
Remediation Action Plan

New Primary School in Worrige

9 Worrige Road, Worrige NSW

Prepared for School Infrastructure NSW

Project 234398.05

29 May 2026

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The undersigned, on behalf of Douglas Partners Pty Ltd, confirm that this document and all attached drawings, logs and test results have been checked and reviewed for errors, omissions and inaccuracies.

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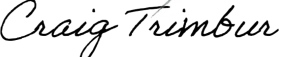
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Remediation Action Plan

New Primary School in Worrigee

9 Worrigee Road, Worrigee NSW

1. Introduction

This remediation action plan (RAP) has been prepared to accompany a Review of Environmental Factors (REF) for the Department of Education (the Department) for the construction and operation of a New Primary School in Worrigee (the activity) under Part 5 of the *Environmental Planning and Assessment Act 1979* (EP&A Act) and *State Environmental Planning Policy (Transport and Infrastructure) 2021* (TI SEPP).

This document has been prepared as supporting information with consideration to the *Guidelines for Division 5.1 Assessments* (the “Guidelines”) and the *Guidelines for Division 5.1 Assessments – Consideration of Environmental Factors for Health Services Facilities and Schools, Addendum October 2024* (the “Addendum”) by the Department of Planning, Housing and Infrastructure. (DPHI).

The RAP was commissioned via email dated 24 April 2026 from Sabina Naser of the Department as variation to Work Order DDWO07423/25 and was undertaken in accordance with DoE Standing Offer Deed for the provision of services, SINSW02503/21-D.

The following key guidelines were consulted in the preparation of this report:

- NEPC National Environment Protection (Assessment of Site Contamination) Measure 1999 (as amended 2013) [NEPM] (NEPC, 2013);
- NSW EPA *Guidelines for Consultants Reporting on Contaminated Land* (NSW EPA, 2020); and
- CRC CARE Remediation Action Plan: Development - Guideline on Establishing Remediation Objectives (CRC CARE, 2019a).

The remediation objectives, devised in accordance with CRC (2019a), are to:

- Address potentially unacceptable risks to relevant environmental values from contamination; and
- Render the site suitable, from a contamination perspective, for the proposed activity.

This RAP provides details of the work that will be required at the site to meet the remediation objectives.

As advised by the client, the remediation works outlined in this report constitute Category 2 Remediation under Clause 4.13 of *SEPP (Resilience and Hazards) 2021*. The Council must be notified at least 30 days prior to the commencement of the remediation work unless alternative conditions are applicable under the development consent.

This RAP presents the procedures and plans which provide the means by which site remediation can be achieved. The Remediation Contractor must base their detailed work methodologies around the requirements of this RAP.

The site layout is shown on Drawing 1, Appendix A. This report must be read in conjunction with all appendices including the notes provided in Appendix A.

2. Activity Description

The activity is for the construction and operation of a New Primary School in Worrigee under Chapter 2 and Chapter 3 of TI SEPP comprising:

- permanent classroom building including a support learning unit;
- hall;
- canteen;
- covered outdoor learning area;
- library;
- administration;
- sports field;
- waste storage facility;
- landscaping;
- car parking;
- public domain works;
- infrastructure upgrades; and
- a capacity of 582 students.

The proposed activity does not include the new public preschool or roundabout. The new public preschool is subject to a separate planning pathway and environmental assessment. The roundabout is to be delivered by Council. **Figure 1** distinguishes the extent of the proposed activity in relation to the new public preschool and roundabout.

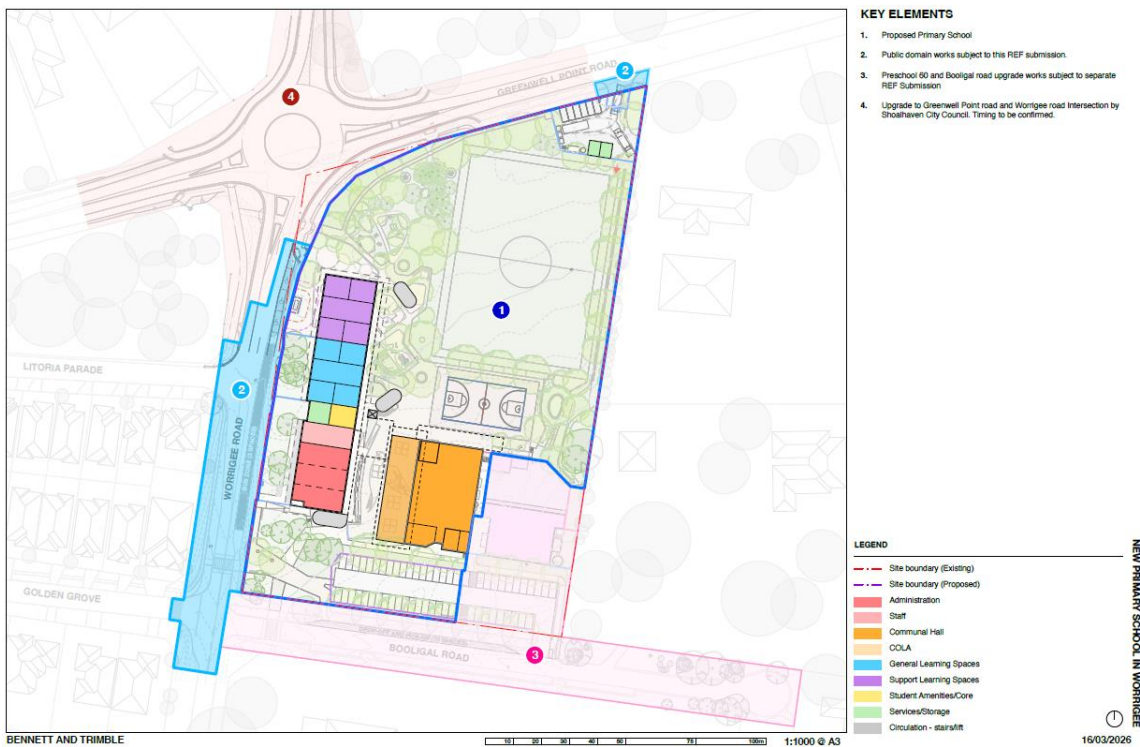


Figure 1: Indicative Site Plan

2.1 Activity site

The site is known as 9 Worrigee Road Worrigee. The site has a frontage of 125.23m to Greenwell Point Road, 149.87m to Worrigee Road and 114.89m to Booligal Road (including the preschool frontage). The site is legally described as Lot 1 in Deposited Plan 576975 and is 2 hectares (by title).

3. Scope of work

The scope of work to achieve the objective is as follows:

- Summarise the findings of previous investigations used to inform the status of contamination and contamination risk at the site;
- Present a conceptual site model (CSM) to list potential and likely contamination source, pathway and receptor linkages to address potentially unacceptable risks to human health and relevant environmental values from contamination;
- Define the anticipated extent of remediation;
- Assess potentially suitable remediation options to render the site suitable for its proposed use, and which will minimise potentially unacceptable risk to human health and/or the environment and which includes the consideration of the principles of ecologically sustainable development;
- Discuss options with the client to confirm the remediation approach to management and/or remediation to render the site suitable, from a contamination perspective, for the proposed development;

- Establish the remediation acceptance criteria (RAC) to be adopted for validation of remediation;
- Identify how successful implementation of the RAP will be demonstrated / validated;
- Outline waste classification, handling and tracking requirements;
- Outline environmental safeguards required to complete the remediation works;
- Include contingency plans and an unexpected finds protocol; and
- Identify the need for, and nature of, any long-term management and/or monitoring following the completion of management / remediation and, if required, provide an outline of an environmental management plan.

4. RAP Site description

RAP Site address	Part of 9 Worrigee Road, Worrigee NSW
Legal description	Part Lot 1 Deposited Plan 576975
Approximate investigation area	1.82 ha
Zoning	Zone R5 – Large Lot Residential
Local Council Area	Shoalhaven City Council
Current use	Semi-rural residential
Surrounding uses	North – Greenwell Point Road then rural East – Semi-rural residential South – Booligal Road then semi-rural residential West – Worrigee Road, residential and undeveloped land

The RAP site boundary is shown on Figure 2.



Figure 2: RAP site boundary (red) and layout

5. Environmental setting

5.1 Topography

The site is at approximately 11 m with respect to Australian Height Datum (AHD) and is on a relatively low ridgeline that runs from the south-west to the north-east. Slopes at the site are gentle and grade down to the south-east. Approximately 300 m to the north-west and approximately 300 m to the south-east are low lying plains (at approximately 2 m AHD).

5.2 Site geology

With reference to the NSW Seamless Geology (GSNSW, 2023) online mapping indicates the site is in an area mapped as Berry Siltstone which is described as mid to dark grey siltstone that grades up sequence to very fine-grained sandstone, is highly fossiliferous and has sporadic dropped pebbles.

According to the Kiama 1:100,000 Soil Landscapes Sheet, the site is located in an area mapped as the Shoalhaven soil landscaped which has alluvial soils. The soil landscaped is described as: level

to gently undulating present river bed and banks, active floodplain with levees and backwater swamps on alluvium; flat to gently undulating terrace surfaces to the Shoalhaven River, relief <5 m and slopes <3%; and completely cleared.

It should be noted that alluvial soils were not encountered during drilling and test pitting.

