Green Valley Islamic College Limited
C/- Midson Group Pty Ltd

Remedial Action Plan, Minarah College: 268 - 278 Catherine Fields Road, Catherine Field, NSW

martens consulting engineers

ENVIRONMENTAL

WATER

WASTEWATER

GEOTECHNICAL

CIVIL

PROJECT MANAGEMENT

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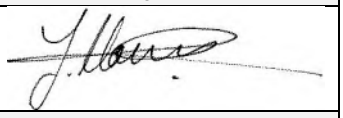
William Xu	Ben McGiffin	Terry Harvey	

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All enquiries regarding this project are to be directed to the Project Manager.

Contents

Abbreviations

ABC	Ambient background concentration
ACM	Asbestos containing material
AEC	Area of environmental concern
AMP	Asbestos Management Plan
ASC NEPM	National Environmental Protection (Assessment of Site Contamination) Measure (2013)
BaP	Benzo(a)pyrene
BTEXN	Benzene, toluene, ethylbenzene, xylene, naphthalene
CEMP	Construction environment management plan
COPC	Contaminants of potential concern
CSM	Conceptual site model
DA	Development application
DEC	Department of Environment and Conservation
DP	Deposited Plan
DPI	NSW Department of Primary Industry
DSI	Detailed Site Investigation
EIL	Ecological investigation levels
EMP	Environmental management plan
EPA	NSW Environmental Protection Authority
HIL	Health investigation levels
HM	Heavy metals
HSL	Health screening levels
HSP	Health and safety plan
LGA	Local government area
MA	Martens & Associates Pty Ltd
mAHD	Metres, Australian Height Datum
mbgl	Metres below ground level
NATA	National Association of Testing Authorities
ND	No data
NEPM	National Environment Protection Measure
OCP	Organochloride pesticides
OEH	NSW Office of Environment and Heritage
OPP	Organophosphorus pesticides
PACM	Potential asbestos containing material
PAH	Polycyclic aromatic hydrocarbons
PCB	Polychlorinated biphenyl
PID	Photoionisation detector
PPE	Personal protective equipment

PSI	Preliminary site investigation
RAC	Remediation acceptance criteria
RAP	Remedial action plan
SAC	Site acceptance criteria
SMP	Site management plan
SOP	Standard operating procedure
SREP	Sydney Regional Environmental Plan
SWL	Standing water level
TCLP	Toxicity characteristics leaching procedure
TEC	Toxic equivalence quotient
TRH	Total recoverable hydrocarbons
WHSP	Worker health and safety plan

1 Introduction

1.1 Overview and Background

This remedial action plan (RRAP) has been prepared by Martens and Associates Pty Ltd (MA) for Green Valley Islamic College Limited (the Client) to support a development application (DA) for a new Green Islamic Valley College campus, hereafter referred to as 'Minarah College' at 268 & 278 Catherine Fields Road, Catherine Field, NSW (the site).

In 2021, Geotechnique completed a PSI and DSI (summarised in Section 3) which identified a localised area of zinc contamination requiring remediation to make the site suitable for the intended future land use as school. Geotechnique (2021) also identified several data gap areas which require further investigation.

This report has been prepared in general accordance with ASC NEPC (1999, amended 2013), NSW EPA (2017) and NSW EPA (2020).

1.2 Proposed Development

We understand from the concept proposal plans (TZG Architects, 2021) and client provided information that the development will include the construction of Minarah College in 5 major stages, with Stage 1 works comprising:

- Demolition of the existing development on the site.
- Construction of a two-storey building at the front of the property (i.e. the western portion), dedicated as a start-up school for up to 350 students.
- Construction of new internal roads and parking areas.

Construction works are understood to require bulk excavation works up to a maximum depth of 3m through out the staged works.

1.3 Objectives and Scope of the RAP

RAP objectives are:

- Set remediation goals and criteria.
- Define the extent of areas requiring remediation.
- Review the available remedial options.
- Select the preferred remedial option.
- Provide details of preferred remedial option.
- Outline procedures and activities for implementation of the preferred remediation option.
- Outline requirements for contractors to prepare environmental and occupational health and safety plans for the remediation.
- Outline contingency plans.
- Outline regulatory compliance requirements.
- Provide details of contacts for the period of remediation works.
- Provide a framework for site environmental management during remediation.

2 Site Background Information

2.1 Location and Setting

Site information is summarised in Table 1. The site and surrounds are shown in Attachment A.

Table 1: Site background information.

Item	Description / Detail
Site address	268 - 278 Catherine Fields Road, Catherine Field, NSW
Legal identifier	Lot 11 in DP 833983 and Lot 12 in DP 833784
Surveyed area	45,000 m^2 (CMS, 2021)
Local Government Area	Camden Council
Current zoning and land use	Zoned RU4 – Primary production Small Lots (Camden LEP, 2010) Site is currently used for rural purposes.
Site description	The site consists primarily of open space and grassed paddocks. Existing infrastructure includes a number of farm sheds. Site vegetation generally consists of pasture grasses, with scattered stands of taller trees at the time of this report. Cobbitty Creek is located near the site's northern boundary. A right of way easement on the property to the west provides access to the site from Cut Hill Road.
Surrounding land uses	The site was surrounded by residential land use to the north and south, vegetated bushland to the east and Catherine Fields Road to the west.
Topography	The site generally has a south western aspect, with grades largely between approximately 5 % and 10 %. Site elevation ranges between approximately 74.5 mAHD in the north west corner to 84.5 mAHD in the south east corner of the site (CMS, 2021).
Geology and soil mapping	The geological map indicates the site is underlain by Bringelly Shale comprising shale, carbonaceous claystone, claystone, laminite, fine to medium grained lithic sandstone and rare coal and tuff (Clark, 1991). The NSW Office of Environment and Heritage's (OEH) information system (eSPADE) indicates the site to be located in the Blacktown (bt) soil landscape, with shallow to moderately deep (>100cm) hard setting mottled texture contrast soils, red and brown podzolic soils on crests grading to yellow podzolic soils on lower slopes and in drainage lines. This soil landscape often associated with localised seasonal waterlogging, localised water erosion hazard, moderately reactive highly plastic subsoil and localised surface movement potential.
Surface hydrology	The site generally drains via overland flow towards the south.

