AGILITY ENGINEERING

LONG-TERM ENVIRONMENTAL MANAGEMENT PLAN

Lots 14 and 15 Section L DP 8993
No. 7 James Street
Argenton

for
Alesco Senior College

Ref: 2020233-LEMP
17 June 2020

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1. INTRODUCTION

This Long-Term Environmental Management Plan (LEMP) has been prepared to ensure that capping works at the property listed below is maintained and utilised in a manner that minimises the impact of lead contaminated soil on site occupants, maintenance personnel and the environment.

Details of the property are listed in Table 1.

Table 1 – Property Details

Site Address	No. 7 James Street, Argenton
Lot and DP	Lots 14 and 15 Section L DP 8993
Site Area	1500m^2 (approximate remediation area 100m^2)
Land Owner	ATWEA College

This Long Term EMP includes information pertaining to the following:

- A description of the contamination existing on the property.
- The nature and extent of the capping.
- Control measures required to maintain the cap.
- Responsibilities.
- Precautions and control measures required when completing works beneath the cap.
- How long this plan is required for.

2. CONTAMINATION STATUS OF THE SITE

This property is located within the Lake Macquarie City Council (LMCC) area and has been impacted by lead contamination associated with the former Pasminco Cockle Creek Smelter (PCCS). Lead contamination due to PCCS may have occurred either via:

- Aerial deposition of lead oxide onto surface soils.
- Filling of land with black lead slag, made available from PCCS until 1994.

The nature of contamination at this property is listed in Table 2.

Capping has been undertaken at the site in accordance with the Agility Engineering Remedial Action Plan (RAP, ref: 2019233-RAP).

3. CAPPING

A portion of this property has been capped to prevent access to black lead slag contaminated fill material.

Details of the capping are provided in Table 2.

Table 2 – Capping Details

Description	Proposed Alesco Seniors College involving refurbishment of the existing site building.
Area of the property capped	The extent of contamination at the site is limited to the north eastern side of the existing site structure with an area of approximately 100m^2.
Nature of contamination	Black slag in fill at a depth of approximately 0.4m in TP1.
Type of capping	Concrete
Surrounding ground surface	Constructed building to the west, site boundary to the north and east and asphalt hardstand to the south.

4. CONTROL MEASURES

Capping via the placement of concrete has been completed to prevent occupants of the property and visitors to the property from encountering black lead slag contaminated fill material. The cap must remain in place for the property to be considered suitable for the proposed use as a seniors college.

Any excavation works to be undertaken beneath the cap must be completed in accordance with the requirements outlined in Section 6. Responsibilities for maintaining the cap are outlined in Section 5.

5. RESPONSIBILITIES

Table 3 outlines responsibilities in relation to capping of lead contaminated soil at the property.

Table 3 – Responsibilities

Entity	Responsibilities
Property Owner	The property owner is responsible for ensuring that the cap remains in place in perpetuity. The property owner is responsible for completing site works beneath the cap in accordance with the requirements outlined in Section 6. If the cap is to

	be removed, it is the property owner's responsibility to remediate the lead slag contaminated fill material below the cap.
LMCC	It is the responsibility of LMCC to notify the presence of this Long Term EMP on Section 10.7 Certificate.
Waste Management Facility	A suitably licenced waste management facility must be contacted prior to the offsite disposal of lead fallout impacted surface soils. Lead slag material requiring offsite removal will require further discussion with NSW EPA, classification in accordance with the NSW EPA Waste Classification Guidelines and disposal at a suitably licenced waste management facility.

6. HOW TO COMPLETE SITE WORKS

In the event that excavation works are required below the cap, the following requirements are to be followed by the property owner.