5.3 Acid sulfate soils

NSW Acid Sulfate Soil Risk mapping indicates that the site is not located in a mapped area associated with the occurrence of acid sulfate soils (ASS). Areas mapped as having a risk of occurrence of ASS are located in low-lying areas approximately 350 m to the north-west, 420 m to the north-east and approximately 250 m to the south-east of the site.

5.4 Surface water and groundwater

There are no surface water bodies located at the site. Crookhaven Creek is located approximately 700 m to the north of the site. A series of unnamed creeks at low-lying areas to the north-west and east flow into Crookhaven Creek. Brundee Swamp is located approximately 550 m to the south-east of the site and water from the swamp drains into the Crookhaven River located approximately 3,750 m to the south-east of the site. Stormwater at the site is anticipated to infiltrate permeable surfaces, flow into the local stormwater system or runoff onto neighbouring land.

Based on topography, groundwater at the site is anticipated to flow to the south-east and may discharge into Brundee Swamp or the Crookhaven River.

The WaterNSW registered bores database indicated that the following two bores are located within a 500 m radius of the site:

- GW107048, located approximately 15 m to the east of the site, was installed to a depth of 76 m in 2004 for domestic purposes. The bore was drilled through shale according to the driller's logs; and
- GW104352, located approximately 340 m to the west of the site, was installed to a depth of 210 m in 2002 for domestic purposes. The bore was drilled through soil and clay to a depth of 2 m and then siltstone and sandstone according to the driller's logs.

6. Summary of previous investigations

Douglas has previously carried out the following contaminated land investigations / assessments at the site:

- Douglas *Report on Preliminary Site Investigation (Contamination), Nowra New Public School, 9 Worrigee Road, Worrigee*, Report 234398.00.R.001.DftA dated 7 May 2025 ('the PSI');
- Douglas *Report on Hazardous Building Materials (HAZMAT) Survey, New Primary School, 9 Worrigee Road, Nowra NSW*, 236271.00.R.001.Rev0 dated 11 August 2025 ('the HAZMAT survey'); and
- Douglas *Report on Detailed Site Investigation (Contamination), New Primary School in Worrigee, 9 Worrigee Road, Worrigee*, Report 234398.02.R.002.Rev1 dated 18 March 2025 ('the DSI').

6.1 The PSI

The PSI broadly comprised a desktop review of readily available information, a site history assessment, a site walkover and reporting.

Based on the findings of the site history assessment, particularly the title deeds and historical aerial photographs, the site had mainly been used for residential and grazing purposes since 1925. The first site structure(s) appeared to have been established sometime between 1969 and 1979, at a similar time to Hardware Traders Pty Ltd owning the land. Significant clearing of standing vegetation occurred at the site after 2001 and small parts of the site appeared to have been used for market gardens after 2006.

During the PSI site walkover, the engineer observed an overgrown stockpile of organic wooded matter with anthropogenic inclusions (i.e., timber, furniture and netting).

Based on the findings of the PSI, Douglas identified five potential sources of contamination at the site, namely: fill of unknown origin; hazardous building materials from site structures; storage and use of pesticides for possible market gardens; low level storage and use of fuels; and fly-tipping of waste materials. Overall, the PSI considered the potential for contamination from these sources to be low.

The PSI recommended a DSI be undertaken to characterise the risk of site contamination from the identified potential sources of contamination.

6.2 The HAZMAT survey

The HAZMAT survey was carried out to determine the condition and extent of HAZMAT within site structures comprising the main residence and pool shelter, workshop and the agricultural structures (1 and 2).

For the purposes of the survey, HAZMAT comprised:

- Asbestos containing materials (ACM);
- Lead paint;
- Lead dust in ceiling cavities;
- Bulk synthetic mineral fibre (SMF) insulation;
- Polychlorinated biphenyls (PCB) in fluorescent light / fan fittings; and
- Ozone depleting substances (ODS).

Table 1 below, summarises the presence (or suspected presence) of HAZMAT in buildings across the site.

Table 1: Hazardous building materials (HAZMAT) risk profile

Building	Asbestos	Lead paint	Lead dust	SMF	PCB	ODS
Main Residence and Pool Shelter	✓	✗	✓	✓	✓	✓
Workshop	✗	✗	✓	✗	✓	✗
Agricultural Structure 1	✗	✗	✗	✗	✗	✗
Agricultural Structure 2	✗	✗	✗	✗	✗	✗

✓ = identified or suspected present, ✗ = not identified and / or not suspected present.

Specific recommendations with regards to managing the HAZMAT identified on-site are provided in Section 7 and Appendix B of the HAZMAT survey.

6.3 The DSI

The DSI comprised a review of relevant previous Douglas investigations, collection of soil samples for contaminated land purposes from 15 geotechnical boreholes (Bores 1 to 15), excavation of an additional six test pits (Pits 16 to 21) across the site as well as surface sampling from three locations (SS1 to SS3), laboratory analysis for a range of contaminants of potential concern (CoPC) and provision of a report.

Field observations identified rather consistent subsurface conditions with topsoil, overlying residual clay, extremely weathered siltstone grading to siltstone (bedrock). Fill was encountered in four locations namely, Bore 9, Pits 18 and 19, and SS2 to depths of between 0.1 m and 0.2 m below ground level (bgl). Fill encountered in Bore 9 appeared to be generally consistent with reworked natural material mixed with the adjacent concrete slab blinding layer. Fill encountered in Pit 18 appeared to be generally consistent with reworked natural material. Fill encountered in Pit 19 appeared to be surface gravels associated with an internal vehicle access way. Material encountered in the SS2 sample location appeared to have been impacted with anthropogenic inclusions from the overlying fly-tipped material and not necessarily representative of more widespread land filling practices.

Sixteen selected soil samples were analysed for various combinations of the following CoPC: metals, total recoverable hydrocarbons (TRH), benzene, toluene, ethylbenzene and xylene (BTEX), polycyclic aromatic hydrocarbons (PAH), organochlorine pesticides (OCP) and organophosphorus pesticides (OPP), speciated phenols, per- and poly-fluoroalkyl substances (PFAS), asbestos (fibrous asbestos (FA), asbestos fines (AF) and asbestos identification (ID)).

Based on the findings of the soil laboratory testing, all contaminants were below the adopted site assessment criteria (SAC) with the exception of arsenic, total chromium and copper in sample SS2/0-0.1 which exceeded a combination of health-based (HIL-A) and ecological investigation levels (EILs).

Based on the results of the DSI it was considered that the site can be made suitable for the proposed New Primary School in Worrigee activity subject to implementation of the recommendations below:

- It was recommended that a remediation action plan (RAP) be prepared in accordance with NSW EPA (2020) to address the heavy metal contamination (specifically arsenic, chromium and copper) detected within soils underlying the fly-tipped material (assessed as SS2).
- Following demolition of site structures, carry out a supplementary contamination investigation of the resultant building footprint.
- As a matter of due diligence, it was also recommended that an unexpected finds protocol (UFP) be included as part of the site management plan during earthworks detailing the process by which any unexpected finds of potential environmental concern will be managed. This was recommended particularly due to the limited sampling undertaken, not meeting the recommendations of the NSW EPA (2022) sampling guidelines.

7. Conceptual site model

A conceptual site model (CSM) is a representation of site-related information regarding contamination sources, receptors and exposure pathways between those sources and receptors. The CSM provides the framework for identifying how the site became contaminated and how potential receptors may be exposed to contamination either in the present or the future i.e. it enables an assessment of the potential source – pathway – receptor linkages (complete pathways).

Based on the previous investigations, the following potential sources of contamination and associated contaminants of potential concern (CoPC) have been identified and summarised in Table 2.

Table 2: Summary of potential sources

Potential sources and associated CoPC
On site sources
S1: Fill of unknown origin. Various CoPC can be associated with fill such as metals, TRH, BTEX, PAH, OCP, OPP, PCB, phenols, asbestos and PFAS; S2: Hazardous building materials from site structures (particularly the main residence). CoPC: lead (from lead-based paints), PCB, synthetic mineral fibres and asbestos; S3: Storage and use of pesticides for possible market gardens at the site. CoPC: metals, OCP and OPP; S4: Storage and use of fuels. CoPC: metals, TRH, BTEX and PAH; S5: Fly tipping (relevant to SS2). Various CoPC can be associated with fly-tipping such as metals, TRH, BTEX, PAH and asbestos.
Off-site sources
No off-site sources of contamination have been identified.

The following potential human and environmental receptors, along with relevant potential pathways, have been identified and summarised in Table 3.

Table 3: Summary of potential receptors and pathways

Potential human receptors
HR1: Current users [residential] HR2: Construction and maintenance workers HR3: End users [students and staff] HR4: Adjacent site users [residential]
Potential environmental receptors
ER1: Surface water [Crookhaven Creek] ER2: Groundwater ER3: Terrestrial ecosystems
Potential pathways to human receptors
HP1: Ingestion and dermal contact HP2: Inhalation of dust, vapours and/or asbestos fibres
Potential pathways to environmental receptors
EP1: Surface water run-off EP2: Leaching of contaminants and vertical migration into groundwater EP3: Lateral migration of groundwater providing base flow to water bodies EP4: Inhalation, ingestion and absorption

Summary of potentially complete exposure pathways

A 'source–pathway–receptor' approach has been used to assess the potential risks of harm being caused to human or environmental receptors from contamination sources on or in the vicinity of the site, via exposure pathways (potential complete pathways). The possible pathways between the above sources (S1 to S5) and receptors are provided in below Table 4.