3 Previous Site Investigation

In preparing this RAP, MA have been provided with the following report documenting site contamination:

- Geotechnique (2021) *Preliminary and Detailed Site Investigation: Lot 11 in DP833983 & Lot 12 in DP833784: – 268 – 278 Catherine Fields Road, Catherine Field, NSW* (Ref: 14892/2-AA).

3.1 Preliminary and Detailed Site Investigation Objectives and Scope of Work

A combined Preliminary Site Investigation (PSI) and Detailed Site Investigation (DSI) report was completed by Geotechnique (2021). The objectives of the assessment were to identify any areas / locations of contamination at the site, from either current or previous activities, which may pose a risk to future site receptors following the proposed development. To achieve this objective Geotechnique completed a scope of work summarised in the following sections.

3.2 Summary Historical Information and Site Records

Historical aerials indicate that the site has been used for rural residential purposes from at least 1965 and continues as rural residential land use to present day. Surrounding land use was found to generally including rural residual land use with several surrounding properties housing market gardens.

Limited available records from a land title search for the site found a mechanical fitter owned Lot 11 in DP833983 between 1978 and 1986. Prior to that time, the lot was also owned by Narellan Farms Pty Ltd, from 1961 to 1971. Lot 12 / DP833784 was owned by a builder between 1959 and 1996. Records show The Muslim League of New South Wales has owned Lot 12 in DP833784 since 2021.

Planning Certificates for both Lots (Certificate Numbers: 20211545 and 20211527 under Section 10.7 (2) Environmental Planning and Assessment Act 1979 indicated the following in regards to potential site contamination:

- The council is not aware of the land or part of land being:
  - Subject to an Ongoing Maintenance Order, as defined under Section 2892 of the Contaminated Land Management Act, 1997
  - Subject to a Site Audit Statement, as defined under Part 4 of the contaminated Land Management Act, 1997.

- Council has no record of the subject site being identified on the NSW Fair Trading's loose-fill asbestos insulation register as containing loose fill asbestos insulation (sometimes called Mr Fluffy insulation)

The site was not listed on the NSW EPA contaminated land register.

3.3 Site Walkover Summary

Geotechnique completed an initial site inspection on 8 April, 2021 and made the following observations:

- The site contained multiple residential dwellings and sheds, including sheds construed from cement fibre sheeting material.
- Two dams were observed in the southern portion of the property. A third dam (visible on site aerial images) appeared to have been recently filled in.
- Most of the site was grass covered with minimal mature vegetation observed.
- A small stockpile of burnt material (including building waste) was observed in the north east portion of the site.
- Generally, there was no visual or olfactory indication of potential contamination. There was no evidence of bulk fuel storage occurring on site.

3.4 Conceptual Site Model

Geotechnique developed a conceptual site model (CSM) which nominated the following potential sources of site contamination based on the findings of the information review and the site walkover:

- Potential presence of fill (including the former dam)
- Application of chemicals to land associated with rural land use
- Hazardous building material associated with current and former site structures.
- Footprints of all existing site structures which may have been subject to fill material for leveling purposes.
- The stockpile of burnt material located in the north east portion of the site.

Contaminants of potential concern (COPC) associated with the above potential sources of contamination include:

- Heavy metals.
- Total Recoverable Hydrocarbons (TRH).
- Benzene, Toluene, Ethyl Benzene, Xylene and Naphthalene (BTEXN).
- Organochlorine Pesticides (OCP).
- Polycyclic Aromatic Hydrocarbons (PAH).
- Polychlorinated Biphenyls(PCB).
- Asbestos.

3.5 Site Testing Summary

Geotechnique (2021) completed onsite testing works on 19 – 20 April, which included the excavation of 65 test pits (via excavator) across the site. Sampling locations were selected based on a combination of judgmental and targeted methodology. Targeted locations included areas of suspected fill (former dam) and current and former buildings.

A total of 80 soil samples for varying depths were submitted to a NATA accredited soil laboratory and analysed for COCP identified in the CSM.

Geotechnique (2021) concluded that risk to site groundwater from the identified potential contamination sources was low and assessment of site groundwater was not included in the site testing program.

3.6 Summary of Subsurface Investigations

3.6.1 Site Assessment Criteria

Geotechnique (2021) adopted suitability conservation residential land use site assessment criteria (SAC) based on the proposed future use of the site as a school. The adopted SAC (derived from NEPM (2013)) included criteria for both protection of human and ecological receptors.

For ecological investigation levels (EIL) Geotechnique (2021) collected physiochemical data to derive site specific EILs for select heavy metals in accordance with NEPM (2013) methodology.

