99.7	----	101	98.7
EP080S: TPH(V)/BTEX Surrogates								
1.2-Dichloroethane-D4	17060-07-0	0.2	%	----	84.9	----	77.9	80.0
Toluene-D8	2037-26-5	0.2	%	----	89.4	----	91.3	77.9
4-Bromofluorobenzene	460-00-4	0.2	%	----	110	----	107	102

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)	Client sample ID			TP29_0.6-0.7	TP29_1.1-1.2	TP30_0.7-0.8	QC17	TP30_1.1-1.2
	Client sampling date / time			07-May-2020 00:00	07-May-2020 00:00	07-May-2020 00:00	07-May-2020 00:00	07-May-2020 00:00
Compound	CAS Number	LOR	Unit	EM2007842-143	EM2007842-144	EM2007842-148	EM2007842-149	EM2007842-150
				Result	Result	Result	Result	Result
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	1.0	%	7.6	7.1	7.5	9.1	9.1
EG005(ED093)T: Total Metals by ICP-AES								
Barium	7440-39-3	10	mg/kg	50	----	----	----	----
Beryllium	7440-41-7	1	mg/kg	<1	----	----	----	----
Cobalt	7440-48-4	2	mg/kg	5	----	----	----	----
Iron	7439-89-6	50	mg/kg	7930	----	----	----	----
Manganese	7439-96-5	5	mg/kg	126	----	----	----	----
Silver	7440-22-4	2	mg/kg	<2	----	----	----	----
Arsenic	7440-38-2	5	mg/kg	8	7	7	10	12
Cadmium	7440-43-9	1	mg/kg	<1	<1	<1	<1	<1
Chromium	7440-47-3	2	mg/kg	10	6	10	8	8
Copper	7440-50-8	5	mg/kg	6	<5	7	6	6
Lead	7439-92-1	5	mg/kg	<5	<5	<5	<5	<5
Nickel	7440-02-0	2	mg/kg	6	3	6	6	6
Zinc	7440-66-6	5	mg/kg	10	<5	9	7	7
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
EG048: Hexavalent Chromium (Alkaline Digest)								
Hexavalent Chromium	18540-29-9	0.5	mg/kg	<0.5	----	----	----	----
EK026SF: Total CN by Segmented Flow Analyser								
Total Cyanide	57-12-5	1	mg/kg	<1	----	----	----	----
EP066: Polychlorinated Biphenyls (PCB)								
Total Polychlorinated biphenyls	----	0.1	mg/kg	<0.1	----	----	----	----
EP068A: Organochlorine Pesticides (OC)								
alpha-BHC	319-84-6	0.05	mg/kg	<0.05	----	----	----	<0.05
Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	<0.05	----	----	----	<0.05
beta-BHC	319-85-7	0.05	mg/kg	<0.05	----	----	----	<0.05
gamma-BHC	58-89-9	0.05	mg/kg	<0.05	----	----	----	<0.05
delta-BHC	319-86-8	0.05	mg/kg	<0.05	----	----	----	<0.05
Heptachlor	76-44-8	0.05	mg/kg	<0.05	----	----	----	<0.05
Aldrin	309-00-2	0.05	mg/kg	<0.05	----	----	----	<0.05
Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	----	----	----	<0.05
^ Total Chlordane (sum)	----	0.05	mg/kg	<0.05	----	----	----	<0.05
trans-Chlordane	5103-74-2	0.05	mg/kg	<0.05	----	----	----	<0.05

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	TP29_0.6-0.7	TP29_1.1-1.2	TP30_0.7-0.8	QC17	TP30_1.1-1.2
			Client sampling date / time	07-May-2020 00:00	07-May-2020 00:00	07-May-2020 00:00	07-May-2020 00:00	07-May-2020 00:00
Compound	CAS Number	LOR	Unit	EM2007842-143	EM2007842-144	EM2007842-148	EM2007842-149	EM2007842-150
				Result	Result	Result	Result	Result
EP068A: Organochlorine Pesticides (OC) - Continued								
alpha-Endosulfan	959-98-8	0.05	mg/kg	<0.05	----	----	----	<0.05
cis-Chlordane	5103-71-9	0.05	mg/kg	<0.05	----	----	----	<0.05
Dieldrin	60-57-1	0.05	mg/kg	<0.05	----	----	----	<0.05
4.4`-DDE	72-55-9	0.05	mg/kg	<0.05	----	----	----	<0.05
Endrin	72-20-8	0.05	mg/kg	<0.05	----	----	----	<0.05
beta-Endosulfan	33213-65-9	0.05	mg/kg	<0.05	----	----	----	<0.05
^ Endosulfan (sum)	115-29-7	0.05	mg/kg	<0.05	----	----	----	<0.05
4.4`-DDD	72-54-8	0.05	mg/kg	<0.05	----	----	----	<0.05
Endrin aldehyde	7421-93-4	0.05	mg/kg	<0.05	----	----	----	<0.05
Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	----	----	----	<0.05
4.4`-DDT	50-29-3	0.2	mg/kg	<0.2	----	----	----	<0.2
Endrin ketone	53494-70-5	0.05	mg/kg	<0.05	----	----	----	<0.05
Methoxychlor	72-43-5	0.2	mg/kg	<0.2	----	----	----	<0.2
^ Sum of Aldrin + Dieldrin	309-00-2/60-57-1	0.05	mg/kg	<0.05	----	----	----	<0.05
^ Sum of DDD + DDE + DDT	72-54-8/72-55-9/50-2	0.05	mg/kg	<0.05	----	----	----	<0.05
EP074E: Halogenated Aliphatic Compounds								
Tetrachloroethene	127-18-4	0.5	mg/kg	<0.5	----	----	----	----
EP075(SIM)A: Phenolic Compounds								
Phenol	108-95-2	0.5	mg/kg	<0.5	----	----	----	----
2-Chlorophenol	95-57-8	0.5	mg/kg	<0.5	----	----	----	----
2-Methylphenol	95-48-7	0.5	mg/kg	<0.5	----	----	----	----
3- & 4-Methylphenol	1319-77-3	1	mg/kg	<1	----	----	----	----
2-Nitrophenol	88-75-5	0.5	mg/kg	<0.5	----	----	----	----
2.4-Dimethylphenol	105-67-9	0.5	mg/kg	<0.5	----	----	----	----
2.4-Dichlorophenol	120-83-2	0.5	mg/kg	<0.5	----	----	----	----
2.6-Dichlorophenol	87-65-0	0.5	mg/kg	<0.5	----	----	----	----
4-Chloro-3-methylphenol	59-50-7	0.5	mg/kg	<0.5	----	----	----	----
2.4.6-Trichlorophenol	88-06-2	0.5	mg/kg	<0.5	----	----	----	----
2.4.5-Trichlorophenol	95-95-4	0.5	mg/kg	<0.5	----	----	----	----
Pentachlorophenol	87-86-5	2	mg/kg	<2	----	----	----	----
^ Sum of Phenols	----	0.5	mg/kg	<0.5	----	----	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	0.5	mg/kg	<0.5	----	----	----	<0.5

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	TP29_0.6-0.7	TP29_1.1-1.2	TP30_0.7-0.8	QC17	TP30_1.1-1.2
			Client sampling date / time	07-May-2020 00:00	07-May-2020 00:00	07-May-2020 00:00	07-May-2020 00:00	07-May-2020 00:00
Compound	CAS Number	LOR	Unit	EM2007842-143	EM2007842-144	EM2007842-148	EM2007842-149	EM2007842-150
				Result	Result	Result	Result	Result
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued								
Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	----	----	----	<0.5
Acenaphthene	83-32-9	0.5	mg/kg	<0.5	----	----	----	<0.5
Fluorene	86-73-7	0.5	mg/kg	<0.5	----	----	----	<0.5
Phenanthrene	85-01-8	0.5	mg/kg	<0.5	----	----	----	<0.5
Anthracene	120-12-7	0.5	mg/kg	<0.5	----	----	----	<0.5
Fluoranthene	206-44-0	0.5	mg/kg	<0.5	----	----	----	<0.5
Pyrene	129-00-0	0.5	mg/kg	<0.5	----	----	----	<0.5
Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	----	----	----	<0.5
Chrysene	218-01-9	0.5	mg/kg	<0.5	----	----	----	<0.5
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	----	----	----	<0.5
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	----	----	----	<0.5
Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	----	----	----	<0.5
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	----	----	----	<0.5
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	----	----	----	<0.5
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	----	----	----	<0.5
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg	<0.5	----	----	----	<0.5
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg	<0.5	----	----	----	<0.5
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg	**0.6**	----	----	----	**0.6**
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg	**1.2**	----	----	----	**1.2**
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	10	mg/kg	<10	----	----	----	<10
C10 - C14 Fraction	----	50	mg/kg	<50	----	----	----	<50
C15 - C28 Fraction	----	100	mg/kg	<100	----	----	----	<100
C29 - C36 Fraction	----	100	mg/kg	<100	----	----	----	<100
^ C10 - C36 Fraction (sum)	----	50	mg/kg	<50	----	----	----	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
C6 - C10 Fraction	C6_C10	10	mg/kg	<10	----	----	----	<10
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg	<10	----	----	----	<10
>C10 - C16 Fraction	----	50	mg/kg	<50	----	----	----	<50
>C16 - C34 Fraction	----	100	mg/kg	<100	----	----	----	<100
>C34 - C40 Fraction	----	100	mg/kg	<100	----	----	----	<100
^ >C10 - C40 Fraction (sum)	----	50	mg/kg	<50	----	----	----	<50
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	50	mg/kg	<50	----	----	----	<50

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	TP29_0.6-0.7	TP29_1.1-1.2	TP30_0.7-0.8	QC17	TP30_1.1-1.2
			Client sampling date / time	07-May-2020 00:00	07-May-2020 00:00	07-May-2020 00:00	07-May-2020 00:00	07-May-2020 00:00
Compound	CAS Number	LOR	Unit	EM2007842-143	EM2007842-144	EM2007842-148	EM2007842-149	EM2007842-150
				Result	Result	Result	Result	Result
EP080: BTEXN								
Benzene	71-43-2	0.2	mg/kg	<0.2	----	----	----	<0.2
Toluene	108-88-3	0.5	mg/kg	<0.5	----	----	----	<0.5
Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	----	----	----	<0.5
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	----	----	----	<0.5
ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	----	----	----	<0.5
^ Sum of BTEX	----	0.2	mg/kg	<0.2	----	----	----	<0.2
^ Total Xylenes	----	0.5	mg/kg	<0.5	----	----	----	<0.5
Naphthalene	91-20-3	1	mg/kg	<1	----	----	----	<1
EP066S: PCB Surrogate								
Decachlorobiphenyl	2051-24-3	0.1	%	**90.9**	----	----	----	----
EP068S: Organochlorine Pesticide Surrogate								
Dibromo-DDE	21655-73-2	0.05	%	**82.8**	----	----	----	**85.4**
EP068T: Organophosphorus Pesticide Surrogate								
DEF	78-48-8	0.05	%	**78.8**	----	----	----	**75.2**
EP074S: VOC Surrogates								
1.2-Dichloroethane-D4	17060-07-0	0.5	%	**86.4**	----	----	----	----
Toluene-D8	2037-26-5	0.5	%	**89.5**	----	----	----	----
4-Bromofluorobenzene	460-00-4	0.5	%	**91.8**	----	----	----	----
EP075(SIM)S: Phenolic Compound Surrogates								
Phenol-d6	13127-88-3	0.5	%	**91.2**	----	----	----	**89.0**
2-Chlorophenol-D4	93951-73-6	0.5	%	**91.9**	----	----	----	**88.1**
2.4.6-Tribromophenol	118-79-6	0.5	%	**51.4**	----	----	----	**75.9**
EP075(SIM)T: PAH Surrogates								
2-Fluorobiphenyl	321-60-8	0.5	%	**107**	----	----	----	**91.0**
Anthracene-d10	1719-06-8	0.5	%	**104**	----	----	----	**105**
4-Terphenyl-d14	1718-51-0	0.5	%	**97.5**	----	----	----	**95.9**
EP080S: TPH(V)/BTEX Surrogates								
1.2-Dichloroethane-D4	17060-07-0	0.2	%	**80.3**	----	----	----	**80.4**
Toluene-D8	2037-26-5	0.2	%	**88.3**	----	----	----	**83.1**
4-Bromofluorobenzene	460-00-4	0.2	%	**101**	----	----	----	**86.6**

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	TP31_0.3-0.4	TP31_0.8-0.9	QC18	----	----
			Client sampling date / time	07-May-2020 00:00	07-May-2020 00:00	07-May-2020 00:00	----	----
Compound	CAS Number	LOR	Unit	EM2007842-152	EM2007842-153	EM2007842-154	--------	--------
				Result	Result	Result	----	----
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	1.0	%	9.9	8.2	8.7	----	----
EG005(ED093)T: Total Metals by ICP-AES								
Barium	7440-39-3	10	mg/kg	40	----	----	----	----
Beryllium	7440-41-7	1	mg/kg	<1	----	----	----	----
Cobalt	7440-48-4	2	mg/kg	8	----	----	----	----
Iron	7439-89-6	50	mg/kg	8150	----	----	----	----
Manganese	7439-96-5	5	mg/kg	93	----	----	----	----
Silver	7440-22-4	2	mg/kg	<2	----	----	----	----
Arsenic	7440-38-2	5	mg/kg	12	11	11	----	----
Cadmium	7440-43-9	1	mg/kg	<1	<1	<1	----	----
Chromium	7440-47-3	2	mg/kg	8	8	8	----	----
Copper	7440-50-8	5	mg/kg	6	5	5	----	----
Lead	7439-92-1	5	mg/kg	<5	<5	<5	----	----
Nickel	7440-02-0	2	mg/kg	6	6	6	----	----
Zinc	7440-66-6	5	mg/kg	7	6	7	----	----
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	<0.1	----	----
EG048: Hexavalent Chromium (Alkaline Digest)								
Hexavalent Chromium	18540-29-9	0.5	mg/kg	<0.5	----	----	----	----
EK026SF: Total CN by Segmented Flow Analyser								
Total Cyanide	57-12-5	1	mg/kg	<1	----	----	----	----
EP066: Polychlorinated Biphenyls (PCB)								
Total Polychlorinated biphenyls	----	0.1	mg/kg	<0.1	----	----	----	----
EP068A: Organochlorine Pesticides (OC)								
alpha-BHC	319-84-6	0.05	mg/kg	<0.05	----	----	----	----
Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	<0.05	----	----	----	----
beta-BHC	319-85-7	0.05	mg/kg	<0.05	----	----	----	----
gamma-BHC	58-89-9	0.05	mg/kg	<0.05	----	----	----	----
delta-BHC	319-86-8	0.05	mg/kg	<0.05	----	----	----	----
Heptachlor	76-44-8	0.05	mg/kg	<0.05	----	----	----	----
Aldrin	309-00-2	0.05	mg/kg	<0.05	----	----	----	----
Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	----	----	----	----
^ Total Chlordane (sum)	----	0.05	mg/kg	<0.05	----	----	----	----
trans-Chlordane	5103-74-2	0.05	mg/kg	<0.05	----	----	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	TP31_0.3-0.4	TP31_0.8-0.9	QC18	----	----
			Client sampling date / time	07-May-2020 00:00	07-May-2020 00:00	07-May-2020 00:00	----	----
Compound	CAS Number	LOR	Unit	EM2007842-152	EM2007842-153	EM2007842-154	--------	--------
				Result	Result	Result	----	----
EP068A: Organochlorine Pesticides (OC) - Continued								
alpha-Endosulfan	959-98-8	0.05	mg/kg	<0.05	----	----	----	----
cis-Chlordane	5103-71-9	0.05	mg/kg	<0.05	----	----	----	----
Dieldrin	60-57-1	0.05	mg/kg	<0.05	----	----	----	----
4.4`-DDE	72-55-9	0.05	mg/kg	<0.05	----	----	----	----
Endrin	72-20-8	0.05	mg/kg	<0.05	----	----	----	----
beta-Endosulfan	33213-65-9	0.05	mg/kg	<0.05	----	----	----	----
^ Endosulfan (sum)	115-29-7	0.05	mg/kg	<0.05	----	----	----	----
4.4`-DDD	72-54-8	0.05	mg/kg	<0.05	----	----	----	----
Endrin aldehyde	7421-93-4	0.05	mg/kg	<0.05	----	----	----	----
Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	----	----	----	----
4.4`-DDT	50-29-3	0.2	mg/kg	<0.2	----	----	----	----
Endrin ketone	53494-70-5	0.05	mg/kg	<0.05	----	----	----	----
Methoxychlor	72-43-5	0.2	mg/kg	<0.2	----	----	----	----
^ Sum of Aldrin + Dieldrin	309-00-2/60-57-1	0.05	mg/kg	<0.05	----	----	----	----
^ Sum of DDD + DDE + DDT	72-54-8/72-55-9/50-2	0.05	mg/kg	<0.05	----	----	----	----
EP074E: Halogenated Aliphatic Compounds								
Tetrachloroethene	127-18-4	0.5	mg/kg	<0.5	----	----	----	----
EP075(SIM)A: Phenolic Compounds								
Phenol	108-95-2	0.5	mg/kg	<0.5	----	----	----	----
2-Chlorophenol	95-57-8	0.5	mg/kg	<0.5	----	----	----	----
2-Methylphenol	95-48-7	0.5	mg/kg	<0.5	----	----	----	----
3- & 4-Methylphenol	1319-77-3	1	mg/kg	<1	----	----	----	----
2-Nitrophenol	88-75-5	0.5	mg/kg	<0.5	----	----	----	----
2.4-Dimethylphenol	105-67-9	0.5	mg/kg	<0.5	----	----	----	----
2.4-Dichlorophenol	120-83-2	0.5	mg/kg	<0.5	----	----	----	----
2.6-Dichlorophenol	87-65-0	0.5	mg/kg	<0.5	----	----	----	----
4-Chloro-3-methylphenol	59-50-7	0.5	mg/kg	<0.5	----	----	----	----
2.4.6-Trichlorophenol	88-06-2	0.5	mg/kg	<0.5	----	----	----	----
2.4.5-Trichlorophenol	95-95-4	0.5	mg/kg	<0.5	----	----	----	----
Pentachlorophenol	87-86-5	2	mg/kg	<2	----	----	----	----
^ Sum of Phenols	----	0.5	mg/kg	<0.5	----	----	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	0.5	mg/kg	<0.5	----	----	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	TP31_0.3-0.4	TP31_0.8-0.9	QC18	----	----
			Client sampling date / time	07-May-2020 00:00	07-May-2020 00:00	07-May-2020 00:00	----	----
Compound	CAS Number	LOR	Unit	EM2007842-152	EM2007842-153	EM2007842-154	--------	--------
				Result	Result	Result	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued								
Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	----	----	----	----
Acenaphthene	83-32-9	0.5	mg/kg	<0.5	----	----	----	----
Fluorene	86-73-7	0.5	mg/kg	<0.5	----	----	----	----
Phenanthrene	85-01-8	0.5	mg/kg	<0.5	----	----	----	----
Anthracene	120-12-7	0.5	mg/kg	<0.5	----	----	----	----
Fluoranthene	206-44-0	0.5	mg/kg	<0.5	----	----	----	----
Pyrene	129-00-0	0.5	mg/kg	<0.5	----	----	----	----
Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	----	----	----	----
Chrysene	218-01-9	0.5	mg/kg	<0.5	----	----	----	----
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	----	----	----	----
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	----	----	----	----
Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	----	----	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	----	----	----	----
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	----	----	----	----
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	----	----	----	----
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg	<0.5	----	----	----	----
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg	<0.5	----	----	----	----
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg	**0.6**	----	----	----	----
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg	**1.2**	----	----	----	----
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	10	mg/kg	<10	----	----	----	----
C10 - C14 Fraction	----	50	mg/kg	<50	----	----	----	----
C15 - C28 Fraction	----	100	mg/kg	<100	----	----	----	----
C29 - C36 Fraction	----	100	mg/kg	<100	----	----	----	----
^ C10 - C36 Fraction (sum)	----	50	mg/kg	<50	----	----	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
C6 - C10 Fraction	C6_C10	10	mg/kg	<10	----	----	----	----
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg	<10	----	----	----	----
>C10 - C16 Fraction	----	50	mg/kg	<50	----	----	----	----
>C16 - C34 Fraction	----	100	mg/kg	<100	----	----	----	----
>C34 - C40 Fraction	----	100	mg/kg	<100	----	----	----	----
^ >C10 - C40 Fraction (sum)	----	50	mg/kg	<50	----	----	----	----
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	50	mg/kg	<50	----	----	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	TP31_0.3-0.4	TP31_0.8-0.9	QC18	----	----
			Client sampling date / time	07-May-2020 00:00	07-May-2020 00:00	07-May-2020 00:00	----	----
Compound	CAS Number	LOR	Unit	EM2007842-152	EM2007842-153	EM2007842-154	--------	--------
				Result	Result	Result	----	----
EP080: BTEXN								
Benzene	71-43-2	0.2	mg/kg	<0.2	----	----	----	----
Toluene	108-88-3	0.5	mg/kg	<0.5	----	----	----	----
Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	----	----	----	----
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	----	----	----	----
ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	----	----	----	----
^ Sum of BTEX	----	0.2	mg/kg	<0.2	----	----	----	----
^ Total Xylenes	----	0.5	mg/kg	<0.5	----	----	----	----
Naphthalene	91-20-3	1	mg/kg	<1	----	----	----	----
EP066S: PCB Surrogate								
Decachlorobiphenyl	2051-24-3	0.1	%	**91.9**	----	----	----	----
EP068S: Organochlorine Pesticide Surrogate								
Dibromo-DDE	21655-73-2	0.05	%	**83.9**	----	----	----	----
EP068T: Organophosphorus Pesticide Surrogate								
DEF	78-48-8	0.05	%	**76.6**	----	----	----	----
EP074S: VOC Surrogates								
1.2-Dichloroethane-D4	17060-07-0	0.5	%	**78.7**	----	----	----	----
Toluene-D8	2037-26-5	0.5	%	**83.8**	----	----	----	----
4-Bromofluorobenzene	460-00-4	0.5	%	**88.4**	----	----	----	----
EP075(SIM)S: Phenolic Compound Surrogates								
Phenol-d6	13127-88-3	0.5	%	**89.5**	----	----	----	----
2-Chlorophenol-D4	93951-73-6	0.5	%	**89.1**	----	----	----	----
2.4.6-Tribromophenol	118-79-6	0.5	%	**76.5**	----	----	----	----
EP075(SIM)T: PAH Surrogates								
2-Fluorobiphenyl	321-60-8	0.5	%	**90.1**	----	----	----	----
Anthracene-d10	1719-06-8	0.5	%	**105**	----	----	----	----
4-Terphenyl-d14	1718-51-0	0.5	%	**96.2**	----	----	----	----
EP080S: TPH(V)/BTEX Surrogates								
1.2-Dichloroethane-D4	17060-07-0	0.2	%	**73.2**	----	----	----	----
Toluene-D8	2037-26-5	0.2	%	**82.7**	----	----	----	----
4-Bromofluorobenzene	460-00-4	0.2	%	**100**	----	----	----	----

Analytical Results

Sub-Matrix: **WATER**
(Matrix: **WATER**)

			Client sample ID	QC1	----	----	----	----
			Client sampling date / time	06-May-2020 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit	EM2007842-080	--------	--------	--------	--------
				Result	----	----	----	----
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	20	µg/L	<20	----	----	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
C6 - C10 Fraction	C6_C10	20	µg/L	<20	----	----	----	----
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	----	----	----	----
EP080: BTEXN								
Benzene	71-43-2	1	µg/L	<1	----	----	----	----
Toluene	108-88-3	2	µg/L	<2	----	----	----	----
Ethylbenzene	100-41-4	2	µg/L	<2	----	----	----	----
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	----	----	----	----
ortho-Xylene	95-47-6	2	µg/L	<2	----	----	----	----
^ Total Xylenes	----	2	µg/L	<2	----	----	----	----
^ Sum of BTEX	----	1	µg/L	<1	----	----	----	----
Naphthalene	91-20-3	5	µg/L	<5	----	----	----	----
EP080S: TPH(V)/BTEX Surrogates								
1.2-Dichloroethane-D4	17060-07-0	2	%	**94.5**	----	----	----	----
Toluene-D8	2037-26-5	2	%	**83.1**	----	----	----	----
4-Bromofluorobenzene	460-00-4	2	%	**100**	----	----	----	----

Surrogate Control Limits

Sub-Matrix: **SOIL**

Compound	CAS Number	Recovery Limits (%) Low	Recovery Limits (%) High
EP066S: PCB Surrogate			
Decachlorobiphenyl	2051-24-3	36	140
EP068S: Organochlorine Pesticide Surrogate			
Dibromo-DDE	21655-73-2	38	128
EP068T: Organophosphorus Pesticide Surrogate			
DEF	78-48-8	33	139
EP074S: VOC Surrogates			
1.2-Dichloroethane-D4	17060-07-0	62	122
Toluene-D8	2037-26-5	64	120
4-Bromofluorobenzene	460-00-4	66	124
EP075(SIM)S: Phenolic Compound Surrogates			
Phenol-d6	13127-88-3	54	125
2-Chlorophenol-D4	93951-73-6	65	123
2.4.6-Tribromophenol	118-79-6	34	122
EP075(SIM)T: PAH Surrogates			
2-Fluorobiphenyl	321-60-8	61	125
Anthracene-d10	1719-06-8	62	130
4-Terphenyl-d14	1718-51-0	67	133
EP080S: TPH(V)/BTEX Surrogates			
1.2-Dichloroethane-D4	17060-07-0	51	125
Toluene-D8	2037-26-5	55	125
4-Bromofluorobenzene	460-00-4	56	124

Sub-Matrix: **WATER**

Compound	CAS Number	Recovery Limits (%) Low	Recovery Limits (%) High
EP080S: TPH(V)/BTEX Surrogates			
1.2-Dichloroethane-D4	17060-07-0	73	129
Toluene-D8	2037-26-5	70	125
4-Bromofluorobenzene	460-00-4	71	129

QUALITY CONTROL REPORT

Work Order	: **EM2007842**	Page	: 1 of 24
Client	: **MUD ENVIRONMENTAL PTY LTD**	Laboratory	: Environmental Division Melbourne
Contact	: TRENT GRAY	Contact	: Kieren Burns
Address	: PO Box 80 HENLEY BEACH SOUTH AUSTRALIA 5022	Address	: 4 Westall Rd Springvale VIC Australia 3171
Telephone	: ----	Telephone	: +61881625130
Project	: ME-328	Date Samples Received	: 12-May-2020
Order number	: ----	Date Analysis Commenced	: 13-May-2020
C-O-C number	: ----	Issue Date	: 15-May-2020
Sampler	: ----		
Site	: Wallaroo Fill		
Quote number	: ADBQ/004/19 Primary Work Only		
No. of samples received	: 155		
No. of samples analysed	: 59		

Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Arenie Vijayaratnam	Non-Metals Team Leader	Melbourne Inorganics, Springvale, VIC
Bronwyn Sheen	Assistant Laboratory Manager	Melbourne Organics, Springvale, VIC
Nancy Wang	2IC Organic Chemist	Melbourne Organics, Springvale, VIC
Nikki Stepniewski	Senior Inorganic Instrument Chemist	Melbourne Inorganics, Springvale, VIC

General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis. Where the LOR of a reported result differs from standard LOR, this may be due to high

Key : Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
RPD = Relative Percentage Difference
# = Indicates failed QC

Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR: No Limit; Result between 10 and 20 times LOR: 0% - 50%; Result > 20 times LOR: 0% - 20%.

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EG005(ED093)T: Total Metals by ICP-AES (QC Lot: 3015929)									
EM2007842-015	TP3_0.5-0.6	EG005T: Beryllium	7440-41-7	1	mg/kg	<1	<1	0.00	No Limit
		EG005T: Cadmium	7440-43-9	1	mg/kg	<1	<1	0.00	No Limit
		EG005T: Barium	7440-39-3	10	mg/kg	30	30	0.00	No Limit
		EG005T: Chromium	7440-47-3	2	mg/kg	7	7	0.00	No Limit
		EG005T: Cobalt	7440-48-4	2	mg/kg	<2	<2	0.00	No Limit
		EG005T: Nickel	7440-02-0	2	mg/kg	3	3	0.00	No Limit
		EG005T: Silver	7440-22-4	2	mg/kg	<2	<2	0.00	No Limit
		EG005T: Arsenic	7440-38-2	5	mg/kg	11	12	0.00	No Limit
		EG005T: Copper	7440-50-8	5	mg/kg	7	6	22.0	No Limit
		EG005T: Lead	7439-92-1	5	mg/kg	<5	<5	0.00	No Limit
		EG005T: Manganese	7439-96-5	5	mg/kg	74	75	0.00	0% - 50%
		EG005T: Zinc	7440-66-6	5	mg/kg	17	15	16.2	No Limit
		EG005T: Iron	7439-89-6	50	mg/kg	5480	5060	8.06	0% - 20%
EM2007842-040	TP6_0.8-0.9	EG005T: Beryllium	7440-41-7	1	mg/kg	<1	<1	0.00	No Limit
		EG005T: Cadmium	7440-43-9	1	mg/kg	<1	<1	0.00	No Limit
		EG005T: Barium	7440-39-3	10	mg/kg	160	150	0.00	0% - 50%
		EG005T: Chromium	7440-47-3	2	mg/kg	21	20	6.05	0% - 50%
		EG005T: Cobalt	7440-48-4	2	mg/kg	3	2	0.00	No Limit
		EG005T: Nickel	7440-02-0	2	mg/kg	4	4	0.00	No Limit
		EG005T: Silver	7440-22-4	2	mg/kg	<2	<2	0.00	No Limit
		EG005T: Arsenic	7440-38-2	5	mg/kg	8	7	0.00	No Limit
		EG005T: Copper	7440-50-8	5	mg/kg	17	10	49.2	No Limit
		EG005T: Lead	7439-92-1	5	mg/kg	77	75	3.11	0% - 50%
		EG005T: Manganese	7439-96-5	5	mg/kg	40	45	10.8	No Limit
		EG005T: Zinc	7440-66-6	5	mg/kg	132	145	9.24	0% - 20%

Sub-Matrix: **SOIL**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
				Laboratory Duplicate (DUP) Report					
EG005(ED093)T: Total Metals by ICP-AES (QC Lot: 3015929) - continued									
EM2007842-040	TP6_0.8-0.9	EG005T: Iron	7439-89-6	50	mg/kg	23500	20600	13.3	0% - 20%
EG005(ED093)T: Total Metals by ICP-AES (QC Lot: 3015931)									
EM2007842-064	TP10_0.7-0.8	EG005T: Beryllium	7440-41-7	1	mg/kg	<1	<1	0.00	No Limit
		EG005T: Cadmium	7440-43-9	1	mg/kg	<1	<1	0.00	No Limit
		EG005T: Barium	7440-39-3	10	mg/kg	40	40	0.00	No Limit
		EG005T: Chromium	7440-47-3	2	mg/kg	16	18	11.8	No Limit
		EG005T: Cobalt	7440-48-4	2	mg/kg	<2	<2	0.00	No Limit
		EG005T: Nickel	7440-02-0	2	mg/kg	4	4	0.00	No Limit
		EG005T: Silver	7440-22-4	2	mg/kg	<2	<2	0.00	No Limit
		EG005T: Arsenic	7440-38-2	5	mg/kg	13	17	29.4	No Limit
		EG005T: Copper	7440-50-8	5	mg/kg	<5	<5	0.00	No Limit
		EG005T: Lead	7439-92-1	5	mg/kg	<5	<5	0.00	No Limit
		EG005T: Manganese	7439-96-5	5	mg/kg	30	35	13.0	No Limit
		EG005T: Zinc	7440-66-6	5	mg/kg	8	10	18.6	No Limit
		EG005T: Iron	7439-89-6	50	mg/kg	18600	22000	16.7	0% - 20%
EM2007842-089	TP16_0.1-0.2	EG005T: Beryllium	7440-41-7	1	mg/kg	<1	<1	0.00	No Limit
		EG005T: Cadmium	7440-43-9	1	mg/kg	<1	<1	0.00	No Limit
		EG005T: Barium	7440-39-3	10	mg/kg	70	90	28.1	No Limit
		EG005T: Chromium	7440-47-3	2	mg/kg	15	18	16.0	No Limit
		EG005T: Cobalt	7440-48-4	2	mg/kg	2	3	0.00	No Limit
		EG005T: Nickel	7440-02-0	2	mg/kg	3	3	0.00	No Limit
		EG005T: Silver	7440-22-4	2	mg/kg	<2	<2	0.00	No Limit
		EG005T: Arsenic	7440-38-2	5	mg/kg	6	<5	24.0	No Limit
		EG005T: Copper	7440-50-8	5	mg/kg	8	16	62.9	No Limit
		EG005T: Lead	7439-92-1	5	mg/kg	<5	<5	0.00	No Limit
		EG005T: Manganese	7439-96-5	5	mg/kg	26	29	9.95	No Limit
		EG005T: Zinc	7440-66-6	5	mg/kg	15	23	41.8	No Limit
		EG005T: Iron	7439-89-6	50	mg/kg	21800	19800	9.98	0% - 20%
EG005(ED093)T: Total Metals by ICP-AES (QC Lot: 3015936)									
EM2007817-001	Anonymous	EG005T: Beryllium	7440-41-7	1	mg/kg	<1	<1	0.00	No Limit
		EG005T: Cadmium	7440-43-9	1	mg/kg	<1	<1	0.00	No Limit
		EG005T: Barium	7440-39-3	10	mg/kg	250	250	0.00	0% - 20%
		EG005T: Chromium	7440-47-3	2	mg/kg	20	20	0.00	0% - 50%
		EG005T: Cobalt	7440-48-4	2	mg/kg	21	20	5.89	0% - 50%
		EG005T: Nickel	7440-02-0	2	mg/kg	74	75	0.00	0% - 20%
		EG005T: Silver	7440-22-4	2	mg/kg	<2	<2	0.00	No Limit
		EG005T: Arsenic	7440-38-2	5	mg/kg	<5	<5	0.00	No Limit
		EG005T: Copper	7440-50-8	5	mg/kg	20	22	10.4	No Limit
		EG005T: Lead	7439-92-1	5	mg/kg	<5	<5	0.00	No Limit
		EG005T: Manganese	7439-96-5	5	mg/kg	385	356	7.80	0% - 20%