Table 4: Summary of potentially complete exposure pathways

Source and CoPC	Exposure pathway	Receptor
S1: Fill of unknown origin S4: Storage and use of fuels S5: Fly tipping	P1: Ingestion and dermal contact P2: Inhalation of dust or fibres P3: Inhalation of vapours	R1: Current site users R2: Future site users R3: Construction and maintenance workers
	P2: Inhalation of dust or fibres P3: Inhalation of vapours	R4: Adjacent site users
	P4: Surface water run-off P6: Lateral migration of groundwater providing base flow to water bodies	R5: Surface water bodies
	P5: Leaching of contaminants and vertical migration into groundwater	R6: Groundwater
	P7: Inhalation, ingestion and absorption	R7: Terrestrial flora and fauna
	P8: Contact with inground structures	R8: Inground structures
S2: Hazardous building materials from site structures S3: Storage and use of pesticides for possible market gardens	P1: Ingestion and dermal contact P2: Inhalation of dust or fibres	R1: Current site users R2: Future site users R3: Construction and maintenance workers
	P2: Inhalation of dust or fibres	R4: Adjacent site users
	P4: Surface water run-off P6: Lateral migration of groundwater providing base flow to water bodies	R5: Surface water bodies
	P5: Leaching of contaminants and vertical migration into groundwater	R6: Groundwater
	P7: Inhalation, ingestion and absorption	R7: Terrestrial flora and fauna

8. Remediation extent

The extent of remediation comprises:

- Remediation Area 1: Building footprints with an unknown contamination status and at risk of becoming impacted with HBM during demolition works. It is noted that one of the buildings that is partly within the site and partly within the new public preschool is part of the scope of the new public preschool to demolish, investigate and remediate if required.

- Remediation Area 2: Metals impacted soils associated with location SS2. The remediation extent for remediation will be defined following excavation and validation sampling.

The approximate extent of Remediation Areas 1 and 2, based on an interpretation of the available test pits and sampling data are shown on Drawing 1, Appendix A. The actual extent (the final remediation extent) will be established at the completion of the excavation of the area during remediation.

9. Remediation options assessment

The objective of the remediation options assessment and evaluation is to establish a preferred remediation strategy. The process involves canvassing various remediation options which may be viable and then ranking each option based on a number of evaluation criteria. The remediation options assessment was undertaken with reference to CRC CARE *Remediation Action Plan: Development - Guideline on Performing Remediation Options Assessment* (CRC CARE, 2019b).

The remediation options assessment is included in Appendix B.

10. Preferred remediation strategy

10.1 Rationale

The rationale for the selection of the preferred remediation strategy is outlined in Appendix B. The preferred option was selected in consultation with the client and was based on both technical considerations (as discussed herein), and other project specific considerations (such as program, cost, and consideration of ongoing liability implications). The preferred remediation strategy is for:

- Remediation Area 1: Supplementary investigation and off site disposal of impacted soils, if any, or development of an alternative management / remediation strategy if the extent of contamination identified is such that off site disposal is no longer the preferred strategy.
- Remediation Area 2: Off site disposal of metals impacted soils.

10.2 Sequence of remediation

The general sequence of remediation shall be determined by the Remediation Contractor with the aim of minimising the potential for cross contamination of 'clean' areas / soils with contaminated soils. This should include avoiding, wherever possible transporting or placing contaminated soil over 'clean' areas separating stockpiles of different origin / contamination profile and validating the complete removal of any contaminated material placed / potentially impacting 'clean' areas.

The general sequence of remediation should consider the following recommended sequence:

- Task 1: Site Preparation, HBM Management during demolition and general tidy up following demolition
 - o Site establishment works.
 - o Demolition of site structures.

- o General tidy up of site wide surficial anthropogenic items from the aesthetic perspective.
- Task 2: Remediation Area 1, Building footprints supplementary investigation:
 - o Visual inspection of the footprints of demolished structures.
 - o Supplementary investigation including grid based soil sampling, laboratory analysis and documentation of findings.
- Task 3: Remediation Area 2, Excavation and off-site disposal of metals impacted soil and any identified impacted soils from building footprints:
 - o Waste classification of unsuitable / surplus fill.
 - o Disposal of unsuitable / surplus fill.
 - o Validation of remediation excavation.

Roles and responsibilities are outlined in the site management plan (Appendix E).

10.3 Task 1: Site Preparation

The following is recommended as the first stage of remediation:

- Client/Contractor to obtain all necessary approvals and licenses with respect to remediation works to allow commencement of the works, including Council approvals;
- Inception meeting between the client, contractor, Occupational Hygienist (OH) and environmental consultant to confirm responsibilities and procedures for remediation and construction. It is noted that the OH and environmental consultant may be the same entity;
- Contractor is to establish at the site and install environmental controls and secure the construction area (see Appendix E);
- As shown in the CSM (Section 6), there is HBM, including ACM, present in existing site structures. Therefore, the following is recommended for each structure requiring demolition:
 - o HBM need to be classified, removed from site and disposed suitably qualified contractor in accordance with NSW EPA requirements prior to commencing the demolition of remaining structure; and
 - o Following demolition an asbestos clearance inspection should be conducted by an OH (if ACM or PACM was identified) and the Environmental Consultant is to conduct a walkover of the former structure footprints to observe any obvious signs of potential contamination on the ground surface.
- A site walkover should be completed by the Environmental Consultant to identify locations or areas where anthropogenic items are observed on the site surface. The identified locations or areas should be surveyed using a differential global positioning system (dGPS) with a lateral accuracy of +/-0.3 m;
- Readily visible foreign / anthropogenic item(s) at each location or area should be removed by the Contractor and disposed of appropriately; and
- Works are to stop (in the area of potential impact) if any unexpected contamination finds are observed during this process (which are to be managed in accordance with the contingency plan in Appendix F).

10.4 **Task 2: Remediation Area 1, Building Footprints**

Following demolition of the site structures supplementary investigation is to be undertaken as recommended by the DSI. The exact scope of the supplementary investigation will be guided by an initial walkover inspection but is expected to broadly comprise:

- Site walkover inspection to observe to exposed ground conditions and any potential indicators of contamination.
- Excavation of grid-based sampling locations to a depth of 0.5m into natural material, approximately 10 sample locations is considered appropriate to investigate the building footprints. Note that we have considered the full footprint of the existing concrete slab in the south eastern portion of the slab as being part of the site for this investigation purpose.
- Laboratory analysis of selected samples from the investigation locations for the CoPC identified in Section 7.
- Preparation of a report documenting the findings of the supplementary investigation and outlining whether any additional impacted soils requiring remediation or management are identified. The supplementary investigation will include review of works undertaken associated with the building that is partly within the site and partly within the new public preschool site.

10.5 **Task 3: Remediation Area 2, Excavation and offsite disposal of impacted soils**

The general process for excavation and off site disposal of impacted soils includes:

- Excavation of a nominal 2 m x 2 m area surrounding SS2 to a depth of approximately 0.5 m and any additional impacted soils identified through the supplementary investigation. The excavated soil should be stockpiled on an impermeable membrane in a designated stockpile area(s) at the site for further waste classification (if required) and subsequent offsite disposal;
- The Environmental Consultant should undertake a visual inspection of the excavation pit and validation sampling of pit walls and base of the excavation (refer to Section 12.4 for sampling frequencies);
- Testing of the collected validation samples at a NATA accredited laboratory for the identified CoPC for the hotspot (i.e., arsenic, total chromium and copper; and any additional CoPC identified from the supplementary investigation);
- If the validation sample result exceeds the remediation acceptance criteria (RAC) provided in Section 11, 'chase-out' the impacted soil using an excavator/backhoe as advised by the Environmental Consultant. Re-sample the resultant excavation and re-excavate as required until the RAC are met;
- Once the excavations have been successfully validated, survey the full extent of the remediation areas or excavations and produce survey drawings showing the depth and extent of the remediation excavations;
- If soils are stored or placed on uncontaminated bare ground the Environmental Consultant is to collect validation samples from the stockpile footprints as per the requirements of Section 12.4. Conduct further excavation of stockpile footprints until the RAC are met (if required);

- Disposal of excavated impacted soil to a licensed waste facility in accordance with Section 13 of this RAP in accordance with the waste classification prepared by the Environmental Consultant;
- Backfill the excavations if necessary with geotechnically suitable virgin excavated natural material (VENM) or excavated natural material (ENM), or a suitable material from within the site; and
- Disposal dockets for all material removed from site or imported to site are to be provided to the Environmental Consultant for inclusion in a validation report.

11. Assessment criteria

11.1 Remediation acceptance criteria

The overarching remediation acceptance criterion (RAC) to be adopted for the project is for 'no unacceptable risks posed by the relevant media (i.e., soils, groundwater or soil vapour) to human health or the environment'.

The remediation works are to be validated as meeting the RAC by the Environmental Consultant by means of visual inspection, field screening, recovery and analysis of samples and review of any available plans as set out in this report.

In the absence of derivation of Tier 2 site specific target levels (SSTL), the (RAC) for contaminants in soil are the same as the Tier 1 site assessment criteria (SAC) adopted for the DSI, protective of human health and ecology. The following table provides a summary of the RAC.