6.1 PERSONAL PROTECTIVE EQUIPMENT REQUIREMENTS

Soil beneath the cap is contaminated with black lead slag fill, which originated from PCCS. To prevent exposure to lead contamination, the following Personal Protective Equipment (PPE) is required to be worn:

- Long sleeved shirt and long pants
- Gloves
- Dust mask

In addition, the following PPE should be applied if working around moving plant such as excavators or backhoes:

- Hard hat
- Safety glasses
- Steel capped boots

6.2 REINSTATEMENT OF THE CAP

The cap must be reinstated at the completion of the works. The reinstated cap must be reinstated as it was prior to works being undertaken and in accordance with the RAP, being of sufficient quality to continue to prevent access to black lead slag contaminated fill below the cap.

If the cap is being removed with no intention to reinstate it, remediation of the lead contamination is required to be undertaken under a revised RAP detailing offsite removal as the preferred option.

6.3 DOCUMENTATION OF EXCAVATED SOIL

In the event that black lead slag contaminated fill material is to be removed from the property, it must be disposed of lawfully.

Classification of waste in accordance with the NSW EPA Waste Classification Guidelines is required for landfill disposal of soils originating from non-residential sites. Further discussion with NSW EPA is recommended.

The property owner must obtain and file copies of the landfill disposal dockets to demonstrate that the lead contaminated soil or black slag was disposed of lawfully.

6.4 IMPORTATION OF MATERIAL

All imported soils and landscaping materials must be validated PRIOR to being received at the site to confirm these are Virgin Excavated Natural Material (VENM) or Excavated Natural Material (ENM).

VENM is defined by NSW EPA as “natural material means natural material (such as clay, gravel, sand, soil or rock fines) that:

- has been excavated or quarried from areas that are not contaminated with manufactured chemicals, or with process residues, as a result of industrial, commercial, mining or agricultural activities, and
- does not contain sulfidic ores or soils, or any other waste, and
- includes excavated natural material that meets such criteria for virgin excavated natural material as may be approved from time to time by a notice published in the NSW Government Gazette”.

ENM is defined by NSW EPA as “naturally occurring rock and soil (including but not limited to materials such as sandstone, shale, clay and soil) that has:

- been excavated from the ground, and
- contains at least 98% (by weight) natural material, and
- does not meet the definition of Virgin Excavated Natural Material in the Act.

ENM does not include material located in a ‘hotspot’; that has been processed; or that contains asbestos, Acid Sulfate Soils (ASS), Potential Acid Sulfate soils (PASS) or sulfidic ores”.

7. LIMITATIONS

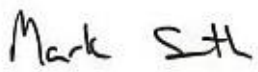
Agility Engineering have performed investigation and consulting services for this project in general accordance with current professional and industry standards. The findings contained within this report are the result of site observations, field investigation and limited laboratory test. The extent of testing was limited to discrete test locations and variations that cannot be inferred or predicted may occur in ground conditions between test locations. To the best of our knowledge, information presented in this report represents a reasonable interpretation of the general condition of the site. Under no circumstances, however, do these findings represent the actual state of the site at all points.

The programme of field sampling and interpretations presented within this report are limited in nature and Agility Engineering, or any other reputable consultant, cannot provide unqualified warranties, nor does Agility Engineering assume liability for site conditions not accessible during the time of the investigation.

Agility Engineering Consulting Engineers should be contacted immediately should subsurface conditions be found to differ from those described in this report.

Agility Engineering Pty Ltd

Matthew Clark
Geo-Environmental Scientist



Mark Smith
Geo-Environmental Engineer
Director

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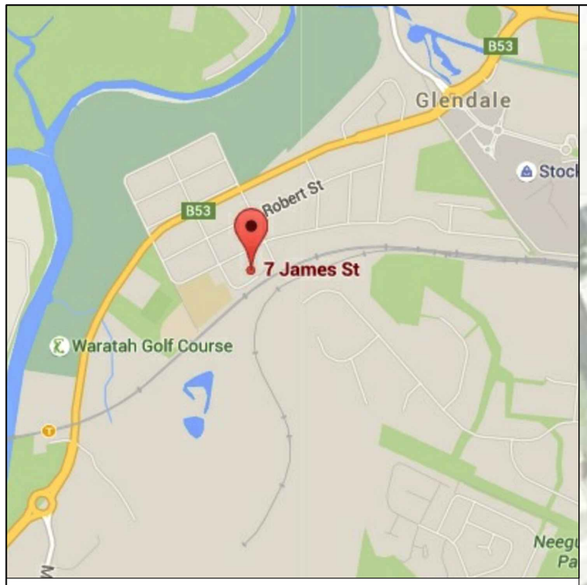