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EG005(ED093)T: Total Metals by ICP-AES (QC Lot: 3015936) - continued									
EM2007817-001	Anonymous	EG005T: Zinc	7440-66-6	5	mg/kg	36	38	6.72	No Limit
		EG005T: Iron	7439-89-6	50	mg/kg	30300	30100	0.825	0% - 20%
EM2007842-127	TP25_0.1-0.2	EG005T: Beryllium	7440-41-7	1	mg/kg	<1	<1	0.00	No Limit
		EG005T: Cadmium	7440-43-9	1	mg/kg	<1	<1	0.00	No Limit
		EG005T: Barium	7440-39-3	10	mg/kg	50	50	0.00	No Limit
		EG005T: Chromium	7440-47-3	2	mg/kg	8	9	11.4	No Limit
		EG005T: Cobalt	7440-48-4	2	mg/kg	3	3	0.00	No Limit
		EG005T: Nickel	7440-02-0	2	mg/kg	5	5	0.00	No Limit
		EG005T: Silver	7440-22-4	2	mg/kg	<2	<2	0.00	No Limit
		EG005T: Arsenic	7440-38-2	5	mg/kg	<5	<5	0.00	No Limit
		EG005T: Copper	7440-50-8	5	mg/kg	7	7	0.00	No Limit
		EG005T: Lead	7439-92-1	5	mg/kg	<5	<5	0.00	No Limit
		EG005T: Manganese	7439-96-5	5	mg/kg	73	67	8.66	0% - 50%
		EG005T: Zinc	7440-66-6	5	mg/kg	7	6	0.00	No Limit
		EG005T: Iron	7439-89-6	50	mg/kg	5460	5260	3.71	0% - 20%
EG005(ED093)T: Total Metals by ICP-AES (QC Lot: 3015937)									
EM2007842-150	TP30_1.1-1.2	EG005T: Beryllium	7440-41-7	1	mg/kg	<1	<1	0.00	No Limit
		EG005T: Cadmium	7440-43-9	1	mg/kg	<1	<1	0.00	No Limit
		EG005T: Barium	7440-39-3	10	mg/kg	40	50	0.00	No Limit
		EG005T: Chromium	7440-47-3	2	mg/kg	8	8	0.00	No Limit
		EG005T: Cobalt	7440-48-4	2	mg/kg	6	6	0.00	No Limit
		EG005T: Nickel	7440-02-0	2	mg/kg	6	6	0.00	No Limit
		EG005T: Silver	7440-22-4	2	mg/kg	<2	<2	0.00	No Limit
		EG005T: Arsenic	7440-38-2	5	mg/kg	12	11	0.00	No Limit
		EG005T: Copper	7440-50-8	5	mg/kg	6	6	0.00	No Limit
		EG005T: Lead	7439-92-1	5	mg/kg	<5	<5	0.00	No Limit
		EG005T: Manganese	7439-96-5	5	mg/kg	105	93	11.5	0% - 20%
		EG005T: Zinc	7440-66-6	5	mg/kg	7	7	0.00	No Limit
		EG005T: Iron	7439-89-6	50	mg/kg	7210	6790	6.01	0% - 20%
EA055: Moisture Content (Dried @ 105-110°C) (QC Lot: 3017002)									
EM2007817-006	Anonymous	EA055: Moisture Content	----	0.1	%	6.6	6.3	5.20	No Limit
EM2007842-039	TP6_0.6-0.7	EA055: Moisture Content	----	0.1	%	11.1	13.2	17.2	0% - 50%
EA055: Moisture Content (Dried @ 105-110°C) (QC Lot: 3017003)									
EM2007842-062	TP10_0.2-0.3	EA055: Moisture Content	----	0.1	%	16.4	16.3	0.00	0% - 50%
EM2007842-084	TP14_0.5-0.6	EA055: Moisture Content	----	0.1	%	8.1	7.9	1.98	No Limit
EA055: Moisture Content (Dried @ 105-110°C) (QC Lot: 3017004)									
EM2007842-114	TP22_0.6-0.7	EA055: Moisture Content	----	0.1	%	16.9	16.3	3.85	0% - 50%
EM2007842-137	TP28_0.1-0.2	EA055: Moisture Content	----	0.1	%	16.9	16.7	1.14	0% - 50%
EG035T: Total Recoverable Mercury by FIMS (QC Lot: 3015930)									

Sub-Matrix: **SOIL**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EG035T: Total Recoverable Mercury by FIMS (QC Lot: 3015930) - continued									
EM2007842-015	TP3_0.5-0.6	EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
EM2007842-040	TP6_0.8-0.9	EG035T: Mercury	7439-97-6	0.1	mg/kg	0.2	0.3	0.00	No Limit
EG035T: Total Recoverable Mercury by FIMS (QC Lot: 3015932)									
EM2007842-064	TP10_0.7-0.8	EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
EM2007842-089	TP16_0.1-0.2	EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
EG035T: Total Recoverable Mercury by FIMS (QC Lot: 3015935)									
EM2007817-001	Anonymous	EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
EM2007842-127	TP25_0.1-0.2	EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
EG035T: Total Recoverable Mercury by FIMS (QC Lot: 3015938)									
EM2007842-150	TP30_1.1-1.2	EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
EG048: Hexavalent Chromium (Alkaline Digest) (QC Lot: 3016949)									
EM2007692-004	Anonymous	EG048G: Hexavalent Chromium	18540-29-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
EM2007817-002	Anonymous	EG048G: Hexavalent Chromium	18540-29-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
EG048: Hexavalent Chromium (Alkaline Digest) (QC Lot: 3016950)									
EM2007842-094	TP17_0.6-0.7	EG048G: Hexavalent Chromium	18540-29-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
EM2007856-003	Anonymous	EG048G: Hexavalent Chromium	18540-29-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
EK026SF: Total CN by Segmented Flow Analyser (QC Lot: 3017060)									
EM2007817-002	Anonymous	EK026SF: Total Cyanide	57-12-5	1	mg/kg	<1	<1	0.00	No Limit
--------		EK026SF: Total Cyanide	57-12-5	1	mg/kg	----	<1	0.00	No Limit
EK026SF: Total CN by Segmented Flow Analyser (QC Lot: 3017062)									
EM2007842-094	TP17_0.6-0.7	EK026SF: Total Cyanide	57-12-5	1	mg/kg	<1	<1	0.00	No Limit
EM2007856-003	Anonymous	EK026SF: Total Cyanide	57-12-5	1	mg/kg	<1	<1	0.00	No Limit
EP066: Polychlorinated Biphenyls (PCB) (QC Lot: 3016717)									
EM2007842-032	TP5_1.0-1.2	EP066: Total Polychlorinated biphenyls	----	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
EP066: Polychlorinated Biphenyls (PCB) (QC Lot: 3016732)									
EM2007842-127	TP25_0.1-0.2	EP066: Total Polychlorinated biphenyls	----	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
EP068A: Organochlorine Pesticides (OC) (QC Lot: 3016716)									
EM2007842-064	TP10_0.7-0.8	EP068: alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: beta-BHC	319-85-7	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: gamma-BHC	58-89-9	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: trans-Chlordane	5103-74-2	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: alpha-Endosulfan	959-98-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: cis-Chlordane	5103-71-9	0.05	mg/kg	<0.05	<0.05	0.00	No Limit

Sub-Matrix: **SOIL**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report					
				LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EP068A: Organochlorine Pesticides (OC) (QC Lot: 3016716) - continued									
EM2007842-064	TP10_0.7-0.8	EP068: Dieldrin	60-57-1	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: 4.4`-DDE	72-55-9	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Endrin	72-20-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: beta-Endosulfan	33213-65-9	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: 4.4`-DDD	72-54-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Endrin aldehyde	7421-93-4	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Endrin ketone	53494-70-5	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: 4.4`-DDT	50-29-3	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
		EP068: Methoxychlor	72-43-5	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
EM2007842-032	TP5_1.0-1.2	EP068: alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: beta-BHC	319-85-7	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: gamma-BHC	58-89-9	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: trans-Chlordane	5103-74-2	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: alpha-Endosulfan	959-98-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: cis-Chlordane	5103-71-9	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Dieldrin	60-57-1	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: 4.4`-DDE	72-55-9	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Endrin	72-20-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: beta-Endosulfan	33213-65-9	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: 4.4`-DDD	72-54-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Endrin aldehyde	7421-93-4	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Endrin ketone	53494-70-5	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: 4.4`-DDT	50-29-3	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
		EP068: Methoxychlor	72-43-5	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
EP068A: Organochlorine Pesticides (OC) (QC Lot: 3016731)									
EM2007842-106	TP20_0.8-0.9	EP068: alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: beta-BHC	319-85-7	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: gamma-BHC	58-89-9	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05	0.00	No Limit

Sub-Matrix: **SOIL**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report					
				LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EP068A: Organochlorine Pesticides (OC) (QC Lot: 3016731) - continued									
EM2007842-106	TP20_0.8-0.9	EP068: trans-Chlordane	5103-74-2	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: alpha-Endosulfan	959-98-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: cis-Chlordane	5103-71-9	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Dieldrin	60-57-1	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: 4.4`-DDE	72-55-9	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Endrin	72-20-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: beta-Endosulfan	33213-65-9	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: 4.4`-DDD	72-54-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Endrin aldehyde	7421-93-4	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Endrin ketone	53494-70-5	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: 4.4`-DDT	50-29-3	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
		EP068: Methoxychlor	72-43-5	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
EM2007842-127	TP25_0.1-0.2	EP068: alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: beta-BHC	319-85-7	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: gamma-BHC	58-89-9	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: trans-Chlordane	5103-74-2	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: alpha-Endosulfan	959-98-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: cis-Chlordane	5103-71-9	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Dieldrin	60-57-1	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: 4.4`-DDE	72-55-9	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Endrin	72-20-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: beta-Endosulfan	33213-65-9	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: 4.4`-DDD	72-54-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Endrin aldehyde	7421-93-4	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Endrin ketone	53494-70-5	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: 4.4`-DDT	50-29-3	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
		EP068: Methoxychlor	72-43-5	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
EP074E: Halogenated Aliphatic Compounds (QC Lot: 3015886)									
EM2007842-032	TP5_1.0-1.2	EP074: Tetrachloroethene	127-18-4	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
EM2007842-152	TP31_0.3-0.4	EP074: Tetrachloroethene	127-18-4	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
EP075(SIM)A: Phenolic Compounds (QC Lot: 3016714)									
EM2007842-064	TP10_0.7-0.8	EP075(SIM): Phenol	108-95-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 2-Chlorophenol	95-57-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit

Sub-Matrix: **SOIL**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
				Laboratory Duplicate (DUP) Report					
EP075(SIM)A: Phenolic Compounds (QC Lot: 3016714) - continued									
EM2007842-064	TP10_0.7-0.8	EP075(SIM): 2-Methylphenol	95-48-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 2-Nitrophenol	88-75-5	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 2.4-Dimethylphenol	105-67-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 2.4-Dichlorophenol	120-83-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 2.6-Dichlorophenol	87-65-0	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 4-Chloro-3-methylphenol	59-50-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 2.4.6-Trichlorophenol	88-06-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 2.4.5-Trichlorophenol	95-95-4	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 3- & 4-Methylphenol	1319-77-3	1	mg/kg	<1	<1	0.00	No Limit
		EP075(SIM): Pentachlorophenol	87-86-5	2	mg/kg	<2	<2	0.00	No Limit
EM2007842-032	TP5_1.0-1.2	EP075(SIM): Phenol	108-95-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 2-Chlorophenol	95-57-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 2-Methylphenol	95-48-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 2-Nitrophenol	88-75-5	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 2.4-Dimethylphenol	105-67-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 2.4-Dichlorophenol	120-83-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 2.6-Dichlorophenol	87-65-0	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 4-Chloro-3-methylphenol	59-50-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 2.4.6-Trichlorophenol	88-06-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 2.4.5-Trichlorophenol	95-95-4	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 3- & 4-Methylphenol	1319-77-3	1	mg/kg	<1	<1	0.00	No Limit
		EP075(SIM): Pentachlorophenol	87-86-5	2	mg/kg	<2	<2	0.00	No Limit
EP075(SIM)A: Phenolic Compounds (QC Lot: 3016729)									
EM2007842-106	TP20_0.8-0.9	EP075(SIM): Phenol	108-95-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 2-Chlorophenol	95-57-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 2-Methylphenol	95-48-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 2-Nitrophenol	88-75-5	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 2.4-Dimethylphenol	105-67-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 2.4-Dichlorophenol	120-83-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 2.6-Dichlorophenol	87-65-0	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 4-Chloro-3-methylphenol	59-50-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 2.4.6-Trichlorophenol	88-06-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 2.4.5-Trichlorophenol	95-95-4	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 3- & 4-Methylphenol	1319-77-3	1	mg/kg	<1	<1	0.00	No Limit
		EP075(SIM): Pentachlorophenol	87-86-5	2	mg/kg	<2	<2	0.00	No Limit
EM2007842-127	TP25_0.1-0.2	EP075(SIM): Phenol	108-95-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 2-Chlorophenol	95-57-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 2-Methylphenol	95-48-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 2-Nitrophenol	88-75-5	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 2.4-Dimethylphenol	105-67-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit

Sub-Matrix: **SOIL**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report					
				LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EP075(SIM)A: Phenolic Compounds (QC Lot: 3016729) - continued									
EM2007842-127	TP25_0.1-0.2	EP075(SIM): 2.4-Dichlorophenol	120-83-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 2.6-Dichlorophenol	87-65-0	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 4-Chloro-3-methylphenol	59-50-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 2.4.6-Trichlorophenol	88-06-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 2.4.5-Trichlorophenol	95-95-4	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 3- & 4-Methylphenol	1319-77-3	1	mg/kg	<1	<1	0.00	No Limit
		EP075(SIM): Pentachlorophenol	87-86-5	2	mg/kg	<2	<2	0.00	No Limit
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QC Lot: 3016714)									
EM2007842-064	TP10_0.7-0.8	EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
EM2007842-032	TP5_1.0-1.2	EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	0.00	No Limit

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QC Lot: 3016714) - continued									
EM2007842-032	TP5_1.0-1.2	EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QC Lot: 3016729)									
EM2007842-106	TP20_0.8-0.9	EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
EM2007842-127	TP25_0.1-0.2	EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 3015887)									
EM2007842-032	TP5_1.0-1.2	EP080: C6 - C9 Fraction	----	10	mg/kg	<10	<10	0.00	No Limit
EM2007842-152	TP31_0.3-0.4	EP080: C6 - C9 Fraction	----	10	mg/kg	<10	<10	0.00	No Limit

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 3015891)									
EM2007842-016	TP3_0.8-0.9	EP080: C6 - C9 Fraction	----	10	mg/kg	<10	<10	0.00	No Limit
EM2007842-095	TP17_1.0-1.1	EP080: C6 - C9 Fraction	----	10	mg/kg	<10	<10	0.00	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 3016715)									
EM2007842-064	TP10_0.7-0.8	EP071: C15 - C28 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: C29 - C36 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: C10 - C14 Fraction	----	50	mg/kg	<50	<50	0.00	No Limit
		EP071: C10 - C36 Fraction (sum)	----	50	mg/kg	<50	<50	0.00	No Limit
EM2007842-032	TP5_1.0-1.2	EP071: C15 - C28 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: C29 - C36 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: C10 - C14 Fraction	----	50	mg/kg	<50	<50	0.00	No Limit
		EP071: C10 - C36 Fraction (sum)	----	50	mg/kg	<50	<50	0.00	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 3016730)									
EM2007842-106	TP20_0.8-0.9	EP071: C15 - C28 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: C29 - C36 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: C10 - C14 Fraction	----	50	mg/kg	<50	<50	0.00	No Limit
		EP071: C10 - C36 Fraction (sum)	----	50	mg/kg	<50	<50	0.00	No Limit
EM2007842-127	TP25_0.1-0.2	EP071: C15 - C28 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: C29 - C36 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: C10 - C14 Fraction	----	50	mg/kg	<50	<50	0.00	No Limit
		EP071: C10 - C36 Fraction (sum)	----	50	mg/kg	<50	<50	0.00	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 3015887)									
EM2007842-032	TP5_1.0-1.2	EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	0.00	No Limit
EM2007842-152	TP31_0.3-0.4	EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	0.00	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 3015891)									
EM2007842-016	TP3_0.8-0.9	EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	0.00	No Limit
EM2007842-095	TP17_1.0-1.1	EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	0.00	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 3016715)									
EM2007842-064	TP10_0.7-0.8	EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: >C10 - C16 Fraction	----	50	mg/kg	<50	<50	0.00	No Limit
		EP071: >C10 - C40 Fraction (sum)	----	50	mg/kg	<50	<50	0.00	No Limit
EM2007842-032	TP5_1.0-1.2	EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: >C10 - C16 Fraction	----	50	mg/kg	<50	<50	0.00	No Limit
		EP071: >C10 - C40 Fraction (sum)	----	50	mg/kg	<50	<50	0.00	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 3016730)									
EM2007842-106	TP20_0.8-0.9	EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: >C10 - C16 Fraction	----	50	mg/kg	<50	<50	0.00	No Limit

Sub-Matrix: **SOIL**

Laboratory Duplicate (DUP) Report

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 3016730) - continued									
EM2007842-106	TP20_0.8-0.9	EP071: >C10 - C40 Fraction (sum)	----	50	mg/kg	<50	<50	0.00	No Limit
EM2007842-127	TP25_0.1-0.2	EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: >C10 - C16 Fraction	----	50	mg/kg	<50	<50	0.00	No Limit
		EP071: >C10 - C40 Fraction (sum)	----	50	mg/kg	<50	<50	0.00	No Limit
EP080: BTEXN (QC Lot: 3015887)									
EM2007842-032	TP5_1.0-1.2	EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
		EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: Naphthalene	91-20-3	1	mg/kg	<1	<1	0.00	No Limit
EM2007842-152	TP31_0.3-0.4	EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
		EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: Naphthalene	91-20-3	1	mg/kg	<1	<1	0.00	No Limit
EP080: BTEXN (QC Lot: 3015891)									
EM2007842-016	TP3_0.8-0.9	EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
		EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: Naphthalene	91-20-3	1	mg/kg	<1	<1	0.00	No Limit
EM2007842-095	TP17_1.0-1.1	EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
		EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: Naphthalene	91-20-3	1	mg/kg	<1	<1	0.00	No Limit

Sub-Matrix: **WATER**

Laboratory Duplicate (DUP) Report

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 3016178)									
EM2007826-011	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.00	No Limit
EM2007826-001	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.00	No Limit

Sub-Matrix: **WATER**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
				Laboratory Duplicate (DUP) Report					
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 3016178)									
EM2007826-011	Anonymous	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.00	No Limit
EM2007826-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.00	No Limit
EP080: BTEXN (QC Lot: 3016178)									
EM2007826-011	Anonymous	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.00	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.00	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.00	No Limit
		EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.00	No Limit
EM2007826-001	Anonymous	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.00	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.00	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.00	No Limit
		EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.00	No Limit

Method Blank (MB) and Laboratory Control Spike (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Spike (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: **SOIL**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EG005(ED093)T: Total Metals by ICP-AES (QCLot: 3015929)								
EG005T: Arsenic	7440-38-2	5	mg/kg	<5	21.7 mg/kg	102	78.5	107
EG005T: Barium	7440-39-3	10	mg/kg	<10	143 mg/kg	104	76.4	110
EG005T: Beryllium	7440-41-7	1	mg/kg	<1	5.63 mg/kg	110	85.4	114
EG005T: Cadmium	7440-43-9	1	mg/kg	<1	4.64 mg/kg	97.8	76.2	108
EG005T: Chromium	7440-47-3	2	mg/kg	<2	43.9 mg/kg	102	77.7	110
EG005T: Cobalt	7440-48-4	2	mg/kg	<2	16 mg/kg	102	78.1	112
EG005T: Copper	7440-50-8	5	mg/kg	<5	32 mg/kg	102	78.1	108
EG005T: Iron	7439-89-6	50	mg/kg	<50	8400 mg/kg	95.8	83.5	112
EG005T: Lead	7439-92-1	5	mg/kg	<5	40 mg/kg	101	78.4	106
EG005T: Manganese	7439-96-5	5	mg/kg	<5	130 mg/kg	106	80.6	110
EG005T: Nickel	7440-02-0	2	mg/kg	<2	55 mg/kg	105	79.9	109
EG005T: Silver	7440-22-4	2	mg/kg	<2	2.1 mg/kg	86.0	80.0	108
EG005T: Zinc	7440-66-6	5	mg/kg	<5	60.8 mg/kg	106	79.1	110
EG005(ED093)T: Total Metals by ICP-AES (QCLot: 3015931)								
EG005T: Arsenic	7440-38-2	5	mg/kg	<5	21.7 mg/kg	103	78.5	107
EG005T: Barium	7440-39-3	10	mg/kg	<10	143 mg/kg	104	76.4	110
EG005T: Beryllium	7440-41-7	1	mg/kg	<1	5.63 mg/kg	112	85.4	114
EG005T: Cadmium	7440-43-9	1	mg/kg	<1	4.64 mg/kg	99.2	76.2	108
EG005T: Chromium	7440-47-3	2	mg/kg	<2	43.9 mg/kg	102	77.7	110
EG005T: Cobalt	7440-48-4	2	mg/kg	<2	16 mg/kg	104	78.1	112
EG005T: Copper	7440-50-8	5	mg/kg	<5	32 mg/kg	103	78.1	108
EG005T: Iron	7439-89-6	50	mg/kg	<50	8400 mg/kg	96.7	83.5	112
EG005T: Lead	7439-92-1	5	mg/kg	<5	40 mg/kg	101	78.4	106
EG005T: Manganese	7439-96-5	5	mg/kg	<5	130 mg/kg	107	80.6	110
EG005T: Nickel	7440-02-0	2	mg/kg	<2	55 mg/kg	106	79.9	109
EG005T: Silver	7440-22-4	2	mg/kg	<2	2.1 mg/kg	86.4	80.0	108
EG005T: Zinc	7440-66-6	5	mg/kg	<5	60.8 mg/kg	107	79.1	110
EG005(ED093)T: Total Metals by ICP-AES (QCLot: 3015936)								
EG005T: Arsenic	7440-38-2	5	mg/kg	<5	21.7 mg/kg	105	78.5	107
EG005T: Barium	7440-39-3	10	mg/kg	<10	143 mg/kg	109	76.4	110
EG005T: Beryllium	7440-41-7	1	mg/kg	<1	5.63 mg/kg	100	85.4	114
EG005T: Cadmium	7440-43-9	1	mg/kg	<1	4.64 mg/kg	101	76.2	108
EG005T: Chromium	7440-47-3	2	mg/kg	<2	43.9 mg/kg	109	77.7	110
EG005T: Cobalt	7440-48-4	2	mg/kg	<2	16 mg/kg	106	78.1	112

Sub-Matrix: **SOIL**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EG005(ED093)T: Total Metals by ICP-AES (QCLot: 3015936) - continued								
EG005T: Copper	7440-50-8	5	mg/kg	<5	32 mg/kg	106	78.1	108
EG005T: Iron	7439-89-6	50	mg/kg	<50	8400 mg/kg	108	83.5	112
EG005T: Lead	7439-92-1	5	mg/kg	<5	40 mg/kg	105	78.4	106
EG005T: Manganese	7439-96-5	5	mg/kg	<5	130 mg/kg	110	80.6	110
EG005T: Nickel	7440-02-0	2	mg/kg	<2	55 mg/kg	102	79.9	109
EG005T: Silver	7440-22-4	2	mg/kg	<2	2.1 mg/kg	85.2	80.0	108
EG005T: Zinc	7440-66-6	5	mg/kg	<5	60.8 mg/kg	107	79.1	110
EG005(ED093)T: Total Metals by ICP-AES (QCLot: 3015937)								
EG005T: Arsenic	7440-38-2	5	mg/kg	<5	21.7 mg/kg	103	78.5	107
EG005T: Barium	7440-39-3	10	mg/kg	<10	143 mg/kg	109	76.4	110
EG005T: Beryllium	7440-41-7	1	mg/kg	<1	5.63 mg/kg	114	85.4	114
EG005T: Cadmium	7440-43-9	1	mg/kg	<1	4.64 mg/kg	99.9	76.2	108
EG005T: Chromium	7440-47-3	2	mg/kg	<2	43.9 mg/kg	108	77.7	110
EG005T: Cobalt	7440-48-4	2	mg/kg	<2	16 mg/kg	106	78.1	112
EG005T: Copper	7440-50-8	5	mg/kg	<5	32 mg/kg	106	78.1	108
EG005T: Iron	7439-89-6	50	mg/kg	<50	8400 mg/kg	108	83.5	112
EG005T: Lead	7439-92-1	5	mg/kg	<5	40 mg/kg	103	78.4	106
EG005T: Manganese	7439-96-5	5	mg/kg	<5	130 mg/kg	109	80.6	110
EG005T: Nickel	7440-02-0	2	mg/kg	<2	55 mg/kg	102	79.9	109
EG005T: Silver	7440-22-4	2	mg/kg	<2	2.1 mg/kg	87.9	80.0	108
EG005T: Zinc	7440-66-6	5	mg/kg	<5	60.8 mg/kg	106	79.1	110
EG035T: Total Recoverable Mercury by FIMS (QCLot: 3015930)								
EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	2.57 mg/kg	101	76.9	110
EG035T: Total Recoverable Mercury by FIMS (QCLot: 3015932)								
EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	2.57 mg/kg	97.7	76.9	110
EG035T: Total Recoverable Mercury by FIMS (QCLot: 3015935)								
EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	2.57 mg/kg	102	76.9	110
EG035T: Total Recoverable Mercury by FIMS (QCLot: 3015938)								
EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	2.57 mg/kg	102	76.9	110
EG048: Hexavalent Chromium (Alkaline Digest) (QCLot: 3016949)								
EG048G: Hexavalent Chromium	18540-29-9	0.5	mg/kg	<0.5	20 mg/kg	73.9	70.0	130
EG048: Hexavalent Chromium (Alkaline Digest) (QCLot: 3016950)								
EG048G: Hexavalent Chromium	18540-29-9	0.5	mg/kg	<0.5	20 mg/kg	76.0	70.0	130
EK026SF: Total CN by Segmented Flow Analyser (QCLot: 3017060)								
EK026SF: Total Cyanide	57-12-5	1	mg/kg	<1	20 mg/kg	81.0	70.0	130
EK026SF: Total CN by Segmented Flow Analyser (QCLot: 3017062)								
EK026SF: Total Cyanide	57-12-5	1	mg/kg	<1	20 mg/kg	81.0	70.0	130

Sub-Matrix: **SOIL**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EP066: Polychlorinated Biphenyls (PCB) (QCLot: 3016717)								
EP066: Total Polychlorinated biphenyls	----	0.1	mg/kg	<0.1	1.18 mg/kg	104	63.2	133
EP066: Polychlorinated Biphenyls (PCB) (QCLot: 3016732)								
EP066: Total Polychlorinated biphenyls	----	0.1	mg/kg	<0.1	1.18 mg/kg	101	63.2	133
EP068A: Organochlorine Pesticides (OC) (QCLot: 3016716)								
EP068: alpha-BHC	319-84-6	0.05	mg/kg	<0.05	0.5 mg/kg	91.0	71.8	126
EP068: Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	<0.05	0.5 mg/kg	78.7	72.2	125
EP068: beta-BHC	319-85-7	0.05	mg/kg	<0.05	0.5 mg/kg	89.0	74.2	124
EP068: gamma-BHC	58-89-9	0.05	mg/kg	<0.05	0.5 mg/kg	107	69.1	124
EP068: delta-BHC	319-86-8	0.05	mg/kg	<0.05	0.5 mg/kg	89.1	65.1	125
EP068: Heptachlor	76-44-8	0.05	mg/kg	<0.05	0.5 mg/kg	84.7	66.6	122
EP068: Aldrin	309-00-2	0.05	mg/kg	<0.05	0.5 mg/kg	88.4	71.8	123
EP068: Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	0.5 mg/kg	89.3	71.1	124
EP068: trans-Chlordane	5103-74-2	0.05	mg/kg	<0.05	0.5 mg/kg	113	64.8	128
EP068: alpha-Endosulfan	959-98-8	0.05	mg/kg	<0.05	0.5 mg/kg	98.8	70.2	126
EP068: cis-Chlordane	5103-71-9	0.05	mg/kg	<0.05	0.5 mg/kg	90.0	72.1	124
EP068: Dieldrin	60-57-1	0.05	mg/kg	<0.05	0.5 mg/kg	89.5	68.0	122
EP068: 4.4`-DDE	72-55-9	0.05	mg/kg	<0.05	0.5 mg/kg	91.5	73.0	124
EP068: Endrin	72-20-8	0.05	mg/kg	<0.05	0.5 mg/kg	83.0	55.8	130
EP068: beta-Endosulfan	33213-65-9	0.05	mg/kg	<0.05	0.5 mg/kg	90.1	72.0	124
EP068: 4.4`-DDD	72-54-8	0.05	mg/kg	<0.05	0.5 mg/kg	89.5	72.0	127
EP068: Endrin aldehyde	7421-93-4	0.05	mg/kg	<0.05	0.5 mg/kg	90.8	66.3	131
EP068: Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	0.5 mg/kg	88.1	62.4	131
EP068: 4.4`-DDT	50-29-3	0.2	mg/kg	<0.2	0.5 mg/kg	78.6	55.4	130
EP068: Endrin ketone	53494-70-5	0.05	mg/kg	<0.05	0.5 mg/kg	90.0	68.8	128
EP068: Methoxychlor	72-43-5	0.2	mg/kg	<0.2	0.5 mg/kg	81.0	55.5	132
EP068A: Organochlorine Pesticides (OC) (QCLot: 3016731)								
EP068: alpha-BHC	319-84-6	0.05	mg/kg	<0.05	0.5 mg/kg	84.4	71.8	126
EP068: Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	<0.05	0.5 mg/kg	73.4	72.2	125
EP068: beta-BHC	319-85-7	0.05	mg/kg	<0.05	0.5 mg/kg	82.0	74.2	124
EP068: gamma-BHC	58-89-9	0.05	mg/kg	<0.05	0.5 mg/kg	98.8	69.1	124
EP068: delta-BHC	319-86-8	0.05	mg/kg	<0.05	0.5 mg/kg	81.4	65.1	125
EP068: Heptachlor	76-44-8	0.05	mg/kg	<0.05	0.5 mg/kg	78.0	66.6	122
EP068: Aldrin	309-00-2	0.05	mg/kg	<0.05	0.5 mg/kg	83.1	71.8	123
EP068: Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	0.5 mg/kg	81.0	71.1	124
EP068: trans-Chlordane	5103-74-2	0.05	mg/kg	<0.05	0.5 mg/kg	103	64.8	128
EP068: alpha-Endosulfan	959-98-8	0.05	mg/kg	<0.05	0.5 mg/kg	89.9	70.2	126
EP068: cis-Chlordane	5103-71-9	0.05	mg/kg	<0.05	0.5 mg/kg	83.3	72.1	124
EP068: Dieldrin	60-57-1	0.05	mg/kg	<0.05	0.5 mg/kg	81.8	68.0	122

Sub-Matrix: **SOIL**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EP068A: Organochlorine Pesticides (OC) (QCLot: 3016731) - continued								
EP068: 4.4`-DDE	72-55-9	0.05	mg/kg	<0.05	0.5 mg/kg	84.2	73.0	124
EP068: Endrin	72-20-8	0.05	mg/kg	<0.05	0.5 mg/kg	72.7	55.8	130
EP068: beta-Endosulfan	33213-65-9	0.05	mg/kg	<0.05	0.5 mg/kg	82.2	72.0	124
EP068: 4.4`-DDD	72-54-8	0.05	mg/kg	<0.05	0.5 mg/kg	82.2	72.0	127
EP068: Endrin aldehyde	7421-93-4	0.05	mg/kg	<0.05	0.5 mg/kg	82.6	66.3	131
EP068: Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	0.5 mg/kg	98.1	62.4	131
EP068: 4.4`-DDT	50-29-3	0.2	mg/kg	<0.2	0.5 mg/kg	69.7	55.4	130
EP068: Endrin ketone	53494-70-5	0.05	mg/kg	<0.05	0.5 mg/kg	81.4	68.8	128
EP068: Methoxychlor	72-43-5	0.2	mg/kg	<0.2	0.5 mg/kg	70.6	55.5	132
EP074E: Halogenated Aliphatic Compounds (QCLot: 3015886)								
EP074: Tetrachloroethene	127-18-4	0.5	mg/kg	<0.5	1 mg/kg	95.5	62.6	116
EP075(SIM)A: Phenolic Compounds (QCLot: 3016714)								
EP075(SIM): Phenol	108-95-2	0.5	mg/kg	<0.5	3 mg/kg	112	80.6	124
EP075(SIM): 2-Chlorophenol	95-57-8	0.5	mg/kg	<0.5	3 mg/kg	111	81.4	124
EP075(SIM): 2-Methylphenol	95-48-7	0.5	mg/kg	<0.5	3 mg/kg	111	82.4	124
EP075(SIM): 3- & 4-Methylphenol	1319-77-3	1	mg/kg	<1	6 mg/kg	113	80.9	128
EP075(SIM): 2-Nitrophenol	88-75-5	0.5	mg/kg	<0.5	3 mg/kg	102	51.4	123
EP075(SIM): 2.4-Dimethylphenol	105-67-9	0.5	mg/kg	<0.5	3 mg/kg	115	79.0	127
EP075(SIM): 2.4-Dichlorophenol	120-83-2	0.5	mg/kg	<0.5	3 mg/kg	109	76.0	125
EP075(SIM): 2.6-Dichlorophenol	87-65-0	0.5	mg/kg	<0.5	3 mg/kg	109	78.6	125
EP075(SIM): 4-Chloro-3-methylphenol	59-50-7	0.5	mg/kg	<0.5	3 mg/kg	104	69.9	121
EP075(SIM): 2.4.6-Trichlorophenol	88-06-2	0.5	mg/kg	<0.5	3 mg/kg	99.6	63.9	120
EP075(SIM): 2.4.5-Trichlorophenol	95-95-4	0.5	mg/kg	<0.5	3 mg/kg	104	64.8	123
EP075(SIM): Pentachlorophenol	87-86-5	2	mg/kg	<2	6 mg/kg	57.0	20.0	117
EP075(SIM)A: Phenolic Compounds (QCLot: 3016729)								
EP075(SIM): Phenol	108-95-2	0.5	mg/kg	<0.5	3 mg/kg	111	80.6	124
EP075(SIM): 2-Chlorophenol	95-57-8	0.5	mg/kg	<0.5	3 mg/kg	112	81.4	124
EP075(SIM): 2-Methylphenol	95-48-7	0.5	mg/kg	<0.5	3 mg/kg	111	82.4	124
EP075(SIM): 3- & 4-Methylphenol	1319-77-3	1	mg/kg	<1	6 mg/kg	114	80.9	128
EP075(SIM): 2-Nitrophenol	88-75-5	0.5	mg/kg	<0.5	3 mg/kg	96.2	51.4	123
EP075(SIM): 2.4-Dimethylphenol	105-67-9	0.5	mg/kg	<0.5	3 mg/kg	116	79.0	127
EP075(SIM): 2.4-Dichlorophenol	120-83-2	0.5	mg/kg	<0.5	3 mg/kg	107	76.0	125
EP075(SIM): 2.6-Dichlorophenol	87-65-0	0.5	mg/kg	<0.5	3 mg/kg	107	78.6	125
EP075(SIM): 4-Chloro-3-methylphenol	59-50-7	0.5	mg/kg	<0.5	3 mg/kg	100	69.9	121
EP075(SIM): 2.4.6-Trichlorophenol	88-06-2	0.5	mg/kg	<0.5	3 mg/kg	98.2	63.9	120
EP075(SIM): 2.4.5-Trichlorophenol	95-95-4	0.5	mg/kg	<0.5	3 mg/kg	105	64.8	123
EP075(SIM): Pentachlorophenol	87-86-5	2	mg/kg	<2	6 mg/kg	70.6	20.0	117
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 3016714)								

Sub-Matrix: **SOIL**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
				Result	Concentration	LCS	Low	High
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 3016714) - continued								
EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	3 mg/kg	111	84.6	128
EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	3 mg/kg	108	76.9	127
EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	3 mg/kg	104	85.3	128
EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	3 mg/kg	102	82.1	126
EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	3 mg/kg	102	85.4	133
EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	3 mg/kg	104	88.7	136
EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	3 mg/kg	101	83.4	136
EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	3 mg/kg	102	85.1	140
EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	3 mg/kg	99.6	80.7	130
EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	3 mg/kg	104	85.2	141
EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	3 mg/kg	115	68.5	120
EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	3 mg/kg	117	80.1	132
EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	3 mg/kg	112	67.4	120
EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	3 mg/kg	103	66.0	126
EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	3 mg/kg	102	65.4	127
EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	3 mg/kg	104	67.8	127
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 3016729)								
EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	3 mg/kg	113	84.6	128
EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	3 mg/kg	115	76.9	127
EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	3 mg/kg	112	85.3	128
EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	3 mg/kg	108	82.1	126
EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	3 mg/kg	104	85.4	133
EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	3 mg/kg	112	88.7	136
EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	3 mg/kg	102	83.4	136
EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	3 mg/kg	106	85.1	140
EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	3 mg/kg	97.1	80.7	130
EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	3 mg/kg	112	85.2	141
EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	3 mg/kg	100	68.5	120
EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	3 mg/kg	118	80.1	132
EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	3 mg/kg	95.7	67.4	120
EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	3 mg/kg	96.2	66.0	126
EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	3 mg/kg	99.2	65.4	127
EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	3 mg/kg	98.4	67.8	127
EP080/071: Total Petroleum Hydrocarbons (QCLot: 3015887)								
EP080: C6 - C9 Fraction	----	10	mg/kg	<10	36 mg/kg	97.6	61.2	127
EP080/071: Total Petroleum Hydrocarbons (QCLot: 3015891)								