Table 5: Remediation acceptance criteria

Item	Remediation acceptance criteria
Remediation Area 1 Metals impacted soil (arsenic, total chromium and copper)	Samples from the base and sides of the excavation must have a concentration of: • arsenic of <100 mg/kg; • total chromium <100 mg/kg; and • copper of <130 mg/kg.
Remediation Area 2 Building footprints	Visual appraisal of evidence of contamination or fill by the environmental consultant. Collected samples with results less than the SAC

11.2 Site assessment criteria

Additional area(s) of contamination encountered beyond those outlined in Section 8, during the course of the remediation and site redevelopment will be subject to the contingency plan or unexpected find protocol (Appendix F) and assessed using the SAC in Appendix C. The SAC are the same as the Tier 1 SAC adopted for the DSI. This is on the provision that other considerations such as risks to groundwater are also taken into account. The broader list of contaminants and their SAC are included in Appendix C.

The SAC should also be used as part of the assessment framework for imported soils (i.e. contaminant concentrations in imported soils must comply with the SAC).

The adopted investigation and screening levels comprise levels for a generic residential with accessible soils land use scenario, which is typically applied to schools as a Tier 1 assessment. The derivation of the SAC is included in Appendix C and the adopted SAC are listed in the summary analytical results tables in Appendix C.

The SAC are not RAC, and an exceedance of the SAC does not automatically trigger the need for remediation. Exceedances of the SAC will trigger the need for further assessment of risk by the Environmental Consultant to determine the need for remediation in accordance with NEPC (2013) and Appendix F.

12. Validation plan

12.1 Data quality objectives

The data quality objectives (DQO) for the validation plan are included in Appendix D.

12.2 Validation assessment requirements

The following site validation work will be required:

- Field assessment by the Environmental Consultant comprising:
 - o Visual inspection, including taking photographs for record purposes;
 - o Collecting validation samples from excavations resulting from the removal of contaminated soils, including contaminated soil stockpile footprints (if relevant); and
 - o Collecting validation / characterisation samples for materials to be re-used on site;
- Surveying by the Surveyor comprising:
 - o Survey of the extent and levels of the base of the excavations;
- Laboratory analysis of validation samples at a NATA accredited laboratory for:
 - o The CoPC relevant to the remediation area; and
 - o Quality control (QC) samples in accordance with Section 15;
- Comparison by the Environmental Consultant of the laboratory results with the SAC and/or RAC as appropriate (refer to Section 11); and
- Preparation by the Environmental Consultant of a validation report detailing the methods and results of the remediation works and validation assessment.

12.3 Visual inspections

All areas to be assessed and validated will first be subject to a visual inspection by the Environmental Consultant. Any areas of impacted fill must be removed prior to validation sampling.

12.4 Validation sampling

The sampling frequency will depend on the volume or area to be assessed and the previous results. The following approximate sampling frequencies will be adopted but may be modified by the Environmental Consultant to take into account previous results, where applicable, and findings from the visual inspections.

- Small to medium excavations (base <500 m²):
- Base of excavation: one sample per 25 m² or part thereof, with a minimum of three samples where the base of the excavation is fill rather than natural soils; and
- Sides of excavation: one sample per 10 m to 20 m length or part thereof with a minimum of one sample per wall. Additional samples will be collected at depths of concern where there is more than one depth of concern, with a minimum of one sample per 1.5 m depth in fill.

Where contaminated soils are stored or treated on bare soils, the footprint of the stockpile will require validation following removal of the contaminated soils.

Validation samples will be analysed by a NATA accredited laboratory for the relevant CoPC relevant to the remediation area.

Validation sample test results will be compared to the RAC, as per the DQO (Appendix D). Where the RAC are considered to have not been met, the remediation excavation(s) will be expanded to 'chase-out' impacted material, as advised by the Environmental Consultant, with the validation sampling then continuing into the extended excavation. This process will continue until all results are below the RAC.

13. Waste disposal

Disposal of waste must be to an appropriately licensed waste facility, as per *Protection of the Environment Operations Act 1997 NSW* (POEO Act) and the *Protection of the Environment (Waste) Regulation 2014 NSW*.

Any waste disposed off-site must be initially classified by the Environmental Consultant in accordance with:

- NSW EPA *Waste Classification Guidelines, Part 1: Classifying Waste* (NSW EPA, 2014a);
- NSW EPA *Waste Classification Guidelines, Part 2: Immobilisation of Waste* (NSW EPA, 2014b);
- NSW EPA *Waste Classification Guidelines, Part 4: Acid Sulfate Soils* (NSW EPA, 2014c); and
- NSW EPA *Addendum to the Waste Classification Guidelines (2014) - Part 1: Classifying Waste* (NSW EPA, 2016) [addendum for per- and poly-fluoroalkyl substances (PFAS)].

Samples will be collected from stockpiles / in situ fill at various depths to characterise the full depth of the material. The frequency is to be determined by the Environmental Consultant based on the risk of contamination and heterogeneity of the material.

For stockpiles comprising similar materials and a:

- Volume up to 200 m³: a recommended minimum frequency of one sample per 25 m³, with a minimum of three per stockpile (NSW EPA, 2022); or
- Volume greater than 200 m³: a recommended minimum frequency of one sample per 25 m³, with a minimum of 12 samples OR a minimum of 10 samples and calculation of the 95% upper confidence limit of the arithmetic mean for all applicable analytes (NSW EPA, 2022). Note that this does not apply to stockpiles impacted, or potentially impacted, by asbestos. For stockpiles greater than 200 m³ which are impacted, or potentially impacted, by asbestos the Environmental Consultant shall provide guidance in accordance with NSW EPA (2022).

It may be possible to classify excavated soil / fill for reuse on another site under a relevant NSW EPA resource recovery order (RRO) so that it can be used on other sites under the requirements of the corresponding NSW EPA resource recovery exemption (RRE). For this option, the frequency of sampling should be in accordance with the relevant RRO and the contaminants to be analysed will be determined by the Environmental Consultant. The Environmental Consultant will provide a report confirming the suitability of the spoil for reuse under a RRO, or otherwise.

All waste must be tracked by the Remediation Contractor from 'cradle to grave'. Copies of all consignment notes / disposal dockets (or similar) and environment protection licences for receipt and disposal of the materials must be maintained by the Remediation Contractor as part of the site log and must be provided to the Environmental Consultant for inclusion in the validation report.

14. Imported material

Any soil, aggregate etc imported for the remediation works must have contaminant concentrations that meet the relevant criteria outlined in Section 11. Imported materials will only be accepted for use at the site if:

- It can legally be accepted onto the site (e.g. classified as virgin excavated natural material (VENM), accompanied by a report / certificate prepared by a qualified environmental consultant);
- Visual inspection of the imported soil confirms that the soil has no signs of concern and is consistent with those described in the supporting classification documentation; and
- It has no aesthetic issues of concern, and
- The materials are validated (by inspection / sampling) by the Environmental Consultant as being suitable for use at the site.

The classification report / certificate for all material proposed for import must be reviewed and approved in writing by the Environmental Consultant prior to import. Materials to be imported may need to meet geotechnical requirements which are to be assessed by others, as required.

If permitted by the development consent and approved by the site owner, Remediation Contractor and Environmental Consultant, material classified under a NSW EPA RRO may also be accepted, provided the material can be used on site in accordance with the corresponding RRE. This could include excavated natural material (ENM), classified under NSW EPA *Resource*

Recovery Order under Part 9, Clause 93 of the Protection of the Environment Operations (Waste) Regulation 2014, The excavated natural material order 2014 (NSW EPA, 2014d).

The need for check-sampling of VENM and/or RRO material is to be determined by the Environmental Consultant depending on the source of the material, adequacy of the supporting documentation provided and inspection(s) of material. Quarried material / VENM may need little or no check sampling.

Any recycled materials proposed for importation must be sampled at a frequency of one sample per 25 m³, with a minimum of three samples per load. The recycled material will not be permitted to be used on site until the results of the inspection and laboratory analysis have been approved in writing by the Environmental Consultant.

15. Quality assurance and quality control

Field quality assurance and quality control (QA/QC) testing will include the following:

- 5% sample inter-laboratory analysis, analysed for the same suite as primary sample;
- 5% sample intra-laboratory analysis, analysed for the same suite as primary sample;
- Rinsate samples (where re-useable sampling equipment is used), analysed for the suite of analytes analysed by the majority of the primary samples; and
- Trip spike and trip blank samples (analysed for BTEX) (approximately one per batch of samples where volatile contaminants are CoPC).

The laboratory will undertake analysis in accordance with its NATA accreditation, including in-house QA/QC procedures.

The QC analytical results will be assessed using the following criteria:

- Sampling location rationale met the sampling objective;
- Standard operating procedures (SOP) are followed;
- Appropriate QA/QC samples are collected/prepared and analysed;
- Samples are stored under secure, temperature-controlled conditions;
- Chain of custody documentation is employed for the handling, transport and delivery of samples to the selected laboratory;
- Conformance with specified holding times;
- Accuracy of spiked samples within the laboratory's acceptable range (typically 70-130% for inorganic contaminants and greater for some organic contaminants);
- Field and laboratory duplicate, and replicate samples will have a precision average of +/- 30% relative percentage difference (RPD); and
- Rinsate samples will show that the sampling equipment (if used) is free of introduced contaminants, i.e. the analytes show that the rinsate sample is within the normal range for deionised water.