3.6.2 Visual Observations

Generally, subsurface conditions consisted of natural silty clays. Fill material was observed in a number of test pits (identified as P1 – P5) located within the former dam in the southern portion of the site. Anthropogenic material was observed at these testing locations including fibre glass sheeting, timbre, pieces of tyre and metal.

3.6.3 Analytical Results

Analytical testing found all COPC to be below the adopted SAC with the exception of elevated zinc concentrations at test pit location P1 from a sample of fill material collected at 0.45 – 0.55 m below ground level. P1 is located within the former dam area which as noted above, contains anthropogenic impacted fill material.

All other COPC were generally found to be below the laboratory limit of reporting and or well below the adopted SAC.

3.7 Conclusion and Recommendations

Geotechnique (2021) concluded that the site can be made suitable for the proposed future land use subject to the following:

- Complete assessment of the soils in the footprints of existing site features, including in former building remnants and gravel pathway located in the eastern portion of the site.
- Removal of the small stockpile of burnt material located in the north east of the site.
- Additional sampling in the vicinity of testing location P1 to determine the extent of zinc contamination
- Preparation of a RAP to remediate the zinc hotspot identified at testing location P1. As part of remediation works, additional testing in the vicinity of testing location P1 will be required to determine the extent of the zinc hotspot.
- Preparation of a validation report to confirm site suitability.

4 Data Gap Extents and Closure

4.1 Data Gaps Extents

Geotechnique (2021) identified the following data gaps which require additional investigation:

- The footprints of all existing site features and building remnants located in the eastern portion of the site.
- Additional sampling in the vicinity of testing location P1 to determine the extent of the zinc hotspot.

Following review of Geotechnique (2021), MA also considers that additional testing within the former dam is required due to the presence of anthropogenic material (including building waste). While testing in this area has been completed during previous investigations, many of the test pits did not extend to natural material. We consider that further testing is required to fully characterise the potential contamination risks associated with fill material containing building waste inclusions.

4.2 Data Gap Closure Methodology

Following demolition of site structures, the following works are required to address site data gaps.

4.2.1 Footprints of Existing and Remnant Structures

1. Walkover and inspection of all building footprints following demolitions works.
2. Collection of two near surface soil samples from within the footprint of each demolished structure and two samples from the remnant building material following removal.
3. Laboratory analysis for BTEX, TRH, PAHs, heavy metals, OC and OP pesticides and asbestos in soil.
4. Laboratory results are to be compared to relevant human health and ecological site assessment criteria (SAC) outlined in Geotechnique (2021).

4.2.2 Former Dam and P1 Testing Location

As outlined above, additional testing within the former dam area is considered necessary to appropriately characterise material. The following scope of works are to be completed:

1. Excavation of an additional 6 test pits within the former dam footprint. Test pits are to extend a minimum of 0.5 m into natural material.

2. Each test pit is to be visually inspected by a suitability qualified environmental consultant for the potential presence of hazardous materials such as potential asbestos containing material (ACM).

3. As noted in Geotechnique (2021) where anthropogenic material is encountered, this material is to be segregated and managed via offsite disposal to a suitability licenced waste facility.

4. To delineate the extent of zinc contamination at Geotechnique (2021) testing location P1 (located within the former dam), an additional 4 soil samples are to be collected surrounding testing location P1. Samples are to be collected from 0.4 – 0.5 bellow ground level and evenly spaced approximately 1 m from P1 testing location in general north, south, east and west configuration. Collected soil samples are to be analysed for zinc and results compared to ecological investigation levels outlined in Geotechnique (2021).

4.3 Data Gap Findings

Subject to data gap closure findings, this RAP is to be amended, or an addendum prepared outlining any additional remediation or management as required.

It is expected that any additional contamination identified in the data gap closure works would likely comprise near surface contamination following the demolition of onsite structures. In this regard it is anticipated that a likely remediation strategy for any additional contamination identified would include excavation and offsite disposal to a licensed waste facility. Methodology to complete additional works is expected to be similar to what is outlined in the following sections of this RAP.

The results of additional zinc sampling at testing location P1 will be used to determine the final extent of the zinc hotspot and full extent of material requiring remediation.

5 Remediation Areas

5.1 Extent of Remediation Required

Based on the findings of Geotechnique (2021), the following area requires remediation to render the site suitable for the proposed development:

- Remediation Area A – zinc impacted hotspot around sampling locations P1.

Following the completion of data gap closure works, additional remediation areas may be identified.

Remediation Area A along is shown in Map 02 in Attachment A.

5.2 Conceptual Site Model

An updated conceptual site model (CSM) has been prepared for this RAP which considered the understood future land use of the site as a school. The CSM has been prepared based on currently known information from Geotechnique (2021) and will likely require refinement following the completion of data gap closure works.

Table 2: Contamination sources and potential receptors.

Contamination source and media	Pathway	Exposure route	Receptor
Zinc impacted soil located at testing location P1 near surface soils	Leaching of contaminants through the soil profile. Transport of contaminants via air (dust). Transport of contaminants by mechanical disturbance (e.g. earthworks during). Transport of contaminants via surface water (runoff).	Direct contact with contaminants. Ingestion of contaminants. Inhalation of contaminated media (e.g. dust).	Possible Human Receptors Workers during road construction works. Subsurface maintenance works Current or future site users.

6 Remediation Options

6.1 General

The remediation goal is to remediate zinc impacted soils and mitigate exposure risks to relevant site receptors.