Sub-Matrix: **SOIL**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EP080/071: Total Petroleum Hydrocarbons (QCLot: 3015891) - continued								
EP080: C6 - C9 Fraction	----	10	mg/kg	<10	36 mg/kg	107	61.2	127
EP080/071: Total Petroleum Hydrocarbons (QCLot: 3016715)								
EP071: C10 - C14 Fraction	----	50	mg/kg	<50	790 mg/kg	102	71.8	129
EP071: C15 - C28 Fraction	----	100	mg/kg	<100	3070 mg/kg	101	83.9	125
EP071: C29 - C36 Fraction	----	100	mg/kg	<100	1520 mg/kg	96.8	77.9	119
EP071: C10 - C36 Fraction (sum)	----	50	mg/kg	<50	----	----	----	----
EP080/071: Total Petroleum Hydrocarbons (QCLot: 3016730)								
EP071: C10 - C14 Fraction	----	50	mg/kg	<50	790 mg/kg	102	71.8	129
EP071: C15 - C28 Fraction	----	100	mg/kg	<100	3070 mg/kg	101	83.9	125
EP071: C29 - C36 Fraction	----	100	mg/kg	<100	1520 mg/kg	96.2	77.9	119
EP071: C10 - C36 Fraction (sum)	----	50	mg/kg	<50	----	----	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 3015887)								
EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	45 mg/kg	96.1	59.5	125
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 3015891)								
EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	45 mg/kg	103	59.5	125
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 3016715)								
EP071: >C10 - C16 Fraction	----	50	mg/kg	<50	1140 mg/kg	101	72.2	128
EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	4050 mg/kg	98.4	82.1	122
EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	270 mg/kg	97.6	55.1	131
EP071: >C10 - C40 Fraction (sum)	----	50	mg/kg	<50	----	----	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 3016730)								
EP071: >C10 - C16 Fraction	----	50	mg/kg	<50	1140 mg/kg	97.0	72.2	128
EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	4050 mg/kg	99.6	82.1	122
EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	270 mg/kg	94.8	55.1	131
EP071: >C10 - C40 Fraction (sum)	----	50	mg/kg	<50	----	----	----	----
EP080: BTEXN (QCLot: 3015887)								
EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	2 mg/kg	97.0	62.7	119
EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	2 mg/kg	97.9	66.6	126
EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	2 mg/kg	100.0	66.3	124
EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	4 mg/kg	101	67.5	128
EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	2 mg/kg	97.5	73.0	128
EP080: Naphthalene	91-20-3	1	mg/kg	<1	0.5 mg/kg	89.7	61.2	123
EP080: BTEXN (QCLot: 3015891)								
EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	2 mg/kg	90.2	62.7	119
EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	2 mg/kg	102	66.6	126
EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	2 mg/kg	103	66.3	124

Sub-Matrix: **SOIL**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report Result	LCS Spike Concentration	LCS Spike Recovery (%) LCS	Recovery Limits (%) Low	Recovery Limits (%) High
EP080: BTEXN (QCLot: 3015891) - continued								
EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	4 mg/kg	115	67.5	128
EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	2 mg/kg	114	73.0	128
EP080: Naphthalene	91-20-3	1	mg/kg	<1	0.5 mg/kg	96.5	61.2	123

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report Result	LCS Spike Concentration	LCS Spike Recovery (%) LCS	Recovery Limits (%) Low	Recovery Limits (%) High
EP080/071: Total Petroleum Hydrocarbons (QCLot: 3016178)								
EP080: C6 - C9 Fraction	----	20	µg/L	<20	360 µg/L	107	65.5	129
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 3016178)								
EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	450 µg/L	108	64.3	126
EP080: BTEXN (QCLot: 3016178)								
EP080: Benzene	71-43-2	1	µg/L	<1	20 µg/L	102	69.8	124
EP080: Toluene	108-88-3	2	µg/L	<2	20 µg/L	105	73.6	126
EP080: Ethylbenzene	100-41-4	2	µg/L	<2	20 µg/L	107	72.0	126
EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	40 µg/L	110	71.5	132
EP080: ortho-Xylene	95-47-6	2	µg/L	<2	20 µg/L	113	76.5	132
EP080: Naphthalene	91-20-3	5	µg/L	<5	5 µg/L	93.4	70.5	127

Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

Sub-Matrix: **SOIL**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	MS Spike Concentration	SpikeRecovery(%) MS	Recovery Limits (%) Low	Recovery Limits (%) High
EG005(ED093)T: Total Metals by ICP-AES (QCLot: 3015929)							
EM2007842-016	TP3_0.8-0.9	EG005T: Arsenic	7440-38-2	50 mg/kg	102	78.0	124
		EG005T: Cadmium	7440-43-9	50 mg/kg	88.3	84.0	116
		EG005T: Chromium	7440-47-3	50 mg/kg	93.1	79.0	121
		EG005T: Copper	7440-50-8	250 mg/kg	103	80.0	120
		EG005T: Lead	7439-92-1	250 mg/kg	93.5	80.0	120
		EG005T: Nickel	7440-02-0	50 mg/kg	89.3	78.0	120
		EG005T: Zinc	7440-66-6	250 mg/kg	84.2	80.0	120
EG005(ED093)T: Total Metals by ICP-AES (QCLot: 3015931)							
EM2007842-068	TP11_0.2-0.3	EG005T: Arsenic	7440-38-2	50 mg/kg	101	78.0	124
		EG005T: Cadmium	7440-43-9	50 mg/kg	94.9	84.0	116

Sub-Matrix: **SOIL**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report Spike Concentration	SpikeRecovery(%) MS	Recovery Limits (%) Low	High
EG005(ED093)T: Total Metals by ICP-AES (QCLot: 3015931) - continued							
EM2007842-068	TP11_0.2-0.3	EG005T: Chromium	7440-47-3	50 mg/kg	101	79.0	121
		EG005T: Copper	7440-50-8	250 mg/kg	105	80.0	120
		EG005T: Lead	7439-92-1	250 mg/kg	100	80.0	120
		EG005T: Nickel	7440-02-0	50 mg/kg	96.2	78.0	120
		EG005T: Zinc	7440-66-6	250 mg/kg	89.1	80.0	120
EG005(ED093)T: Total Metals by ICP-AES (QCLot: 3015936)							
EM2007817-002	Anonymous	EG005T: Arsenic	7440-38-2	50 mg/kg	99.5	78.0	124
		EG005T: Cadmium	7440-43-9	50 mg/kg	96.6	84.0	116
		EG005T: Chromium	7440-47-3	50 mg/kg	105	79.0	121
		EG005T: Copper	7440-50-8	250 mg/kg	98.7	80.0	120
		EG005T: Lead	7439-92-1	250 mg/kg	99.5	80.0	120
		EG005T: Nickel	7440-02-0	50 mg/kg	105	78.0	120
		EG005T: Zinc	7440-66-6	250 mg/kg	93.3	80.0	120
EG005(ED093)T: Total Metals by ICP-AES (QCLot: 3015937)							
EM2007842-152	TP31_0.3-0.4	EG005T: Arsenic	7440-38-2	50 mg/kg	94.9	78.0	124
		EG005T: Cadmium	7440-43-9	50 mg/kg	88.1	84.0	116
		EG005T: Chromium	7440-47-3	50 mg/kg	92.4	79.0	121
		EG005T: Copper	7440-50-8	250 mg/kg	102	80.0	120
		EG005T: Lead	7439-92-1	250 mg/kg	92.8	80.0	120
		EG005T: Nickel	7440-02-0	50 mg/kg	88.5	78.0	120
		EG005T: Zinc	7440-66-6	250 mg/kg	83.5	80.0	120
EG035T: Total Recoverable Mercury by FIMS (QCLot: 3015930)							
EM2007842-016	TP3_0.8-0.9	EG035T: Mercury	7439-97-6	0.5 mg/kg	105	76.0	116
EG035T: Total Recoverable Mercury by FIMS (QCLot: 3015932)							
EM2007842-068	TP11_0.2-0.3	EG035T: Mercury	7439-97-6	0.5 mg/kg	111	76.0	116
EG035T: Total Recoverable Mercury by FIMS (QCLot: 3015935)							
EM2007817-002	Anonymous	EG035T: Mercury	7439-97-6	0.5 mg/kg	110	76.0	116
EG035T: Total Recoverable Mercury by FIMS (QCLot: 3015938)							
EM2007842-152	TP31_0.3-0.4	EG035T: Mercury	7439-97-6	0.5 mg/kg	104	76.0	116
EG048: Hexavalent Chromium (Alkaline Digest) (QCLot: 3016949)							
EM2007703-002	Anonymous	EG048G: Hexavalent Chromium	18540-29-9	20 mg/kg	69.2	58.0	114
EM2007703-002	Anonymous	EG048G: Hexavalent Chromium	18540-29-9	20 mg/kg	65.4	58.0	114
EG048: Hexavalent Chromium (Alkaline Digest) (QCLot: 3016950)							
EM2007842-127	TP25_0.1-0.2	EG048G: Hexavalent Chromium	18540-29-9	20 mg/kg	80.2	58.0	114
EM2007842-127	TP25_0.1-0.2	EG048G: Hexavalent Chromium	18540-29-9	20 mg/kg	95.3	58.0	114
EK026SF: Total CN by Segmented Flow Analyser (QCLot: 3017060)							

Sub-Matrix: **SOIL**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EK026SF: Total CN by Segmented Flow Analyser (QCLot: 3017060) - continued							
EM2007703-002	Anonymous	EK026SF: Total Cyanide	57-12-5	20 mg/kg	114	70.0	130
EK026SF: Total CN by Segmented Flow Analyser (QCLot: 3017062)							
EM2007842-127	TP25_0.1-0.2	EK026SF: Total Cyanide	57-12-5	20 mg/kg	77.4	70.0	130
EP066: Polychlorinated Biphenyls (PCB) (QCLot: 3016717)							
EM2007842-045	TP7_0.7-0.8	EP066: Total Polychlorinated biphenyls	----	1.18 mg/kg	101	44.0	144
EP066: Polychlorinated Biphenyls (PCB) (QCLot: 3016732)							
EM2007842-137	TP28_0.1-0.2	EP066: Total Polychlorinated biphenyls	----	1.18 mg/kg	102	44.0	144
EP068A: Organochlorine Pesticides (OC) (QCLot: 3016716)							
EM2007842-031	TP5_0.7-0.8	EP068: gamma-BHC	58-89-9	0.5 mg/kg	101	22.0	139
		EP068: Heptachlor	76-44-8	0.5 mg/kg	78.0	18.0	130
		EP068: Aldrin	309-00-2	0.5 mg/kg	86.6	23.0	136
		EP068: Dieldrin	60-57-1	0.5 mg/kg	86.9	42.0	136
		EP068: Endrin	72-20-8	0.5 mg/kg	73.2	23.0	146
		EP068: 4.4`-DDT	50-29-3	0.5 mg/kg	70.3	20.0	133
EP068A: Organochlorine Pesticides (OC) (QCLot: 3016731)							
EM2007842-113	TP22_0.2-0.3	EP068: gamma-BHC	58-89-9	0.5 mg/kg	102	22.0	139
		EP068: Heptachlor	76-44-8	0.5 mg/kg	79.2	18.0	130
		EP068: Aldrin	309-00-2	0.5 mg/kg	87.7	23.0	136
		EP068: Dieldrin	60-57-1	0.5 mg/kg	89.0	42.0	136
		EP068: Endrin	72-20-8	0.5 mg/kg	77.2	23.0	146
		EP068: 4.4`-DDT	50-29-3	0.5 mg/kg	72.6	20.0	133
EP075(SIM)A: Phenolic Compounds (QCLot: 3016714)							
EM2007842-016	TP3_0.8-0.9	EP075(SIM): Phenol	108-95-2	3 mg/kg	105	63.0	117
		EP075(SIM): 2-Chlorophenol	95-57-8	3 mg/kg	104	65.0	123
		EP075(SIM): 2-Nitrophenol	88-75-5	3 mg/kg	89.7	40.0	134
		EP075(SIM): 4-Chloro-3-methylphenol	59-50-7	3 mg/kg	95.0	56.0	122
		EP075(SIM): Pentachlorophenol	87-86-5	3 mg/kg	25.3	15.3	139
EP075(SIM)A: Phenolic Compounds (QCLot: 3016729)							
EM2007692-005	Anonymous	EP075(SIM): Phenol	108-95-2	3 mg/kg	103	63.0	117
		EP075(SIM): 2-Chlorophenol	95-57-8	3 mg/kg	104	65.0	123
		EP075(SIM): 2-Nitrophenol	88-75-5	3 mg/kg	85.9	40.0	134
		EP075(SIM): 4-Chloro-3-methylphenol	59-50-7	3 mg/kg	89.2	56.0	122
		EP075(SIM): Pentachlorophenol	87-86-5	3 mg/kg	47.7	15.3	139
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 3016714)							
EM2007842-016	TP3_0.8-0.9	EP075(SIM): Acenaphthene	83-32-9	3 mg/kg	96.5	67.0	117
		EP075(SIM): Pyrene	129-00-0	3 mg/kg	92.4	52.0	148

Sub-Matrix: **SOIL**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report Spike Concentration	SpikeRecovery(%) MS	Recovery Limits (%) Low	High
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 3016729)							
EM2007692-005	Anonymous	EP075(SIM): Acenaphthene	83-32-9	3 mg/kg	99.0	67.0	117
		EP075(SIM): Pyrene	129-00-0	3 mg/kg	96.3	52.0	148
EP080/071: Total Petroleum Hydrocarbons (QCLot: 3015887)							
EM2007842-045	TP7_0.7-0.8	EP080: C6 - C9 Fraction	----	28 mg/kg	74.4	42.0	131
EP080/071: Total Petroleum Hydrocarbons (QCLot: 3015891)							
EM2007842-031	TP5_0.7-0.8	EP080: C6 - C9 Fraction	----	28 mg/kg	98.4	42.0	131
EP080/071: Total Petroleum Hydrocarbons (QCLot: 3016715)							
EM2007842-031	TP5_0.7-0.8	EP071: C10 - C14 Fraction	----	790 mg/kg	101	53.0	123
		EP071: C15 - C28 Fraction	----	3070 mg/kg	100	70.0	124
		EP071: C29 - C36 Fraction	----	1520 mg/kg	96.0	64.0	118
EP080/071: Total Petroleum Hydrocarbons (QCLot: 3016730)							
EM2007692-003	Anonymous	EP071: C10 - C14 Fraction	----	790 mg/kg	94.6	53.0	123
		EP071: C15 - C28 Fraction	----	3070 mg/kg	97.1	70.0	124
		EP071: C29 - C36 Fraction	----	1520 mg/kg	93.3	64.0	118
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 3015887)							
EM2007842-045	TP7_0.7-0.8	EP080: C6 - C10 Fraction	C6_C10	33 mg/kg	72.6	39.0	129
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 3015891)							
EM2007842-031	TP5_0.7-0.8	EP080: C6 - C10 Fraction	C6_C10	33 mg/kg	96.8	39.0	129
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 3016715)							
EM2007842-031	TP5_0.7-0.8	EP071: >C10 - C16 Fraction	----	1140 mg/kg	100	65.0	123
		EP071: >C16 - C34 Fraction	----	4050 mg/kg	97.7	67.0	121
		EP071: >C34 - C40 Fraction	----	270 mg/kg	96.9	44.0	126
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 3016730)							
EM2007692-003	Anonymous	EP071: >C10 - C16 Fraction	----	1140 mg/kg	92.0	65.0	123
		EP071: >C16 - C34 Fraction	----	4050 mg/kg	96.3	67.0	121
		EP071: >C34 - C40 Fraction	----	270 mg/kg	90.9	44.0	126
EP080: BTEXN (QCLot: 3015887)							
EM2007842-045	TP7_0.7-0.8	EP080: Benzene	71-43-2	2 mg/kg	99.8	50.0	136
		EP080: Toluene	108-88-3	2 mg/kg	100	56.0	139
EP080: BTEXN (QCLot: 3015891)							
EM2007842-031	TP5_0.7-0.8	EP080: Benzene	71-43-2	2 mg/kg	98.6	50.0	136
		EP080: Toluene	108-88-3	2 mg/kg	104	56.0	139

Sub-Matrix: **WATER**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report Spike Concentration	SpikeRecovery(%) MS	Recovery Limits (%) Low	High

Sub-Matrix: **WATER**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
				Concentration	MS	Low	High
EP080/071: Total Petroleum Hydrocarbons (QCLot: 3016178)							
EM2007826-002	Anonymous	EP080: C6 - C9 Fraction	----	280 µg/L	76.0	43.0	125
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 3016178)							
EM2007826-002	Anonymous	EP080: C6 - C10 Fraction	C6_C10	330 µg/L	73.3	44.0	122
EP080: BTEXN (QCLot: 3016178)							
EM2007826-002	Anonymous	EP080: Benzene	71-43-2	20 µg/L	90.4	68.0	130
		EP080: Toluene	108-88-3	20 µg/L	94.3	72.0	132

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: **EM2007842**	Page	: 1 of 13
Client	: **MUD ENVIRONMENTAL PTY LTD**	Laboratory	: Environmental Division Melbourne
Contact	: TRENT GRAY	Telephone	: +61881625130
Project	: ME-328	Date Samples Received	: 12-May-2020
Site	: Wallaroo Fill	Issue Date	: 15-May-2020
Sampler	: ----	No. of samples received	: 155
Order number	: ----	No. of samples analysed	: 59

This report is automatically generated by the ALS LIMS through interpretation of the ALS Quality Control Report and several Quality Assurance parameters measured by ALS. This automated reporting highlights any non-conformances, facilitates faster and more accurate data validation and is designed to assist internal expert and external Auditor review. Many components of this report contribute to the overall DQO assessment and reporting for guideline compliance.

Brief method summaries and references are also provided to assist in traceability.

Summary of Outliers

Outliers : Quality Control Samples

This report highlights outliers flagged in the Quality Control (QC) Report.

- **NO Method Blank value outliers occur.**
- **NO Duplicate outliers occur.**
- **NO Laboratory Control outliers occur.**
- **NO Matrix Spike outliers occur.**
- **For all regular sample matrices, NO surrogate recovery outliers occur.**

Outliers : Analysis Holding Time Compliance

- **NO Analysis Holding Time Outliers exist.**

Outliers : Frequency of Quality Control Samples

- **NO Quality Control Sample Frequency Outliers exist.**

Analysis Holding Time Compliance

If samples are identified below as having been analysed or extracted outside of recommended holding times, this should be taken into consideration when interpreting results.

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times (referencing USEPA SW 846, APHA, AS and NEPM) based on the sample container provided. Dates reported represent first date of extraction or analysis and preclude subsequent dilutions and reruns. A listing of breaches (if any) is provided herein.

Holding time for leachate methods (e.g. TCLP) vary according to the analytes reported. Assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These are: organics 14 days, mercury 28 days & other metals 180 days. A recorded breach does not guarantee a breach for all non-volatile parameters.

Holding times for ***VOC in soils*** vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive or Vinyl Chloride and Styrene are not key analytes of interest/concern.

Matrix: **SOIL**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method	*Sample Date*	*Extraction / Preparation*			*Analysis*		
Container / Client Sample ID(s)		*Date extracted*	*Due for extraction*	*Evaluation*	*Date analysed*	*Due for analysis*	*Evaluation*
EA055: Moisture Content (Dried @ 105-110°C)							
Soil Glass Jar - Unpreserved (EA055)							
TP3_0.5-0.6, TP3_0.8-0.9, TP5_0.2-0.3, TP5_0.7-0.8, TP5_1.0-1.2, TP5_1.4-1.6, TP6_0.3-0.4, QC10, TP6_0.6-0.7, TP6_0.8-0.9, TP7_0.3-0.4, TP7_0.7-0.8, TP8_0.2-0.3, TP8_0.6-0.7, TP8_1.0-1.1, TP9_0.2-0.3, TP9_0.6-0.7, TP9_1.0-1.1, TP10_0.2-0.3, QC12, QC13, TP10_0.7-0.8, TP11_0.2-0.3, TP11_0.6-0.7, TP12_0.2-0.3, TP12_0.6-0.7	**06-May-2020**	**----**	----	----	**13-May-2020**	20-May-2020	✓
Soil Glass Jar - Unpreserved (EA055)							
TP13_0.1-0.2, TP14_0.1-0.2, TP14_0.5-0.6, TP16_0.1-0.2, TP16_0.4-0.5, TP17_0.2-0.3, TP17_0.6-0.7, TP17_1.0-1.1, QC15, TP20_0.5-0.6, TP20_0.8-0.9, TP22_0.2-0.3, TP22_0.6-0.7, TP23_0.8-0.9, TP24_0.1-0.2, TP24_0.7-0.8, TP24_1.2-1.3, TP25_0.1-0.2, QC17, TP25_0.5-0.6, TP25_1.3-1.4, TP27_0.2-0.3, TP27_1.2-1.3, TP28_0.1-0.2, TP28_0.7-0.8, TP29_0.6-0.7, TP29_1.1-1.2, TP30_0.7-0.8, TP30_1.1-1.2, TP31_0.3-0.4, TP31_0.8-0.9, QC18	**07-May-2020**	**----**	----	----	**13-May-2020**	21-May-2020	✓

Matrix: **SOIL**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation: Date extracted	Due for extraction	Evaluation	Analysis: Date analysed	Due for analysis	Evaluation
EG005(ED093)T: Total Metals by ICP-AES							
Soil Glass Jar - Unpreserved (EG005T)							
TP3_0.5-0.6, TP3_0.8-0.9, TP5_0.2-0.3, TP5_0.7-0.8, TP5_1.0-1.2, TP5_1.4-1.6, TP6_0.3-0.4, QC10, TP6_0.6-0.7, TP6_0.8-0.9, TP7_0.3-0.4, TP7_0.7-0.8, TP8_0.2-0.3, TP8_0.6-0.7, TP8_1.0-1.1, TP9_0.2-0.3, TP9_0.6-0.7, TP9_1.0-1.1, TP10_0.2-0.3, QC12, QC13, TP10_0.7-0.8, TP11_0.2-0.3, TP11_0.6-0.7, TP12_0.2-0.3, TP12_0.6-0.7	**06-May-2020**	**13-May-2020**	02-Nov-2020	✓	**13-May-2020**	02-Nov-2020	✓
Soil Glass Jar - Unpreserved (EG005T)							
TP13_0.1-0.2, TP14_0.1-0.2, TP14_0.5-0.6, TP16_0.1-0.2, TP16_0.4-0.5, TP17_0.2-0.3, TP17_0.6-0.7, TP17_1.0-1.1, QC15, TP20_0.5-0.6, TP20_0.8-0.9, TP22_0.2-0.3, TP22_0.6-0.7, TP23_0.8-0.9, TP24_0.1-0.2, TP24_0.7-0.8, TP24_1.2-1.3, TP25_0.1-0.2, QC17, TP25_0.5-0.6, TP25_1.3-1.4, TP27_0.2-0.3, TP27_1.2-1.3, TP28_0.1-0.2, TP28_0.7-0.8, TP29_0.6-0.7, TP29_1.1-1.2, TP30_0.7-0.8, TP30_1.1-1.2, TP31_0.3-0.4, TP31_0.8-0.9, QC18	**07-May-2020**	**13-May-2020**	03-Nov-2020	✓	**13-May-2020**	03-Nov-2020	✓

Matrix: **SOIL**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)		Sample Date	Extraction / Preparation: Date extracted	Due for extraction	Evaluation	Analysis: Date analysed	Due for analysis	Evaluation
EG035T: Total Recoverable Mercury by FIMS								
Soil Glass Jar - Unpreserved (EG035T)								
TP3_0.5-0.6,	TP3_0.8-0.9,	**06-May-2020**	**13-May-2020**	03-Jun-2020	✓	**14-May-2020**	03-Jun-2020	✓
TP5_0.2-0.3,	TP5_0.7-0.8,							
TP5_1.0-1.2,	TP5_1.4-1.6,							
TP6_0.3-0.4,	QC10,							
TP6_0.6-0.7,	TP6_0.8-0.9,							
TP7_0.3-0.4,	TP7_0.7-0.8,							
TP8_0.2-0.3,	TP8_0.6-0.7,							
TP8_1.0-1.1,	TP9_0.2-0.3,							
TP9_0.6-0.7,	TP9_1.0-1.1,							
TP10_0.2-0.3,	QC12,							
QC13,								
TP10_0.7-0.8,	TP11_0.2-0.3,							
TP11_0.6-0.7,	TP12_0.2-0.3,							
TP12_0.6-0.7								
Soil Glass Jar - Unpreserved (EG035T)								
TP24_0.1-0.2,	TP24_0.7-0.8,	**07-May-2020**	**13-May-2020**	04-Jun-2020	✓	**13-May-2020**	04-Jun-2020	✓
TP24_1.2-1.3,	TP25_0.1-0.2,							
TP25_0.5-0.6,	TP25_1.3-1.4,							
TP27_0.2-0.3,	TP27_1.2-1.3,							
TP28_0.1-0.2,	TP28_0.7-0.8,							
TP29_0.6-0.7,	TP29_1.1-1.2,							
TP30_0.7-0.8,	QC17,							
TP30_1.1-1.2,	TP31_0.3-0.4,							
TP31_0.8-0.9,	QC18							
Soil Glass Jar - Unpreserved (EG035T)								
TP13_0.1-0.2,	TP14_0.1-0.2,	**07-May-2020**	**13-May-2020**	04-Jun-2020	✓	**14-May-2020**	04-Jun-2020	✓
TP14_0.5-0.6,	TP16_0.1-0.2,							
TP16_0.4-0.5,	TP17_0.2-0.3,							
TP17_0.6-0.7,	TP17_1.0-1.1,							
QC15,	TP20_0.5-0.6,							
TP20_0.8-0.9,	TP22_0.2-0.3,							
TP22_0.6-0.7,	TP23_0.8-0.9							
EG048: Hexavalent Chromium (Alkaline Digest)								
Soil Glass Jar - Unpreserved (EG048G)								
TP5_1.0-1.2,	TP7_0.7-0.8,	**06-May-2020**	**14-May-2020**	03-Jun-2020	✓	**14-May-2020**	21-May-2020	✓
TP8_0.6-0.7,	TP9_0.2-0.3,							
TP12_0.6-0.7,	QC13							
Soil Glass Jar - Unpreserved (EG048G)								
TP17_0.6-0.7,	TP25_0.1-0.2,	**07-May-2020**	**14-May-2020**	04-Jun-2020	✓	**14-May-2020**	21-May-2020	✓
TP28_0.1-0.2,	TP29_0.6-0.7,							
TP31_0.3-0.4								

Matrix: **SOIL**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / *Container / Client Sample ID(s)*	*Sample Date*	*Extraction / Preparation* Date extracted	*Extraction / Preparation* Due for extraction	*Extraction / Preparation* Evaluation	*Analysis* Date analysed	*Analysis* Due for analysis	*Analysis* Evaluation
EK026SF: Total CN by Segmented Flow Analyser							
Soil Glass Jar - Unpreserved (EK026SF) TP5_1.0-1.2, TP7_0.7-0.8, TP8_0.6-0.7, TP9_0.2-0.3, TP12_0.6-0.7, QC13	**06-May-2020**	**13-May-2020**	20-May-2020	✓	**14-May-2020**	27-May-2020	✓
Soil Glass Jar - Unpreserved (EK026SF) TP17_0.6-0.7, TP25_0.1-0.2, TP28_0.1-0.2, TP29_0.6-0.7, TP31_0.3-0.4	**07-May-2020**	**13-May-2020**	21-May-2020	✓	**14-May-2020**	27-May-2020	✓
EP066: Polychlorinated Biphenyls (PCB)							
Soil Glass Jar - Unpreserved (EP066) TP5_1.0-1.2, TP7_0.7-0.8, TP8_0.6-0.7, TP9_0.2-0.3, TP12_0.6-0.7, QC13	**06-May-2020**	**13-May-2020**	20-May-2020	✓	**14-May-2020**	22-Jun-2020	✓
Soil Glass Jar - Unpreserved (EP066) TP17_0.6-0.7, TP25_0.1-0.2, TP28_0.1-0.2, TP29_0.6-0.7, TP31_0.3-0.4	**07-May-2020**	**13-May-2020**	21-May-2020	✓	**14-May-2020**	22-Jun-2020	✓
EP068A: Organochlorine Pesticides (OC)							
Soil Glass Jar - Unpreserved (EP068) TP3_0.8-0.9, TP5_0.7-0.8, TP5_1.0-1.2, TP6_0.3-0.4, QC10, TP7_0.7-0.8, TP8_0.2-0.3, TP8_0.6-0.7, TP9_0.2-0.3, TP9_0.6-0.7, TP10_0.7-0.8, TP11_0.6-0.7, TP12_0.6-0.7, QC13	**06-May-2020**	**13-May-2020**	20-May-2020	✓	**14-May-2020**	22-Jun-2020	✓
Soil Glass Jar - Unpreserved (EP068) TP14_0.5-0.6, TP16_0.4-0.5, TP17_0.6-0.7, TP17_1.0-1.1, QC15, TP20_0.8-0.9, TP22_0.2-0.3, TP23_0.8-0.9, TP24_0.7-0.8, TP25_0.1-0.2, TP25_0.5-0.6, TP27_0.2-0.3, TP28_0.1-0.2, TP28_0.7-0.8, TP29_0.6-0.7, TP30_1.1-1.2, TP31_0.3-0.4	**07-May-2020**	**13-May-2020**	21-May-2020	✓	**14-May-2020**	22-Jun-2020	✓

Matrix: **SOIL**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)		Sample Date	Extraction / Preparation			Analysis		
			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP074E: Halogenated Aliphatic Compounds								
Soil Glass Jar - Unpreserved (EP074)								
TP5_1.0-1.2,	TP7_0.7-0.8,	**06-May-2020**	**13-May-2020**	13-May-2020	✓	**13-May-2020**	13-May-2020	✓
TP8_0.6-0.7,	TP9_0.2-0.3,							
TP12_0.6-0.7,	QC13							
Soil Glass Jar - Unpreserved (EP074)								
TP17_0.6-0.7,	TP25_0.1-0.2,	**07-May-2020**	**13-May-2020**	14-May-2020	✓	**13-May-2020**	14-May-2020	✓
TP28_0.1-0.2,	TP29_0.6-0.7,							
TP31_0.3-0.4								
EP075(SIM)A: Phenolic Compounds								
Soil Glass Jar - Unpreserved (EP075(SIM))								
TP5_1.0-1.2,	TP7_0.7-0.8,	**06-May-2020**	**13-May-2020**	20-May-2020	✓	**14-May-2020**	22-Jun-2020	✓
TP8_0.6-0.7,	TP9_0.2-0.3,							
TP12_0.6-0.7,	QC13							
Soil Glass Jar - Unpreserved (EP075(SIM))								
TP17_0.6-0.7,	TP25_0.1-0.2,	**07-May-2020**	**13-May-2020**	21-May-2020	✓	**14-May-2020**	22-Jun-2020	✓
TP28_0.1-0.2,	TP29_0.6-0.7,							
TP31_0.3-0.4								
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Soil Glass Jar - Unpreserved (EP075(SIM))								
TP3_0.8-0.9,	TP5_0.7-0.8,	**06-May-2020**	**13-May-2020**	20-May-2020	✓	**14-May-2020**	22-Jun-2020	✓
TP5_1.0-1.2,	TP6_0.3-0.4,							
QC10,	TP7_0.7-0.8,							
TP8_0.2-0.3,	TP8_0.6-0.7,							
TP9_0.2-0.3,	TP9_0.6-0.7,							
TP10_0.7-0.8,	TP11_0.6-0.7,							
TP12_0.6-0.7,	QC13							
Soil Glass Jar - Unpreserved (EP075(SIM))								
TP14_0.5-0.6,	TP16_0.4-0.5,	**07-May-2020**	**13-May-2020**	21-May-2020	✓	**14-May-2020**	22-Jun-2020	✓
TP17_0.6-0.7,	TP17_1.0-1.1,							
QC15,	TP20_0.8-0.9,							
TP22_0.2-0.3,	TP23_0.8-0.9,							
TP24_0.7-0.8,	TP25_0.1-0.2,							
TP25_0.5-0.6,	TP27_0.2-0.3,							
TP28_0.1-0.2,	TP28_0.7-0.8,							
TP29_0.6-0.7,	TP30_1.1-1.2,							
TP31_0.3-0.4								

Matrix: **SOIL**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method **Container** / Client Sample ID(s)	**Sample Date**	Extraction / Preparation **Date extracted**	 Due for extraction	 Evaluation	Analysis **Date analysed**	 Due for analysis	 Evaluation
EP080/071: Total Petroleum Hydrocarbons							
Soil Glass Jar - Unpreserved (EP080) TP3_0.8-0.9, TP5_0.7-0.8, TP5_1.0-1.2, TP6_0.3-0.4, QC10, TP7_0.7-0.8, TP8_0.2-0.3, TP8_0.6-0.7, TP9_0.2-0.3, TP9_0.6-0.7, TP10_0.7-0.8, TP11_0.6-0.7, TP12_0.6-0.7, QC13	**06-May-2020**	**13-May-2020**	20-May-2020	✓	**13-May-2020**	20-May-2020	✓
Soil Glass Jar - Unpreserved (EP071) TP3_0.8-0.9, TP5_0.7-0.8, TP5_1.0-1.2, TP6_0.3-0.4, QC10, TP7_0.7-0.8, TP8_0.2-0.3, TP8_0.6-0.7, TP9_0.2-0.3, TP9_0.6-0.7, TP10_0.7-0.8, TP11_0.6-0.7, TP12_0.6-0.7, QC13	**06-May-2020**	**13-May-2020**	20-May-2020	✓	**14-May-2020**	22-Jun-2020	✓
Soil Glass Jar - Unpreserved (EP080) TP14_0.5-0.6, TP16_0.4-0.5, TP17_0.6-0.7, TP17_1.0-1.1, QC15, TP20_0.8-0.9, TP22_0.2-0.3, TP23_0.8-0.9, TP24_0.7-0.8, TP25_0.1-0.2, TP25_0.5-0.6, TP27_0.2-0.3, TP28_0.1-0.2, TP28_0.7-0.8, TP29_0.6-0.7, TP30_1.1-1.2, TP31_0.3-0.4	**07-May-2020**	**13-May-2020**	21-May-2020	✓	**13-May-2020**	21-May-2020	✓
Soil Glass Jar - Unpreserved (EP071) TP14_0.5-0.6, TP16_0.4-0.5, TP17_0.6-0.7, TP17_1.0-1.1, QC15, TP20_0.8-0.9, TP22_0.2-0.3, TP23_0.8-0.9, TP24_0.7-0.8, TP25_0.1-0.2, TP25_0.5-0.6, TP27_0.2-0.3, TP28_0.1-0.2, TP28_0.7-0.8, TP29_0.6-0.7, TP30_1.1-1.2, TP31_0.3-0.4	**07-May-2020**	**13-May-2020**	21-May-2020	✓	**14-May-2020**	22-Jun-2020	✓