16. Management and responsibilities

16.1 Site management plan

A general site management plan for the operational phase of site remediation is included in Appendix E. The management plan includes soil, noise, dust, work health safety (WHS), remediation schedule, hours of operation and incident response. The Remediation Contractor is to implement the general site management plan for the duration of remediation works by incorporating the plan into their over-arching construction environmental management plan (CEMP).

16.2 Site responsibilities

The site management plan (Appendix E) provides a summary of the general program management and associated responsibilities. Contact details for key utilities are also included in the event of needing to respond to any incidents.

16.3 Contingency plan and unexpected finds protocol

Plans for contingency situations (e.g. encountering asbestos in fill), along with an unexpected finds protocol for dealing with unexpected finds during remediation work / earthworks, are included in Appendix F.

17. Validation reporting

17.1 Documentation

The following documents will need to be collated and reviewed by the Environmental Consultant as part of the validation assessment (including those items that are prepared by the Environmental Consultant):

- Any licences and approvals required for the remediation works (Remediation Contractor);
- Waste classification report(s) (Environmental Consultant);
- Transportation Record: comprising a record of all truckloads of soil (including aggregate) entering the site, including truck identification (e.g. registration number), date, time, source site, load characteristics (e.g. type of material, i.e. quarried aggregate, etc.), approximate volume, use (e.g., general site raising, service trenches, etc.) (Remediation Contractor);
- Disposal dockets: for any soil disposed off-site including transportation records, spoil source, spoil disposal location, receipt provided by the receiving waste facility / site (Remediation Contractor). Note: A record of the building materials disposed off-site is also to be kept and provided to the Principal, on request;
- Imported materials records: records for any soil imported onto the site, including source site, classification reports, inspection records of soil upon receipt at site and transportation records (Remediation Contractor);
- Records relating to any unexpected finds and contingency plans implemented (Remediation Contractor);
- Laboratory certificates and chain-of-custody documentation;

- Inspections records from the Environmental Consultant;
- Photographic records by all contractors and consultants of the works undertaken within their purview of responsibilities (Remediation Contractor);
- Airborne asbestos monitoring records (in the event that asbestos works are undertaken due any unexpected finds) (Remediation Contractor); and
- Interim / final visual and sampling clearances for any asbestos related works (in the event that asbestos works are undertaken due any unexpected finds) (Remediation Contractor).

17.2 Reporting

A validation assessment report will be prepared by the Environmental Consultant in accordance with NSW EPA (2020).

The validation report shall describe the remediation approach adopted, methodology, results and conclusion of the assessment and make a statement regarding the suitability of the site for the proposed activity (primary school).

18. Conclusions

It is considered that the site can be made suitable for the proposed New Primary School in Worrigeer activity subject to implementation of this RAP.

19. References

CRC CARE. (2019a). *Remediation Action Plan: Development - Guideline on Establishing Remediation Objectives*. National Remediation Framework: CRC for Contamination Assessment and Remediation of the Environment.

CRC CARE. (2019b). *Remediation Action Plan: Development - Guideline on Performing Remediation Options Assessment*. National Remediation Framework: CRC for Contamination Assessment and Remediation of the Environment.

GSNSW. (2023). *NSW Seamless Geology*. Geological Survey NSW Web Map Service.

NEPC. (2013). *National Environment Protection (Assessment of Site Contamination) Measure 1999 (as amended 2013) [NEPM]*. Australian Government Publishing Services Canberra: National Environment Protection Council.

NSW EPA. (2014a). *Waste Classification Guidelines, Part 1: Classifying Waste*. NSW Environment Protection Authority.

NSW EPA. (2014b). *Waste Classification Guidelines, Part 2: Immobilisation of Waste*. NSW Environment Protection Authority.

NSW EPA. (2014c). *Waste Classification Guidelines, Part 4: Acid Sulfate Soils*. NSW Environment Protection Authority.

NSW EPA. (2014d). *Resource Recovery Order under Part 9, Clause 93 of the Protection of the Environment Operations (Waste) Regulation 2014, The excavated natural material order 2014*. NSW Environment Protection Authority.

NSW EPA. (2016). *Addendum to the Waste Classification Guidelines (2014) - Part 1: Classifying Waste*. NSW Environment Protection Authority.

NSW EPA. (2020). *Guidelines for Consultants Reporting on Contaminated Land*. Contaminated Land Guidelines: NSW Environment Protection Authority.

NSW EPA. (2022). *Sampling Design, Part 1: Application; Part 2: Interpretation*. NSW Environment Protection Authority.

20. Limitations

Douglas Partners Pty Ltd (Douglas) has prepared this report for this project at 9 Worrigeer Road, Worrigeer NSW in line with Douglas' proposal dated 17 March 2026 as variation to Work Order DDWO0743425 and was undertaken in accordance with SINSW Standing Offer Deed for the provision of services, SINSW02503/21-D and acceptance received from dated 24 April 2026 from Sabina Naser. This report is provided for the exclusive use of School Infrastructure NSW for this project only and for the purposes as described in the report. It should not be used by or relied upon for other projects or purposes on the same or other site or by a third party. Any party so relying upon this report beyond its exclusive use and purpose as stated above, and without the express written consent of Douglas, does so entirely at its own risk and without recourse to Douglas for any loss or damage. In preparing this report Douglas has necessarily relied upon information provided by the client and/or their agents.

The results discussed in the report are indicative of the sub-surface conditions on the site only at the specific sampling and/or testing locations, and then only to the depths investigated and at the time the work was carried out. Sub-surface conditions can change abruptly due to variable geological processes and also as a result of human influences. Such changes may occur after Douglas' field testing has been completed.

Douglas' advice is based upon the conditions encountered during previous investigations. The accuracy of the advice provided by Douglas in this report may be affected by undetected variations in ground conditions across the site between and beyond the sampling and/or testing locations. The advice may also be limited by budget constraints imposed by others or by site accessibility.

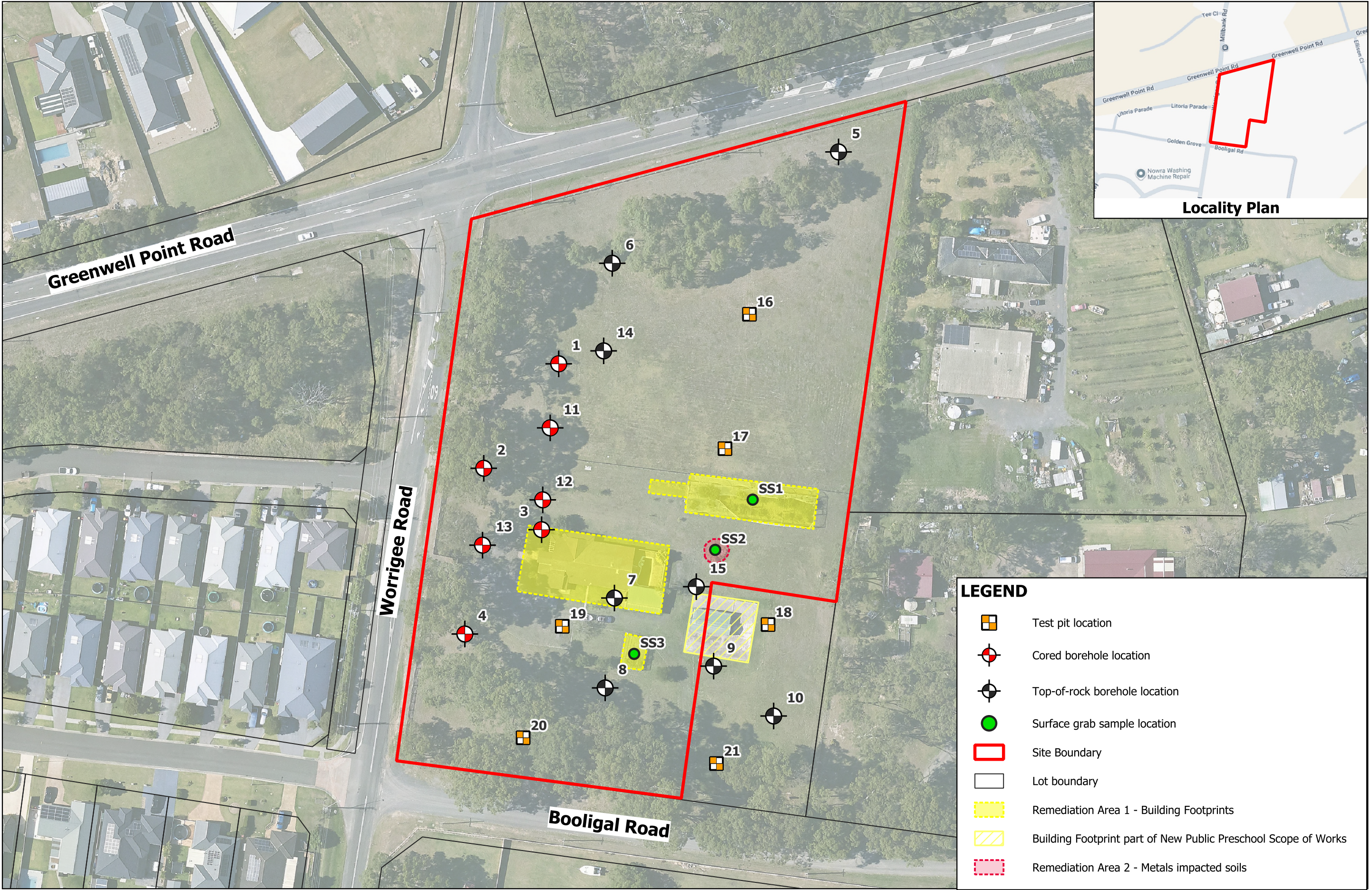
The assessment of atypical safety hazards arising from this advice is restricted to the environmental components set out in this report and based on known project conditions and stated design advice and assumptions. While some recommendations for safe controls may be provided, detailed 'safety in design' assessment is outside the current scope of this report and requires additional project data and assessment.