6.2 Remediation Goal

The remediation goal is to remediate contaminated site soils to render the site suitable for the proposed school. The remediation plan will provide requirements for site data gap closure, remediation, waste classification and validation works.

6.3 Assessment of Remedial Options

6.3.1 Overview

The following section outlines the process for selecting appropriate remedial strategies, and is completed in general accordance with the guidance outlined in NSW EPA (2020).

6.3.2 Assessment of Remedial Options for Soil Remediation

A review of soil remedial technologies has been undertaken to establish which technology or combination of technologies is most suitable to meet the site remediation objectives. Soil remediation options were considered, with reference to NSW EPA (2017) and ASC NEPM (2013), for the preferred hierarchy of options for site clean up and / or management, as follows:

- On site treatment of the contamination so that is it destroyed and the associated risk is reduced to an acceptable level.
- Off site treatment of excavated soil, so that the contamination is destroyed or the associated risk is reduced to an acceptable level, after which the soil is returned to the site.
- Removal of contaminated material to an approved facility, followed, where necessary, by replacement with appropriate material, if required.
- Cap and contain material onsite with an appropriately designed barrier.
- Where the assessment indicates remediation would have no net environmental benefit or would have a net adverse

environmental effect, implementation of an appropriate management strategy would be required.

Review of available soil remediation strategies and technologies is considered on the basis of:

- Effectiveness at achieving remediation objectives.
- Suitability in light of the proposed development.
- Anticipated costs.
- Ongoing environmental and public health adequacy.

A review of the preferred treatment option is presented in Table 3.

Table 3: Review of preferred soil remediation option.

Remediation Options	Advantages	Disadvantages	Comments
Capping and containment	○ Excavation and removal of contaminated soils not required, reducing tipping costs.	○ Ecological risk may not be mitigated as contamination remains onsite and within proximity to potential ecological receptors. ○ Cost of assessing leachability and assessing any entombment measures to prevent offsite contamination mitigation. ○ A long term Environmental Management Plan (EMP) required to manage remaining contamination. ○ Note on title indicating presence of contamination.	Containment and capping would be a suitable remediation technique to address contaminated soil. Burial of contaminated soil onsite places future land use restrictions on the site with the requirement of an EMP and note on title. While technically feasible, the option of onsite burial places unacceptable future restrictions on site title and is likely to be less preferable than offsite disposal.
Offsite disposal	○ Provides the shortest timeframe for remediation. ○ Removes risks to relevant receptors and avoids any long term management requirements. ○ Meets redevelopment objectives. ○ Suitable to remove zinc, contamination.	○ Cost for material transport and disposal charges. ○ Cost associated with classifying wastes prior to offsite disposal.	This proven and reliable technique for managing onsite contamination is suitable as it removes identified contamination and associated risk to relevant site receptors. Additionally, there is no requirement for ongoing management or note on tile which is considered preferable. This remediation option is considered the most appropriate remediation technique to remove risk and prevent long term management requirements.

6.3.3 *Preferred Soil Remediation Option*

In consideration of soil remediation technologies presented in Table 3 and the proposed intended future land use of the remediation area, the excavation, waste classification and offsite disposal of contaminated soil is considered the most suitable remediation technology. Offside disposal removes any future environmental liability from the site.

Details of remediation and validation methodology are provided in Section 7.

7 Remediation Plan

7.1 Introduction

The following sections outline works required to remediate identified contamination such that the site is fit for the proposed commercial land use. It is our understanding that State Environmental Planning Policy (SEPP) Biodiversity and Conservation (2021) applies to the site and in accordance with Clause 9.9 (4) *Remediation of contaminated land*, development consent from Council is required.

Unless otherwise identified, activities discussed below will be the responsibility of the remediation contractor or its representative.

7.2 Stage 1 – Authorisation Process

The following authorisation processes shall be undertaken:

- Consent for remediation works shall be sort from Council authorising the commencement of remediation works outlined in this RAP.
- At the conclusion of remediation works, Council shall be notified in accordance with Clause 4.14 (2) of SEPP (Resilience and Hazards) 2021.

7.3 Stage 2 – Appointment of Environmental Consultant and Remediation Contractor

For data gap closure and remediation works to be successfully completed the appointment of a suitability qualified environmental consultant and remediation contractor is required.

The environmental consultant should be engaged to:

- Provide necessary supervision of all data gap closure, remediation and validation works.
- Provide waste classification of material to be disposed of offsite.
- Document all stages of the excavation and stockpiling of contaminated soil.
- Monitor and document the offsite disposal of material to appropriately licenced landfill.
- Perform validation inspections and testing of remediation areas.

- Prepare a validation report documenting remediation and validation reports, and confirming final site status.

7.4 Stage 3 – Site Establishment

Prior to any remediation / construction works, the site shall be prepared for the works. This will include:

- Establishment of site offices, work sheds and amenities for site workers.
- Appropriate decontamination facilities for personnel and plant / equipment.
- Appropriate physical barriers and site signage is to be erected surrounding site areas requiring remediation and site signage.
- Installation of appropriate dust control measures (i.e. dust screens and water sprays).
- Establishment of site holding areas (if required) for contaminated material to be stored prior to offsite disposal. Site areas nominated to store material (both contaminated and remediated) are to have appropriate environmental controls in place including storm water diversion, erosion and sedimentation controls and dust suppression.

7.5 Stage 4 – Site Demolition Works and Data Gap Closure Works

Site demolition works are to be completed by an appropriately qualified contractor and include any hazardous material management requirements which may be necessary for demolition of site structures.