Matrix: **SOIL**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation Date extracted	Extraction / Preparation Due for extraction	Extraction / Preparation Evaluation	Analysis Date analysed	Analysis Due for analysis	Analysis Evaluation
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions							
Soil Glass Jar - Unpreserved (EP080) TP3_0.8-0.9, TP5_0.7-0.8, TP5_1.0-1.2, TP6_0.3-0.4, QC10, TP7_0.7-0.8, TP8_0.2-0.3, TP8_0.6-0.7, TP9_0.2-0.3, TP9_0.6-0.7, TP10_0.7-0.8, TP11_0.6-0.7, TP12_0.6-0.7, QC13	**06-May-2020**	**13-May-2020**	20-May-2020	✓	**13-May-2020**	20-May-2020	✓
Soil Glass Jar - Unpreserved (EP071) TP3_0.8-0.9, TP5_0.7-0.8, TP5_1.0-1.2, TP6_0.3-0.4, QC10, TP7_0.7-0.8, TP8_0.2-0.3, TP8_0.6-0.7, TP9_0.2-0.3, TP9_0.6-0.7, TP10_0.7-0.8, TP11_0.6-0.7, TP12_0.6-0.7, QC13	**06-May-2020**	**13-May-2020**	20-May-2020	✓	**14-May-2020**	22-Jun-2020	✓
Soil Glass Jar - Unpreserved (EP080) TP14_0.5-0.6, TP16_0.4-0.5, TP17_0.6-0.7, TP17_1.0-1.1, QC15, TP20_0.8-0.9, TP22_0.2-0.3, TP23_0.8-0.9, TP24_0.7-0.8, TP25_0.1-0.2, TP25_0.5-0.6, TP27_0.2-0.3, TP28_0.1-0.2, TP28_0.7-0.8, TP29_0.6-0.7, TP30_1.1-1.2, TP31_0.3-0.4	**07-May-2020**	**13-May-2020**	21-May-2020	✓	**13-May-2020**	21-May-2020	✓
Soil Glass Jar - Unpreserved (EP071) TP14_0.5-0.6, TP16_0.4-0.5, TP17_0.6-0.7, TP17_1.0-1.1, QC15, TP20_0.8-0.9, TP22_0.2-0.3, TP23_0.8-0.9, TP24_0.7-0.8, TP25_0.1-0.2, TP25_0.5-0.6, TP27_0.2-0.3, TP28_0.1-0.2, TP28_0.7-0.8, TP29_0.6-0.7, TP30_1.1-1.2, TP31_0.3-0.4	**07-May-2020**	**13-May-2020**	21-May-2020	✓	**14-May-2020**	22-Jun-2020	✓

Matrix: **SOIL**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)		Sample Date	Extraction / Preparation			Analysis		
			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP080: BTEXN								
Soil Glass Jar - Unpreserved (EP080)								
TP3_0.8-0.9,	TP5_0.7-0.8,	**06-May-2020**	**13-May-2020**	20-May-2020	✓	**13-May-2020**	20-May-2020	✓
TP5_1.0-1.2,	TP6_0.3-0.4,							
QC10,	TP7_0.7-0.8,							
TP8_0.2-0.3,	TP8_0.6-0.7,							
TP9_0.2-0.3,	TP9_0.6-0.7,							
TP10_0.7-0.8,	TP11_0.6-0.7,							
TP12_0.6-0.7,	QC13							
Soil Glass Jar - Unpreserved (EP080)								
TP14_0.5-0.6,	TP16_0.4-0.5,	**07-May-2020**	**13-May-2020**	21-May-2020	✓	**13-May-2020**	21-May-2020	✓
TP17_0.6-0.7,	TP17_1.0-1.1,							
QC15,	TP20_0.8-0.9,							
TP22_0.2-0.3,	TP23_0.8-0.9,							
TP24_0.7-0.8,	TP25_0.1-0.2,							
TP25_0.5-0.6,	TP27_0.2-0.3,							
TP28_0.1-0.2,	TP28_0.7-0.8,							
TP29_0.6-0.7,	TP30_1.1-1.2,							
TP31_0.3-0.4								

Matrix: **WATER**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP080/071: Total Petroleum Hydrocarbons							
Amber VOC Vial - Sulfuric Acid (EP080)							
QC1	**06-May-2020**	**13-May-2020**	20-May-2020	✓	**13-May-2020**	20-May-2020	✓
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions							
Amber VOC Vial - Sulfuric Acid (EP080)							
QC1	**06-May-2020**	**13-May-2020**	20-May-2020	✓	**13-May-2020**	20-May-2020	✓
EP080: BTEXN							
Amber VOC Vial - Sulfuric Acid (EP080)							
QC1	**06-May-2020**	**13-May-2020**	20-May-2020	✓	**13-May-2020**	20-May-2020	✓

Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(were) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **SOIL**

Evaluation: × = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Laboratory Duplicates (DUP)							
Hexavalent Chromium by Alkaline Digestion and DA Finish	EG048G	4	40	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Moisture Content	EA055	6	60	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (SIM)	EP075(SIM)	4	37	**10.81**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Pesticides by GCMS	EP068	4	31	**12.90**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Polychlorinated Biphenyls (PCB)	EP066	2	11	**18.18**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Cyanide by Segmented Flow Analyser	EK026SF	4	34	**11.76**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	7	65	**10.77**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	7	65	**10.77**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	4	37	**10.81**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	4	31	**12.90**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Volatile Organic Compounds	EP074	2	11	**18.18**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Hexavalent Chromium by Alkaline Digestion and DA Finish	EG048G	4	40	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (SIM)	EP075(SIM)	2	37	**5.41**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Pesticides by GCMS	EP068	2	31	**6.45**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Polychlorinated Biphenyls (PCB)	EP066	2	11	**18.18**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Cyanide by Segmented Flow Analyser	EK026SF	2	34	**5.88**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	4	65	**6.15**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	4	65	**6.15**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	2	37	**5.41**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	2	31	**6.45**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Volatile Organic Compounds	EP074	1	11	**9.09**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Hexavalent Chromium by Alkaline Digestion and DA Finish	EG048G	2	40	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (SIM)	EP075(SIM)	2	37	**5.41**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Pesticides by GCMS	EP068	2	31	**6.45**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Polychlorinated Biphenyls (PCB)	EP066	2	11	**18.18**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Cyanide by Segmented Flow Analyser	EK026SF	2	34	**5.88**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	4	65	**6.15**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	4	65	**6.15**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	2	37	**5.41**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	2	31	**6.45**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Volatile Organic Compounds	EP074	1	11	**9.09**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Hexavalent Chromium by Alkaline Digestion and DA Finish	EG048G	4	40	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (SIM)	EP075(SIM)	2	37	**5.41**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard

Matrix: **SOIL**

Evaluation: × = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Matrix Spikes (MS) - Continued							
Pesticides by GCMS	EP068	2	31	**6.45**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Polychlorinated Biphenyls (PCB)	EP066	2	11	**18.18**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Cyanide by Segmented Flow Analyser	EK026SF	2	34	**5.88**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	4	65	**6.15**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	4	65	**6.15**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	2	37	**5.41**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	2	31	**6.45**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Volatile Organic Compounds	EP074	1	11	**9.09**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard

Matrix: **WATER**

Evaluation: × = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Laboratory Duplicates (DUP)							
TRH Volatiles/BTEX	EP080	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
TRH Volatiles/BTEX	EP080	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
TRH Volatiles/BTEX	EP080	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
TRH Volatiles/BTEX	EP080	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard

Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	Method	Matrix	Method Descriptions
Moisture Content	EA055	SOIL	In house: A gravimetric procedure based on weight loss over a 12 hour drying period at 105-110 degrees C. This method is compliant with NEPM (2013) Schedule B(3) Section 6.1 and Table 1 (14 day holding time).
Total Metals by ICP-AES	EG005T	SOIL	In house: Referenced to APHA 3120; USEPA SW 846 - 6010. Metals are determined following an appropriate acid digestion of the soil. The ICPAES technique ionises samples in a plasma, emitting a characteristic spectrum based on metals present. Intensities at selected wavelengths are compared against those of matrix matched standards. This method is compliant with NEPM (2013) Schedule B(3)
Total Mercury by FIMS	EG035T	SOIL	In house: Referenced to AS 3550, APHA 3112 Hg - B (Flow-injection (SnCl2) (Cold Vapour generation) AAS) FIM-AAS is an automated flameless atomic absorption technique. Mercury in solids are determined following an appropriate acid digestion. Ionic mercury is reduced online to atomic mercury vapour by SnCl2 which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM (2013) Schedule B(3)
Hexavalent Chromium by Alkaline Digestion and DA Finish	EG048G	SOIL	In house: Referenced to USEPA SW846, Method 3060A. Hexavalent chromium is extracted by alkaline digestion. The digest is determined by photometrically by automatic discrete analyser, following pH adjustment. The instrument uses colour development using dephenylcarbazide. Each run of samples is measured against a five-point calibration curve. This method is compliant with NEPM (2013) Schedule B(3)
Total Cyanide by Segmented Flow Analyser	EK026SF	SOIL	In house: Referenced to APHA 4500-CN C / ASTM D7511. Caustic leachates of soil samples are introduced into an automated segmented flow analyser. Complex bound cyanide is decomposed in a continuously flowing stream, at a pH of 3.8, by the effect of UV light. A UV-B lamp (312 nm) and a decomposition spiral of borosilicate glass are used to filter out UV light with a wavelength of less than 290 nm thus preventing the conversion of thiocyanate into cyanide. The hydrogen cyanide present at a pH of 3.8 is separated by gas dialysis. The hydrogen cyanide is then determined photometrically, based on the reaction of cyanide with chloramine-T to form cyanogen chloride. This then reacts with 4-pyridine carboxylic acid and 1,3-dimethylbarbituric acid to give a red colour which is measured at 600 nm. This method is compliant with NEPM (2013) Schedule B(3)
Polychlorinated Biphenyls (PCB)	EP066	SOIL	In house: Referenced to USEPA SW 846 - 8270E Extracts are analysed by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (2013) Schedule B(3) (Method 504)
Pesticides by GCMS	EP068	SOIL	In house: Referenced to USEPA SW 846 - 8270E Extracts are analysed by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. This technique is compliant with NEPM (2013) Schedule B(3) (Method 504,505)
TRH - Semivolatile Fraction	EP071	SOIL	In house: Referenced to USEPA SW 846 - 8015A Sample extracts are analysed by Capillary GC/FID and quantified against alkane standards over the range C10 - C40. Compliant with NEPM amended 2013.
Volatile Organic Compounds	EP074	SOIL	In house: Referenced to USEPA SW 846 - 8260D Extracts are analysed by Purge and Trap, Capillary GC/MS. Quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (2013) Schedule B(3) (Method 501)
PAH/Phenols (SIM)	EP075(SIM)	SOIL	In house: Referenced to USEPA SW 846 - 8270E. Extracts are analysed by Capillary GC/MS in Selective Ion Mode (SIM) and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (2013) Schedule B(3) (Method 502 and 507)

Analytical Methods	Method	Matrix	Method Descriptions
TRH Volatiles/BTEX	EP080	SOIL	In house: Referenced to USEPA SW 846 - 8260D. Extracts are analysed by Purge and Trap, Capillary GC/MS. Quantification is by comparison against an established 5 point calibration curve. Compliant with NEPM amended 2013.
TRH Volatiles/BTEX	EP080	WATER	In house: Referenced to USEPA SW 846 - 8260D Water samples are directly purged prior to analysis by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. Alternatively, a sample is equilibrated in a headspace vial and a portion of the headspace determined by GCMS analysis. This method is compliant with the QC requirements of NEPM (2013) Schedule B(3)

Preparation Methods	Method	Matrix	Method Descriptions
NaOH leach for CN in Soils	CN-PR	SOIL	In house: APHA 4500 CN. Samples are extracted by end-over-end tumbling with NaOH.
Alkaline digestion for Hexavalent Chromium	EG048PR	SOIL	In house: Referenced to USEPA SW846, Method 3060A.
Hot Block Digest for metals in soils sediments and sludges	EN69	SOIL	In house: Referenced to USEPA 200.2. Hot Block Acid Digestion 1.0g of sample is heated with Nitric and Hydrochloric acids, then cooled. Peroxide is added and samples heated and cooled again before being filtered and bulked to volume for analysis. Digest is appropriate for determination of selected metals in sludge, sediments, and soils. This method is compliant with NEPM (2013) Schedule B(3) (Method 202)
Methanolic Extraction of Soils for Purge and Trap	ORG16	SOIL	In house: Referenced to USEPA SW 846 - 5030A. 5g of solid is shaken with surrogate and 10mL methanol prior to analysis by Purge and Trap - GC/MS.
Tumbler Extraction of Solids	ORG17	SOIL	In house: Mechanical agitation (tumbler). 10g of sample, Na2SO4 and surrogate are extracted with 30mL 1:1 DCM/Acetone by end over end tumble. The solvent is decanted, dehydrated and concentrated (by KD) to the desired volume for analysis.
Volatiles Water Preparation	ORG16-W	WATER	A 5 mL aliquot or 5 mL of a diluted sample is added to a 40 mL VOC vial for sparging.

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Project Details

Mud Ref.:	ME-328	Laboratory:	ALS	Report no.:	
COC Ref.:		Lab quote:	ADBQ/004/19	Temperature on arrival:	
Client:	MPG	Contact:	T. Gray / A. Webber	Data output:	CSV / ESDAT CSV / PDF
Address:	Wallaroo Fill	Email for results:	info@mudenvironmental.com.au	Turnaround time:	24hrs / 48hrs / standard

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Signature:		Signature:		Consignment no.:	

Environmental Division
Melbourne
Work Order Reference
EM2007842

S 12/5

Telephone : + 61-3-8549 9600

Testing

	Sample ID	Date	Matrix	S2	S26	EP068A	P15/2	W18	Glass jar	Comments
1	TP1_0-0.2	6/5/20	SOIL						1	
2	TP1_0.4-0.6								1	S2 = metals x 8
3	TP1_0.8-1.0								1	
4	TP1_1.4-1.6								1	S26 = TRH, BTEXN PAH, metals
5	TP1_1.9-2.0								1	
6	TP2_0.2-0.3								1	
7	QC2								1	EP068A = OCPs
8	TP2_0.6-0.8								1	
9	QC3								1	P15/2 = SA Waste Screen
10	TP2_1.0-1.2								1	
11	QC4								1	
12	TP2_1.5-1.7								1	W18 = TPH C6-C9 + BTEX
13	QC5								1	
14	TP3_0.1-0.3								1	
15	TP3_0.5-0.6			X					1	
16	TP3_0.8-0.9				X	X			1	
17	TP3_1.1-1.2								1	
									17	

Common Holding Times (confirm with lab)

1d (s) / 3d (w)	microbiological	7d (s) / 14d (w)	TRH, PAH, phenols, pesticides	28d (w)	anions
1d (s)	pH, sPOCAS, CrS	7d (s) / 7d (w)	ASLP, TCLP, TDS, TSS	28d (s + w)	Mercury, CrVI
2d (s)	ntrate, nitrite, total N, BOD	14d (s + w)	BTEX, MAH, VOC	6m (s + w)	metals

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Signature:	[signature]	Signature:		Consignment no.:	

Testing

No.	Sample ID	Date	Matrix	S2	S26	EP068A	P15/2	W18	Glass Jar	Plastic 125mL	40mL vial	250mL amber	Comments
18	TP3_1.3-1.4	6/5/20	Soil						1				
19	TP3_1.6-1.8								1				
20	TP4_0.1-0.2								1				
21	TP4_0.4-0.5								1				
22	QC6								1				
23	TP4_0.8-0.9								1				
24	QC7								1				
25	TP4_1.1-1.2								1				
26	QC8								1				
27	TP4_1.3-1.4								1				
28	TP5_0-0.2								1				
29	TP5_0.2-0.3			X					1				
30	TP5_0.4-0.5								1				
31	TP5_0.7-0.8				X	X			1				
32	TP5_1.0-1.2						X		1				
33	TP5_1.4-1.6			X					1				
34	TP5_1.9-2.1								1				

34

Common Holding Times (confirm with lab)

1d (s) / 3d (w)	microbiological	7d (s) / 14d (w)	TRH, PAH, phenols, pesticides	28d (w)	anions
1d (s)	pH, sPOCAS, CrS	7d (s) / 7d (w)	ASLP, TCLP, TDS, TSS	28d (s + w)	Mercury, CrVI
2d (s)	ntrate, nitrite, total N, BOD	14d (s + w)	BTEX, MAH, VOC	6m (s + w)	metals

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Relinquished by:	T. Gray	Received by:		Freight company:	
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Signature:		Signature:		Consignment no.:	

Testing

	Sample ID	Date	Matrix	Analytes: S2	S26	EP068A	P15/2		W18	Containers: Glass Jar	Plastic 125mL	40mL vial	250mL amber	Comments
35	TP6_0-0.1	6/5/20	Soil							1				
36	QC9									1				
37	TP6_0.3-0.4				X	X				1				
38	QC10				X	X				1				
39	TP6_0.6-0.7			X						1				
40	TP6_0.8-0.9			X						1				
41	TP6_1.3-1.4									1				
42	TP6_1.6-1.7									1				
43	TP7_0-0.2									1				
44	TP7_0.3-0.4			X						1				
45	TP7_0.7-0.8						X			1				
46	TP7_1.1-1.2									1				
47	TP7_1.5-1.6									1				
48	TP7_1.7-1.8									1				
49	TP8_0-0.1									1				
50	TP8_0.2-0.3				X	X				1				
51	TP8_0.6-0.7						X			1				

51

Common Holding Times (confirm with lab)

1d (s) / 3d (w)	microbiological	7d (s) / 14d (w)	TRH, PAH, phenols, pesticides	28d (w)	anions
1d (s)	pH, sPOCAS, CrS	7d (s) / 7d (w)	ASLP, TCLP, TDS, TSS	28d (s + w)	Mercury, CrVI
2d (s)	ntrate, nitrite, total N, BOD	14d (s + w)	BTEX, MAH, VOC	6m (s + w)	metals

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Date + time:	8/5/20	Date + time:		Shipment method:	
Signature:		Signature:		Consignment no.:	

Testing

	Sample ID	Date	Matrix	S2	S26	EP068A	P15/2	W18	Glass Jar	Plastic 125mL	40mL vial	250mL amber	Comments
52.	QC11	6/5/20	Soil						1				
53.	TP8_1.0-1.1			X					1				
54.	TP8_1.3-1.4								1				
55.	TP8_1.8-1.9								1				
56.	TP9_0-0.1								1				
57.	TP9_0.2-0.3						X		1				
58.	TP9_0.6-0.7				X	X			1				
59.	TP9_1.0-1.1			X					1				
60.	TP9_1.4-1.5								1				
61.	TP10_0-0.1								1				
62.	TP10_0.2-0.3			X					1				
63.	QC12			X					1				
64.	TP10_0.7-0.8				X	X			1				
65.	TP10_1.1-1.2								1				
66.	TP10_1.4-1.5								1				
67.	TP11_0-0.1								1				
68.	TP11_0.2-0.3			X					1				
									68				

Common Holding Times (confirm with lab)

1d (s) / 3d (w)	microbiological	7d (s) / 14d (w)	TRH, PAH, phenols, pesticides	28d (w)	anions
1d (s)	pH, sPOCAS, CrS	7d (s) / 7d (w)	ASLP, TCLP, TDS, TSS	28d (s + w)	Mercury, CrVI
2d (s)	ntrate, nitrite, total N, BOD	14d (s + w)	BTEX, MAH, VOC	6m (s + w)	metals

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Transport

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Signature:		Signature:		Consignment no.:	

Testing

	Sample ID	Date	Matrix	S2	S26	EP068A	P15/2	W18	Glass Jar	Plastic 125mL	40mL vial	250mL amber	Comments
69	TP11_0.6-0.7	6/5/20	Soil		X	X			1				S2 = metals x 8
70	TP11_0.9-1.0	↓	↓						1				
71	TP11_1.1-1.2								1				S26 = TRH, BTEXN, PAH, metals
72	TP11_1.5-1.6								1				
73	TP12_0-0.1								1				
74	TP12_0.2-0.3			X					1				EP068A = OCP's
75	TP12_0.6-0.7						X		1				
76	QC13						X		1				P15/2 = SA waste Screen
77	TP12_1.0-1.1								1				
78	TP12_1.3-1.4								1				
79	QC14								1				W18 = TRH C_6-C_9 + BTEX
80	QC1	6/5/20.	WATER					X			2		
									79		2		

Common Holding Times (confirm with lab)

1d (s) / 3d (w)	microbiological	7d (s) / 14d (w)	TRH, PAH, phenols, pesticides	28d (w)	anions
1d (s)	pH, sPOCAS, CrS	7d (s) / 7d (w)	ASLP, TCLP, TDS, TSS	28d (s + w)	Mercury, CrVI
2d (s)	ntrate, nitrite, total N, BOD	14d (s + w)	BTEX, MAH, VOC	6m (s + w)	metals

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COC Ref.:		Lab quote:	ADBQ/004/019	Temperature on arrival:	
Client:	MBG	Contact:	T. Gray / A. Webber	Data output:	CSV / ESDAT CSV / PDF
Address:	Wallaroo Fill	Email for results:	**info@mudenvironmental.com.au**	Turnaround time:	**24hrs / 48hrs / standard**

Transport

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Signature:	TG	Signature:		Consignment no.:	

Testing

	Sample ID	Date	Matrix	Analytes: S2	S26	EP068A	P15/2	Containers: Glass jar	Comments
81.	TP13_0.1-0.2	7/5/20	SOIL	X				1	
82	TP13_0.5-0.6							1	
83	TP14_0.1-0.2			X				1	
84	TP14_0.5-0.6				X	X		1	
85	TP14_1.0-1.1							1	
86.	TP15_0.2-0.3							1	
87	TP15_0.7-0.8							1	
88	TP15_1.2-1.3							1	
89	TP16_0.1-0.2			X				1	
90.	TP16_0.4-0.5				X	X		1	
91	TP16_0.9-1.0							1	
92	TP16_1.4-1.5							1	
93	TP17_0.2-0.3			X				1	
94	TP17_0.6-0.7						X	1	
95	TP17_1.0-1.1				X	X		1	
96.	QC15				X	X		1	
97	TP17_1.4-1.5							1	
								96	

Common Holding Times (confirm with lab)

1d (s) / 3d (w)	microbiological	7d (s) / 14d (w)	TRH, PAH, phenols, pesticides	28d (w)	anions
1d (s)	pH, sPOCAS, CrS	7d (s) / 7d (w)	ASLP, TCLP, TDS, TSS	28d (s + w)	Mercury, CrVI
2d (s)	ntrate, nitrite, total N, BOD	14d (s + w)	BTEX, MAH, VOC	6m (s + w)	metals

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COC Ref.:		Lab quote:	ADBQ/004/019	Temperature on arrival:	
Client:	MPG	Contact:	T. Gray / A. Webber	Data output:	CSV / ESDAT CSV / PDF
Address:	Wallaroo Fill	Email for results:	**info@mudenvironmental.com.au**	Turnaround time:	**24hrs / 48hrs / standard**

Transport

Relinquished by:	T. Gray	Received by:		Freight company:	
Date + time:	8/5/20	Date + time:		Shipment method:	
Signature:		Signature:		Consignment no.:	

Testing

	Sample ID	Date	Matrix	Analytes: S2	S26	EP068A	P15/2	Containers: Glass jar	Comments
98	TP17_1.8-1.9	7/5/20	SOIL					1	
99	TP19_0.4-0.5							1	
100	TP19_0.9-1.0							1	
101	QC16							1	
102	TP19_1.4-1.5							1	
103	TP19_1.9-2.0							1	
104	TP20_0.2-0.3							1	
105	TP20_0.5-0.6			X				1	
106	TP20_0.8-0.9				X	X		1	
107	TP20_1.1-1.2							1	
108	TP20_1.4-1.5							1	
109	TP21_0.6-0.7							1	
110	TP21_1.0-1.1							1	
111	TP21_1.3-1.4							1	
112	TP21_1.8-1.9							1	
113	TP22_0.2-0.3				X	X		1	
114	TP22_0.6-0.7			X				1	
								17	

Common Holding Times (confirm with lab)

1d (s) / 3d (w)	microbiological	7d (s) / 14d (w)	TRH, PAH, phenols, pesticides	28d (w)	anions
1d (s)	pH, sPOCAS, CrS	7d (s) / 7d (w)	ASLP, TCLP, TDS, TSS	28d (s + w)	Mercury, CrVI
2d (s)	ntrate, nitrite, total N, BOD	14d (s + w)	BTEX, MAH, VOC	6m (s + w)	metals

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[illegible] [illegible] 12/5 10:15

MUD ENVIRONMENTAL

www.mudenvironmental.com.au
info@mudenvironmental.com.au
PO Box 80 Henley Beach SA 5022
+61 439 725 754

CHAIN OF CUSTODY RECORD

Project Details

Mud Ref.:	ME-328	Laboratory:	ALS	Report no.:	
COC Ref.:		Lab quote:	ADBQ/004/19	Temperature on arrival:	
Client:	MPG	Contact:	T. Gray / A. Webber	Data output:	CSV / ESDAT CSV / PDF
Address:	Wallaroo Fill	Email for results:	**info@mudenvironmental.com.au**	Turnaround time:	**24hrs / 48hrs / standard**

Transport

Relinquished by:	T. Gray	Received by:		Freight company:	
Date + time:	8/5/20	Date + time:		Shipment method:	
Signature:		Signature:		Consignment no.:	

Testing

	Sample ID	Date	Matrix	Analytes: S2	S26	EP068A	P15/2	Containers: Glass jar	Comments
115	TP22_1.0-1.1	7/5/20	SOIL					1	
116	TP23_0.2-0.3							1	
117	TP23_0.4-0.5							1	
118	TP23_0.6-0.7							1	
119	TP23_0.8-0.9				X	X		1	
120	TP23_1.4-1.5							1	
121	TP24_0.1-0.2			X				1	
122	TP24_0.3-0.4							1	
123	TP24_0.5-0.6							1	
124	TP24_0.7-0.8				X	X		1	
125	TP24_1.2-1.3			X				1	
126	TP24_1.7-1.8							1	
127	TP25_0.1-0.2						X	1	
128	TP25_0.5-0.6				X	X		1	
129	TP25_1.0-1.1							1	
130	TP25_1.3-1.4			X				1	
131	TP25_1.8-1.9							1	

130

Common Holding Times (confirm with lab)

1d (s) / 3d (w)	microbiological	7d (s) / 14d (w)	TRH, PAH, phenols, pesticides	28d (w)	anions
1d (s)	pH, sPOCAS, CrS	7d (s) / 7d (w)	ASLP, TCLP, TDS, TSS	28d (s + w)	Mercury, CrVI
2d (s)	ntrate, nitrite, total N, BOD	14d (s + w)	BTEX, MAH, VOC	6m (s + w)	metals

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CHAIN OF CUSTODY RECORD

Project Details

Mud Ref.:	ME-328	Laboratory:	ALS	Report no.:	
COC Ref.:		Lab quote:	ADBQ/004/19	Temperature on arrival:	
Client:	MPG	Contact:	T. Gray / A. Webber	Data output:	CSV / ESDAT CSV / PDF
Address:	Wallaroo Fill	Email for results:	**info@mudenvironmental.com.au**	Turnaround time:	**24hrs / 48hrs / standard**

Transport

Relinquished by:	T. Gray	Received by:		Freight company:	
Date + time:	8/5/20	Date + time:		Shipment method:	
Signature:		Signature:		Consignment no.:	

Testing

	Sample ID	Date	Matrix	Analytes: S2	S26	EP068A	P15/2	Containers: Glass jar	Comments
132	TP27_0-0.1	7/5/20	SOIL					1	
133	TP27_0.2-0.3				X	X		1	
134	TP27_0.7-0.8							1	
135	TP27_1.2-1.3			X				1	
136	TP27_1.7-1.8							1	
137	TP28_0.1-0.2						X	1	
138	TP28_0.7-0.8				X	X		1	
139	TP28_1.4-1.5							1	
140	TP28_1.8-1.9							1	
141	TP29_0-0.1							1	
142	TP29_0.2-0.3							1	
143	TP29_0.6-0.7						X	1	
144	TP29_1.1-1.2			X				1	
145	TP29_1.6-1.7							1	
146	TP30_0.2-0.3							1	
147	TP30_0.5-0.6							1	
148	TP30_0.7-0.8			X				1	
								147	

Common Holding Times (confirm with lab)

1d (s) / 3d (w)	microbiological	7d (s) / 14d (w)	TRH, PAH, phenols, pesticides	28d (w)	anions
1d (s)	pH, sPOCAS, CrS	7d (s) / 7d (w)	ASLP, TCLP, TDS, TSS	28d (s + w)	Mercury, CrVI
2d (s)	ntrate, nitrite, total N, BOD	14d (s + w)	BTEX, MAH, VOC	6m (s + w)	metals

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CHAIN OF CUSTODY RECORD

Project Details

Mud Ref.:	ME-328	Laboratory:	ALS	Report no.:	
COC Ref.:		Lab quote:	ADBQ/004/19	Temperature on arrival:	
Client:	MPG	Contact:	T. Gray / A. Webber	Data output:	**CSV** / **ESDAT CSV** / **PDF**
Address:	Wallaroo Fill	Email for results:	**info@mudenvironmental.com.au**	Turnaround time:	**24hrs / 48hrs / standard**

Transport

Relinquished by:	T. Gray	Received by:		Freight company:	
Date + time:	8/5/20	Date + time:		Shipment method:	
Signature:		Signature:		Consignment no.:	

Testing

	Sample ID	Date	Matrix	Analytes: S2	S26	EP085A	P15/2	Containers: Glass jar	Comments
149	QC17	7/5/20	SOIL	X				1	
150	TP30_1.1-1.2				X	X		1	
151	TP30_1.5-1.6							1	
152	TP31_0.3-0.4						X	1	
153	TP31_0.8-0.9			X				1	
154	QC18			X				1	
155	TP31_1.3-1.4								

153

Common Holding Times (confirm with lab)

1d (s) / 3d (w)	microbiological	7d (s) / 14d (w)	TRH, PAH, phenols, pesticides	28d (w)	anions
1d (s)	pH, sPOCAS, CrS	7d (s) / 7d (w)	ASLP, TCLP, TDS, TSS	28d (s + w)	Mercury, CrVI
2d (s)	ntrate, nitrite, total N, BOD	14d (s + w)	BTEX, MAH, VOC	6m (s + w)	metals

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APPENDIX D

Test Pit Logs + Explanatory Notes

MUD ENVIRONMENTAL

BORELOG EXPLANATORY NOTES

Unified Soil Classification

Mud Environmental field logging uses symbology consistent with the Unified Soil Classification System (USCS). Appropriate symbols are selected based on limited visual examination only and are not for geotechnical classification, foundation and/or footing design.

Major divisions			Group symbol	Group name
Coarse grained soils - more than 50% retained on 0.075 mm sieve	*gravel* > 50% of coarse fraction retained on 4.75 mm sieve	clean gravel <5% smaller 0.075 mm sieve	**GW**	well-graded gravel, fine to coarse gravel
			GP	poorly graded gravel
		gravel with >12% fines	**GM**	silty gravel
			GC	clayey gravel
	sand ≥ 50% of coarse fraction passes 4.75 mm sieve	clean sand	**SW**	well-graded sand, fine to coarse sand
			SP	poorly graded sand
		sand with >12% fines	**SM**	silty sand
			SC	clayey sand
Fine grained soils - more than 50% passing 0.075 mm sieve	*silt and clay* liquid limit < 50	inorganic	**ML**	silt
			CL	clay of low plasticity, lean clay
		organic	**OL**	organic silt, organic clay
	silt and clay liquid limit ≥ 50	inorganic	**MH**	silt of high plasticity, elastic silt
			CH	clay of high plasticity, fat clay
		organic	**OH**	organic clay, organic silt
Highly organic soils			**Pt**	peat

Additional Lithology Symbols

Fill material

Bitumen

Concrete

Groundwater Well Completion Symbols

Ground level flush gatic cover, concreted	Sand filter pack
Standpipe, concreted	Endcap
Grout consisting of cement +/- bentonite mix	Blank PVC casing
Bentonite plug	Slotted PVC casing and standing water level

MUD ENVIRONMENTAL

Contractor: Mud Environmental	Date: 6 May 2020	**TP01**
Method: Test Pits	Elevation:	
Equipment: Backhoe	Easting:	Logged By:
Bucket Width: 0.9 Meters	Northing:	Trent Gray

Sample	Sample ID	PID (ppm)	Depth Feet	Lithology	Class	Description	Observations
	0-0.2	0.1			SC	FILL 1: SAND, clayey, gravelly, fine to coarse grained sands, calcareous & sandstone gravels + boulders up to 300mm, trace shells, trace slag, moist, orange-brown.	
	0.4-0.6	0.0					
	0.8-1.0	0.1			SW	FILL 2: SAND, fine to coarse grained, rounded sandstone and mudstone gravels to 50mm, shells & shell fragments throughout, moist, pale yellow-brown.	
			1				
	1.4-1.6	0.2					
	1.9-2.0	0.1			CH	FILL 3: CLAY, sandy, medium to high plasticity, firm, blocky, some grey mottling, low moisture, orange-brown to red-brown	
			2			End of Test Pit @ 2.0m	

Notes:

Site:

MPG Wallaroo Fill

Site Address:

72 Wallaroo Plain Road, Wallaroo, South Australia

Project No.: **ME-328**

MUD ENVIRONMENTAL	Contractor: Mud Environmental	Date: 6 May 2020	**TP02**
	Method: Test Pits	Elevation:	
	Equipment: Backhoe	Easting:	Logged By:
	Bucket Width: 0.9 Meters	Northing:	Trent Gray

Sample	Sample ID	PID (ppm)	Depth Feet	Lithology	Class	Description	Observations
					CH	FILL 3: CLAY, sandy, medium to high plasticity, firm, blocky, some grey mottling, low moisture, orange-brown to red-brown	
	0.2-0.3 (QC2)	0.1					
	0.6-0.8 (QC3)	0.1					
					SW	FILL 2: SAND, fine to coarse grained, rounded sandstone and mudstone gravels to 50mm, shells & shell fragments throughout, moist, pale yellow-brown.	
			1				
	1.0-1.2 (QC4)	0.1					
					SC	FILL 4: SAND, clayey, gravelly, sandstone boulders up to 500mm, trace shells, trace slag, moist, light-brown.	
	1.5-1.7 (QC5)	0.1					
			2			End of Test Pit @ 2.0m	

Notes:

Site:

MPG Wallaroo Fill

Site Address:

72 Wallaroo Plain Road, Wallaroo, South Australia

Project No.: **ME-328** Page 1

MUD ENVIRONMENTAL

Contractor: Mud Environmental	Date: 6 May 2020		**TP03**
Method: Test Pits	Elevation:		
Equipment: Backhoe	Easting:		Logged By:
Bucket Width: 0.9 Meters	Northing:		Trent Gray

Sample	Sample ID	PID (ppm)	Depth Feet	Lithology	Class	Description	Observations
	0.1-0.3	0.1			SC	FILL 1: SAND, clayey, gravelly, fine to coarse grained sands, calcareous & sandstone gravels + boulders up to 300mm, trace shells, trace slag, moist, orange-brown.	
	0.5-0.6	0.0			SW	FILL 2: SAND, fine to coarse grained, rounded sandstone and mudstone gravels to 50mm, shells & shell fragments throughout, moist, pale yellow-brown.	
	0.8-0.9	0.1					
			1				
	1.1-1.2	0.0					
	1.3-1.4	0.2			CH	FILL 3: CLAY, sandy, medium to high plasticity, firm, blocky, some grey mottling, low moisture, orange-brown to red-brown	
	1.6-1.8	0.1			SC	FILL 4: SAND, clayey, gravelly, sandstone boulders up to 500mm, trace shells, trace bulk slag, moist, light-brown.	
			2				
						End of Test Pit @ 2.2m	

Notes:

Site:

MPG Wallaroo Fill

Site Address:

72 Wallaroo Plain Road, Wallaroo, South Australia

Project No.: **ME-328** Page 1

MUD ENVIRONMENTAL				
Contractor: Mud Environmental	Date: 6 May 2020	**TP04**
Method: Test Pits	Elevation:	
Equipment: Backhoe	Easting:	Logged By:
Bucket Width: 0.9 Meters	Northing:	Trent Gray

Sample	Sample ID	PID (ppm)	Depth Feet	Lithology	Class	Description	Observations
	0.1-0.2	0.1			SC	FILL 1: SAND, clayey, gravelly, fine to coarse grained sands, calcareous & sandstone gravels + boulders up to 300mm, trace shells, trace slag, moist, orange-brown.	
	0.4-0.5 (QC6)	0.0					
	0.8-0.9 (QC7)	0.1			SW	FILL 2: SAND, fine to coarse grained, rounded sandstone and mudstone gravels to 50mm, shells & shell fragments throughout, moist, pale yellow-brown.	
			1		CH	FILL 3: CLAY, sandy, medium to high plasticity, firm, blocky, some grey mottling, low moisture, orange-brown to red-brown	
	1.1-1.2 (QC8)	0.0					
	1.3-1.4	0.2			SC	FILL 4: SAND, clayey, gravelly, sandstone boulders up to 500mm, trace shells, trace vesicular slag + bulk slag, moist, light-brown.	
			2				
						End of Test Pit @ 2.1m	