This report must be read in conjunction with all of the attached and should be kept in its entirety without separation of individual pages or sections. Douglas cannot be held responsible for interpretations or conclusions made by others unless they are supported by an expressed statement, interpretation, outcome or conclusion stated in this report.

This report, or sections from this report, should not be used as part of a specification for a project, without review and agreement by Douglas. This is because this report has been written as advice and opinion rather than instructions for construction.

Appendix A

Drawing 1
About this Report



REV	DESCRIPTION/COMMENT	DATE	DRAWN BY
0	234398.05.R.005.Rev0	1.05.2026	EB
1	234398.05.R.005.Rev1	29.05.2026	KGH

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Douglas
PARTNERS

OFFICE: Wollongong
1 Luso Drive, Unanderra NSW
(02) 4271 1836

CLIENT:

Education
School Infrastructure

NOTE:
1: Basemap from Metromap.com (Dated 09.01.2026)

COORDINATE REFERENCE SYSTEM: GDA2020, MGA ZONE 56

PROJECT NAME:
New Primary School in Worrigeer

PROJECT ADDRESS:
9 Worrigeer Road, Worrigeer NSW

DRAWING TITLE:
Site Location and Features

PROJECT NO:
234398.05

DRAWING NO:
D.001

REVISION:
1

Introduction

These notes have been provided to amplify Douglas' report in regard to classification methods, field procedures and the comments section. Not all are necessarily relevant to all reports.

Douglas' reports are based on information gained from limited subsurface excavations and sampling, supplemented by knowledge of local geology and experience. For this reason, they must be regarded as interpretive rather than factual documents, limited to some extent by the scope of information on which they rely.

Copyright

This report is the property of Douglas Partners Pty Ltd. The report may only be used for the purpose for which it was commissioned and in accordance with the Engagement Terms for the commission supplied at the time of proposal. Unauthorised use of this report in any form whatsoever is prohibited.

Borehole and Test Pit Logs

The borehole and test pit logs presented in this report are an engineering and/or geological interpretation of the subsurface conditions, and their reliability will depend to some extent on frequency of sampling and the method of drilling or 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 erroneous indication of the true water table;
- Water table levels will vary from time to time with seasons or recent weather

changes. 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 measurements can be made by installing standpipes which are read at intervals over several days, or perhaps weeks for low permeability soils. Piezometers, sealed in a particular stratum, may be advisable in low permeability soils or where there may be interference from a perched water table.

Reports

The report has been prepared by qualified personnel, is based on the information obtained from field and laboratory testing, and has been undertaken to current engineering standards of interpretation and analysis. Where the report has been prepared for a specific design proposal, the information and interpretation may not be relevant if the design proposal is changed. If this happens, Douglas will be pleased to review the report and the sufficiency of the investigation work.

Every care is taken with the report as it relates to interpretation of subsurface conditions, discussion of geotechnical and environmental aspects, and recommendations or suggestions for design and construction. However, Douglas cannot always anticipate or assume responsibility for:

- Unexpected variations in ground conditions. The potential for this will depend partly on borehole or pit spacing and sampling frequency;
- Changes in policy or interpretations of policy by statutory authorities; or
- The actions of contractors responding to commercial pressures.

If these occur, Douglas will be pleased to assist with investigations or advice to resolve the matter.

About this Report

Site Anomalies

In the event that conditions encountered on site during construction appear to vary from those which were expected from the information contained in the report, Douglas requests that it be immediately notified. Most problems are much more readily resolved when conditions are exposed rather than at some later stage, well after the event.

Information for Contractual Purposes

Where information obtained from this report is provided for tendering purposes, it is recommended that all information, including the written report and discussion, be made available. In circumstances where the discussion or comments section is not relevant to the contractual situation, it may be appropriate to prepare a specially edited document. Douglas would be pleased to assist in this regard and/or to make additional report copies available for contract purposes at a nominal charge.

Site Inspection

The company 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.

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Appendix B

Remediation Options Assessment and Evaluation

1. Introduction

The following key guidelines and technical reports were consulted in the preparation of this remediation options assessment:

- NEPC *National Environment Protection (Assessment of Site Contamination) Measure 1999 (as amended 2013) [NEPM]* (NEPC, 2013); and
- CRC CARE *Remediation Action Plan: Development - Guideline on Performing Remediation Options Assessment* (CRC CARE, 2019a).

The first stage of developing a remediation strategy is to establish clear and measurable remediation objectives and remediation criteria (clean-up levels). These will form the requirements against which remediation options are assessed.

The next stage of the remediation options assessment is to select technology and management options, or combinations of options, that have the potential to reduce contaminant concentrations and/or apply management controls as necessary so that the remediation objectives are achieved and no unacceptable risk is posed by the contamination in the context of the current and proposed site use. Where several viable options have been identified, an assessment of each of the options will be required to determine which option will most adequately and sustainably meet the remediation objectives (CRC CARE, 2019a).

The remediation objectives are to:

- Address potentially unacceptable risks to relevant environmental values from contamination (refer to the CSM in Section 7); and
- Render the site suitable, from a contamination perspective, for the proposed activity (refer to Section 1).

2. Hierarchy of remediation options

NEPC (2013) stipulates the preferred hierarchy of options for site clean-up (remediation) and/or management which is outlined as follows:

- On-site treatment of the contamination so that it is destroyed, or the associated risk is reduced to an acceptable level; and
- Off-site treatment of excavated soil, so that the contamination is destroyed, or the associated risk is reduced to an acceptable level, after which soil is returned to the site;

or, if these two options are not practicable;

- Consolidation and isolation of the soil on site by containment with a properly designed barrier; and
- Removal of contaminated material to an approved site or facility, followed, where necessary, by replacement with appropriate material;

or,

- 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.

3. Remediation options assessment

3.1 Introduction

The following issues have been identified at the site which require remediation:

- Potentially impacted soils beneath building footprints; and
- Metals impacted soils surrounding SS2.

3.2 Remediation options assessment

Given the straightforward nature of the contamination issues at the site and the necessary earthworks (final landform) as part of the proposed activity, only three options for the soil contamination have been considered, as follows:

- Do nothing;
- On-site management / cap and contain (consolidation and isolation by containment); and
- Excavation and off-site disposal.

The following key guidelines have therefore been consulted:

- CRC CARE *Technology Guide: Soil - Containment* (CRC CARE, 2019c);
- CRC CARE *Technology Guide: Soil - Excavation* (CRC CARE, 2019b);
- WA DoH *Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia* (WA DoH, 2021); and
- WorkCover NSW *Managing Asbestos in or on Soil* (WorkCover NSW, 2014).

In consultation with the client, Douglas understand that an important consideration to the client is the ongoing liability associated with a cap and contain strategy.

Accordingly, the preferred remediation strategy is excavation and off-site disposal.

4. Preferred remediation strategy

The preferred option selected in consultation with the client, taking in to account technical considerations (as discussed herein), and other project specific considerations (such as program, cost and consideration of ongoing liability implications) is excavation and off site disposal of impacted soils.

5. References

CRC CARE. (2019a). *Remediation Action Plan: Development - Guideline on Performing Remediation Options Assessment*. National Remediation Framework: CRC for Contamination Assessment and Remediation of the Environment.

CRC CARE. (2019b). *Technology Guide: Soil - Excavation*. National Remediation Framework: CRC for Contamination Assessment and Remediation of the Environment.

CRC CARE. (2019c). *Technology Guide: Soil - Containment*. National Remediation Framework: CRC for Contamination Assessment and Remediation of the Environment.

NEPC. (2013). *National Environment Protection (Assessment of Site Contamination) Measure 1999 (as amended 2013) [NEPM]*. Australian Government Publishing Services Canberra: National Environment Protection Council.

WA DoH. (2021). *Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia*. WA Department of Health.

WorkCover NSW. (2014). *Managing Asbestos in or on Soil*. March 2014: WorkCover NSW, NSW Government.

Appendix C

Site Assessment Criteria

1. Introduction

1.1 Guidelines

The following key guidelines were consulted for deriving the site assessment criteria (SAC):

- NEPC *National Environment Protection (Assessment of Site Contamination) Measure 1999 (as amended 2013) [NEPM]* (NEPC, 2013).
- HEPA *PFAS National Environmental Management Plan (NEMP)* (HEPA, 2025).