Geotechnique (2021) notes that several of the existing site structures are likely to contain asbestos. If this is confirmed, an asbestos clearance certificate will be required following site demolition works. All clearance certificates and relevant waste documentation associated with demolition works are to be provided to the appointed environmental consultant for review and inclusion in the site validation report.

Following demolition works and review of relevant clearance and waste documentation, the environmental consultant is to complete the data gap closure works outlined in Section 4.

7.6 Stage 5 – Remediation Work

The adopted remediation is outlined in the following sections.

7.6.1 Remediation Area A

The proposed works sequence in Remediation Area A is:

1. Excavation in the remediation area is to take place to a minimum 0.6 m below ground level (mbgl). The final extent of remediation excavation works will be determined following the data gap closure works. Excavated material is to be placed either:
    i. Directly into trucks for offsite disposal if in situ waste classified; or
    ii. In the designated contaminated material holding area for classification and offsite disposal.
2. If not classified in situ, excavated material is to be sampled for waste classification purposes as outlined in Section 6.7.1.
3. The appointed environmental consultant shall validate remediation excavations, as outlined in Section 6.8.

7.7 Stage 6 - Waste Classification

7.7.1 Waste Classification

Prior to any soil or material being removed from site, material is to be sampled and waste classified in accordance with NSW EPA (2014) Waste Classification Guidelines. Results of previous testing are to be considered in developing testing regime and past results must be considered in making the classification.

7.7.2 Waste Disposal, Materials Tracking and Management

Stockpiled contaminated spoil shall be recorded on a site diagram and daily site logs by the remediation contractor and supervising MA consultant. These documents shall be updated daily and kept in the site office. The daily site log shall record the area in which work was conducted for that day, general description of the works completed, onsite movement of materials, etc.

Transportation of waste shall be, where applicable, undertaken by appropriately qualified and licensed contractor.

7.8 Stage 7 – Site Validation

Prior to the site being declared fit for the intended future use, a validation report documenting the completed remediation works and results of site validation testing must be prepared by the appointed site environmental consultant. The following sections outline the site validation requirements.

7.8.1 Data Quality Objectives

The data quality objective (DQO) process is required to define the type, quantity and quality of data needed to support decisions relating to the environmental condition of the site. Table 4 outlines the process used to develop the DQO for the site post remediation and were developed with reference to NSW EPA (2017) and ASC NEPM (2013).

Table 4: Data quality objectives for the assessment of soil.

Step 1 **Stating the Problem**	Previous site investigations have identified the presence of zinc contamination in near surface soils, which requires appropriate remediation before the site can be deemed suitable for the intended land use.
Step 2 **Identifying the Decision(s)**	To assess the suitability of the site for future land use, decisions are to be made based on the remediation removing the identified risk to future site users. o Has the completed remediation works removed the identified risk to future site users? o Is the soil quality suitable for the intended land use? o Are future management of site soils required?
Step 3 **Identification of Inputs to the Decision**	The inputs to the validation of the site will include: o Existing assessment data. o Results of data gap closure investigations / works. o Observations during remedial activities. o Soil sampling results from remediation and validation works. o Assessment of analytical results against site remediation acceptance criteria (RAC).
Step 4 **Study Boundary Definitions**	Study boundaries are as follows: o Lateral – Lateral boundary of the assessment is defined by the remediation area boundary. o Vertical – Vertical boundary will be governed by the maximum depth of impacted soil. o Temporal – The dates of site inspection and validation works.
Step 5 **Development of Decision Rules**	The decision rules for this remediation area are as follows: o If the concentration of contaminants in the soil data collected from a remediation area do not exceed the RAC, then the area can be confirmed as validated. o If the concentration of contaminates in the soil data collected from a remediation area exceeds the RAC, then additional remediation or management strategies will be required for that remediation area. o Any material nominated for offsite disposal shall be classified in accordance with NSW EPA (2014) Waste Classification Guidelines. o Material tracking is to be appropriately documented and waste disposal dockets validated.

Step 6 **Specification of Limits on Decision Errors**	For interpretation of data, guidance found in ASC NEPM (2013) Schedule B2 regarding 95% upper confidence limit (UCL) may be applied. Schedule B2 states that the 95% UCL of the arithmetic mean provides a 95% confidence level that the true population mean will be less than or equal to this value. Therefore, a decision can be made based on a probability that 95% of the data collected will satisfy the site acceptance criteria. A limit on decision error will be 5% that a conclusive statement may be incorrect. In applying the statistical analysis of the data: o No individual sample results have a concentration that exceeds 250% of the SAC. o The standard deviation of the sampled population should not exceed 50% of the SAC.
Step 7 **Optimisation of Sampling Design**	Validation based on the remediation option, to ensure that all the necessary data is collected to confirm site suitability for the proposed school development.

7.8.2 Validation Criteria

To ensure that site remediation works have rendered the site fit for the proposed future land sue, validation testing is to confirm contamination levels are below adopted RAC (Table 5).

Table 5: Remediation acceptance criteria.

Media	Adopted Guidelines	Applicability
Soil	ASC NEPM (2013)	Zinc < 570 mg/kg (EIL – Urban Residential)[1] Zinc < 7400 mg/kg (HIL A)

Note
[1] EIL derived from site specific physiochemical properties as outlined in Geotechnique (2021).

7.8.3 Validation Sampling Program

Table 6 outlines the soil validation sampling frequency and analytical program.