Notes:

Site:

MPG Wallaroo Fill

Site Address:

72 Wallaroo Plain Road, Wallaroo, South Australia

Project No.: **ME-328**

MUD ENVIRONMENTAL

Contractor:	Mud Environmental	Date:	6 May 2020	**TP05**
Method:	Test Pits	Elevation:		
Equipment:	Backhoe	Easting:		Logged By:
Bucket Width:	0.9 Meters	Northing:		Trent Gray

Sample	Sample ID	PID (ppm)	Depth Feet	Lithology	Class	Description	Observations
	0-0.2	0.2			SC	FILL 1: SAND, clayey, gravelly, fine to coarse grained sands, calcareous & sandstone gravels + boulders up to 300mm, trace shells, trace slag, moist, orange-brown.	
	0.2-0.3	0.2			CH	FILL 3: CLAY, sandy, medium to high plasticity, firm, blocky, some grey mottling, low moisture, orange-brown to red-brown	
	0.4-0.5	0.1					
	0.7-0.8	0.2			SW	FILL 2: SAND, fine to coarse grained, rounded sandstone and mudstone gravels to 50mm, shells & shell fragments throughout, moist, pale yellow-brown.	
			1				
	1.0-1.2	0.1					
	1.4-1.6	0.0					
	1.9-2.1	0.1	2		SC	FILL 4: SAND, clayey, gravelly, sandstone boulders up to 500mm, trace shells, trace slag, moist, light-brown.	
						End of Test Pit @ 2.1m	

Notes:

Site:

MPG Wallaroo Fill

Site Address:

72 Wallaroo Plain Road, Wallaroo, South Australia

Project No.: **ME-328**

MUD ENVIRONMENTAL

Contractor: Mud Environmental	Date: 6 May 2020		**TP06**
Method: Test Pits	Elevation:		
Equipment: Backhoe	Easting:		Logged By:
Bucket Width: 0.9 Meters	Northing:		Trent Gray

Sample	Sample ID	PID (ppm)	Depth Feet	Lithology	Class	Description	Observations
	0-0.1 (QC9)	0.1			SC	FILL 1: SAND, clayey, gravelly, fine to coarse grained sands, calcareous & sandstone gravels + boulders up to 300mm, trace shells, trace slag, moist, orange-brown.	
	0.3-0.4 (QC10)	0.0			CH	FILL 3: CLAY, sandy, medium to high plasticity, firm, blocky, some grey mottling, low moisture, orange-brown to red-brown	
	0.6-0.7	0.0			SW	FILL 2: SAND, fine to coarse grained, rounded sandstone and mudstone gravels to 50mm, shells & shell fragments throughout, moist, pale yellow-brown.	
	0.8-0.9	0.1	1		CH	FILL 3: CLAY, sandy, medium to high plasticity, firm, blocky, some grey mottling, low moisture, orange-brown to red-brown	
	1.3-1.4	0.1					
	1.6-1.7	0.0			SC	FILL 4: SAND, clayey, gravelly, sandstone boulders up to 500mm, trace shells, trace slag, moist, light-brown.	
			2			End of Test Pit @ 2.0m	

Notes:

Site:

MPG Wallaroo Fill

Site Address:

72 Wallaroo Plain Road, Wallaroo, South Australia

Project No.: **ME-328**

MUD ENVIRONMENTAL

Contractor: Mud Environmental	Date: 6 May 2020	**TP07**
Method: Test Pits	Elevation:	
Equipment: Backhoe	Easting:	Logged By:
Bucket Width: 0.9 Meters	Northing:	Trent Gray

Sample	Sample ID	PID (ppm)	Depth Feet	Lithology	Class	Description	Observations
	0-0.2	0.1			SC	FILL 1: SAND, clayey, gravelly, fine to coarse grained sands, calcareous & sandstone gravels + boulders up to 300mm, trace shells, trace slag, moist, orange-brown.	
	0.3-0.4	0.1			CH	FILL 3: CLAY, sandy, medium to high plasticity, firm, blocky, some grey mottling, low moisture, orange-brown to red-brown	
	0.7-0.8	0.0					
			1				
	1.1-1.2	0.1					
	1.5-1.6	0.2					
	1.7-1.8	0.1			SC	FILL 4: SAND, clayey, gravelly, sandstone boulders up to 500mm, trace shells, trace vesicular slag + bulk slag, moist, light-brown.	
			2				
						End of Test Pit @ 2.1m	

Notes:

Site:

MPG Wallaroo Fill

Site Address:

72 Wallaroo Plain Road, Wallaroo, South Australia

Project No.: **ME-328**

MUD ENVIRONMENTAL	Contractor: Mud Environmental	Date: 6 May 2020	**TP08**
	Method: Test Pits	Elevation:	
	Equipment: Backhoe	Easting:	Logged By:
	Bucket Width: 0.9 Meters	Northing:	Trent Gray

Sample	Sample ID	PID (ppm)	Depth Feet	Lithology	Class	Description	Observations
	0-0.1	0.0			SC	FILL 1: SAND, clayey, gravelly, fine to coarse grained sands, calcareous & sandstone gravels + boulders up to 300mm, trace shells, trace slag, moist, orange-brown.	
	0.2-0.3	0.0				FILL 3: CLAY, sandy, medium to high plasticity, firm, blocky, some grey mottling, low moisture, orange-brown to red-brown	
	0.6-0.7 (QC11)	0.1			CH		
	1.0-1.1	0.1	1				
	1.3-1.4	0.0			SC	FILL 4: SAND, clayey, gravelly, sandstone boulders up to 500mm, trace shells, trace vesicular slag + bulk slag, moist, light-brown.	
	1.8-1.9	0.0	2		CH	FILL 3: CLAY, sandy, medium to high plasticity, firm, blocky, some grey mottling, low moisture, orange-brown to red-brown	
						End of Test Pit @ 2.1m	

Notes:

Site:

MPG Wallaroo Fill

Site Address:

72 Wallaroo Plain Road, Wallaroo, South Australia

Project No.: **ME-328**

MUD ENVIRONMENTAL	Contractor: Mud Environmental	Date: 6 May 2020	**TP09**
	Method: Test Pits	Elevation:	
	Equipment: Backhoe	Easting:	Logged By:
	Bucket Width: 0.9 Meters	Northing:	Trent Gray

Sample	Sample ID	PID (ppm)	Depth Feet	Lithology	Class	Description	Observations
	0-0.1	0.1			SC	FILL 1: SAND, clayey, gravelly, fine to coarse grained sands, calcareous & sandstone gravels + boulders up to 300mm, trace shells, trace slag, moist, orange-brown.	
	0.2-0.3	0.2			CH	FILL 3: CLAY, sandy, medium to high plasticity, firm, blocky, some grey mottling, low moisture, orange-brown to red-brown	
	0.6-0.7	0.1					
	1.0-1.1	0.0	1				
	1.4-1.5	0.2			SC	FILL 4: SAND, clayey, gravelly, sandstone boulders up to 500mm, trace shells, trace vesicular slag + bulk slag, moist, light-brown.	
						End of Test Pit @ 1.9m	
			2				

Notes:

Site:

MPG Wallaroo Fill

Site Address:

72 Wallaroo Plain Road, Wallaroo, South Australia

Project No.: **ME-328**

MUD ENVIRONMENTAL

Contractor: Mud Environmental	Date: 6 May 2020	**TP10**
Method: Test Pits	Elevation:	
Equipment: Backhoe	Easting:	Logged By:
Bucket Width: 0.9 Meters	Northing:	Trent Gray

Sample	Sample ID	PID (ppm)	Depth Feet	Lithology	Class	Description	Observations
	0-0.1	0.2			SC	FILL 1: SAND, clayey, gravelly, fine to coarse grained sands, calcareous & sandstone gravels + boulders up to 300mm, trace shells, trace slag, moist, orange-brown.	
	0.2-0.3 (QC12)	0.2			CH	FILL 3: CLAY, sandy, medium to high plasticity, firm, blocky, some grey mottling, low moisture, orange-brown to red-brown	
	0.7-0.8	0.1					
			1				
	1.1-1.2	0.2					
	1.4-1.5	0.2			SC	FILL 4: SAND, clayey, gravelly, sandstone boulders up to 500mm, trace shells, trace vesicular slag + bulk slag, moist, light-brown.	
			2			End of Test Pit @ 2.0m	

Notes:

Site:

MPG Wallaroo Fill

Site Address:

72 Wallaroo Plain Road, Wallaroo, South Australia

Project No.: **ME-328**

MUD ENVIRONMENTAL	Contractor: Mud Environmental	Date: 6 May 2020	**TP11**
	Method: Test Pits	Elevation:	
	Equipment: Backhoe	Easting:	Logged By:
	Bucket Width: 0.9 Meters	Northing:	Trent Gray

Sample	Sample ID	PID (ppm)	Depth Feet	Lithology	Class	Description	Observations
	0-0.1	0.1			SC	FILL 1: SAND, clayey, gravelly, fine to coarse grained sands, calcareous & sandstone gravels + boulders up to 300mm, trace shells, trace slag, moist, orange-brown.	
	0.2-0.3	0.0			CH	FILL 3: CLAY, sandy, medium to high plasticity, firm, blocky, some grey mottling, low moisture, orange-brown to red-brown	
	0.6-0.7	0.1					
	0.9-1.0	0.0					
			1				
	1.1-1.2	0.1			SC	FILL 4: SAND, clayey, gravelly, sandstone boulders up to 500mm, trace shells, trace vesicular slag + bulk slag, moist, light-brown.	
	1.5-1.6	0.1					
					CH	FILL 3: CLAY, sandy, medium to high plasticity, firm, blocky, some grey mottling, low moisture, orange-brown to red-brown	
			2				
						End of Test Pit @ 2.1m	

Notes:

Site:

MPG Wallaroo Fill

Site Address:

72 Wallaroo Plain Road, Wallaroo, South Australia

Project No.: **ME-328**

MUD ENVIRONMENTAL	Contractor: Mud Environmental	Date: 6 May 2020	**TP12**
	Method: Test Pits	Elevation:	
	Equipment: Backhoe	Easting:	Logged By:
	Bucket Width: 0.9 Meters	Northing:	Trent Gray

Sample	Sample ID	PID (ppm)	Depth Feet	Lithology	Class	Description	Observations
	0-0.1	0.1			SC	FILL 1: SAND, clayey, gravelly, fine to coarse grained sands, calcareous & sandstone gravels + boulders up to 300mm, trace shells, trace slag, moist, orange-brown.	
	0.2-0.3	0.2				FILL 3: CLAY, sandy, medium to high plasticity, firm, blocky, some grey mottling, low moisture, orange-brown to red-brown	
	0.6-0.7 (QC13)	0.1			CH		
	1.0-1.1	0.0	1				
	1.3-1.4 (QC14)	0.1			SC	FILL 4: SAND, clayey, gravelly, sandstone boulders up to 500mm, trace shells, trace vesicular slag + bulk slag, moist, light-brown.	
			2			End of Test Pit @ 2.0m	

Notes:

Site:

MPG Wallaroo Fill

Site Address:

72 Wallaroo Plain Road, Wallaroo, South Australia

Project No.: **ME-328**

MUD ENVIRONMENTAL	Contractor: Mud Environmental	Date: 6 May 2020	**TP13**
	Method: Test Pits	Elevation:	
	Equipment: Backhoe	Easting:	Logged By:
	Bucket Width: 0.9 Meters	Northing:	Trent Gray

Sample	Sample ID	PID (ppm)	Depth Feet	Lithology	Class	Description	Observations
					SC	FILL 1: SAND, clayey, gravelly, fine to coarse grained sands, calcareous & sandstone gravels + boulders up to 300mm, trace shells, trace slag, moist, orange-brown.	
	0.1-0.2	0.0					
					CH	FILL 3: CLAY, sandy, medium to high plasticity, firm, blocky, some grey mottling, low moisture, orange-brown to red-brown	
	0.5-0.6	0.0					
			1		SC	FILL 4: SAND, clayey, gravelly, sandstone boulders up to 500mm, trace shells, trace vesicular slag + bulk slag, moist, light-brown.	
					CL	FILL 5: CLAY, sandy, low to medium plasticity, calcareous gravels throughout, trace shells, moist, orange-brown.	
			2			End of Test Pit @ 2.0m	

Notes:

Site:

MPG Wallaroo Fill

Site Address:

72 Wallaroo Plain Road, Wallaroo, South Australia

Project No.: **ME-328**

MUD ENVIRONMENTAL	Contractor: Mud Environmental	Date: 6 May 2020	**TP14**
	Method: Test Pits	Elevation:	
	Equipment: Backhoe	Easting:	Logged By:
	Bucket Width: 0.9 Meters	Northing:	Trent Gray

Sample	Sample ID	PID (ppm)	Depth Feet	Lithology	Class	Description	Observations
					SC	FILL 1: SAND, clayey, gravelly, fine to coarse grained sands, calcareous & sandstone gravels + boulders up to 300mm, trace shells, trace slag, moist, orange-brown.	
	0.1-0.2	0.1					
					SW	FILL 2: SAND, fine to coarse grained, rounded sandstone and mudstone gravels to 50mm, shells & shell fragments throughout, moist, pale yellow-brown.	
	0.5-0.6	0.1					
			1				
	1.0-1.1	0.1					
					SC	FILL 4: SAND, clayey, gravelly, sandstone boulders up to 500mm, trace shells, trace vesicular slag + bulk slag, moist, light-brown.	
					CL	FILL 5: CLAY, sandy, low to medium plasticity, calcareous gravels throughout, trace shells, moist, orange-brown.	
			2			End of Test Pit @ 2.0m	

Notes:

Site:

MPG Wallaroo Fill

Site Address:

72 Wallaroo Plain Road, Wallaroo, South Australia

Project No.: **ME-328**

MUD ENVIRONMENTAL	Contractor: Mud Environmental	Date: 6 May 2020	**TP15**
	Method: Test Pits	Elevation:	
	Equipment: Backhoe	Easting:	Logged By:
	Bucket Width: 0.9 Meters	Northing:	Trent Gray

Sample	Sample ID	PID (ppm)	Depth Feet	Lithology	Class	Description	Observations
					SC	FILL 1: SAND, clayey, gravelly, fine to coarse grained sands, calcareous & sandstone gravels + boulders up to 300mm, trace shells, trace slag, moist, orange-brown.	
	0.2-0.3	0.0			CH	FILL 3: CLAY, sandy, medium to high plasticity, firm, blocky, some grey mottling, low moisture, orange-brown to red-brown	
	0.7-0.8	0.1					
			1				
	1.2-1.3	0.0					
					SC	FILL 4: SAND, clayey, gravelly, sandstone boulders up to 500mm, trace shells, trace vesicular slag + bulk slag, moist, light-brown.	
			2			End of Test Pit @ 2.0m	

<u>Notes:</u>

<u>Site:</u>

MPG Wallaroo Fill

<u>Site Address:</u>

72 Wallaroo Plain Road, Wallaroo, South Australia

Project No.: **ME-328** Page 1

MUD ENVIRONMENTAL

Contractor:	Mud Environmental	Date:	6 May 2020	**TP16**
Method:	Test Pits	Elevation:		
Equipment:	Backhoe	Easting:		Logged By:
Bucket Width:	0.9 Meters	Northing:		Trent Gray

Sample	Sample ID	PID (ppm)	Depth Feet	Lithology	Class	Description	Observations
					SC	FILL 1: SAND, clayey, gravelly, fine to coarse grained sands, calcareous & sandstone gravels + boulders up to 300mm, trace shells, trace slag, moist, orange-brown.	
	0.1-0.2	0.1					
	0.4-0.5	0.0			CH	FILL 3: CLAY, sandy, medium to high plasticity, firm, blocky, some grey mottling, low moisture, orange-brown to red-brown	
	0.9-1.0	0.0	1				
	1.4-1.5	0.0					
					SC	FILL 4: SAND, clayey, gravelly, sandstone boulders up to 500mm, trace shells, trace vesicular slag + bulk slag, moist, light-brown.	
			2			End of Test Pit @ 2.0m	

Notes:

Site:

MPG Wallaroo Fill

Site Address:

72 Wallaroo Plain Road, Wallaroo, South Australia

Project No.: **ME-328** Page 1

MUD ENVIRONMENTAL

Contractor: Mud Environmental	Date: 6 May 2020	**TP17**
Method: Test Pits	Elevation:	
Equipment: Backhoe	Easting:	Logged By:
Bucket Width: 0.9 Meters	Northing:	Trent Gray

Sample	Sample ID	PID (ppm)	Depth Feet	Lithology	Class	Description	Observations
					SC	FILL 1: SAND, clayey, gravelly, fine to coarse grained sands, calcareous & sandstone gravels + boulders up to 300mm, trace shells, trace slag, moist, orange-brown.	
	0.2-0.3	0.1			CH	FILL 3: CLAY, sandy, medium to high plasticity, firm, blocky, some grey mottling, low moisture, orange-brown to red-brown	
	0.6-0.7	0.1				FILL 5: CLAY, sandy, low to medium plasticity, calcareous gravels throughout, trace shells, moist, orange-brown.	
			1				
	1.0-1.1 (QC15)	0.0			CL		
	1.4-1.5	0.1					
	1.8-1.9	0.1					
			2			End of Test Pit @ 2.0m	

Notes:

Site:

MPG Wallaroo Fill

Site Address:

72 Wallaroo Plain Road, Wallaroo, South Australia

Project No.: **ME-328** Page 1

MUD ENVIRONMENTAL

Contractor: Mud Environmental	Date: 6 May 2020	**TP18**
Method: Test Pits	Elevation:	
Equipment: Backhoe	Easting:	Logged By:
Bucket Width: 0.9 Meters	Northing:	Trent Gray

Sample	Sample ID	PID (ppm)	Depth Feet	Lithology	Class	Description	Observations
					SC	FILL 1: SAND, clayey, gravelly, fine to coarse grained sands, calcareous & sandstone gravels + boulders up to 300mm, trace shells, trace bulk slag to 100mm, moist, orange-brown.	
			1		CL	MIXED FILL 3 + FILL 4 + FILL 5 layers containing trace bulk slag.	
			2			End of Test Pit @ 2.0m	

Notes:

Site:

MPG Wallaroo Fill

Site Address:

72 Wallaroo Plain Road, Wallaroo, South Australia

Project No.: **ME-328** Page 1

MUD ENVIRONMENTAL	Contractor: Mud Environmental	Date: 6 May 2020	TP19
	Method: Test Pits	Elevation:	
	Equipment: Backhoe	Easting:	Logged By:
	Bucket Width: 0.9 Meters	Northing:	Trent Gray

Sample	Sample ID	PID (ppm)	Depth Feet	Lithology	Class	Description	Observations
					SC	FILL 1: SAND, clayey, gravelly, fine to coarse grained sands, calcareous & sandstone gravels + boulders up to 300mm, trace shells, trace slag, moist, orange-brown.	
					SC	FILL 4: SAND, clayey, gravelly, sandstone boulders up to 500mm, trace shells, trace vesicular slag + bulk slag, moist, light-brown.	
	0.4-0.5	0.1			CL	FILL 6: CLAY, sandy, medium plasticity, fine calcareous gravels and shell fragments throughout, some mottling, moist, pale yellow-brown	
	0.9-1.0 (QC16)	0.0	1				
	1.4-1.5	0.1					
	1.9-2.0	0.0	2			End of Test Pit @ 2.0m	

Notes:

Site:
MPG Wallaroo Fill

Site Address:
72 Wallaroo Plain Road, Wallaroo, South Australia

Project No.: **ME-328**

	Contractor: Mud Environmental	Date: 6 May 2020	**TP20**
MUD ENVIRONMENTAL	Method: Test Pits	Elevation:	
	Equipment: Backhoe	Easting:	Logged By:
	Bucket Width: 0.9 Meters	Northing:	Trent Gray

Sample	Sample ID	PID (ppm)	Depth Feet	Lithology	Class	Description	Observations
					SC	FILL 1: SAND, clayey, gravelly, fine to coarse grained sands, calcareous & sandstone gravels + boulders up to 300mm, trace shells, trace slag, moist, orange-brown.	
	0.2-0.3	0.0			CH	FILL 3: CLAY, sandy, medium to high plasticity, firm, blocky, some grey mottling, low moisture, orange-brown to red-brown	
	0.5-0.6	0.1			SW	FILL 2: SAND, fine to coarse grained, rounded sandstone and mudstone gravels to 50mm, shells & shell fragments throughout, moist, pale yellow-brown.	
	0.8-0.9	0.0			SC	FILL 7: SAND, clayey, fine-grained, moist, pale orange-brown.	
			1				
	1.1-1.2	0.0					
	1.4-1.5	0.0			SW	FILL 8: SAND, fine to medium grained, shells present, moist, light-brown.	
					CL	FILL 6: CLAY, sandy, medium plasticity, fine calcareous gravels and shell fragments throughout, some mottling, moist, pale yellow-brown	
			2			End of Test Pit @ 2.0m	

Notes:

Site:

MPG Wallaroo Fill

Site Address:

72 Wallaroo Plain Road, Wallaroo, South Australia

Project No.: **ME-328**

MUD ENVIRONMENTAL	Contractor: Mud Environmental	Date: 6 May 2020	**TP21**
	Method: Test Pits	Elevation:	
	Equipment: Backhoe	Easting:	Logged By:
	Bucket Width: 0.9 Meters	Northing:	Trent Gray

Sample	Sample ID	PID (ppm)	Depth Feet	Lithology	Class	Description	Observations
					CL	FILL 5: CLAY, sandy, low to medium plasticity, calcareous gravels throughout, trace shells, moist, orange-brown, trace slag present	
	0.6-0.7	0.0			CH	FILL 3: CLAY, sandy, medium to high plasticity, firm, blocky, some grey mottling, low moisture, orange-brown to red-brown	
	1.0-1.1	0.1	1				
	1.3-1.4	0.1			SW	FILL 8: SAND, fine to medium grained, shells present, moist, light-brown.	
	1.8-1.9	0.0					
			2			End of Test Pit @ 2.0m	

Notes:

Site:

MPG Wallaroo Fill

Site Address:

72 Wallaroo Plain Road, Wallaroo, South Australia

Project No.: **ME-328**

MUD ENVIRONMENTAL	Contractor: Mud Environmental	Date: 6 May 2020	**TP22**
	Method: Test Pits	Elevation:	
	Equipment: Backhoe	Easting:	Logged By:
	Bucket Width: 0.9 Meters	Northing:	Trent Gray

Sample	Sample ID	PID (ppm)	Depth Feet	Lithology	Class	Description	Observations
					SC	FILL 4: SAND, clayey, gravelly, sandstone boulders up to 500mm, trace shells, trace vesicular slag + bulk slag, moist, light-brown.	
	0.2-0.3	0.0				FILL 3: CLAY, sandy, medium to high plasticity, firm, blocky, some grey mottling, low moisture, orange-brown to red-brown	
	0.6-0.7	0.0			CH		
	1.0-1.1	0.0	1				
					SC	FILL 4: SAND, clayey, gravelly, sandstone boulders up to 500mm, trace shells, trace vesicular slag + bulk slag, moist, light-brown.	
			2			End of Test Pit @ 2.0m	

Notes:

Site:

MPG Wallaroo Fill

Site Address:

72 Wallaroo Plain Road, Wallaroo, South Australia

Project No.: **ME-328**

MUD ENVIRONMENTAL

Contractor: Mud Environmental	Date: 6 May 2020	**TP23**	
Method: Test Pits	Elevation:		
Equipment: Backhoe	Easting:	Logged By:	
Bucket Width: 0.9 Meters	Northing:	Trent Gray	

Sample	Sample ID	PID (ppm)	Depth Feet	Lithology	Class	Description	Observations
					SC	FILL 1: SAND, clayey, gravelly, fine to coarse grained sands, calcareous & sandstone gravels + boulders up to 300mm, trace shells, trace slag, moist, orange-brown.	
	0.2-0.3	0.0			SW	FILL 8: SAND, fine to medium grained, shells present, moist, light-brown.	
	0.4-0.5	0.1					
	0.6-0.7	0.0			SW	FILL 2: SAND, fine to coarse grained, rounded sandstone and mudstone gravels to 50mm, shells & shell fragments throughout, moist, pale yellow-brown.	
	0.8-0.9	0.0			CL	FILL 6: CLAY, sandy, medium plasticity, fine calcareous gravels and shell fragments throughout, some mottling, moist, pale yellow-brown	
			1				
	1.4-1.5	0.1					
			2			End of Test Pit @ 2.0m	

Notes:

Site:

MPG Wallaroo Fill

Site Address:

72 Wallaroo Plain Road, Wallaroo, South Australia

Project No.: **ME-328**

MUD ENVIRONMENTAL	Contractor: Mud Environmental	Date: 6 May 2020	**TP24**
	Method: Test Pits	Elevation:	
	Equipment: Backhoe	Easting:	Logged By:
	Bucket Width: 0.9 Meters	Northing:	Trent Gray

Sample	Sample ID	PID (ppm)	Depth Feet	Lithology	Class	Description	Observations
	0.1-0.2	0.1			SW	FILL 8: SAND, fine to medium grained, shells present, moist, light-brown.	
	0.3-0.4	0.1					
	0.5-0.6	0.0			CH	FILL 3: CLAY, sandy, medium to high plasticity, firm, blocky, some grey mottling, low moisture, orange-brown to red-brown	
	0.7-0.8	0.2				FILL 8: SAND, fine to medium grained, shells present, moist, light-brown.	
			1				
	1.2-1.3	0.1			SW		
	1.7-1.8	0.0					
			2			End of Test Pit @ 2.0m	

Notes:

Site:

MPG Wallaroo Fill

Site Address:

72 Wallaroo Plain Road, Wallaroo, South Australia

Project No.: **ME-328**

MUD ENVIRONMENTAL

Contractor: Mud Environmental	Date: 6 May 2020	**TP25**
Method: Test Pits	Elevation:	
Equipment: Backhoe	Easting:	Logged By:
Bucket Width: 0.9 Meters	Northing:	Trent Gray

Sample	Sample ID	PID (ppm)	Depth Feet	Lithology	Class	Description	Observations
	0.1-0.2	0.2			SW	FILL 8: SAND, fine to medium grained, shells present, moist, light-brown.	
	0.5-0.6	0.1					
	1.0-1.1	0.1	1				
	1.3-1.4	0.1			CL	FILL 6: CLAY, sandy, medium plasticity, fine calcareous gravels and shell fragments throughout, some mottling, moist, pale yellow-brown	
	1.8-1.9	0.1					
			2			End of Test Pit @ 2.0m	

Notes:

Site:

MPG Wallaroo Fill

Site Address:

72 Wallaroo Plain Road, Wallaroo, South Australia

Project No.: **ME-328** Page 1

MUD ENVIRONMENTAL

Contractor: Mud Environmental	Date: 6 May 2020	**TP26**
Method: Test Pits	Elevation:	
Equipment: Backhoe	Easting:	Logged By:
Bucket Width: 0.9 Meters	Northing:	Trent Gray

Sample	Sample ID	PID (ppm)	Depth Feet	Lithology	Class	Description	Observations
					SP	MIXED FILL 4 + FILL 5 with trace slag present	
			1				
					SC	FILL 7: SAND, clayey, fine-grained, moist, pale orange-brown.	
			2			End of Test Pit @ 2.0m	

Notes:

Site:

MPG Wallaroo Fill

Site Address:

72 Wallaroo Plain Road, Wallaroo, South Australia

Project No.: **ME-328** Page 1

MUD ENVIRONMENTAL

Contractor: Mud Environmental	Date: 6 May 2020	**TP27**
Method: Test Pits	Elevation:	
Equipment: Backhoe	Easting:	Logged By:
Bucket Width: 0.9 Meters	Northing:	Trent Gray

Sample	Sample ID	PID (ppm)	Depth Feet	Lithology	Class	Description	Observations
	0-0.1	0.0			SW	FILL 8: SAND, fine to medium grained, shells present, moist, light-brown.	
	0.2-0.3	0.1			CL	FILL 6: CLAY, sandy, medium plasticity, fine calcareous gravels and shell fragments throughout, some mottling, moist, pale yellow-brown	
	0.7-0.8	0.1					
			1		SW	FILL 8: SAND, fine to medium grained, shells present, moist, light-brown.	
	1.2-1.3	0.0					
	1.7-1.8	0.0			CL	FILL 5: CLAY, sandy, low to medium plasticity, calcareous gravels throughout, trace shells, moist, orange-brown.	
			2			End of Test Pit @ 2.0m	

Notes:

Site:

MPG Wallaroo Fill

Site Address:

72 Wallaroo Plain Road, Wallaroo, South Australia

Project No.: **ME-328**

MUD ENVIRONMENTAL	Contractor: Mud Environmental	Date: 6 May 2020	TP28
	Method: Test Pits	Elevation:	
	Equipment: Backhoe	Easting:	Logged By:
	Bucket Width: 0.9 Meters	Northing:	Trent Gray

Sample	Sample ID	PID (ppm)	Depth Feet	Lithology	Class	Description	Observations
	0.1-0.2	0.1			CH	FILL 3: CLAY, sandy, medium to high plasticity, firm, blocky, some grey mottling, low moisture, orange-brown to red-brown	
	0.7-0.8	0.1					
			1				
	1.4-1.5	0.0					
	1.8-1.9	0.1			SW	FILL 8: SAND, fine to medium grained, shells present, moist, light-brown.	
			2			End of Test Pit @ 2.0m	

Notes:

Site:

MPG Wallaroo Fill

Site Address:

72 Wallaroo Plain Road, Wallaroo, South Australia

Project No.: **ME-328** Page 1

MUD ENVIRONMENTAL

Contractor:	Mud Environmental	Date:	6 May 2020	**TP29**
Method:	Test Pits	Elevation:		
Equipment:	Backhoe	Easting:		Logged By:
Bucket Width:	0.9 Meters	Northing:		Trent Gray

Sample	Sample ID	PID (ppm)	Depth Feet	Lithology	Class	Description	Observations
	0-0.1	0.0			SW	FILL 8: SAND, fine to medium grained, shells present, moist, light-brown.	
	0.2-0.3	0.0			CH	FILL 3: CLAY, sandy, medium to high plasticity, firm, blocky, some grey mottling, low moisture, orange-brown to red-brown	
	0.6-0.7	0.0			SW	FILL 8: SAND, fine to medium grained, shells present, moist, light-brown.	
			1				
	1.1-1.2	0.1					
	1.6-1.7	0.0					
			2			End of Test Pit @ 2.0m	

Notes:

Site:

MPG Wallaroo Fill

Site Address:

72 Wallaroo Plain Road, Wallaroo, South Australia

Project No.: **ME-328** Page 1

MUD ENVIRONMENTAL

Contractor: Mud Environmental	Date: 6 May 2020	**TP30**	
Method: Test Pits	Elevation:		
Equipment: Backhoe	Easting:	Logged By:	
Bucket Width: 0.9 Meters	Northing:	Trent Gray	

Sample	Sample ID	PID (ppm)	Depth Feet	Lithology	Class	Description	Observations
					SC	FILL 1: SAND, clayey, gravelly, fine to coarse grained sands, calcareous & sandstone gravels + boulders up to 300mm, trace shells, trace slag, moist, orange-brown.	
	0.2-0.3	0.1			CH	FILL 6: CLAY, sandy, medium plasticity, fine calcareous gravels and shell fragments throughout, some mottling, moist, pale yellow-brown	
	0.5-0.6	0.0			SC	FILL 7: SAND, clayey, fine-grained, moist, pale orange-brown.	
	0.7-0.8 (QC17)	0.1				FILL 8: SAND, fine to medium grained, shells present, moist, light-brown.	
			1				
	1.1-1.2	0.1			SW		
	1.5-1.6	0.0					
					CL	FILL 3: CLAY, sandy, medium to high plasticity, firm, blocky, some grey mottling, low moisture, orange-brown to red-brown	
			2			End of Test Pit @ 2.0m	

Notes:

Site:

MPG Wallaroo Fill

Site Address:

72 Wallaroo Plain Road, Wallaroo, South Australia

Project No.: **ME-328**

MUD ENVIRONMENTAL	Contractor: Mud Environmental	Date: 6 May 2020	**TP31**
	Method: Test Pits	Elevation:	
	Equipment: Backhoe	Easting:	Logged By:
	Bucket Width: 0.9 Meters	Northing:	Trent Gray

Sample	Sample ID	PID (ppm)	Depth Feet	Lithology	Class	Description	Observations
					SC	FILL 1: SAND, clayey, gravelly, fine to coarse grained sands, calcareous & sandstone gravels + boulders up to 300mm, trace shells, trace slag, moist, orange-brown.	
					CH	FILL 6: CLAY, sandy, medium plasticity, fine calcareous gravels and shell fragments throughout, some mottling, moist, pale yellow-brown	
	0.3-0.4	0.1					
	0.8-0.9 (QC18)	0.1					
			1				
	1.3-1.4	0.1					
					SC	FILL 4: SAND, clayey, gravelly, sandstone boulders up to 500mm, trace shells, trace slag & cinders present, moist, light-brown.	
			2			End of Test Pit @ 2.0m	

Notes:

Site:

MPG Wallaroo Fill

Site Address:

72 Wallaroo Plain Road, Wallaroo, South Australia

Project No.: **ME-328** Page 1

MUD ENVIRONMENTAL	Contractor: Mud Environmental	Date: 6 May 2020	**TP32**
	Method: Test Pits	Elevation:	
	Equipment: Backhoe	Easting:	Logged By:
	Bucket Width: 0.9 Meters	Northing:	Trent Gray

Sample	Sample ID	PID (ppm)	Depth Feet	Lithology	Class	Description	Observations
					SW	FILL 8: SAND, fine to medium grained, shells present, moist, light-brown.	
					SP	FILL 9: SAND, fine to medium grained, calcareous, trace shells, boulders up to 300mm, low moisture, pale red-pink.	
			1		CL	FILL 5: CLAY, sandy, low to medium plasticity, calcareous gravels throughout, trace shells, moist, orange-brown.	
						End of Test Pit @ 1.8m	
			2				

Notes:

Site:

MPG Wallaroo Fill

Site Address:

72 Wallaroo Plain Road, Wallaroo, South Australia

Project No.: **ME-328**

APPENDIX E

Site Photographs

Photograph 1 – View east across the western portion of stockpile during Site Walkover (21 May 2019).

Photograph 2 – View west across the eastern portion of stockpile during Site Walkover (21 May 2019).

Photograph 3 – View of stockpile surface materials during initial Site Walkover (21 May 2019).

Photograph 4 – View to the east at soil profile of north-western corner of the stockpile (6 May 2020).

Photograph 5 – Up close view of north-western corner of stockpiled soils. Note slag at base (6 May 2020).

Photograph 6 – View to north-west across the surface of the western portion of the stockpile (6 May 2020).

Photograph 7 – View to the east along southern boundary of eastern portion of the stockpile (7 May 2020).

Photograph 8 – View to the west along southern boundary of eastern portion of the stockpile (7 May 2020).

Photograph 9 – View to the south along the western boundary of eastern portion of stockpile (7 May 2020).

Photograph 10 – View to the east along northern boundary of eastern portion of the stockpile (7 May 2020).


Photograph 11 – Test pit TP01 log (6 May 2020).


Photograph 12 – Test pit TP02 log (6 May 2020).

Photograph 13 – Test pit TP03 log (6 May 2020).

Photograph 14 – Test pit TP04 log (6 May 2020).

Photograph 15 –Slag fragments on surface of stockpile adjacent test pit TP04 (6 May 2020).

Photograph 16 – Bulk slag and vesicular slag in FILL 4 materials in test pit TP04 at 1.2m-2.0m (6 May 2020).