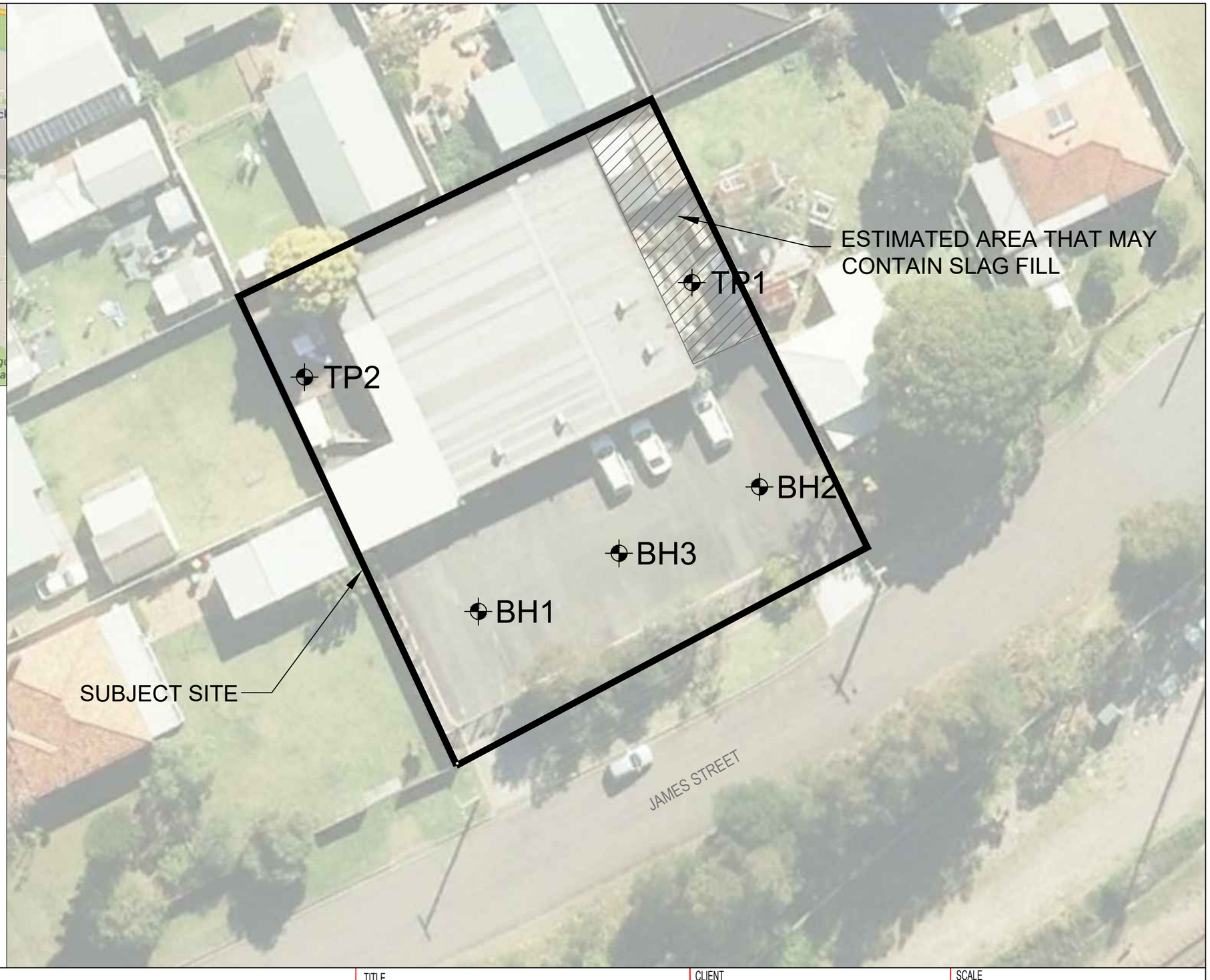

LEGEND:

BH1/TP1 - APPROXIMATE BOREHOLE/TESTPIT LOCATION

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TITLE	SITE PLAN LOTS 14 & 15 SECTION L DP 8993 No. 7 JAMES STREET ARGENTON
CLIENT	ALESCO SENIOR COLLEGE
SCALE	NOT TO SCALE
DATE	19/09/2019
DRAWING No.	2019233-SIT-01
DRAWN	M.C
REVISION	0

Geotechnical General Notes

Introduction
These notes have been provided in order to explain your geotechnical report. Not all elements are necessarily relevant to all reports.

Geotechnical Report
This geotechnical report is based on information gained from personal local experience, understanding of local geology, limited site investigation, subsurface sampling and/or laboratory testing. This report is tailored to provide information relevant to the scope of the project. Agility have performed the geotechnical investigation in general accordance with current professional and industry standards.

The extent of testing was limited to discrete test locations and variations that cannot be inferred or predicted may occur in ground conditions between test locations. To the best of our knowledge, information presented in this report represents a reasonable interpretation of the general condition of the site. Under no circumstances, however, do these findings represent the actual state of the site at all points. For this reason, this report must be regarded as interpretive rather than as a factual document as the report is limited by the scope of information on which interpretations are based upon. Site access constraints such as existing dwellings, steep sloping sites, dense vegetation and underground services may limit the understanding of the sub-surface profile across the site.

This geotechnical engineering report is based on conditions which existed at the time of subsurface exploration. Without approval from Agility Engineering, this report should not be used if there are any changes to the scope of the project or changes to the site conditions. Construction operations at or adjacent to the site and natural events such as floods, earthquakes or groundwater fluctuations may also affect subsurface conditions and thus, the reliability of this geotechnical report. Without consultation, Agility Engineering will not accept responsibility for problems that occur due to project modifications and/or site modifications. The programme of field sampling, laboratory testing and interpretations presented within this report are limited in nature and Agility Engineering does not assume liability for site conditions not accessible during the time of the investigation.

Agility Engineering should be contacted immediately should subsurface conditions be found to differ from those described in this report.

Engineering Logs
The engineering logs (borehole, test pit logs presented in this report are a geological interpretation of the subsurface conditions, and their reliability will depend to some extent on frequency of sampling and the method of excavation. Ideally, continuous undisturbed sampling or core drilling will provide the most reliable assessment, but this is not always practicable or possible to justify on economic grounds. In any case the boreholes and test pits represent only a very small sample of the total subsurface profile.

Interpretation of the information and its application to design and construction should therefore take into account the spacing of boreholes or pits, the frequency of sampling and the possibility of other than 'straight line' variations between the test locations.

Groundwater
Where groundwater levels are measured in boreholes there are several potential problems, namely:

- In low permeability soils, groundwater may enter the hole very slowly or perhaps not at all during the time the hole is left open;
- A localised, perched water table may lead to an inaccurate indication of the true water table;
- Water table levels will vary from time to time with seasons, weather and/or tidal events. They may not be the same at the time of construction as are indicated in the report; and
- The use of water or mud as a drilling fluid will mask any groundwater inflow. Water has to be blown out of the hole and drilling mud must first be washed out of the hole if water measurements are to be made.

More reliable groundwater observations may be made by installing piezometer standpipes which may be monitored over variable extended timeframes.

Tree Effects
Due to complex tree root geometry, variable moisture extraction by trees and the difficulty in predicting future tree growth, a precise design for the effects of trees is outside current knowledge. The owner must be aware that although precautions have been taken for the effects of trees in our design, some distortion must be accepted. Engineers are not experts in tree growth and cannot be expected to know the anticipated growth and mature height of trees.