Table 6: Proposed validation sampling program.

Remediation Area	Remediation Process	Required Testing
Remediation Area A	Excavation and offsite disposal	Following remediation excavation, visual inspection and sampling of the excavation is required. Sampling rate is to be one sample per 25 m^2 of wall or floor with a minimum 1 sample per 10 linear m of wall face and 3 samples for the excavation base. Samples are to be tested for zinc and be assessed against the adopted RAC. Validation samples collected for laboratory analysis will be preferably taken directly from surface being sampled. Where sampling uses excavation machinery, samples shall be taken from the centre of the excavator bucket from undisturbed bulk soil material.

7.8.4 Validation Test Failure

The following steps shall be taken should the remediation area fail validation:

- Laboratory assessment fail – If laboratory results indicate a RAC exceedance in a validation sample, the area is to be further excavated by a minimum 100 mm for a failed floor sample, or the excavation is to be extended laterally by a minimum 0.5 m for a failed wall sample.

- Excavated material is to be disposed offsite with other remediation spoil or waste classified as per Section 7.7.1. The process is to be repeated until validation is successful.

7.8.5 Imported Fill Protocol

Where any fill is imported to the site during remediation or for further earthworks, the fill is to be documented and verified as VENM, ENM or other waste exempt material.

All imported material is to be inspected be the appointed environmental consultant wither at the material source location or prior to application to land. All waste classification information pertaining to imported material is to be reviewed by the environmental consultant prior to the material being imported to site.

7.8.6 Quality Control/Quality Assurance

Where samples are to be collected (i.e. for waste classification), the following field QA/QC measures will be used for validation sampling:

- Collection of one intra laboratory duplicate sample per ten primary samples or one per sampling event.

- Collection of one inter laboratory duplicate sample per twenty primary samples.

- Rinsate samples are to be collected from any non single use sampling equipment used during validation sample collection.

All samples will be analysed by a NATA accredited testing laboratory.

7.8.7 Data Assessment

Where duplicate samples have been collected, analysis of data shall identify, then use for assessment, the highest result of either the primary or duplicate.

Laboratory data will be reviewed by the environmental consultant and assessed by applying data validation guidelines. The data will be compared to the adopted RAC or waste classification criteria. Adequacy of remediation shall be assessed on a strict compliance or noncompliance basis for each sample.

Statistical interpretation of waste classification data may be required to establish material waste classification.

7.8.8 Validation Reporting

A site validation report is to be prepared by the environmental consultant at the completion of remediation works. This report shall document remediation and validation sequence, detail all sampling and results of the assessment, provide material tracking data for material taken from the site and document any imported material (and testing or supporting documentation for it).

The document shall include details regarding any remaining site contamination, and identify residual risks posed by remaining contaminants, and provide comment on whether remediation has been successful and suitability of the site for the proposed commercial land use.

8 Site Management Plan for Remediation

8.1 Overview

A site specific Construction EMP (CEMP) and Worker Health and Safety Plan (WHSP) are to be prepared by the Contractor prior to the commencement of site works. The following sections are intended as a guide to the information that should be included in these plans.

8.2 Construction Environmental Management Plan

A site specific CEMP shall be prepared to ensure the works do not negatively impact on potential receptors (humans and environment) and comply with applicable environmental legislation.

Based on the site condition and proposed remediation method, primary environmental hazards requiring management during remedial works may include:

- Soil management.
- Noise and odour controls.
- Air quality / dust control.
- Erosion and sediment control measures.

Additional onsite management issues that may be included in the CEMP include:

- Site access and security.
- Signage and contact Information.
- Traffic control.
- Hours of operation.
- Imported material.

Suggested requirements for these management points are discussed in the following subsections.

8.2.1 Soil Management

The following should be addressed regarding soil and stockpile management in accordance with Landcom (2004) *Managing Urban Stormwater: Soils and Construction*:

- All stockpiles containing soil or material identified as contaminated shall be stored in clearly marked areas with appropriate signage.

8.2.2 Noise Control

To mitigate noise impacts which may arise as a result of remedial works, the Contractor will undertake works in accordance with state and local noise regulations. The Contractor's machinery, including machinery hired by the Contractor, should be in good working order so that abnormal machine noise is avoided.

All works are to be undertaken with the designated working hours in Section 8.2.8.

8.2.3 Odour Control

Based on the identified site contaminants and site location relative to surrounding receptors, odour is not considered to be a major environmental concern. Should odours be encountered contingency measures including the covering of temporary stockpiles should be implemented.

8.2.4 Air Quality / Dust Control

Dust control procedures are to include:

- Cover of all soil loads entering or exiting the site.
- Use of water sprays across disturbed areas.

8.2.5 Erosion and Sediment Control Measures

Erosion and sediment control measures will be required at the site in accordance with Landcom (2004). Measures are to be:

- Suitable for the proposed remediation works;
- Assessed, maintained and where necessary repaired throughout the duration of works;
- Appropriate for mitigating topsoil erosion, containing sediment within the site after works have been completed; and

- Maintained onsite until all topsoil has been stabilised at the premises.

8.2.6 Site Access and Security

Prior to works commencing, barricades shall be erected to control access to the designated work area, along the proposed remediation area boundary. Site security and access controls must remain in place during all onsite construction works.

8.2.7 Signage and Contact Information

Security fencing and appropriate signage around all open excavations must be installed and maintained by the Contractor.