Photograph 17 – Test pit TP05 log (6 May 2020).

Photograph 18 – Test pit TP06 log (6 May 2020).

Photograph 19 – Test pit TP07 log (6 May 2020).

Photograph 20 – Test pit TP08 log (6 May 2020).

Photograph 21 – Test pit TP09 log (6 May 2020).

Photograph 22 – Test pit TP10 log (6 May 2020).

Photograph 23 – Test pit TP11 log (6 May 2020).

Photograph 24 – Test pit TP12 log (6 May 2020).

Photograph 25 – Test pit TP13 log (7 May 2020).

Photograph 26 – Test pit TP14 log (7 May 2020).

Photograph 27 – Test pit TP15 log (7 May 2020).

Photograph 28 – View to the west at test pit TP15 location (7 May 2020).


Photograph 29 – Test pit TP16 log (7 May 2020).


Photograph 30 – Test pit TP17 log (7 May 2020).

Photograph 31 – Test pit TP18 log (7 May 2020).

Photograph 32 – Test pit TP19 log (7 May 2020).

Photograph 33 – Test pit TP20 log (7 May 2020).

Photograph 34 – Test pit TP21 log (7 May 2020).

Photograph 35 – Test pit TP22 log (7 May 2020).

Photograph 36 – Test pit TP23 log (7 May 2020).

Photograph 37 – Test pit TP24 log (7 May 2020).

Photograph 38 – Test pit TP25 log (7 May 2020).

Photograph 39 – Test pit TP26 log (7 May 2020).

Photograph 40 – Test pit TP27 log (7 May 2020).

Photograph 41 – Test pit TP28 log (7 May 2020).

Photograph 42 – Test pit TP29 log (7 May 2020).

Photograph 43 – Test pit TP30 log (7 May 2020).

Photograph 44 – Test pit TP31 log (7 May 2020).

Photograph 45 – Test pit TP32 log (7 May 2020).

APPENDIX F

Soil Data Validation

APPENDIX F
Soil Data Validation

An evaluation of the QA/QC requirements of the laboratory testing data for soil samples collected at the site is provided below.

As part of the evaluation of laboratory chemical data, duplicate pair results were compared by determining the relative percentage difference (RPD) between the results. The RPD was calculated using the formula:

$$RPD\ (\%) = \frac{100 \times (X_1 - X_2)}{\bar{X}}$$

where X_1, X_2 = duplicate results and $\bar{X}$ = mean of duplicate results.

According to AS4482.1-2005 and the ASC NEPM:

- typical RPD values for soils range between ±30%; and
- a soil RPD within the range of -30% to 30% is considered to show acceptable agreement and, conversely data outside this range is considered to have poor agreement.

Generally higher RPD values occur for organic compounds than for metals and where low concentrations of an analyte are recorded.

The results of internal laboratory quality control procedures are provided within the laboratory certificates (**Appendix C**). The acceptance criterion for internal laboratory replicates is set at an RPD of -30% to 30%. Laboratory recoveries should be in the range 70% to 130%.

Table F1 below indicates conformance to specific QA/QC requirements for soil laboratory testing data. All field replicate and relevant field blank sample results (e.g. trip blanks and/or rinsate blanks) are presented in the summary tables included in **Appendix B**.

Table F1 - Soil Data Validation

QA / QC Requirement	Compliant?	Comment
Chain of custody documentation completed	✓	All samples were transported under Mud Environmental chain of custody procedures.
Samples delivered to laboratory within sample holding times and with correct preservative	✓	All primary samples were delivered to the laboratories within the sample holding times and in laboratory supplied containers.
All analyses NATA accredited	✓	The primary (ALS) laboratory is NATA accredited for all analyses performed.
Equipment calibration	✓	The photoionisation detector (PID) was calibrated by the rental company prior to fieldworks. A fresh air calibration was undertaken prior to each day of use.
Intra-laboratory replicate testing frequency of at least 5% (minimum 1 in 20)	✓	Six intra-laboratory replicate samples were analysed for a combination of metals, TPH, BTEX, PAHs, OCPs, phenols and PCBs, which complies with the 5% (1 in 20) of primary samples tested recommended in guidance (52 primary samples analysed).
Intra-laboratory replicate sample RPDs within 30%-50% set by AS4482.1-2005	✓	Where RPDs could be calculated, the majority of replicate samples were within 30-50%. Where RPDs exceeded 50%, both the primary and replicate sample concentrations were reported well below the adopted assessment criteria. As such, the RPD results are considered acceptable in accordance with published guidance.
Inter-laboratory replicate testing frequency of at least 5% (minimum 1 in 20)	-	Inter-laboratory replicate sample testing was not undertaken or considered necessary as part of this investigation.
Inter-laboratory replicate sample RPDs within 30%-50% set by AS4482.1-2005	-	Not applicable.
Trip blanks frequency of at least 1 per batch	✓	One trip blank sample (QC1) was collected and submitted for TPH C6-C9 and BTEXN analysis.
Trip blank results below laboratory's LOR	✓	All chemical concentrations in the trip blank sample were reported below the laboratory LOR.

QA / QC Requirement	Compliant?	Comment
Rinsate (equipment) blanks frequency of at least 1 per batch	-	As all soil samples were collected directly from excavated test pit soils using dedicated disposable nitrile gloves for each sample, no rinsate blank samples were collected or considered necessary as part of this investigation.
Equipment Blank results below laboratory's LOR.	-	Not applicable.
Acceptable laboratory QC results	✓	The laboratory internal QC including duplicates, method blanks, laboratory control spikes and matrix spikes were reviewed and are considered acceptable for the purposes of this assessment.

In summary, it is considered that the field and laboratory QA/QC measures implemented provide confidence that the data collected is reliable for the purpose of this assessment.

Attachment 11

Remediation Action Plan

Wallaroo (Harlequin Stone) Quarry

Extractive Minerals Lease 5793 and

Miscellaneous Purposes Licence 109

Remediation Action Plan

February 2023

Prepared for Australasian Granite Pty Ltd

REVISION HISTORY

Version	Prepared By	Notes	Date
1	Terry Menadue, Macro ES	Submitted with Revised Program for Environment Protection and Rehabilitation (PEPR) for EML 5793 and MPL 109.	February 2023

Macro Environmental Solutions (Macro) is an Adelaide based company and the field work for this plan was undertaken near Wallaroo on the Yorke Peninsula of South Australia.

Macro therefore wishes to acknowledge the custodians of the land this work was undertaken on, the Kaurna and Narangga people, and their Elders past, present and emerging. Macro acknowledges and respects their continuing culture and the contribution they make to the life of these regions.

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1 Introduction

This remediation action plan (RAP) relates to management of potentially contaminating materials at the Wallaroo Quarry operating within approvals under the *Mining Act* 1971, Extractive Minerals Lease (EML) 5793 and Miscellaneous Purposes Licence (MPL) 109 administered by the Department for Energy and Mining (DEM).

The property is owned by Shane and Karren Dunstan and the mining tenements are held by Australasian Granite Pty Ltd (AAG).

The Site has historically received copper blast furnace slag and waste soils from the nearby Copper Cove Marina development. These materials are the subject of this RAP.

Following a review of a draft revision to the Program for Environment Protection and Rehabilitation (PEPR) required under the *Mining Act 1971*, the South Australian Environmental Protection Authority (EPA) recommended that a Preliminary Site Investigation (PSI) be undertaken to identify if imported materials have caused contamination at the Site.

AAG engaged, environmental consultants, Greencap to undertake a PSI in 2021. Greencap provided a PSI report which concluded that '*as the slag material presents a potential future risk to groundwater, it is recommended that a* ***Remediation Action Plan*** *is developed prior to the decommissioning of the quarry once the post-quarrying fate of the site is determined in consultation with the current site owner. This is to include a means to remove the contamination pathway that exists between the stockpiled slag material and groundwater that will ultimately migrate to Wallaroo Bay*.'

Following the completion of the PSI report, DEM issued formal correspondence to AAG on 28 May 2021 requiring that a RAP be provided in accordance with the EPA Guidelines for the Assessment and Remediation of Site Contamination 2019 (GAR) with an updated version of the PEPR. The correspondence also highlighted that an assessment into the impacts of potential contamination pathways between copper slag on the Site and nearby Groundwater Dependent Ecosystems (GDEs) had not been provided and that this is required in the PEPR.

1.1 Objectives

The objectives of this RAP are to:

- Summarise the site context, history, and previous investigations,
- Update the EPA GAR environmental values process and pre-remedial conceptual site model (CSM) developed by Greencap to include GDEs,
- Set appropriate species protection trigger values for GDEs based on recognised guidelines,
- Update the risk assessment for groundwater contamination impacts to sensitive receptors,
- Identify options for available remediation strategies to control potential contamination impacts, and
- Document the procedures and standards to be followed to remove the risk of contamination spreading offsite and to ensure the viability of the proposed final land use for the quarry.

Note: This RAP is intended to be provided as an attachment to the 2023 revised PEPR for the Site and is designed to be read as an attachment to the PEPR. Therefore, several references to other attachments and drawings featured within the full PEPR will be made rather than duplicating these attachments and drawings.

1.2 Legislative context

1.2.1 Mining Act 1971

The key legislation for commercial mining operations in South Australia is the *Mining Act 1971* (the Mining Act). DEM are the primary regulating agency for exploration and mining operations conducted under the Act.

In accordance with Section 70B of the Act, operations on mining tenements are required to hold an approved PEPR. Where potential impacts from proposed mining operations are relevant to other environmental legislation, DEM will refer mining programs submitted for approval to external government agencies responsible for the administration of the other legislation.

A revision to the Wallaroo Quarry PEPR was first submitted for approval on 3 June 2019, and subsequent versions submitted on 18 January 2021 and 1 November 2021. DEM provided a request for further information following the second submission requiring that a RAP be included with the revised PEPR that is prepared in accordance with the EPA *Guidelines for the Assessment and Remediation of Site Contamination 2019*.

1.2.2 Environment Protection Act 1993

In additional to the requirements of operating approvals under the Mining Act, mining operations in South Australia are required to comply with the requirements of the *Environment Protection Act 1993* (EP Act), administered by the EPA. A range of environmental policies sit under the EP Act, and this includes the *Environment Protection (Water Quality) Policy 2015* (WQEPP).

The EPA GAR supports the requirements of the WQEPP and the EP Act where it relates to groundwater contamination. The GAR includes information to assist in the identification of potential contamination risks and the preparation of remediation plans to ensure the risks posed to sensitive receptors by contamination are effectively controlled.

The preparation of this RAP will follow the advice provided within the GAR.

1.2.3 National Environment Protection (Assessment of Site Contamination) Measure 1999 (as amended in 2013)

The National Environment Protection (Assessment of Site Contamination) Measure 1999 (ASC NEPM) provides a national risk-based framework for the staged or tiered assessment of site contamination in Australia.

The ASC NEPM framework includes the use of PSIs and CSM development to identify the risks of contamination to both human and environmental receptors. This work was completed in the Greencap 2020 PSI (refer **PEPR Attachment 5**) and will be summarised and updated in **Section 4** and **Section 5** of this RAP.

2 Description of the site and surroundings

2.1 Site location and topography

Wallaroo Quarry is located 1,250 metres from the outskirts of the Wallaroo Township on the upper Yorke Peninsula, approximately 140 kilometres (km) from Adelaide (refer **PEPR Drawing 1**).

Wallaroo Quarry is located on the northern edge of an East-West orientated open valley of low-lying land which extends inland for ~3.5km from Wallaroo Bay and the Spencer Gulf coast which is less than 1.5km away (refer **PEPR Drawing 2**). The low-lying land comprises samphire swamp lands at an elevation of approximately four metres to six metres Australian Height Datum (AHD) and is subject to periodic flooding following rainfall events.

2.2 Description of surrounding environment and land uses.

Wallaroo has an industrial background with evidence of the previous metallurgical processing and port facilities visible around the town.

A variety of land uses are present around the Site. The South Australian Generalised Land Use spatial layer from 2020 is featured in **PEPR Drawing 7** and shows the following:

- Neighbouring properties to the north and east are used for agriculture.
- A rural residential property is located on Jones Road to the west of the Site.
- The full CT 6233/860 area is zoned for mining.
- Areas further south and west are zoned as vacant or reserve.

A review of the Planning and Design Code Conservation Zones on SARIG shows that areas to the South containing the samphire shrubland appear to have been rezoned for conservation (refer **PEPR Attachment 7**).

3 Site history

3.1 Agricultural activities

Historically, the southern side of the property that EML 5793 and MPL 109 is located on (CT6233/860) was covered by the samphire shrubland that is currently present on the southern and western boundaries. It is expected that the northern section of the property not covered by the samphire shrubland was utilised for cropping and/or grazing purposes (refer **PEPR Attachment 5, page 9**).

3.2 Quarrying activities

EML 5793 was approved on 27 March 1992 for the purpose of extracting surface calcrete cap-rock as a source of rubble for local road construction. Following the discovery of the granite resource below the cap-rock, dimension stone mining was introduced to the tenement from 2002 onwards.

MPL 109 was approved on 19 June 2008 for ancillary mining operations (the storage of dimension stone product and waste rock). Ancillary mining operations are based on the western side of MPL 109 in the areas immediately surrounding EML 5793.

The MPL 109 area extends to the eastern boundary of the property, and the entire eastern side of MPL 109 is covered in approximately three to five metres of waste soils sourced from the nearby Copper Cove Marina development. It should be noted that the deposition of the waste soils on the property predated the establishment of MPL 109 and these activities are not associated with mining operations on EML 5793.

3.3 Receipt of industrial residue (copper blast furnace slag) and marina waste soils

3.3.1 Copper blast furnace slag (copper slag)

A review of aerial imagery provided in the Greencap 2020 PSI identified that the copper slag present at the Site was received between 1987 and 1999.

3.3.2 Marina waste soils

A review of aerial imagery provided in the Greencap 2020 PSI identified that the Marina waste soils present at the Site were received between 1999 and 2003.

4 Previous contamination investigations

4.1 Greencap preliminary site investigation (PSI)

A PSI was completed by environmental consultants, Greencap, in 2020 (refer **PEPR Attachment 5**).

The PSI was prepared with reference to the following industry standards and guidelines:

- The National Environment Protection (Assessment of Site Contamination) Measure 1999 (as amended 2013) (ASC NEPM).
- SA EPA publication 'Guidelines for the assessment and remediation of site contamination', July 2018 (as updated October 2019).
- Australian Standard "Guide to the investigation and sampling of potentially contaminated soil": AS4482.1-2005.

The scope of the PSI was as follows:

- A site history, including the identification of potential contaminants of concern associated with current and past uses of the site.
- A limited soil/waste material investigation to provide an indicative assessment of the contamination status of the two known waste materials (specifically in relation to slag and marina spoil).
- Predictive modelling to assess potential risk to the environment associated with the presence of foundry waste.
- Preparation of a PSI report and documentation of findings.

The PSI provided a detailed description of the Site history and the current conditions on the Site following a site inspection conducted on 20 August 2020.

The PSI incorporated an indicative 'soil' investigation which involved the sampling and analysis of the following:

- Sampling at three locations within areas of slag contamination (SLAG 1 to SLAG 3).
- Sampling at three locations within areas of where marina waste soils have been placed (MS1 to MS3).
- Sampling at one location where there was no evidence of the above materials to provide indicative background soil quality conditions (BG1).

The samples were compared to the following assessment criteria that were based on the assumption that the Site would be rehabilitated to an industrial, agricultural or open land use:

- Ecological Investigation Levels (EILs) for commercial / industrial.
- EILs for areas of ecological significance.
- Ecological Screening Levels (ESLs) for commercial / industrial.
- ESLs for areas of ecological significance.
- Health Investigation Levels (HIL D) for commercial / industrial land use.

None of the samples exceeded the health-based assessment criteria.

The EILs were exceeded for SLAG 1 (copper, zinc, and nickel), SLAG 2 (copper and zinc) and SLAG 3 (copper and zinc). The EIL was also exceeded at BG1 for copper and the marina waste soils samples did not exceed the assessment criteria.

To gain further understanding of the chemical stability of the slag material, leachate tests were conducted for all heavy metal results for the SLAG 1 sample. The results from the testing were that when exposed to water with a pH of 7.0, copper would leach at 0.56mg/L, zinc would leach at 0.17mg/L, and both lead and nickel would leach at 0.02mg/L. The other four metals tested (arsenic, cadmium, chromium and mercury would leach at a rate of less than 0.01mg/L.

The PSI included an undertaking of the four-step process outlined in the EPA GAR to determine the environmental value of groundwater within a 2km radius of the Site and the development of a CSM. However, the PSI overlooked the nearby GDEs as a sensitive receptor and applied modelling results against marine receptors located much further away.

The nearby GDEs were therefore not incorporated in the subsequent risk assessment undertaken in accordance with the ASC NEPM. However, the modelling and risk assessment did find that impacts to ecological receptors in the Wallaroo marine environment are not at risk from contamination present at the Site.

The PSI did identify that residents may theoretically use groundwater for future recreational purposes (e.g. filling swimming pools or constructing garden water features). However, due to the high salinity levels of the groundwater it is likely to significantly reduce the life of any pool pumping equipment and will likely cause significant staining to garden water features from salt residue, future recreation purposes has not been considered as a receptor in the PEPR or this RAP.

4.2 Quarry pit water assessment

An assessment into potential groundwater interception within the quarry pit is provided in **Section 2.6** of the PEPR. A 14-metre-deep test hole was drilled in the bottom of the pit floor in November 2022 in an attempt to identity the groundwater table level within the granite fractured-rock aquifer but did not intercept water.

As the test hole did not confirm whether quarrying at the Site had intercepted groundwater, the following indicators were assessed to make a determination on the matter:

- Time series aerial imagery
- Quarry pit floor and groundwater elevation
- Available groundwater wells data
- Water quality sampling

It is concluded that the groundwater has been intercepted at the bottom of the pit.

The basis for the conclusions is as follows:

- Time-series aerial imagery shows that the bottom of the pit appears to permanently hold water,
- Elevation measurements show the bottom of the pit is at or near sea level, and
- Water quality testing shows that the pit water has a salinity well above what would be expected if all the water was surface water.

Furthermore, the water quality sampling confirmed the leachate testing conducted by Greencap. A thin layer of copper slag covers several surfaces within the quarry pit sub-catchment, and may be present below the water level within the quarry base itself. The analysis of the water sample taken from the pit found that the copper levels within the water is 49 µg/L.

4.3 Mud Environmental Soil classification

MUD Environmental undertook a soil classification project on behalf of the Monopoly Property Group to determine if the waste soils on MPL 109 are suitable for use as fill for the Wallaroo Shores redevelopment. The objective of the project was to classify up to 10,000m^3 of waste soils for potential removal from the Site and to make a log of the materials encountered to assess the physical nature of the materials.

A total of 135 representative samples of stockpiled soil materials were collected from 32 individual test pits located on the western side of MPL 109 on 6-7 May 2020. Maps showing the locations of the sampling area are provided in Figure 1 and Figure 2 of the Soil Classification Report (refer **PEPR Attachment 10**).

The assessment confirmed that the majority of waste soils on the Site are suitable for use in rehabilitation and do not represent a contamination source for the Site. The Marina waste soils are therefore not considered a contaminated material and do not require remediation action.

5 Groundwater environmental values and conceptual site model (CSM)

5.1 Updated GAR environmental values process

5.1.1 Step 1. Determination of protected environmental values of groundwater using the WQEPP

Groundwater data available on 'WaterConnect' suggests that the local groundwater is hypersaline with Total Dissolved Solid (TSD) concentrations upwards of 20,000 mg/L. For reference sea water is usually around 35,000 mg/L (Lenntech, 2023).

The outcome for Step 1 in the Greencap PSI remains unchanged as based on salinity levels, the local groundwater holds no environmental value for items listed in Schedule 1, Table 3 of the WQEPP.

5.1.2 Step 2: Assess and identify surface water bodies within 2 km buffer zone

The PSI states that '*The nearest surface water body is the Wallaroo Bay located approximately 1,700 metres to the west of the Site.*' (refer **PEPR Attachment 5, page 26**). However, as shown in PEPR Drawing 5, a range of aquatic and terrestrial GDEs are located on the southern and western side of the Site within a 2km radius.

5.1.3 Step 3: Review registered groundwater users (WaterConnect database)

The following groundwater data was obtained from the WaterConnect database:

- Groundwater well 6430-087 (the Kooagnie Mine Shaft) has a recorded historical reading of a reduced water level of -2.85m AHD. The water is also very saline with Total Dissolved Solids (TDS) of 26,903 mg/L (similar to sea water). It should be noted that this measurement was in 1937 and it is not stated how the measurement was taken and analysed.
- Groundwater well 6430-1248 is located approximately 2.3km east of the Site and has several measurements between 2006 and 2019. The average RSWL from these measurements is 11.71m AHD. The water is also very saline with Total Dissolves Solids (TDS) of 27,940 mg/L (similar to well 6430-087).
- Groundwater well 6430-897 is located just south of the inland marina. The RSWL measured in 2002 (prior to the marina being established) was -0.29m AHD.

While the data shows that local groundwater salinity levels are high, and the sparsity of the groundwater wells in the area highlights the low value of the groundwater for human purposes due to the high salinity.

5.1.4 Step 4: Actual or potential harm to water that is not trivial – application of EPA recognised criteria

As the local groundwater holds no environmental value as drinking water, recreation and aesthetics or for primary industries, the application of recognised criteria for these uses is not considered to be required.

However, as local GDEs are present within 2km of the Site, the application of the default guideline values from the Australian and New Zealand Guidelines for Fresh & Marine Water Quality (Commonwealth of Australia, 2019) are appropriate.

5.2 Updated CSM

5.2.1 Site contamination sources

The Greencap 2020 PSI report identified the following potential contamination sources on the Site (refer **PEPR Attachment 5)**:

- A fine layer of slag present around stockpiles and over a number of trafficable areas
- Several stockpiles were observed along the northern extent of the EML footprint and in the north-eastern corner of the MPL footprint. Stockpiles comprised limestone, slag, large rock pieces and possible fill material.
- Slag material was prevalent across the site and stockpiled in more concentrated locations adjacent the open-cut pit and the north-eastern corner of the MPL footprint.

The location of copper slag within the mining tenements is shown in **PEPR Drawing 9**.

5.2.2 Potentially affected media

The potentially affected media at the Site is as follows:

- Surfaces below copper slag stockpile areas and surface coverage areas.
- Surface water runoff from within the copper slag stockpile areas and surface coverage areas.
- Surface water and groundwater present in the base of the quarry pit.
- Groundwater infiltration below the base of the quarry pit.

5.2.3 Sensitive receptors

As discussed in Section 4.1, the contamination at the Site does not represent a risk to human receptors or agricultural land uses.

Nearby GDEs have been identified as a sensitive receptor that could potentially be impacted by groundwater contamination from copper slag leachate from the Site.

5.2.4 Potential exposure pathways

Leachate testing of copper slag samples taken from the Site and testing of the copper levels within the water present at the quarry base has identified that copper is capable of, and appears to be, leaching out from copper slag present at the Site.

Copper slag is present within the quarry pit sub-catchment, and results from water quality testing suggest copper is leaching out into surface water that is entering the quarry pit and is then mixing with groundwater at the base of the pit.

It has been identified, but not confirmed, that the groundwater intercepted at the base of the quarry pit may have a hydraulic connection with the groundwater that is accessible to the samphire shrublands adjacent to the southern and western boundaries of the Site (GDEs).

5.2.5 CSM flow chart

An updated CSM flow diagram is provided in Figure 1.

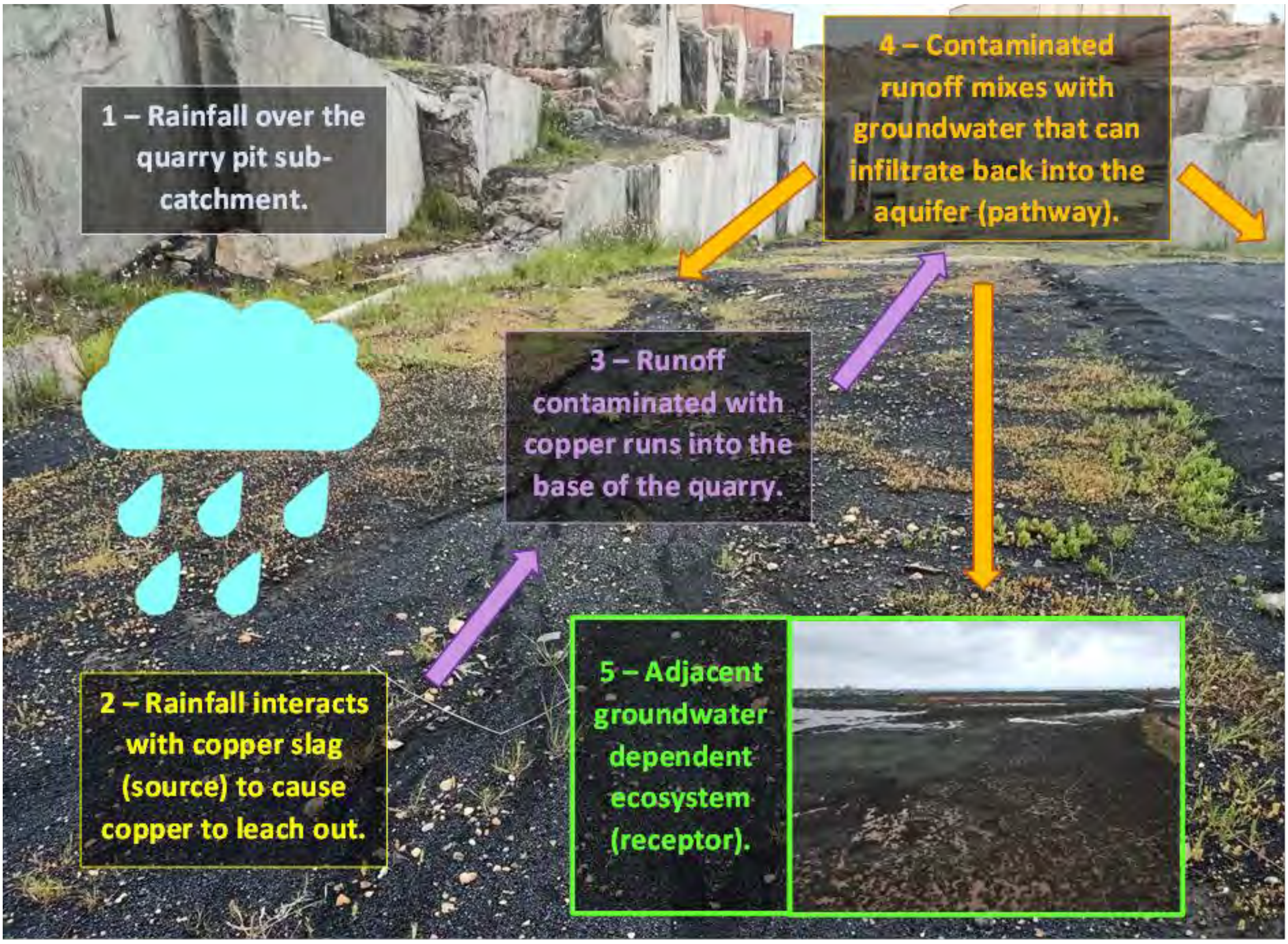


Figure 1 – Conceptual site model flow diagram

5.2.6 Impact event and risk assessment

To align with the wider PEPR development a risk assessment was undertaken using the process described in **Section 5** of the PEPR.

The potential impact event assessed was the impact on nearby GDEs due to groundwater contamination.

A source-pathway-receptor connection was confirmed and prior to the implementation of control strategies, the likelihood of the impacts occurring was determined to be ‘possible’ (it is a possibility and would not be totally unexpected) and the consequence of the impact was determined to be ‘moderate’ (would cause some environmental damage requiring moderate resources and/or time to rectify and/or a moderate level of environmental or social harm). The pre-control risk was assessed as being medium.

5.3 Environmental outcome and measurement criteria

The proposed environmental outcome in the PEPR for Groundwater is that ‘*The tenement holder must ensure there is no adverse impact to groundwater dependent ecosystems or adverse change to the* *environmental values of water within the aquifers inside or outside of the land as a result of mining operations*.'

The measurement criteria in the PEPR applied to measure achievement of the Groundwater outcome aligns with the requirements of the GAR and is as follows:

- Annual compliance reporting demonstrates that the Remediation Action Plan (RAP) has been implemented as proposed, and
- Within 24-months of the completion of the RAP, heavy metal concentrations within the pit water do not exceed the 80% level of species protection trigger value for freshwater in the ANZ water quality guidelines.

The measurement criteria function under the assumption that if the species protection trigger value is achieved within the base of the quarry pit, it will therefore be achieved outside of the Site.

6 Remediation options

6.1 Remediation goals

As a source-pathway-exposure pathway connection has been identified between contamination at the Site and nearby GDEs, remediation is considered to be required.

The goal of the remediation is to achieve the environmental outcome for groundwater. To achieve this, the source-pathway-exposure pathway connection must be reduced, prevented or eliminated. As no control strategies can be applied to either the receptor or exposure pathway, the most effective remediation option is to eliminate the source of the contamination.

6.2 Initial remediation options

6.2.1 Relocate all copper slag to primary stockpile area

As discussed in Section 5.2.1, copper slag is present in a thin layer across sections of the surface area within the quarry pit sub-catchment area where it can interact with rainfall to produce runoff water contaminated with copper.

The only option proposed for initial remediation efforts is to remove as much copper slag from the surface areas within the quarry pit sub-catchment as reasonably possible and relocate the material to the primary copper slag stockpile that does not have a pathway to groundwater.

As the quarry pit is proposed to expand in the future, all copper slag surface coverage, as shown in PEPR Drawing 9, will be removed and relocated to the copper slag primary stockpiling area.

6.3 Long-term remediation options

Two options for long-term remediation of the Site have been identified and are described below.

6.3.1 Remove copper slag from the property (option 1)

Option 1 involves the removal of all copper slag from the primary copper slag stockpile area (refer **PEPR Drawing 9**) to offsite locations. Scenarios in which copper slag could be removed from the Site are as follows:

a) Copper slag is collected from the Site and relocated to a EPA approved processing facility to be recycled for a beneficial reuse (e.g. as an abrasive for grit blasting used for industrial cleaning).

b) Copper slag is processed on the Site (subject to required development consent and EPA approvals) and sold as a product from the property (e.g.as an abrasive for grit blasting or for use as ‘greens’ on local golf courses that do not have enough water to sustain ‘greens’ made of grass.

c) Copper slag is collected from the Site and disposed of at an EPA approved waste facility.

6.3.2 Cap copper slag (option 2)

Copper slag stockpiled in the primary copper slag stockpile area could be used at the base of the rehabilitated landform where backfilling is proposed. An explanatory diagram of this option is provided in **Figure 2**.

It is anticipated that due to the batter above the buried copper slag, low amounts of water will infiltrate into the rehabilitated landform to interact with the copper slag. Furthermore, the copper slag would lay on consolidated granite bedrock which would contain any leachate.

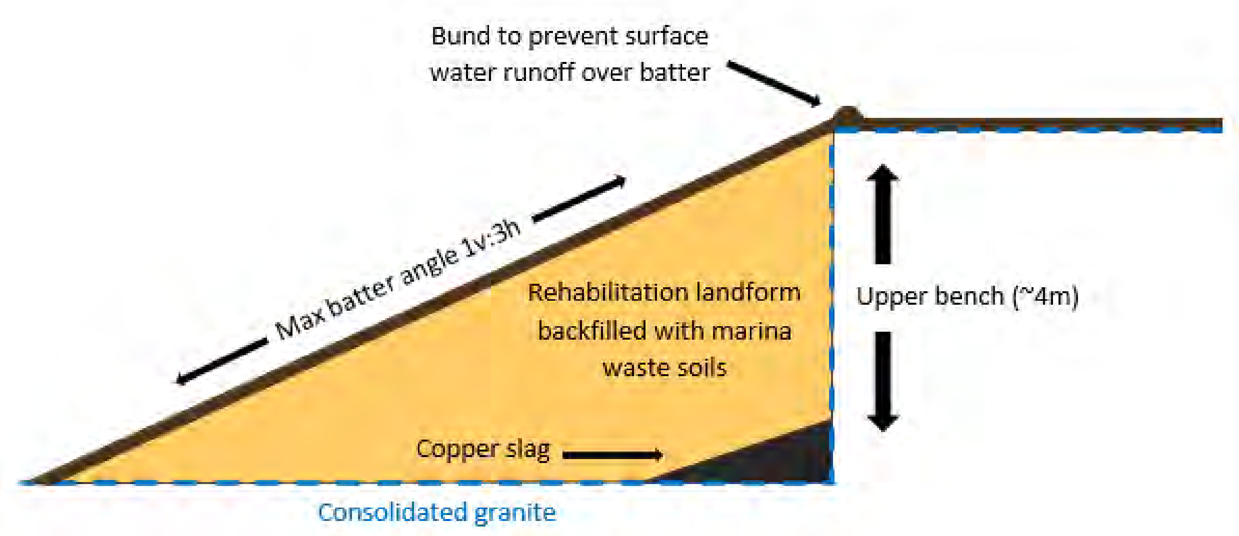


Figure 2 – Conceptual explanatory diagram for copper slag capping onsite

6.3.3 Landowner consultation

The landowner was engaged over the long-term remediation options for the copper slag at the property in November 2022. The landowner advised that his preference would be for the copper slag to be removed from the property.

6.4 Proposed long-term remediation strategy

From the two identified options for long-term remediation, Option 1 was determined to be the preferred choice based on the following considerations:

- In reference to the DEM 'hierarchy of controls' discussed in *Minerals Regulatory Guideline MG2a - Preparation of a mining application for metallic and industrial minerals* (DEM, 2020), removal of the copper slag (source) would be considered 'Elimination' and Option 1 would therefore be on the top tier of the hierarchy. Placement of the copper slag within the mined-out void would be considered a 'design/engineering control' and Option 2 would therefore be on the second tier of the hierarchy.
- Option 1 is the landowners preferred option.
- Option 1 creates an opportunity for the copper slag to be reused for another application rather than being disposed of.

Therefore the below strategy preferences Option 1 but includes Option 2 as a contingency plan should the Option 1 scenarios not be feasibly possible.

The preference for the Option 1 scenarios is a), then b), then c). In reference to the EPA waste management hierarchy (refer **Figure 3**), Scenarios a) and b) would be considered to be 'reuse' which is on the third tier of the hierarchy (the top tier being the most sustainable). Scenario c) would be considered to be 'dispose' and is on the bottom tier of the hierarchy (least sustainable). Scenario a) would then be favoured over Scenario b) to avoid the need to obtain further environmental approvals.

The long-term remediation strategy is as follows:

1) Undertake an investigation into local markets for the raw copper slag. If a local market can be identified, terms of delivery or collection will be negotiated, and the copper slag will be removed from the Site.

   If the investigation fails to identify a market for the raw material, move on to Stage 2 of the strategy.

2) Undertake an investigation into local markets for copper slag that can be sold as a fit-for-purpose product. Once identified, determine what processing methods and equipment are required and apply for the relevant environmental approvals in consultation with the EPA, DEM and the Copper Coast Council. If and when the relevant approvals are obtained, undertaken the processing and arrange delivery or collection with the vendor.

   If the investigation fails to identify a market for the processed material, or environmental approvals cannot be obtained, move on to Stage 3 of the strategy.

3) Undertaken an investigation into local waste facilities that are approved to receive the copper slag. Once identified, arrange for the copper slag to be delivered or collected and the copper slag will be removed from the Site.

   If the investigation fails to identify a local disposal site, move on to Stage 4 of the strategy.

4) Seek endorsement from the EPA and DEM to initiate Option 2 and relocate the copper slag in low mounds along the toe of the upper bench of the Site where it can be capped by approximately four metres of backfill within the rehabilitation landform as shown in **Figure 2**. Should the EPA or DEM refuse to endorse Option 2, a specialised contamination consultant will be engaged to assist in the identification of an alternative long-term remediation strategy.