Site Inspection
Agility Engineering will always be pleased to provide engineering inspection services for geotechnical and environmental aspects of work to which this report is related. This could range from a site visit to confirm that conditions exposed are as expected, to full time engineering presence on site.

Soil & Rock Classification

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Description and Classification Methods

The description and classification of soils and rocks used within this report are based on descriptions and classifications detailed in Australian Standard AS 1726:2017.

Soil Types

AS 1726:2017 defines soil as particulate materials that occur in the ground and can be disaggregated or remoulded by hand in air or water without prior soaking. The dominant soil component is given capital letters and secondary and minor soil components are given lower case letters. FILL and TOPSOIL are also given block letters and are indicated at the beginning of the soil description.

Particle Size of Soil Components

Type		Particle size (mm)
	BOULDERS	>200
	COBBLES	63 - 200
Coarse grained soil	GRAVEL Course	19 - 63
	GRAVEL Medium	6.7 - 19
	GRAVEL Fine	2.36 – 6.7
	SAND Course	0.6 – 2.36
	SAND Medium	0.21 – 0.6
	SAND Fine	0.075 – 0.21
Fine grained soil*	SILT	0.002 - 0.075
	CLAY	<0.002

* Fine grained soils to be described from engineering behaviour by visual tactile techniques

Fine Grained Soil Plasticity

Soil plasticity is characterised from the liquid limit of silts and clays. When laboratory tests are not available, plasticity is estimated using field visual and tactile methods.

Plasticity	Liquid limit for silt	Liquid limit for clay
Non-plastic	Not applicable	Not applicable
Low plasticity	≤50	≤35
Medium plasticity	Not applicable	>35, ≤50
High plasticity	>50	>50

Course Grained Soil Particle Characteristics

Definitions of grading terms used are:

- Well graded - a good representation of all particle sizes
- Poorly graded - one or more intermediate sizes poorly represented
- Gap graded – one or more intermediate sizes absent
- Uniform - an excess of a particular particle size

Where significant, particle shape can be defined as being rounded, sub-rounded, sub-angular, angular, flaky, platy or elongated.

Moisture Condition

Soil Type	Moisture Condition	Description
Course grained soil	Dry (D)	Non-cohesive and free running
	Moist (M)	Soil cool, darkened and sticks together
	Wet (W)	Soil cool dark, free water forms when handling
Fine grained soil	*w*<PL	Soil dryer than plastic limit, hard and friable or powdery
	w ~PL	Soil near plastic limit, can be moulded
	w >PL	Soil wetter than plastic limit, soil usually weakened, free water forms when handling

Cohesive Soil Consistency

Cohesive soils include fine grained soils and coarse grained soils with sufficient fine grained components to induce cohesive behaviour. Consistency describes the ease with which a soil can be remoulded measured by the indicative undrained shear strength of the soil or assessed by field tests.

Consistency	Abbreviation	Undrained shear strength (kPa)
Very Soft	VS	<12
Soft	S	12 - 25
Firm	F	25 - 50
Stiff	St	50 - 100
Very Stiff	VSt	100 - 200
Hard	H	>200
Friable	Fr	-

Relative Density of Non-Cohesive, Coarse Grained Soils

Non-cohesive soils are classified on the basis of relative density, generally assessed from penetration test procedures and well-established correlations.

Relative Density	Abbreviation	Density Index %
Very loose	VL	<15
Loose	L	15 - 35
Medium Dense	MD	35 - 65
Dense	D	65 - 85
Very Dense	VD	>85

Rock Classification

The rock type is given in capital letters followed by the grain size, colour, fabric and texture of the rock. The degree of weathering and the rock material strength classification are provided. Where no point load strength index or laboratory testing was undertaken, rock strength will be estimated using field assessment techniques in accordance with AS 1726:2017 or estimated from drilling resistance.