A sign displaying the contact details of the Contractor (including the onsite foreman or manager) shall be displayed for the duration of onsite works.

8.2.8 Hours of Operation

Onsite works are only permitted during hours approved in the site development consent for construction works.

8.3 Worker Health and Safety Plan (WHSP)

Worker health and safety of all onsite workers or visitors is the responsibility of the Contractor. The purpose of a WHSP is to provide relevant health and safety information for all personnel working on or visiting the site.

The WHSP should include (but not necessarily be limited to):

- WHS legislative requirements.
- Hazardous materials identification (including fuel and chemical management).
- Induction requirements. All onsite personnel and visitors must be suitably inducted prior to entering the site.
- Location of worker facilities.
- Designation, delineation and control of access to various work zones.
- Community notification.
- Roles and responsibilities.

- Training and competency.
- Hazard identification and risk assessment.
- Control measures including personal protective equipment (PPE).
- Incident and emergency response.
- Safe work method statement(s).
- Toolbox meetings.
- Audits and inspections.

8.3.1 WHS Legislation and Standards

All onsite works should comply with the WHS Act, regulations, codes of practice, and with relevant Australian Standards. As a minimum all work must comply with:

- Workplace Health and Safety Act (2011).
- Workplace Health and Safety Regulation (2017).
- Work Safe Australia – How to Safely Remove Asbestos: Code of Practice (2016).
- AS 1940 (2017) – The Storage and Handling of Flammable and Combustible Liquids.
- AS 2436 (2010 R2016) – Guide to Noise and Vibration Control on Construction, Demolition and Maintenance Sites.
- Managing the Work Environment and Facilities Code of Practice (December 2018).
- Managing Noise and Preventing Hearing Loss at Work Code of Practice (October 2018).
- Hazardous Manual Tasks Code of Practice (October 2018).
- Work Health and Safety Consultation, Co-operation and Co-ordination Code of Practice (May 2018).

8.3.2 Hazard Assessment

A WHS hazards assessment is to be completed by the Contractor and incorporated into the WHSP. Key hazards may include:

- Onsite chemical hazards (storage of fuels, contaminated soils).
- Heat exposure for workers.
- Buried services.
- Noise.
- Dust.
- Operation of heavy equipment.
- Operation of electrical equipment.

8.3.3 Site Inductions

Prior to starting works, site workers and subcontractors involved in the project shall attend a site specific safety induction.

Documented evidence of the safety induction must be available onsite. The Contractor must supply site workers and subcontractors with appropriate PPE as outlined in Section 8.3.4.

8.3.4 Personal Protective Equipment

Table 7 below lists the personal protective equipment (PPE) required to prevent exposure to contaminants, in designated remediation areas.

Table 7: Personal protective equipment.

Type	Description	When Required
Eye protection	Safety glasses	All site activities
Hand protection	Disposable nitrile gloves	Soil sampling activities
	Cut resistant gloves	Manual handling activities
Body protection	High visibly clothing	All site activities
	Sunhat, sunscreen	All site activities
Foot protection	Steel toed boots	All site activities
Hearing protection	Ear plugs or ear muffs	Site activities likely to generate potentially harmful noise levels
Respiratory protection	P2 dust masks	During dusty conditions

Site personnel should be aware that personal protective equipment required to be worn may limit manual dexterity, hearing, visibility and may increase the difficulty of performing tasks. PPE places an additional strain on the user when performing work that requires physical activity.

Eating, drinking, chewing gum or tobacco, smoking or any practice that involves hand to mouth transfer increases the probability of ingestion of foreign matter into the body. Hands must be thoroughly washed before eating, drinking or smoking. Clothing which becomes dirty from onsite work should be washed separately from other clothing.

9 Environmental Regulatory Requirements

9.1 SEPP (Biodiversity and Conservation) 2021

Remedial works will require approval in accordance with SEPP (Biodiversity and Conservation) 2021 which we understand applies to the site. It is anticipated that approval shall be sought by way of a development application or amendments to the existing development application.

9.2 SEPP (Resilience and Hazards) 2021

In accordance with SEPP (Resilience and Hazards) 2021, Council is to be notified 30 days post completion of remedial works.

9.3 Waste Disposal Requirements

All waste soil must be classified in accordance with EPA (2014) waste classification guidelines prior to offsite disposal to a suitably licenced waste receiving facility.

Waste classification documentation must be kept for validation of the remediation works.

9.4 Asbestos Licences

If any asbestos is detected during remedial works, it shall be assessed by a MA consultant. Any removal shall be undertaken in accordance with relevant work health and safety regulation including but not limited to:

- Safework NSW – Applicant Guide for Asbestos Licences and Notifications (2019).
- Work Safe Australia – How to Safely Remove Asbestos: Code of Practice (2016).

10 Remediation Contacts

Names and phone numbers of appropriate personnel for contact during the remediation will be provided prior to commencement of remediation work.

11 Contingency Plan for Remediation and Redevelopment

11.1 Overview

It is considered possible that unexpected situations may occur during remediation and site redevelopment works including the possibility to uncover unidentified contamination. A site contingency plan for managing unexpected situations should be prepared by the Contractor. Unexpected situations that may arise include:

1. Uncovering types of contamination that are not presently identified.
2. Generation of unacceptable levels of dust.
3. Generation of unacceptable asbestos fibres.
4. Generation of an unacceptable level of noise.
5. Excessive rainfall, and collection of excessive water in excavations.

The following sections outline contingency procedures for the events listed above.