6.5 Remediation action plan (RAP)

The following RAP outlines the following:

- a table of actions required to implement the remediation options
- methods and locations for each action
- a target implementation schedule
- assignment of tasks.

6.5.1 Stage 1 – Relocation of copper slag from the quarry pit sub-catchment

Stage 1 of the RAP incorporates a clean-up of the areas within the quarry pit sub-catchment area. The RAP for Stage 1 is outlined in **Table 1**.

Table 1 – Stage 1 remediation action plan

Action #	Action	Method and location	Responsibility	Schedule
1	Prepare primary copper slag stockpiling area (SP1)	a) Survey SP1 and plan where additional copper slag will be stockpiled within the area.	Tenement holder to arrange a contractor to undertake the RAP actions.	Within 12 months of the revised PEPR approval.
		b) Check outer bunds to ensure that surface water runoff will all be contained within the area.		
2	Relocate the secondary copper slag stockpile to SP1.	a) Excavate the secondary copper slag stockpile and load into tipper truck.		
		b) Deposit the loaded copper slag to the designated place within SP1.		
3	Relocate copper slag from the base of the quarry pit to SP1.	a) Excavate the copper slag from the base of the quarry pit into a tipper truck.		
		b) Deposit the loaded copper slag to the designated place within SP1.		
4	Relocate copper slag spread over surfaces within the quarry pit surface water catchment to SP1.	a) Mark out the Stage 4 quarry pit boundary (refer **PEPR Drawing 14**).		
		b) Strip the copper slag from the surfaces within the marked out area and load into a tipper truck.		
		c) Deposit the loaded copper slag to the designated place within SP1.		
5	Inspect the marked-out area and relocate any identified copper slag missed during Action 2 – 4.	a) Conduct a visual inspection of: • The secondary copper slag stockpile area, • The base of the quarry pit, and • All surfaces within the Stage 4 quarry pit area, For any traces of copper slag.		Within four weeks of completing Task 1 – 4.
		b) Remove any identified copper slag using the methods discussed in Action 2 – 4.		

6.5.2 Stage 2 – Removal of copper slag from the Site

Stage 2 of the RAP involves three scenarios whereby the copper slag present at the Site will be removed, and one scenario where copper slag will be relocated to the mined-out areas of the Site and capped with backfill material should the first three scenarios not be feasibly possible. The RAP for Stage 2 is outlined in **Table 2**.

Table 2 – Stage 2 remediation action plan

Action #	Action	Method and location	Responsibility	Schedule
1	Undertake an investigation into local markets for raw copper slag.	a) Conduct a desktop search and make a list of companies utilising copper slag products within South Australia.	Tenement holder, or contractor arranged by the tenement holder.	Within 12 months of the revised PEPR approval.
		b) Contact companies from the list to advise of the availability of the raw copper slag and determine if they are interested in being potential vendors for raw or processed fit-for-purpose copper slag.		
		c) If a vendor is successfully identified for the raw copper slag, arrange for the copper slag to be collected or delivered to the vendor.		
		d) If no potential vendors for the raw copper slag were identified, proceed to Action 2.		
2	Undertake an investigation into local markets for processed fit-for-purpose copper slag.	a) If any potential vendors interested in processed, fit-for-purpose copper slag were identified, determine what processing methods and equipment are required and apply for the relevant environmental approvals in consultation with the EPA, DEM and the Copper Coast Council.		
		b) If and when the relevant approvals are obtained, undertaken the processing and prepare product stockpiles in SP1. Environmental management (e.g. dust control) to be undertaken in accordance with Section 5 of the PEPR.		
		c) Arrange for the copper slag to be collected or delivered to the vendor.		

		d) If no potential vendors for the processed, fit-for-purpose copper slag were identified, proceed to Action 3.		
3	Undertaken an investigation into local waste facilities that are approved to receive the copper slag	a) Conduct a desktop search and make a list of Sites approved to receive copper slag within 100km of the Site.		Within 18 months of the revised PEPR approval.
		b) Make contact with Sites and record the price for disposing the copper slag and the distance from the Site.		
		c) Select the most cost efficient location to dispose of the material and arrange for the copper slag to be collected or delivered to the location.		
		d) If no feasible locations were identified, proceed to Action 4.		
4	Relocate the copper slag in low mounds along the toe of the upper bench of the Site where it can be capped by approximately four metres of backfill within the rehabilitation landform	a) Contact DEM and the EPA and update on the RAP status and enquire on the approvals pathway to initiate Stage 4 (remediation option 2).		Within 24 months of the revised PEPR approval.
		b) Undertaken required assessments to obtain regulatory endorsement.		Subject to requirements of the regulatory pathway.
		c) Once endorsement provided, excavate the copper slag from SP1 and deposit in low mounds at the toe of mined-out areas of the upper bench.		Within 12 months of endorsement.
		d) Take soil samples from three locations and at two depths within SP1 to determine if any contamination in the base soils is present from the copper slag stockpiling. If contamination is present above Ecological Investigation Levels (EIL) undertake further sampling to		

		determine the depth of the contamination. Once depth is confirmed, removed contaminated material and relocate to the upper bench toe with the copper slag from the area to be capped.		
		e) Record the location and photograph copper slag (and any contaminated soil) deposited in the pit.		
		f) Backfill over the copper slag as per the PEPR rehabilitation plans.		As per the staged mining and rehabilitation in the PEPR.

6.5.3 Environmental management

Environmental management activities during the undertaking of the RAP will align with the general mining requirements within the Wallaroo Quarry PEPR. This includes consideration of hours of operation, soil and water management, site access, noise, dust, vibration, odour, public safety, flora and fauna, heritage, and social impacts.

Refer to Section 5 of the PEPR for further detail on the environmental performance requirements for all mining related activities on EML 5793 and MPL 109.

6.5.4 Hazardous material management

The copper slag present at the Site was analysed and the contamination was deemed to be below Health Investigation Levels (Greencap, 2020).

The Site Inspection conducted by Greencap (2020) for the PSI did not identify any additional hazardous materials present on the Site.

Therefore, as works proposed in the RAP will not encounter hazardous materials and no hazardous material management is required to implement the RAP.

7 Validation methodology

The following validation methods will be used to report on and assess the effectiveness of the RAP.

7.1 Visual inspection

Visual inspections will be undertaken at the completion of the copper slag relocation works to ensure that all accessible copper slag has been removed from the surfaces within the quarry pit sub-catchment and relocated to the primary copper slag stockpiling area (refer **PEPR Drawing 9**).

7.2 Annual RAP auditing

An audit of the implementation of the RAP will be undertaken annually in accordance with the Wallaroo Quarry Compliance monitoring plan (refer **PEPR Attachment 15**). The monitoring will include water sampling and analysis of heavy metals within the water at the base of the quarry pit.

8 Reporting

The results from visual inspections (refer Section 7.1) and annual RAP auditing (refer Section 7.2) will be discussed in the Wallaroo Quarry Mining Compliance Reports prepared in accordance with Regulation 77 of the *Mining Regulations 2020*.

Where it is observed that the Implementation of the RAP has been unsatisfactory for the reporting period, an incident report will be lodged in accordance with Regulation 79 of the *Mining Regulations 2020*.

9 References

Department for Energy and Mining (2020), *Minerals Regulatory Guideline MG2a - Preparation of a mining application for metallic and industrial minerals,* accessed online 19 February 2023 at this link.

Environment Protection Authority (2019), Guidelines for the assessment and remediation of site contamination, accessed online 19 February 2023 at this link.

Greencap (2021), *Preliminary Site Investigation Report, 72 Wallaroo Plain Road, Wallaroo*, distributed to Australasian Granite on 26 October 2021.

Lenntech (2023), *Composition of seawater*, accessed online 18 February 2023 at this link.

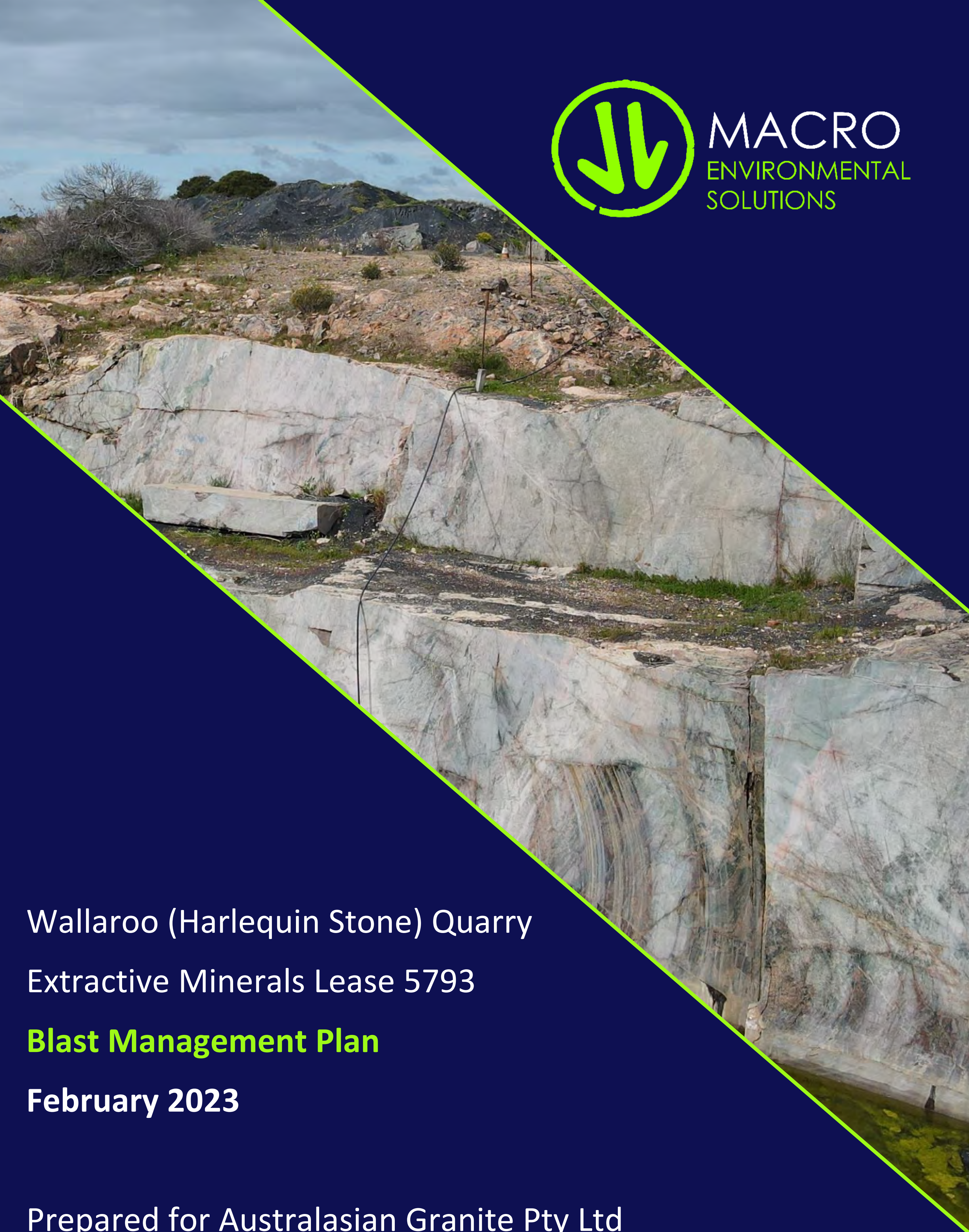
Mud Environmental (2020), *Soil Classification – 72 Wallaroo Plain Road, Wallaroo.* Distributed to Monopoly Property Group on 25 June 2020.

National Environment Protection Council (2013), *Schedule B2 Guideline on Site Charactrisation,* released with the National Environment Protection (Assessment of Site Contamination) Measure 1999, accessed online 18 February 2023 at this link.

National Environment Protection Council (2013), *Schedule B5a Guideline on Ecological Risk Assessment,* released with the National Environment Protection (Assessment of Site Contamination) Measure 1999, accessed online 18 February 2023 at this link.

Attachment 12

Blast Management Plan



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Wallaroo (Harlequin Stone) Quarry

Extractive Minerals Lease 5793

Blast Management Plan

February 2023

Prepared for Australasian Granite Pty Ltd

REVISION HISTORY

Version	Prepared By	Date	Notes
Interim BMP 1	Terry Menadue, Macro ES	23 October 2022	Draft prepared following discussions with Australasian Granite and Lucas Total Contract Solutions (TCS), and consultation with the landholder and Copper Coast Council.
Interim BMP 2	Updates by Ben Davis, Lucas TCS	24 October 2022	Incorporating comments from review.
Interim BMP 3	Terry Menadue, Macro ES	10 November 2022	Incorporating additional comments from Lucas TCS.
BMP V1	Terry Menadue, Macro ES	11 February 2023	Updated BMP for Revised PEPR.

Macro Environmental Solutions (Macro) is an Adelaide based company and the field work for this plan was undertaken near Wallaroo on the Yorke Peninsula of South Australia.

Macro therefore wishes to acknowledge the custodians of the land this work was undertaken on, the Kaurna and Narangga people, and their Elders past, present and emerging. Macro acknowledges and respects their continuing culture and the contribution they make to the life of these regions.

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Contents

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1 Introduction

This blast management plan (BMP) relates to mining operations at Wallaroo Quarry on Extractive Minerals Lease (EML) 5793. Wallaroo Quarry also consist of Miscellaneous Purposes Licence (MPL) 109, but as blasting activities are not permitted on MPL 109, this plan is only relevant to operations on EML 5793.

The purpose of this BMP is to outline planned blasting activities, control and management strategies to achieve the proposed environmental outcomes and measurement criteria for blasting in the Wallaroo Quarry revised Program for Environmental Protection and Rehabilitation (PEPR).

The BMP has been developed in collaboration with Lucas Total Contract Solutions (Lucas TCS) and in consultation with relevant stakeholders.

2 Planned Blasting Activities

2.1 Demand for blasted material

Planned blasting activities will target a layer of fractured granite with a thickness of 4 – 8 metres that sits above the more consolidated layer of granite suitable for dimension stone production.

The blasting will break up the layer into oversized rocks (too large for crushing) that will then be sorted and transported to customer projects such as the nearby T-Ports port expansion project at Wallaroo for use as armour rock. Armour rock in the area are nearly diminished, and access to the rock at Wallaroo Quarry is critical to local projects.

2.2 Blasting in the context of the mining and rehabilitation plans

A revised Program for Environment Protection and Rehabilitation (PEPR) is currently under development for Wallaroo Quarry and is due for submission in March 2023. Provision mining and rehabilitation plans, as well as a Draft Concept Final Pit Design (refer **Drawing 1**) have been prepared and considered in this BMP to ensure all blasting activities are aligned with the overarching mine plans for the Site.

Mining operations for armour rock on EML 5793 are proposed to extend the quarry pit eastwards from the 2022 pit boundary before progressing southwards in Stage 1. The upper bench will then have reached the terminal extent on the western, northern and eastern sides. Armour rock will then continue westwards in Stage 2 creating a neat southern upper bench. Finally, extraction will continue southwards into Stage 3 with the terminal southern upper bench being formed at completion of the armour rock mining (refer **Drawing 2**). The planned blasting activities discussed in this BMP are consistent with the mining plans featured in **PEPR Drawing 11 – 14**.

2.3 Planned blasting location and operations

Blasting operations are proposed in addition to rock breaking and the removal of overburden in the north-eastern section of the quarry. A concept plan is provided in **Drawing 2** to show the proposed mining in three stages. Mining activities will include blasting and rock breaking activities to form a neat upper bench with the lower bench being formed by the dimension stone mining.

Trial blasts have been undertaken in the Stage 1 area following the interim Blast Management Plan prepared in November 2022, which successfully tested safety controls and procedures for armour rock blasting at the Site and begun creating an approximately four metre high upper bench.

The north-east corner of EML 5793 does have some fill cover consisting of overburden and waste rock (granite) that may be suitable as armour rock. This material will be removed from the surface and screened prior to blasting occurring. This may show that some areas within the proposed blasting area have been mined too close to the bench height for blasting to occur and the blasting patterns will be modified accordingly.

At the completion of the blasting, the north-eastern section of the pit will be available for progressive rehabilitation and/or stockpiling of dimension stone product.

3 Blast Management Plan

3.1 Surrounding land use

An overview of the surrounding area is provided in **Drawing 3**.

Public roads are present along the northern boundary of the Site (Chatties Lane) and approximately 150 metres to the west (Wallaroo Plains Road and Jones Road).

Mining tenements EML 6155 and Mineral Lease 6277 are located on the northern side of Chatties Lane approximately 15 metres from the EML 5793 northern boundary. The tenements are currently not operational other than Lucas TCS recently removing some material for the T-Ports project.

The area south of the Site is uninhabited swampland as is much of the area to the west.

The area to the east of the Site is uninhabited farming land.

3.2 Sensitive receptor

The nearest sensitive receptor (residence) is located approximately 605 metres to the west of the proposed final pit extent on Jones Road. The next nearest sensitive receptor (residence) is approximately 1,200 metres north of the proposed final pit extend.

The outskirts of the Wallaroo Township are approximately 1,400 metres from the proposed final pit extent and are not expected to be impacted by the blasting activities.

In terms of blasting management, potentially impacted receptors are considered to be:

- the Jones Road residents (Jones)
- the EML 6155 tenement holder (Paddock)
- local road users (Chatties Lane, Wallaroo Plains Road and Jones Road).

3.3 Consultation

3.3.1 Neighbouring mining tenement holder (and landowner)

Engagement undertaken with neighbouring mining tenement holder on 25 October 2022 by Lucas TCS. The tenement holder did not raise concerns relating to the blasting but would appreciate blast monitoring to be undertaken at their residence.

Blast monitoring was undertaken at the residence during the trial blasting undertaken in late 2022. The vibration and air-blast overpressure were below the threshold to register on the monitoring equipment and no concerns were raised by the neighbouring tenement holder.

3.3.2 Nearest residence (Jones Road)

The landholder / limestone operator engaged with the residents from the neighbouring property on Jones Road on 29 October 2022. No concerns were raised during the consultation providing no damage occurred to their property.

3.3.3 Copper Coast Council

A request for approval to temporarily close the sections of Chatties Lane, Wallaroo Plains Road and Jones Road within the blast exclusion zone (refer **Drawing 3**) was submitted to the Copper Coast Council by Lucas TCS. No blasting will be undertaken until the road closure approval from the Council is obtained and any concerns related to blasting raised will be discussed in the revised PEPR.

3.3.4 Department for Energy and Mining

The interim Blast Management Plan was distributed to DEM for review to demonstrate that blasting activities conducted under ADP 2000/073 are undertaken in accordance with contemporary environmental standards and in consultation with the community.

3.4 Communication Protocol

The following stakeholders will be provided a notification approximately 24-hours prior to the blast being undertaken:

- The neighbouring tenement holders
- The nearest residence (Jones Road)
- The Cooper Coast Council
- The DEM Compliance Team

3.5 Interim Environmental Outcome and Measurement Criteria

The environmental outcome and measurement criteria for Blasting is provided in Table 1.

Table 1 – Blasting environmental outcome and measurement criteria

Environmental outcome	Measurement criteria (outcome achievement)
The tenement holder must ensure that there are no adverse impacts from airblast overpressure, flyrock or vibration to public safety, human comfort, livestock and/or third-party property, caused by blasting on the tenement.	Site records will demonstrate that any blasting related complaints regarding vibration and/or airblast overpressure are acknowledged within 48 hours with the complaint investigated within seven days. Should the complaint be deemed valid, control and management strategies will be reviewed and updated as required and Site records will show the updates were provided to the complainant. Should complaints continue, monitoring will be undertaken near the receptor location to demonstrate that peak sound pressure (overpressure) is less than 115 dB(A) and ground vibration is less than 5 mm/s.

Potential impact	Measurement type and form	Locations	Frequency	Control or baseline data
Vibration and airblast overpressure	Complaint records.	Electronically filed.	Ongoing.	Not applicable.
	Records from vibration and airblast overpressure monitoring.	Nearby the complainant's location as agreed with DEM.	Each blast until three consecutive blasts are below monitoring thresholds.	AS2187. 2-2006
Flyrock	Records from post-blast inspections.	Outside of the EML 5793 boundary.	Following each blast.	Not applicable.

3.6 Control and Management Strategies

Control and management strategies implemented to ensure compliance with the environmental outcome are featured in Table 2.

Table 2 – Blasting control and management strategies

Control and management strategy	Strategy Type
Blasting activities will be undertaken in accordance with the Blast Management Plan (this plan). Trial blasting for armour rock will be undertaken under existing approvals using the control strategies below and any learnings incorporated into the Blast Management Plan.	Planning
All blasting to be undertaken by licenced staff and/or contractors and in accordance with Australian Standard (AS 2187.2).	Mitigation
Small-sized armour rock trial blasting will be undertaken to validate the safety and effectiveness of the blasting methods (completed).	Mitigation
All blasts are to be recorded in Site Records detailing timing, size, number of blast holes, quantity and type of explosives used.	Recording / Reporting
Blasting will be undertaken on weekdays with blasts initiated within normal working hours (8:00am to 5:00pm).	Mitigation
Neighbours will be notified by telephone 24 hours before the scheduled day and time of armour rock or vertical dimension stone blasts.	Mitigation
Dimension stone explosives will be stored in accordance with the Explosives Storage Licence and no ANFO will be stored onsite.	Mitigation
Blast exclusion zones will be established for all armour rock blasts and where relevant, a permit to temporary close Council roads will be obtained from the Copper Coast Council.	Contingency
Blast Monitoring will be undertaken near the nearest resident for initial blasts to ensure vibration and airblast overpressure levels and following complaints as discussed in the measurement criteria.	Recording / Reporting
Efficient effective and safe blasting technology will be used in accordance with AS 2187.2.	Mitigation

3.7 Monitoring

3.7.1 Vibration and airblast overpressure

Monitoring for vibration is best undertaken on concrete or bitumen surface as near as possible to the receptor location. Two proposed monitoring sites have been selected, *Blast Monitoring Point 1 (BMP1)* is located to measure the vibrational and airblast overpressure levels near the Jones Road residence west of the Site. *Blast Monitoring Point 2 (BMP2)* is located at the Wallaroo Plains Road residence north of the Site.

Monitoring will alternate between BMP1 and BMP2 at the discretion of the blasting contractor in discussion with the Tenement Holder.

3.7.2 Flyrock

Observations of flyrock will be made from sentry points looking at the blast location at the time of blasting.

The area along Chatties Lane will fall within the blast exclusion zone and the EML 5793 boundary will be inspected following the blast to determine if any flyrock left the tenement area.

3.8 Reporting

Prior to each blast the checklist provided in **Attachment 1** will be completed by the blasting supervisor. Copies of completed checklists will be maintained in the site records and provided to DEM upon request.

Any non-compliance with the environmental outcome for blasting and associated measurement criteria will be reported to DEM as an incident in accordance with Regulation 79 of the *Mining Regulations 2020*.

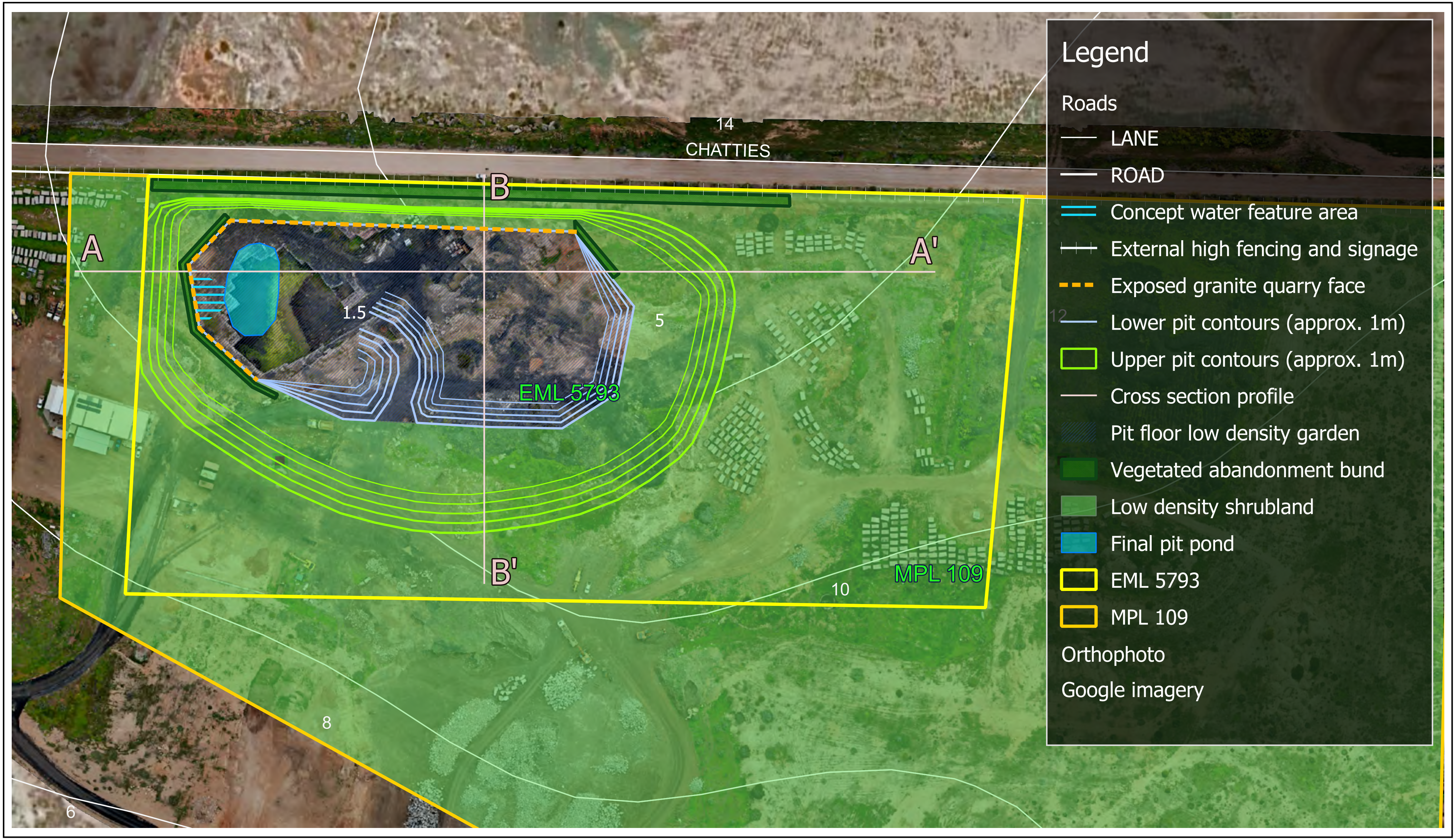
The number of blasts, monitoring results, a summary of the effectiveness of the control strategies and any complaints and/or incidents will be reported in the Mining Compliance Report submitted annually to DEM in accordance with Regulation 77 of the *Mining Regulations 2020.*

4 Drawings

Drawing 1 – Concept final landform map

Drawing 2 – Staged armour rock mining plans

Drawing 3 – Blast Management and Monitoring Map.



Drawing 1 - Concept final landform map

Wallaroo Quarry - EML 5793 & MPL 109

25/01/2023

WGS 84 / UTM zone 53S

0 50 100 150 m

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Drawing 2 – Staged armour rock mining plans

Wallaroo Quarry - EML 5793 & MPL 109

11/02/2023

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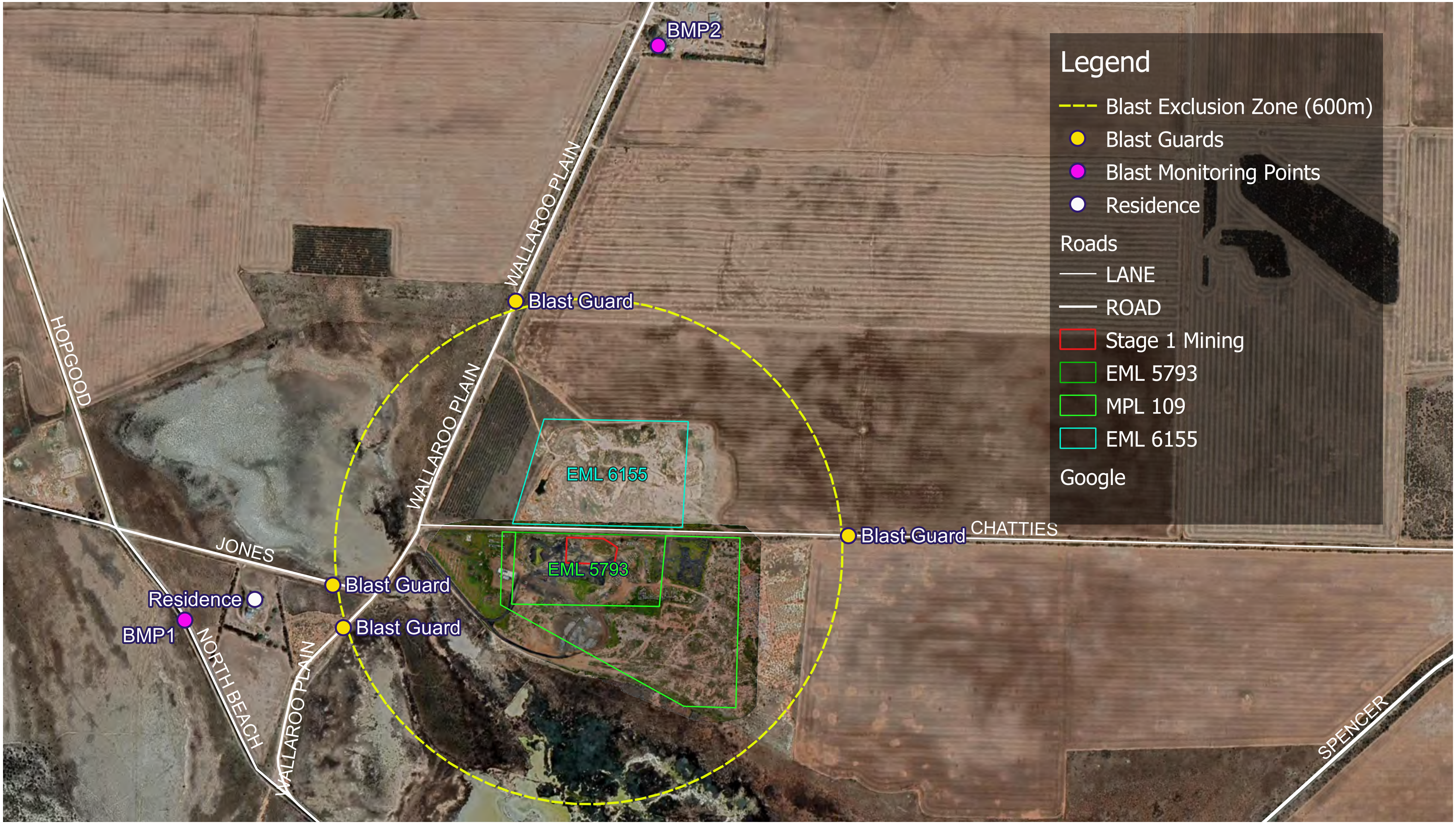

Drawing 3 - Blast Management and Monitoring Map

Wallaroo Quarry - EML 5793

25/10/2022

WGS 84 / UTM zone 53S

0 250 500 750 1,000 m

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Attachment 1

Wallaroo Quarry Blasting Checklist and Monitoring Record

Wallaroo Quarry Armour Rock Blasting Management Checklist

Task	Allocated Person	Status	Comments
Blast planned in accordance with the approved mine plans and blast management plans			
Approval to close public roads obtained from the Copper Coast Council			
EML 6155 tenement holder provided 24-hour blast notification			
Jones Road landholder provided 24-hour blast notification			
600m exclusion zone map prepared			
Blast guards set up on Wallaroo Plain Road and Chatties Lane as required			
Vibration and airblast overpressure monitoring equipment set-up			
EML 6155 and neighbouring properties confirmed vacant			
Sentries in place to monitor exclusion zone			
Post-blast flyrock inspection undertaken along Chatties Lane and EML 5793 perimeter			
Monitoring	**Location**	**Criteria**	**Result / Observations**
Vibration		5mm/s	
Airblast overpressure		115 dB(A)	
Flyrock	Chatties Lane & EML 5793 boundary	No flyrock observed	

Attachment 13

Explosives Magazine Licence 75340

Government of South Australia

SafeWork SA

EXPLOSIVES MAGAZINE

Client No: 1564 **Printed Date:** 01/06/2022

AustralAsian Granite Pty Ltd
T/A AustralAsian Granite Pty Ltd
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DETAILS

SCHEDULE S
(Regulation 11.04 (2))
South Australia
Explosives Act 1936

75340

LICENCE FOR MAGAZINE

A licence is hereby granted to :

AustralAsian Granite Pty Ltd

of Tickera Road,
WALLAROO SA 5556

for a Magazine situated at DP 27804, Allotment 2, Hundred of Wallaroo Old Tikera Road, Wallaroo

(Quantity to be stored not to exceed 2000kg) provided that the said magazine is maintained in accordance with the provisions of the Act and Regulations.

Quantity 1: **1992kg Blasting Explosives**
Quantity 2: **8kg (equivalent to 500 detonators)**
Quantity 3:
Total Qty: **2000kg**

This licence (unless previously revoked) shall expire on the thirty-first day of May 2023.

Special Conditions:
As attached.

Danielle Childs
Delegate of the Director

Form: GL056

Attachment 14

Waste-derived fill management plan

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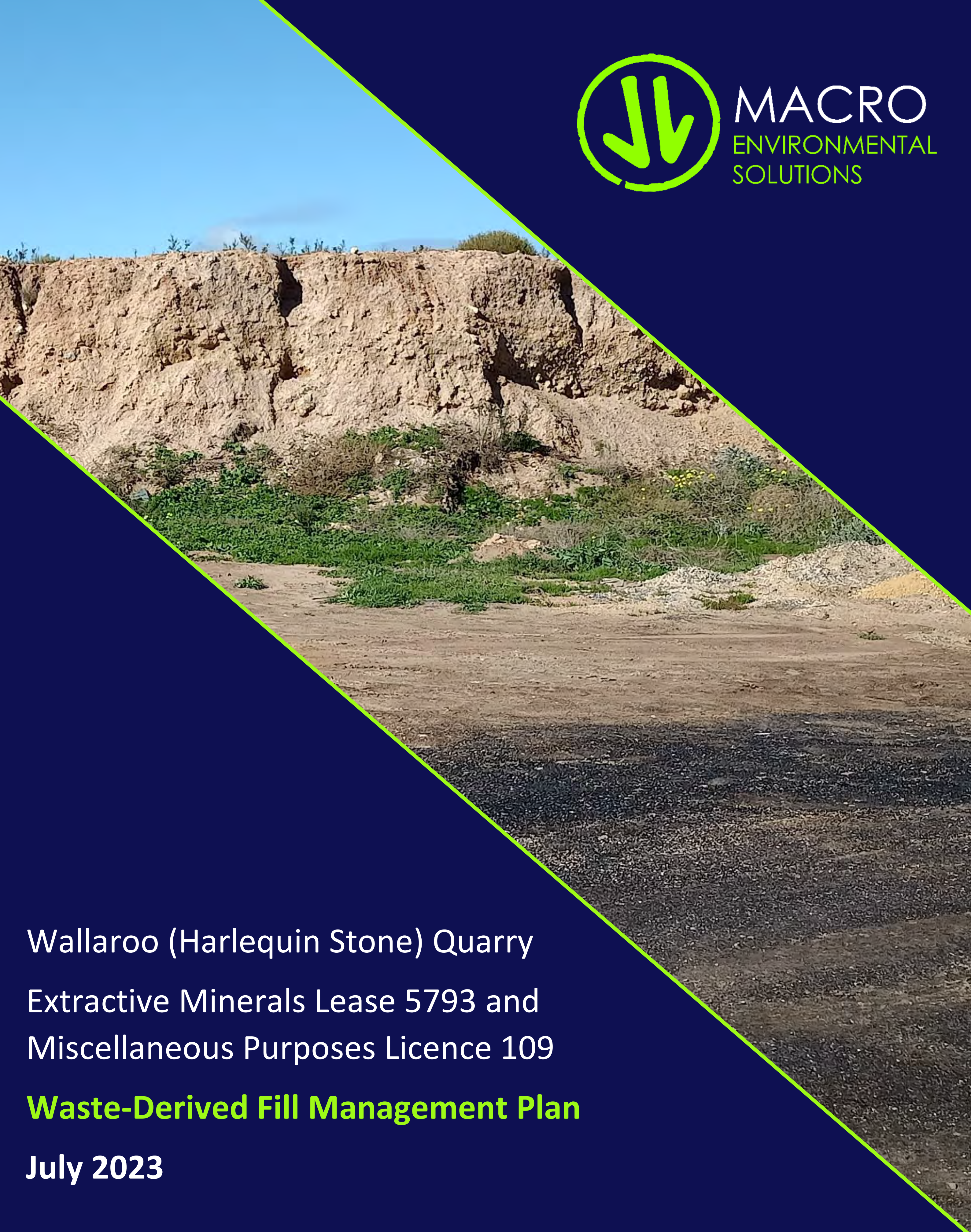

Wallaroo (Harlequin Stone) Quarry

Extractive Minerals Lease 5793 and Miscellaneous Purposes Licence 109

Waste-Derived Fill Management Plan

July 2023

Prepared for Australasian Granite Pty Ltd

REVISION HISTORY

Version	Prepared By	Date	Notes
1.0	Terry Menadue	5 July 2023	Draft prepared in alignment with comments from DEM request for further information following the Wallaroo Quarry PEPR V1 assessment. Issued to DEM for preliminary review.
1.1	Terry Menadue	8 July 2023	Updates to draft based on comments from DEM preliminary review. Final draft prepared for submission of the Program for Environment Protection and Rehabilitation V2.