1.2 General

The SAC applied to the RAP are the same as from the DSI and are informed by the CSM which identified human and environmental receptors to potential contamination at the site. Analytical results are assessed (as a Tier 1 assessment) against the SAC comprising primarily the investigation and screening levels of Schedule B1 of NEPC (2013).

The following inputs are relevant to the selection and/or derivation of the SAC:

- Land use: residential (relevant to primary school as below).
 - Corresponding to land use category 'A', residential with garden / accessible soil (home grown produce <10% fruit and vegetable intake, (no poultry)), also includes children's day care centres, preschools and primary schools.
- Soil type: sand / silt / clay.

2. Soils

2.1 Health investigation and screening levels

The generic health investigation levels (HIL) and health screening levels (HSL) are considered to be appropriate for the assessment of human health risk via all relevant pathways of exposure associated with contamination at the site. The adopted soil HIL and HSL for the contaminants of concern are in Table 1 and Table 2.

Table 1: Health investigation levels (mg/kg)

Contaminant	HIL-A
Metals	
Arsenic	100
Cadmium	20
Chromium (VI)	100
Copper	6000
Lead	300
Mercury (inorganic)	40

Contaminant	HIL-A
Nickel	400
Zinc	7400
PAH	
B(a)P TEQ	3
Total PAH	300
Phenols	
Phenol	3000
Pentachlorophenol	100
OCP	
DDT+DDE+DDD	240
Aldrin and dieldrin	6
Chlordane	50
Endosulfan	270
Endrin	10
Heptachlor	6
HCB	10
Methoxychlor	300
OPP	
Chlorpyrifos	160
PCB	
PCB	1

Table 2: Health screening levels (mg/kg)

Contaminant	HSL-A&B	HSL-A&B
SAND	0 m to <1 m	1 m to <2 m
Benzene	0.5	0.5
Toluene	160	220
Ethylbenzene	55	NL
Xylenes	40	60
Naphthalene	3	NL
TRH F1	45	70
TRH F2	110	240
SILT	0 m to <1 m	1 m to <2 m

Contaminant	HSL-A&B	HSL-A&B
Benzene	0.6	0.7
Toluene	390	NL
Ethylbenzene	NL	NL
Xylenes	95	210
Naphthalene	4	NL
TRH F1	40	65
TRH F2	230	NL
CLAY	0 m to <1 m	1 m to <2 m
Benzene	0.7	1
Toluene	480	NL
Ethylbenzene	NL	NL
Xylenes	110	310
Naphthalene	5	NL
TRH F1	50	90
TRH F2	280	NL

Notes: TRH F1 is TRH C₆-C₁₀ minus BTEX

TRH F2 is TRH >C₁₀-C₁₆ minus naphthalene

The soil saturation concentration (C_{sat}) is defined as the soil concentration at which the porewater phase cannot dissolve any more of an individual chemical. The soil vapour that is in equilibrium with the porewater will be at its maximum. If the derived soil HSL exceeds C_{sat}, a soil vapour source concentration for a petroleum mixture could not exceed a level that would result in the maximum allowable vapour risk for the given scenario. For these scenarios, no HSL is presented for these chemicals and the HSL is shown as 'not limiting' or 'NL'

The HSL for direct contact derived from CRC CARE (2011) are in Table 3.

Table 3: Health screening levels for direct contact (mg/kg)

Contaminant	DC HSL-A	DC HSL-IMW
Benzene	100	1100
Toluene	14 000	120 000
Ethylbenzene	4500	85 000
Xylenes	12 000	130 000
Naphthalene	1400	29 000
TRH F1	4400	82 000
TRH F2	3300	62 000
TRH F3	4500	85 000
TRH F4	6300	120 000

Notes: TRH F1 is TRH C₆-C₁₀ minus BTEX

TRH F2 is TRH >C₁₀-C₁₆ minus naphthalene

IMW intrusive maintenance worker

2.2 Health investigation levels for per- and poly-fluoroalkyl substances in soil

The laboratory analytical results for per- and poly-fluoroalkyl substances (PFAS) in soil have been assessed against HIL published in HEPA (2025). The HIL represent a nationally-agreed suite that should be used to inform site investigations. The HIL are intentionally conservative, and an exceedance of these criteria may not constitute a risk if other exposure pathways are controlled. An exceedance of the HIL should trigger further investigations, such as a site-specific risk assessment. At the time of this investigation, screening values were available only for perfluorooctane sulfonate (PFOS), perfluorooctanoic acid (PFOA) and perfluorohexane sulfonate (PFHxS).

The HIL derived from Table 5 of HEPA (2025) are in Table 4.

Table 4: Health investigation levels (mg/kg)

Contaminant	HIL-A
PFOS and PFHxS *	0.003
PFOA	0.06

Notes: * Includes PFOS only, PFHxS only and the sum of the two.

2.3 Asbestos in soil

The HSL for asbestos in soil are based on likely exposure levels for different scenarios published in NEPC (2013) for the following forms of asbestos:

- Bonded asbestos containing material (ACM); and
- Fibrous asbestos and asbestos fines (FA and AF).

The HSL are in Table 5.

Table 5: Health screening levels for asbestos

Form of asbestos	HSL-A
ACM	0.01%
FA and AF	0.001%
FA and AF and ACM	No visible asbestos for surface soil *

Notes: Surface soils defined as top 10 cm.

* Based on site observations at the sampling points and the analytical results of surface samples.

Where insufficient sample recovery is possible for FA and AF analysis the presence or absence of asbestos at a limit of reporting of 0.1 g/kg (AS:4964) will be adopted for the assessment as an initial screen.

2.4 Ecological investigation levels

Ecological investigation levels (EIL) and added contaminant limits (ACL), where appropriate, have been derived in NEPC (2013) for arsenic, copper, chromium (III), nickel, lead, zinc, DDT and naphthalene. The adopted EIL, derived using the interactive (excel) calculation spreadsheet on the NEPM toolbox website are shown in Table 7, with inputs into their derivation shown in Table 6.

Table 6: Inputs to the derivation of the ecological investigation levels

Variable	Input	Rationale
Age of contaminants	"Aged" (>2 years)	Historic contamination sources
pH	5.30	Average of results
CEC	6.93 cmol _c /kg	Average of results
Clay content	10%	Assumed, conservative
Traffic volumes	Low	Low traffic environment
State / Territory	NSW	Location of site

Table 7: Ecological investigation levels (mg/kg)

Contaminant	EIL-A-B-C
Metals	
Arsenic	100
Copper	130
Nickel	75
Chromium III	410
Lead	1100
Zinc	280
PAH	
Naphthalene	170
OCP	
DDT	180

Notes: EIL-A-B-C urban residential and public open space

2.5 Ecological screening levels

Ecological screening levels (ESL) are used to assess the risk of selected petroleum hydrocarbon compounds, BTEX and benzo(a)pyrene to terrestrial ecosystems. The adopted ESL are shown in Table 8.

Table 8: Ecological screening levels (mg/kg)

Contaminant	Soil type	ESL-A-B-C
Benzene	Coarse	50
Toluene	Coarse	85
Ethylbenzene	Coarse	70
Xylenes	Coarse	105
TRH F1	Coarse/ Fine	180*
TRH F2	Coarse/ Fine	120*
TRH F3	Coarse	300
TRH F4	Coarse	2800
B(a)P	Coarse	0.7
Benzene	Fine	65
Toluene	Fine	105
Ethylbenzene	Fine	125
Xylenes	Fine	45
TRH F1	Coarse/ Fine	180*
TRH F2	Coarse/ Fine	120*
TRH F3	Fine	1300
TRH F4	Fine	5600
B(a)P	Fine	0.7

Notes: ESL are of low reliability except where indicated by * which indicates that the ESL is of moderate reliability
 TRH F1 is TRH C₆-C₁₀ minus BTEX
 TRH F2 is TRH >C₁₀-C₁₆ including naphthalene
 ESL-A-B-C urban residential and public open space

2.6 Ecological soil guideline values

The interim ecological soil guideline values (EGV) derived from Table 6 of HEPA (2025) are in Table 9.

Table 9: Ecological soil guideline values (mg/kg) – all land uses

Contaminant	Direct exposure	Indirect exposure
PFOS	1	0.003
PFOA	10 / 0.005	0.003
PFHxS	NC	NC

Notes: NC no criterion

*For intensely developed sites with no secondary consumers and minimal potential for indirect ecological exposure, a higher criterion of up to 0.14 mg/kg PFOS may be appropriate.

2.7 Management limits

In addition to appropriate consideration and application of the HSL and ESL, there are additional considerations which reflect the nature and properties of petroleum hydrocarbons, including:

- Formation of observable light non-aqueous phase liquids (LNAPL);
- Fire and explosion hazards;
- Effects on buried infrastructure e.g. penetration of, or damage to, in-ground services.

The adopted management limits are in Table 10.

Table 10: Management limits (mg/kg)

Contaminant	Soil type	ML-A-B-C
TRH F1	Coarse	700
TRH F2	Coarse	1000
TRH F3	Coarse	2500
TRH F4	Coarse	10 000
TRH F1	Fine	800
TRH F2	Fine	1000
TRH F3	Fine	3500
TRH F4	Fine	10 000

Notes: TRH F1 is TRH C₆-C₁₀ including BTEX
 TRH F2 is TRH >C₁₀-C₁₆ including naphthalene
 ML-A-B-C residential, parkland and public open space

3. References

HEPA. (2025). *PFAS National Environmental Management Plan (NEMP)*. Version 3.0: Heads of EPAs Australia and New Zealand.