11.2 Unexpected Finds

All site personnel are to be aware of their responsibilities under the unexpected finds protocol and are to report any potential signs of contamination (e.g. observed PACM, petroleum and / or oil spills, chemical odours or staining) to the site manager immediately.

In the event of uncovering unexpected finds during remedial works, the following steps are to be undertaken by the Contractor:

- Cease all work in the area and notify site foreman / manager and environmental consultant.
- Notify any relevant authorities (e.g. fire brigade) if an emergency response is required.
- Construct temporary barricading to prevent worker / public access to any unexpected and / or unknown substances.
- Install appropriate stormwater diversion and sediment controls as required.

- Notify relevant authorities that the Contractor is legally required to notify (e.g. NSW EPA and / or Council).

- Site foreman / manager is to arrange site inspection by the environmental consultant to assess the unexpected find and determine if any further investigation, management or remedial action is required in the area.

The environmental consultant is to prepare an assessment and, if required, validation of each unexpected find to the Contractor prior to the recommencing of works ceased as a result of the unexpected find.

All unexpected finds are to be documented in the site Validation Report prepared by the environmental consultant at the end of remediation works.

11.3 Unacceptable Level of Dust

Contingency measures must be prepared to control unacceptable dust levels. Excessive dust may be identified by workers, dust monitoring equipment or community complaints. Actions to control excessive dust can include:

- Increased use of water sprays.

- Covering soil stockpiles.

- Changing work protocols (e.g. avoiding work on windy days).

11.4 Unacceptable Level of Noise

Contingency measures must be prepared to control unacceptable noise levels. Excessive noise may be identified by workers, noise monitoring equipment or community complaints. Actions to control excessive noise can include:

- Identification and isolation of the source of noise.

- Modification of the action of the source to reduce the noise.

- Erection of temporary noise barriers.

11.5 Excessive Rainfall

Contingency measures must be prepared to control the effects of excessive rainfall. Actions to control the effects of excessive rainfall can include:

- Construction of sediment and surface water controls.
- Diversion of surface water away from excavations, soil stockpiles and active work areas.
- Appropriate stockpile covers.

12 Conclusion

This RAP has outlined remediation and validation requirements to address identified zinc contamination in a small area (identified as Remediation Area A) at 268 – 278 Catherine Fields Road, Catherine Field.

From review of assessment findings, and the proposed commercial land use, excavation, waste classification and offsite disposal of contaminated soil was considered the most appropriate remediation technique.

This RAP provides remediation and validation methodology to manage risk posed by contamination and render the site suitable for the proposed future land use.

It is likely that, following successful remediation and validation of the site, the site shall be made suitable for the proposed development.

13 References

Camden Council (2017) *Management of Contaminated Lands Policy P2.0054.2.*

Clark N. R. and Jones D. C. (1991) Penrith 1:100 000 Geological Sheet 9030, 1st edition, Geological Survey of New South Wales, Sydney.

CMS Surveyors (2021) Survey Plan, Drawing No. 20131detail (1), Sheets 1 – 13, Issue 1, dated 25.03.2021 (CMS, 2021).

Geotechnique (2021), *Preliminary and Detailed Site Investigation Lot 11 in DP833983 & Lot 12 in DP833784 268 – 278 Catherine Fields Road, Catherine Field,* referenced report number 14892/2-AA, dated 30.04.2021

Landcom (2004) *4th Ed. Managing Urban Stormwater: Soils and Construction.*

NEPC (1999, amended 2013) *National Environmental Protection (Assessment of Site Contamination) Measure*. Referred to as NEPM (1999, amended 2013).

NSW Department of Environment & Heritage eSPADE, NSW soil and land information (www.environment.nsw.gov.au).

NSW EPA (2017) *3rd Ed. Contaminated Sites: Guidelines for the NSW Site Auditor Scheme.*

NSW EPA (1995) *Contaminated Sites: Sampling Design Guidelines.*

NSW EPA (2009) *Interim Construction Noise Guideline.*

NSW EPA (2014) *Waste Classification Guidelines Part 1: Classifying Waste.*

NSW EPA (2020) *Contaminated Sites: Guidelines for Consultants Reporting on Contaminated Sites.*

State Environmental Planning Policy No. 55 – *Remediation of Land.*

Tonkin Zulaikha Greer Architects (2021), Drawing No. A 100, A 101, A 102, Project No. 21019 (TZG Architects, 2021).

Tonkin Zulaikha Greer Architect (2021), Minarah College 268 & 278 Catherine Fields Road, Catherine Field Masterplan Report, dated 26.08.2021

14 Attachment A – Site Plan / Remediation Areas

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Map Title / Figure:

Data Gap Closure Areas

Map 01	Map
268 & 278 Catherine Fields Road, Catherine Field, NSW	Site
Proposed Minarah College	Project
Remedial Action Plan	Sub-Project
Green Valley Islamic College Limited	Client
31/03/2022	Date

martens
Environment | Water | Geotechnics | Civil | Projects

Project No: 210832O Map Set: MS06-R02 EPSG: 28356

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Map Title / Figure:

Remediation Area

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Environment | Water | Geotechnics | Civil | Projects

Map 02	Map
268 & 278 Catherine Fields Road, Catherine Field, NSW	Site
Proposed Minarah College	Project
Remedial Action Plan	Sub-Project
Green Valley Islamic College Limited	Client
31/03/2022	Date

Project No: 210320 Map Set: MS06-R02 EPSG: 28356