Macro Environmental Solutions (Macro) is an Adelaide based company and the field work for this plan was undertaken near Wallaroo on the Yorke Peninsula of South Australia.

Macro therefore wishes to acknowledge the custodians of the land this work was undertaken on, the Kaurna and Narungga people, and their Elders past, present and emerging. Macro acknowledges and respects their continuing culture and the contribution they make to the life of these regions.

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Contents

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1 Introduction

This Waste-Derived Fill (WDF) Management Plan (WDFMP) relates to mining operations at Wallaroo Quarry on Extractive Minerals Lease (EML) 5793 and Miscellaneous Purposes Licence (MPL) 109.

The purpose of this WDFMP is to outline planned WDF activities, and control and management strategies, to achieve the proposed environmental outcomes and measurement criteria for WDF in the Wallaroo Quarry revised Program for Environmental Protection and Rehabilitation (PEPR).

The WDFMP has been developed to demonstrate alignment with the South Australia Environment Protection Authority (EPA) '*Standard for the production and use of Waste Derived Fill*' (WDF Standard).

The WDFMP has also been developed in consideration of comments provided by the Department for Energy and Mining (DEM) in a Request for Further Information dated 28 June 2023, following review of Wallaroo Quarry PEPR, version 1.2.

Note: This WDFMP is intended to be provided as an attachment to the 2023 revised PEPR for the Wallaroo Quarry and is designed to be read as an attachment to the PEPR. Therefore, several references to other attachments and drawings featured within the full PEPR will be made rather than duplicating these attachments and drawings.

2 Planned WDF Activities

2.1 Justification for the use of WDF in quarry rehabilitation

An opportunity exists to utilise a surplus of WDF material (waste soils) that was deposited on the same property as EML 5793 and MPL 109 following the excavation of the Copper Cove Marina Development.

It is noted that the receipt of the WDF from the project was not related to the mining operations undertaken on EML 5793 or ancillary operations on MPL 109.

A limited amount of overburden and topsoil has been produced by operations on EML 5793 and use of the available WDF on the property allows for the establishment of gently sloped batters within the concept final landform (PEPR **Drawing 15** and **Drawing 16**) that would otherwise not be achievable.

It is considered that by creating gentler slopes on the rehabilitated batters within the pit, the post-mining land use for these areas (light intensity grazing and amenity) will be enhanced. The enhancement is due to a higher likelihood of vegetation establishment and lower likelihood of erosion.

As the quantity of WDF on the property is unrestricted and is in a quantity that greatly exceeds the quantity proposed for use in the concept final landform, the dependence on WDF to achieve the concept final landform is not considered to be a risk as it would be if the WDF availability was uncertain. This is discussed in more detail in **Section 3.3.1.4.1** of the Wallaroo Quarry PEPR.

2.2 Suitability of the marina waste soils as WDF

An assessment of approximately 32,000m^3 of the waste soils present on the western and central-western section of the WDF deposition area on the property confirmed that the majority of material present met the criteria of the EPA WDF Standard for direct use as waste soils.

The soil classification project identified nine separate soil types that were predominantly sand, or clay composed of minor amounts of other materials such as gravels, shells, boulders up to 500mm, shells and trace slag.

Of the nine different layers defined within the soil classification project, three layers were not deemed suitable as 'waste fill' for a residential development. However, this was due to the presence of larger rocks up to 500mm and trace amounts of copper slag present reducing the aesthetics of the material. This material will therefore be suitable for use in backfilling the pit in accordance with the control and management strategies discussed in **Section 3** of this WDFMP.

This soil classification report is provided as **Attachment 10** of the Wallaroo Quarry PEPR.

Only WDF that is fit-for-purpose for direct use will be utilised in the rehabilitation.

2.3 Imported waste soils

The Wallaroo PEPR seeks to obtain approval to receive waste soils from local developments for direct use in the rehabilitation of the Site.

This will potentially provide a greater quantity of topsoil for the rehabilitation landforms and would also provide a location for the deposition of waste soils from local developments that may otherwise need to go to landfill.

3 WDF Management

3.1 Use of WDF in rehabilitation

The use of WDF in the rehabilitated landform is dependent on the physical characteristics of each load of material. A description of the uses based on the depth below the surface is provided in **Table 1**.

Table 1 – WDF use in rehabilitation summary

Depth below surface	Use of WDF in rehabilitation
0.0m – 1.0m	WDF is limited to waste soil[a]. Waste soil must not be from a site where a Potentially Contaminating Activity (PCA) has occurred and must not contain intermediate waste soils. No rocks greater than 100mm in diameter on the longest axis.
> 1.0m	WDF may include waste soil (as discussed above) and direct reuse construction, and demolition (C&D) waste[b] and industrial residues[c]. No asphalt or bitumen. No C&D waste that requires processing. No industrial residues[c] (other than what is required under a *remediation action plan* for the site). No rocks or particles greater than 500mm in diameter on the longest axis. Where rocks or particles greater than 200mm are used, material to be compacted using heavy machinery to ensure no voids are present in the final landform.

a. Waste soil as described in Section 5.1 of the EPA WDF Standard.
b. C&D waste as described in Section 5.3 of the EPA WDF Standard.
c. Industrial residues as described in Section 5.2 of the EPA WDF Standard.

3.2 Receipt of waste and testing requirements.

3.2.1 WDF present on the property

The majority and potentially all the WDF used in rehabilitation will be sourced from the marina waste soils landform all present on the property.

As this WDF has already been classified (see **Section 2.2** of the WDFMP) no further testing of the material will be required.

Sampling over the WDF present on the site has shown the material is fit-for-purpose and doesn't require further processing.

Operators will instead maintain a log of the WDF material used in rehabilitation that has been sourced from within the property and will conduct a visual assessment of each bucket load of WDF material encountered in accordance with the 'don't take rules' in the WDF operator induction sheet (**Attachment 1** of the WDFMP).

3.2.2 Imported waste soils

The receipt of waste soils from outside of the property will be undertaken in accordance with Table 3 of the EPA WDF Standard (**Attachment 2** of this WDFMP).

All imported WDF from outside of the property will be recorded on the WDF Import Register (**Attachment 3** of this WDFMP).

3.3 Materials flow and stockpile management

WDF material will be reclaimed directly from the marina waste soils deposition area within the property on an as needs basis.

Should an excess of high quality soils for topdressing rehabilitation be encountered than is needed for a particular rehabilitation campaign, the high quality material may be stored within the waste rock storage area (see PEPR **Drawing 10**) in low stockpiles ready for use in future rehabilitation.

Where WDF is imported to the Site, material will be received within the waste rock storage area (see PEPR **Drawing 10**).

Only quantities of WDF will be received at the Site that are realistically required for rehabilitation.

WDF imported to the Site will not be stockpiled for longer than six months prior to use in rehabilitation and the quantity stockpiled will not exceed 500m^3.

3.4 Operator training

All operators involved in the WDF activities will be undergo a WDF induction (see **Attachment 1**) and will be trained to effectively execute this WDFMP.

3.5 Control and Management Strategies

A summary of the control and management strategies is provided in **Table 2**.

Table 2 – WDF control and management strategies

Control and management strategy
The receipt of WDF is undertaken in accordance with the requirements of this WDFMP.
Only low-risk waste soils for direct reuse to be received at the Site and will be fit-for-purpose for use in rehabilitation.
All loads of WDF received at the Site to be visually inspected and loads with signs of contamination (e.g. discoloration and/or odour) or that are not fit-for-purpose are rejected.
WDF is stockpiled in the Waste Rock storage area which has a hard stand.
All WDF received at the Site will be recorded in the WDF Import Register.
No rocks greater than 100mm within 1.0m of the rehabilitation surface and no rocks greater than 200mm within 1.0m of the rehabilitation surface.
No rocks or particles greater than 500mm in any area of the rehabilitation landforms. All fill materials to be placed and compacted in layers.
WDF stockpiles on the Site will not exceed 500m^3 and will be used in rehabilitation within six months of receipt.
Operators involved in WDF activities at the Site are inducted on the requirements of this WDFMP.

3.6 Records management and reporting

The following records will be prepared and maintained on the operators electronic filing system:

- A log of the amount of pre-existing WDF material from the property used in rehabilitation.
- Completed operator induction sheets
- A register of all WDF material imported to the Site.

A summary of WDF activities and the WDF import register will be provided in the Annual Compliance Reports for the Site.

Any failure to comply with the environmental outcome and measurement criteria featured in the Wallaroo Quarry PEPR for WDF will be reported in accordance with Regulation 79 of the *Mining Regulation 2020*.

Attachment 1

WDF operator induction sheet

Wallaroo Quarry WDF operator induction sheet

Inductee name	
Inductor name	
Date	

Induction requirement	**Inductee Initial**
The inductee has been trained on the ‘don’t take’ rules.	
The inductee has been provided with an escorted visit to the marina waste soil reclamation area.	
The inductee has been provided with an escorted visit to the rehabilitation areas.	
The inductee has been provided with an escorted visit to the waste rock storage area.	
The inductee has been trained on, and understands the requirements of, the WDF Management Plan.	

Don’t take rules
Don’t take means don’t take from the marina waste soils deposition area to the rehabilitation area.
Don’t receive means don’t receive any WDF material transported to the Site.
Don’t take or receive any WDF material that has a chemical odour.
Don’t take or receive any WDF material that has discolouration that may be caused by a contaminant.
Don’t take or receive any WDF material that has more than trace levels (<1%) of contaminants such as plastics or woody debris.
Don’t take or receive any WDF material that has rocks or particles greater than 500mm in diameter on the longest axis.
Don’t take or receive any WDF material that has asphalt or bitumen.
Don’t receive any WDF material without a consultant’s report if required by the WDF Standard.

Attachment 2

Summary of requirements for waste soil being used as WDF

Table 3 Summary of requirements for waste soil being used as WDF

	General Obligations—sites where no PCA has occurred or is occurring[1]			~~Specific EPA Requirements—sites where a PCA has or is occurring~~	
Obligations and Requirements	**Single source domestic premises, or <100 tonnes from other non-PCA site**	**>100 tonnes from non-PCA site**		~~**Site with PCA**~~	
General environmental duty[2]	☑	☑		☑	
Maintain records[3]	☑	☑		☑[4]	
Sampling and assessment[5]	☒	☑[6] (Waste fill chemical criteria plus other analytes as relevant)		☑ (~~Waste fill chemical criteria plus other analytes as relevant)~~[7]	
Requirements based on sampling results	**N/A**	**Up to maximum waste fill quality**	~~**Up to maximum Intermediate Waste Soil chemical quality**~~	~~**Up to maximum waste fill quality**~~	~~**Up to maximum Intermediate Waste Soil chemical quality**~~
Documentation required[8]	☒	☑ Consultant report[9]	☑ ~~Auditor Protocol~~[10]	☑ ~~Consultant report~~	☑ ~~Auditor Protocol~~[10]
Submission of information and approval required[11]	☒	☒	☑	☒	☑
Restriction on destination (Non-sensitive use only)	☒	☒[9]	☑	☑[12]	☑
Receiving fill material is a PCA[13]	☒	☒	☒	☑	☑
EPA to indicate existence of report[14]	☒	☒	☑	☒	☑
Vendor to indicate existence of report[15]	☒	☑	☑	☑	☑

Note: No material from a PCA site and no intermediate waste soil is to be used in the rehabilitation.

Attachment 3

Wallaroo quarry waste-derived fill import register

Wallaroo quarry waste-derived fill import register

Date	Delivery from	Received by	Source location	Quantity (tonnes)	Material description	Contamination and prohibited waste check[1]	Consultant report provided (>100t) [2]

[1] Refer to **Table 1** of the EPA Standard for the production and use of Waste Derived Fill
[2] Refer to **Table 3** of the EPA Standard for the production and use of Waste Derived Fill

Attachment 15

Compliance summary and monitoring plan

WALLAROO QUARRY COMPLIANCE SUMMARY AND MONITORING PLAN

Compliance summary for the operational phase

Environmental element	Outcome	Measurement criteria (outcome achievement)	Measurement type and form	Locations	Frequency	Control or baseline data
Air quality	The Tenement Holder must ensure there are no public nuisance impacts from dust generated by mining operations.	Site records will demonstrate that any air quality related complaints are acknowledged within 48 hours and investigated within seven days. Should the complaint be deemed valid, control and management strategies will be reviewed and updated as required and Site records will show the updates were provided to the complainant. Should complaints continue, air quality monitoring is to occur at locations, and using methods, as agreed with the regulating agency, to demonstrate: • That mining operations do not cause dust deposition (ash content) to exceed $4g/m^2$/month (rolling annual average), when monitored in accordance with Australian Standard AS 3580.10.1 Methods for sampling and analysis of ambient air – Determination of particulates – Deposited matter – Gravimetric method.	Complaint records.	Electronically filed.	Ongoing.	Not applicable.
			Dust deposition monitoring.	As agreed with the regulating agency.	Monthly sampling (+/- 2 days)	Background dust deposition levels.

Environmental element	Outcome	Measurement criteria (outcome achievement)	Measurement type and form	Locations	Frequency	Control or baseline data
Blasting	The tenement holder must ensure that there are no adverse impacts from airblast overpressure, flyrock or vibration to public safety, human comfort, livestock and/or third-party property, caused by blasting on the tenement.	Site records will demonstrate that any blasting related complaints regarding vibration and/or airblast overpressure are acknowledged within 48 hours with the complaint investigated within seven days. Should the complaint be deemed valid, control and management strategies will be reviewed and updated as required and Site records will show the updates were provided to the complainant. Should complaints continue, monitoring will be undertaken near the receptor location to demonstrate that peak sound pressure (overpressure) is less than 115 dB(A) and ground vibration is less than 5 mm/s.	Complaint records.	Electronically filed.	Ongoing.	Not applicable.
			Records from vibration and airblast overpressure monitoring.	Nearby the complainant's location as agreed with DEM.	Each blast until three consecutive blasts are below monitoring thresholds.	AS2187. 2-2006.
		No evidence of flyrock observed outside of the EML 5793 or MPL 109 area during post-blasting inspections.	Records from post-blast inspections.	Outside of the EML 5793 boundary.	Following each blast.	Not applicable.
Fire	The tenement holder must, during construction and operation, ensure there are no public injuries and or deaths, no adverse impacts to adjacent land use and no	An investigation by a suitably qualified person into a fire that starts on the tenements that result in public injuries and or deaths, adverse impacts to adjacent land use, or unauthorised damage to public or third-party private property and infrastructure demonstrates that	All fires ignited within the tenement boundaries are recorded. Any fire that ignited within the tenement boundaries that spreads outside the tenement	Fire location and surrounds.	Following a fire. An investigation report to be provide to the	Not applicable.

Environmental element	Outcome	Measurement criteria (outcome achievement)	Measurement type and form	Locations	Frequency	Control or baseline data
	unauthorised damage to public or third-party private property and infrastructure as a result of fires caused by mining operations that could have been reasonably prevented.	the tenement holder could not have reasonably prevented the incident from occurring.	boundary with be notifiable as an incident and will be investigated by a suitably qualified person to determine if the fire could have been reasonably prevented by the tenement holder.		Regulator within 30 days of the incident (unless otherwise agreed with the Regulator).	
Groundwater	The tenement holder must ensure there is no adverse impact to groundwater dependent ecosystems or adverse change to the environmental values of water within the aquifers inside or outside of the land as a result of mining operations.	Annual compliance reporting demonstrates that the Remediation Action Plan (RAP) has been implemented as proposed. Within 24-months of the completion of the RAP, heavy metal concentrations within the pit water do not exceed the 80% level of species protection trigger value for freshwater in the ANZ water quality guidelines.	Annual compliance reports demonstrate that the RAP has been implemented as planned.	EML 5793, MPL 109	Annually	Not applicable.
			Annual water quality monitoring	EML 5793 pit floor (refer Drawing 17).	Annually, and prior to surrender application.	PEPR Table 1, Section 2.6.3.4
Heritage	The tenement holder must, during construction and operation, ensure there is no damage, disturbance or interference to Aboriginal and non-Aboriginal heritage sites, objects or remains as a result of mining operations unless it is	Site records demonstrate that work ceased immediately following identification of a potential cultural heritage Sites or objects and that the Aboriginal Affairs and Reconciliation Division (and/or other relevant authority) and Regulator were notified within 24 hours.	Records of actions and communications following the discovery of a cultural heritage Site / Object.	Electronically filed.	Following discovery.	Not applicable.

Environmental element	Outcome	Measurement criteria (outcome achievement)	Measurement type and form	Locations	Frequency	Control or baseline data
	authorised under the relevant legislation.	Site records show that works in the vicinity of the discovery did not recommence until agreed with the appropriate authorities.				
Land use and third-party property	The tenement holder must, during construction and operation, ensure there are no adverse impacts to third–party land use or property on or off the land as a result of mining operations other than those agreed between the tenement holder and the affected user or determined by an appropriate court.	Annual inspections of the Site will confirm that mining operations have not caused damage to third-party land uses or property. An investigation by a suitably qualified person into a complaint relating to impacts from mining on third-party land use and/or property demonstrates that the tenement holder could not have reasonably prevented the impacts from occurring.	Records from annual inspections and post-complaint investigation reports	EML 5793, MPL 109, surrounding areas.	Annual and following a complaint.	Not applicable.
Noise	The tenement holder must, during construction and operation, ensure no public nuisance impacts from noise as a result of mining operations.	Site records will demonstrate that any noise related complaints are acknowledged within 48 hours and investigated within seven days. Should the complaint be deemed valid, control and management strategies will be reviewed and updated as required and Site records will show the updates were provided to the complainant. Should complaints continue, monitoring will be undertaken near the receptor location to demonstrate that noise levels do not exceed the Indicative Noise Levels described in the EPA Noise Policy (LAeq < 57dB(A)).	Site complaint records on the complaint register	Outside of the EML 5793 boundary.	Following a complaint.	Not applicable.
			Noise monitoring (for LAeq) in accordance with the EPA Noise Policy	At or near the complainant location.	15-minute period when Site is operation and not upwind.	EPA Noise Policy indicative noise levels, currently 57dB(A).

Environmental element	Outcome	Measurement criteria (outcome achievement)	Measurement type and form	Locations	Frequency	Control or baseline data
Public safety	The tenement holder must, during construction and operation, ensure that unauthorised entry to the land does not result in public injuries and or deaths that could have been reasonably prevented.	Site records will demonstrate all public injuries and/or deaths resulting from unauthorised access to the tenement are recorded and an investigation by a suitably qualified independent third party is completed within 30 days (or other time as agreed with the Regulator). The results of the investigation demonstrate the tenement holder could not have been reasonably prevented.	Records from incident register.	EML 5793, MPL 109	Following an incident.	Not applicable.
Surface water	The tenement holder must ensure that no surface water contaminated as a result of mining operations leaves the land.	Site records will demonstrate that inspections of the disturbed area boundary and primary copper slag stockpiling area are undertaken annually and following exceptional rainfall events (50mm in 48 hours as measured at Wallaroo BoM Station 22020) and any observed areas of erosion and/or potential sediment runoff from the Site are remediated within 30 days.	Records from erosion and sediment runoff inspections (and remedial actions as required).	Periphery of the disturbed area on the Site and primary slag stockpiling area.	Annually and following exceptional rainfall events.	Previous inspection, PEPR Drawing 6 and Drawing 6a.
Traffic	The tenement holder must, during construction and operation, ensure there are no traffic accidents involving members of the public and mining related traffic that could have been reasonably prevented by the tenement holder.	Site records will demonstrate that annual monitoring of the Site Access Point is undertaken and that any safety issues observed are addressed within 30 days.	Site records of annual inspections.	Site access point and section of the road within 50m.	Annually.	Previous annual compliance reports.
		Site records demonstrate that all traffic accidents or involving the public and mining related traffic are recorded. An investigation of each incident is undertaken by a suitably qualified and independent third-party within 14 days (or other time as agreed	Site records (incident register) and investigation reports.	Site access point and section of the	Within 14 days of a traffic incident.	Not applicable.

Environmental element	Outcome	Measurement criteria (outcome achievement)	Measurement type and form	Locations	Frequency	Control or baseline data
		with the Regulator) and demonstrates the Tenement Holder could not have reasonably prevented the accident from occurring.		road within 50m.		
Visual amenity	The tenement holder must ensure the form, contrasting aspects and reflective aspects of mining operations are visually softened to blend in with the surrounding landscape.	Site records will demonstrate that a visual assessment and photo-point monitoring from Jones Road and North Beach Road is undertaken annually to ensure visual amenity impacts are as low as reasonably practicable and any offensive visible aspects of the mining operations are addressed within 30 days (or other period as approved by the lead regulating agency).	Records from annual inspections and photo-point monitoring (and remedial actions as required).	Jones Road and North Beach Road (refer PEPR Drawing 17).	Annually.	Previous compliance reports.
Waste-derived fill	The tenement holder must ensure no adverse impacts to the environment from waste-derived fill brought onto the land as a result of mining operations unless otherwise authorised through the relevant legislation.	Site records will demonstrate that: • all WDF received at the Site are registered and consultant soil quality reports have been provided (if required) prior to or at the time of delivery to the Site. • all WDF activities at the Site have been conducted in accordance with the EPA WDF Standard no more than 5,000m^3 of WDF is stockpiled at the Site.	Site records (WDF register and consultant soil quality reports).	EML 5793, MPL 109.	Ongoing.	Waste soil quality criteria within the EPA WDF Standard.
			Site records of annual visual inspections of WDF stockpiles (surveying will be undertaken if stockpiles estimated to be greater than 4,000m^3.	EML 5793, MPL 109.	Annually.	Stockpile volume < 5,000m^3.
	The tenement holder must ensure no adverse impacts		Site records (evidence of appropriate waste disposal).	EML 5793, MPL 109.	Ongoing.	Not applicable.

Environmental element	Outcome	Measurement criteria (outcome achievement)	Measurement type and form	Locations	Frequency	Control or baseline data
Waste disposal	to the environment from commercial or industrial waste, not including tailings and waste rock, produced as a result of mining operations.	Site records will demonstrate that all waste has been stored and disposed of in accordance with EPA standards and guidelines. Annual compliance reporting demonstrates that the Remediation Action Plan (RAP) has been implemented as proposed.	Annual compliance reports demonstrate that the RAP has been implemented as planned.	EML 5793, MPL 109	Annually	Remediation Action Plan (PEPR Attachment 11).
Weeds, pests and plant pathogens	The tenement holder must, during construction and operation, ensure no introduction of new species of environmental weed, plant pathogens or pests (including feral animals), nor sustained increase in abundance of existing weed or pest species on the land.	Site records will demonstrate that annual inspections are undertaken for new weeds, plant pathogens or pests (including feral animals) and for evidence of increased abundance of existing weeds, plant pathogens and/or pests (including feral animals) and any positive observations were managed in a timely fashion and in accordance with available advice from the Northern and Yorke Landscape Board (NYLB).	Annual inspections for weeds and plant pathogens and records of follow-up management actions as required.	EML 5793, MPL 109.	Annual inspections and follow-up actions undertaken in the appropriate season as advised by the NYLB.	Previous annual compliance report.
			Annual inspections for pest fauna and records of follow-up management actions as required.	EML 5793, MPL 109.	Annual inspections and follow-up actions undertaken in the appropriate season as advised by the NYLB.	Previous annual compliance report.

Compliance summary for closure

Environmental element	Outcome	Measurement criteria (outcome achievement)	Measurement type and form	Locations	Frequency	Control or baseline data
Land use and third-party property	The tenement holder must ensure the land is progressively and finally rehabilitated to support the future land use agreed by the Director of Mines or another authorised officer.	Annual inspections will confirm that progressively rehabilitated areas are: • free from major erosion and scouring, • do not show visible signs of instability, • establishing a vegetation cover of native species, and • conforming to the local topography and drainage system. An inspection of the final landform by a suitably qualified third-party will confirm that the final landform will successfully support the proposed final land use.	Records from annual inspections of the rehabilitated areas for erosion, signs of instability and vegetation establishment	Rehabilitated areas on EML 5793, MPL 109.	Annually and prior to surrender.	PEPR Drawing 15 and Drawing 16.
Public safety	The tenement holder must demonstrate that post completion, the risks to the health and safety of the public so far as they may be affected by mining operations, are as low as reasonably practicable.	A review of the final landform and public safety control strategies present at closure by a suitably qualified person will confirm that the final landform is constructed consistently with the proposed final landform, geotechnically stable and safe to the public as far as reasonably practicable.	Progressive rehabilitation landform slope angles and safety features reported in annual compliance reports.	EML 5793, MPL 109	Annually.	PEPR Drawing 15 and Drawing 16.

Environmental element	Outcome	Measurement criteria (outcome achievement)	Measurement type and form	Locations	Frequency	Control or baseline data
Visual amenity	The tenement holder must ensure all rehabilitated landforms integrate and harmonise with the surrounding landscape.	Visual assessment of the Site and surrounds undertaken by a suitably qualified person at closure confirms that the final landform integrates and harmonises with the surrounding landscape and is consistent with the proposed final landform.	Report from visual assessment of the final landform.	Areas outside of the Site where line of sight exists into the Site.	Prior to closure.	PEPR Drawing 15 and Drawing 16.
Waste disposal	The tenement holder must ensure that no mining related wastes are present on the land at the completion of mining activities.	An inspection by a suitably qualified person (third-party) will confirm that all mining related waste has been removed from the final rehabilitated landform.	Report from inspection of the whole final landform area.	EML 5793, MPL 109.	Prior to closure.	Not applicable.

Compliance monitoring plan

Trigger	Outcome	Monitoring method	Measurement criteria	Location	Reporting
Event – Continuing dust complaint.	Air quality.	Dust deposition monitoring in accordance with AS 3580.10.1. Samples taken monthly (30 days +/- 2-days) for a period as agreed with the Regulator.	Dust deposition (ash content) does not exceed 4g/m2/month (rolling average).	Representative of complainant location (refer local dwelling location in PEPR Drawing 8).	Data provided in annual reports. Final report provided at the end of monitoring campaign. Exceedances of criteria reported as an incident in accordance with Regulation 79 of the *Mining Regulations 2020*.
Event – blasting.	Blasting	Vibration using a calibrated monitoring unit.	Vibration < 5mm/second.	Near receptor locations (refer PEPR Drawing 17).	Annual compliance report. Exceedances of criteria reported as an incident in accordance with Regulation 79 of the *Mining Regulations 2020*.
		Airblast overpressure using a calibrated monitoring unit.	Peak particle velocity < 115dB(A).		
		Visual inspection for flyrock	No evidence of flyrock observed outside of the EML 5793 or MPL 109 area.	Chatties Lane, MPL 109 western boundary, MPL 109 southern boundary (refer PEPR Drawing 17).	
Event – fire.	Fire.	Investigation by a suitably qualified person into the source of the fire, damage caused by the fire and the controls implemented by the tenement holder to prevent and contain the fire.	Tenement Holder could not have been reasonably prevented the fire.	Fire ignition location on EML 5793 or MPL 109 and surrounding areas.	Investigation report provided to the lead regulating agency within 30 days of the incident. Annual compliance report.

Trigger	Outcome	Monitoring method	Measurement criteria	Location	Reporting
Annual monitoring.	Groundwater.	Review of the implementation of the Site Remediation Action Plan (RAP) (refer PEPR Attachment 11).	Tenement Holder implemented the RAP as planned.	EML 5793 and MPL 109 areas discussed in the RAP.	Annual compliance report. Where it is observed that the measurement criteria have not been achieved, an incident in accordance with Regulation 79 of the *Mining Regulations 2020*.
		3 x water samples collected from the pool of water on the pit floor (if present) and combined to make one sample for testing for heavy metal concentrations at a	Within 24-months of the completing the RAP, heavy metal concentrations do not exceed the 80% level of species protection trigger value for freshwater in the ANZ water quality guidelines.	EML 5793 pit floor (refer PEPR Drawing 17).	Annual compliance report. Exceedances of criteria reported as an incident in accordance with Regulation 79 of the *Mining Regulations 2020*.
Event – heritage discovery	Heritage.	Review of actions and communications following the discovery of a cultural heritage Site / Object.	Tenement Holder ceased works immediately following the discovery. Tenement Holder notified appropriate authorities within 24 hours. Tenement holder did not recommence until agreed with the appropriate authorities.	Investigation on EML 5793 and MPL 109. Electronic records.	Annual compliance report. Where it is observed that the measurement criteria have not been achieved, an incident in accordance with Regulation 79 of the *Mining Regulations 2020*.
Annual monitoring.	Land use and third-party property.	Visual inspections of local infrastructure and the EML 5793 and MPL 109 boundaries for evidence of third-party impacts.	Tenement holder is taking reasonable measures to prevent land use and third-party property impacts.	Local infrastructure locations (refer PEPR drawing 8) and EML 5793 and MPL 109 boundary.	Annual compliance report. Where it is observed that the measurement criteria have not been achieved, an incident in accordance with Regulation 79 of the *Mining Regulations 2020*.

Trigger	Outcome	Monitoring method	Measurement criteria	Location	Reporting
		Visual inspections of rehabilitated areas for erosion, instability, and vegetation establishment.	No major erosion and scouring. No visible signs of instability. Sustained vegetation cover of native species establishment. Conforming to the local topography and drainage system.	Rehabilitated areas on EML 5793, MPL 109.	Annual compliance report. Where it is observed that the measurement criteria have not been achieved, an incident in accordance with Regulation 79 of the *Mining Regulations 2020*.
Event – Land use and third-party property complaint.	Land use and third-party property.	An investigation into a land use and third-party property complaint undertaken by a suitably qualified person.	The tenement holder could not have reasonably prevented the impacts from occurring.	EML 5793, MPL 109 and relevant land use and third-party property locations.	Investigation report provided to the lead regulating agency within 30 days of the complaint. Annual compliance report.
Event – Continuing noise complaint.	Noise.	Noise monitoring in accordance with the EPA Noise Policy and guidelines.	Noise levels less than 57dB(A) (LAeq) in consideration of extraneous background noises when measured over a 15 minute period.	Representative of complainant location (refer local dwelling location in PEPR **Drawing 8**).	Data provided in annual reports. Noise monitoring report. Exceedances of criteria reported as an incident in accordance with Regulation 79 of the *Mining Regulations 2020*.
Event – Public safety incident (injury or death).	Public safety.	An investigation into a public safety incident undertaken by a suitably qualified independent third-party.	The tenement holder could not have reasonably prevented the incident from occurring.	EML 5793, MPL 109 and relevant public safety incident locations.	Investigation report provided to the lead regulating agency within 30 days of the incident. Annual compliance report.
Annual monitoring.	Public safety.	Visual inspections of rehabilitated landform slope angles and safety features.	Rehabilitated landform is constructed consistently with the proposed final landform, geotechnically stable and safe to the public as far as reasonably practicable.	Rehabilitated areas on EML 5793, MPL 109.	Annual compliance report. Where it is observed that the measurement criteria have not been achieved, an incident in accordance with Regulation 79 of the *Mining Regulations 2020*.

Trigger	Outcome	Monitoring method	Measurement criteria	Location	Reporting
Event – rainfall exceeds 50mm within 48 hours.	Surface water.	Visual inspection for surface water erosion or potential sediment runoff.	Any observed areas where sediment laden runoff is leaving the disturbed areas are remediated within 30 days.	Periphery of the disturbed areas within EML 5793 and MPL 109 and primary slag stockpiling area (refer PEPR Drawing 17).	Annual compliance report. Where it is observed that the measurement criteria have not been achieved, an incident in accordance with Regulation 79 of the *Mining Regulations 2020*.
Annual monitoring.	Surface water.	Visual inspection for surface water erosion or potential sediment runoff.	Any observed areas where sediment laden runoff is leaving the disturbed areas are remediated within 30 days.	Periphery of the disturbed areas within EML 5793 and MPL 109 and primary slag stockpiling area (refer PEPR Drawing 17).	Annual compliance report. Where it is observed that the measurement criteria have not been achieved, an incident in accordance with Regulation 79 of the *Mining Regulations 2020*.
Annual monitoring.	Traffic.	Visual inspection for potential traffic safety issues such as obstructions of the view from the Site Access Point, damage to the road etc.	Any observed safety issues addressed within 30 days.	Site Access Point and section of road within 50 metres.	Annual compliance report. Where it is observed that the measurement criteria have not been achieved, an incident in accordance with Regulation 79 of the *Mining Regulations 2020*.
Event – Incident involving the public and mining related traffic.	Traffic.	An investigation into a traffic incident undertaken by a suitably qualified independent third-party.	The tenement holder could not have reasonably prevented the incident from occurring.	Site Access Point and section of road within 50 metres.	Investigation report provided to the lead regulating agency within 30 days of the incident. Annual compliance report.

Trigger	Outcome	Monitoring method	Measurement criteria	Location	Reporting
Annual monitoring.	Visual amenity.	Visual inspection and photo-point monitoring to assess potential visual amenity impacts to the public.	Visual amenity impacts are as low as reasonably practicable.	Jones Road and North Beach Road (refer PEPR Drawing 17).	Annual compliance report. Where it is observed that the measurement criteria have not been achieved, an incident in accordance with Regulation 79 of the *Mining Regulations 2020*.
Annual monitoring.	Waste-derived fill (WDF).	Visual inspections of WDF stockpiles to confirm that no more than $5,000m^3$ is stockpiled at the Site.	Stockpiled volume < $5,000m^3$.	EML 5793, MPL 109 WDF stockpiling areas.	Annual compliance report. Where it is observed that the measurement criteria have not been achieved, an incident in accordance with Regulation 79 of the *Mining Regulations 2020*.
Annual monitoring.	Waste disposal.	Review of the implementation of the Site Remediation Action Plan (RAP) (refer PEPR Attachment 11).	Tenement Holder implemented the RAP as planned.	EML 5793 and MPL 109 areas discussed in the RAP.	Annual compliance report. Where it is observed that the measurement criteria have not been achieved, an incident in accordance with Regulation 79 of the *Mining Regulations 2020*.
Annual monitoring.	Weeds, pests and plant pathogens.	Visual inspections for weeds, pest fauna and plant pathogen presence and abundance and records of follow-up management actions as required.	Tenement holder has managed positive observations in the appropriate season in accordance with available advice from the Northern Yorke Landscape Board.	EML 5793 and MPL 109.	Annual compliance report. Where it is observed that the measurement criteria have not been achieved, an incident in accordance with Regulation 79 of the *Mining Regulations 2020*.