NEPC. (2013). *National Environment Protection (Assessment of Site Contamination) Measure 1999 (as amended 2013) [NEPM]*. Australian Government Publishing Services Canberra: National Environment Protection Council.

Appendix D

Data Quality Objectives

1. Data quality objectives

The objective of the validation plan is to assess the results of validation testing against the remediation acceptance criteria (RAC) stated within Section 11.1, assess the resultant suitability of the site for the intended land use, and to provide information on any environmental impacts which may have resulted from the works.

The validation assessment will be conducted with reference to the seven step data quality objectives process (DQO) as outlined in NEPC (2013), described below.

Table 1: Data quality objectives

Step	Summary
1: State the problem	The site requires remediation and validation of remediation in order to render it suitable for residential land use (as applicable to the proposed primary school). The objective of the validation plan is to confirm the successful implementation of this remediation action plan. A conceptual site model (CSM) for the proposed development has been prepared (Section 7).
2: Identify the decisions / goal of the study	The CSM identifies the contaminants of potential concern (CoPC) and the likely impacted media. The key CoPC impacting the site are: - Metals (arsenic, total chromium and copper); and - Any additional impacts identified through supplementary investigation. The validation sampling results will be compared against the RAC. The preferred remediation strategy as outlined in the RAP is the excavation and disposal of contaminated soils. The success of the remediation and subsequent validation will be based on a comparison of the analytical results for all CoPC to the adopted RAC and, if necessary, compared to the 95% upper confidence limit (UCL) of the arithmetic mean (95% UCL) concentrations.
3: Identify the information inputs	Relevant inputs to the decision include: - The CSM, identifying the CoPC and affected media; - Analysis for the relevant CoPC using NATA accredited laboratories and methods, where possible; - Field and laboratory QA/QC data to assess the suitability of the environmental data for the validation assessment; - Results compared with the RAC; - Assessments of any aggregates, soil, etc imported as part of the permanent remediation works; and

Step	Summary
	A photoionisation detector (PID) to screen soils on site for VOC. PID readings will be used to inform sample selection for laboratory analysis as part of the supplementary investigation.
4: Define the study boundaries	The lateral boundaries of the site are shown on Drawing 1, Appendix A. The vertical boundaries are to the extent of contamination impact as determined from the site history assessment, site observations and previous investigations used to inform the RAP.
5: Develop the analytical approach (or decision rule)	The decision rule is to compare all analytical results with the RAC. Initial comparisons will be with individual results then, where appropriate, summary statistics (including mean, standard deviation and 95% UCL), to further assess potential risks posed by the site contamination. Quality control results are to be assessed according to their relative percent difference (RPD) values. For field and laboratory duplicate results, RPDs should generally be below 30%; for field blanks, results should be at or less than the limits of reporting (NEPC, 2013). The field and laboratory quality assurance assessment is included in Section 15.
6: Specify the performance or acceptance criteria	Baseline condition: Contaminants at the site and/or statistical analysis of data exceed the RAC and pose a potentially unacceptable risk to receptors (null hypothesis). Alternative condition: Contaminants at the site and statistical analysis of data complies with the RAC and therefore, do not pose a potentially unacceptable risk to receptors (alternative hypothesis). Unless conclusive information from the collected data is sufficient to reject the null hypothesis, it will be assumed that the baseline condition is true.
7: Optimise the design for obtaining data	Sampling design and procedures to be implemented to optimise data collection for achieving the DQO include the following: - Sampling frequencies in accordance with Section 12.4; - Analysis for the CoPC at NATA accredited laboratories using NATA endorsed methods where possible; and - Adequately experienced environmental scientists/engineers conducting field work and sample analysis interpretation.

2. References

NEPC. (2013). *National Environment Protection (Assessment of Site Contamination) Measure 1999 (as amended 2013) [NEPM]*. Australian Government Publishing Services Canberra: National Environment Protection Council.

Appendix E

Site Managment Plan

1. Introduction

This general site management plan (SMP) has been developed to minimise potentially adverse impacts on the environment, and worker and public health as a result of the proposed remediation works.

The Remediation Contractor must have in place a construction environmental management plan (CEMP) (or similar) which is specific to the equipment used for the remediation and the proposed methods to be adopted by the Remediation Contractor. This SMP has been prepared to augment the Remediation Contractor's CEMP and contains general details for aspects of the work, as per reporting requirements for a remediation action plan (RAP) under NSW EPA *Guidelines for Consultants Reporting on Contaminated Land* (NSW EPA, 2020).

Apart from the management principles outlined in this SMP, the Remediation Contractor must also ensure compliance with all relevant environmental legislation and regulations, including (but not limited to) the following:

- Contaminated Land Management Act 1997 NSW (CLM Act);
- Protection of the Environment Operations Act 1997 NSW (POEO Act);
- Protection of the Environment Legislation Amendment Act 2011 NSW;
- Protection of the Environment Operations Amendment (Scheduled Activities and Waste) Regulation 2008 NSW.
- Environmentally Hazardous Chemicals Act 1985 NSW;
- Environmental Offences and Penalties Act 1989 NSW;
- Pesticide Act 1999 NSW and Pesticides Regulation 2017; and
- Work Health and Safety Act 2017 NSW (WHS Act) and Work Health and Safety Regulations 2017 NSW.

2. Roles and responsibilities

2.1 Principal

The Principal is responsible for the environmental performance of the proposed remediation works, including implementation of acceptable environmental controls during remediation works. The Principal will retain the overall responsibility for ensuring this RAP is appropriately implemented. The Principal is to nominate a representative (the Principal's Representative), who is responsible for overseeing the implementation of this RAP. The actual implementation of the RAP will, however, be conducted by the Remediation Contractor on behalf of the Principal.

The Principal is responsible for providing appropriate information to the Remediation Contractor to allow them to safely plan the required works. This includes the asbestos register for the site and this RAP.

The Principal is also responsible for implementing an appropriate communications plan.

2.2 Remediation Contractor

The Remediation Contractor will be the party responsible for daily implementation of this RAP and shall fulfil the responsibilities of the Remediation Contractor as defined by SafeWork NSW. It is noted that the Remediation Contractor may appoint appropriately qualified sub-contractors or sub-consultants to assist in fulfilling the requirements of the procedures. The Remediation Contractor will appoint a Site Manager.

In addition to the implementation of the RAP it will be the Remediation Contractors responsibility to:

- Obtain/ensure relevant sub-contractors obtain specific related approvals as necessary to implement the earthworks including permits for removal of asbestos-containing material, SafeWork NSW notification etc.;
- Develop or request and review any site plans to manage the works to be conducted;
- Ensure that all remediation works and other related activities are undertaken in accordance with this RAP;
- Maintain all site records related to the implementation of this RAP including but not limited to;
 - o Tracking of all movement of soil within the site, on to site and off-site from cradle to grave;
 - o Transportation Record: comprising a record of all truckloads of soil (including aggregate) entering the site, including truck identification (e.g. registration number), date, time, source site, load characteristics (e.g. type of material, i.e. quarried aggregate, etc.), approximate volume, use (e.g., general site raising, service trenches, etc.);
 - o Disposal dockets: for any soil disposed off-site including transportation records, spoil source, spoil disposal location, receipt provided by the receiving waste facility / site;
 - o Imported materials records: records for any soil imported onto the site, including source site, classification reports, inspection records of soil upon receipt at site and transportation records;
 - o Records relating to any unexpected finds and contingency plans implemented;
 - o Photographic records by all contractors and consultants of the works undertaken within their purview of responsibilities; and
 - o Interim / final visual and sampling clearances for any asbestos related works (in the event that asbestos works are undertaken).
- Ensure sufficient information is provided to engage or direct all required parties, including sub-contractors, to implement the requirements of the RAP other than those that are the direct responsibility of the Remediation Contractor;
- Manage the implementation of any recommendation made by those parties in relation to work undertaken in accordance with the RAP;
- Inform, if appropriate, the relevant regulatory authorities of any non-conformances with the procedures and requirements of the RAP in accordance with the procedures outlined in this document;
- Retain records of any contingency actions;

- On completion of the project, to review the RAP records for completeness and update as necessary; and
- Recommend any modification to general documentation which would further improve the environmental outcomes of this RAP.

2.3 Surveyor

The project surveyor will be a registered surveyor engaged by the Remediation Contractor to undertake surveying works as required by this RAP.

2.4 Asbestos Contractor

The Asbestos Contractor will be responsible for undertaking all asbestos work involving any asbestos impacted fill and will hold a Class A licence for the removal of asbestos (issued by SafeWork NSW), on the basis that the asbestos identified at the site to date has included both friable and bonded asbestos.

The Asbestos Contractor can be the same entity as the Remediation Contractor.

2.5 Sub-contractors

All sub-contractors will be inducted onto the site, informed of their responsibilities in relation to this RAP and sign their agreement to abide by the RAP requirements. Where necessary, sub-contractors will also be trained in accordance with the requirements of this document. All sub-contractors must conduct their operations in accordance with the RAP as well as all applicable regulatory requirements.

2.6 Environmental Consultant

The Environmental Consultant will provide advice on implementing the RAP. The Environmental Consultant will be responsible for:

- Undertake any required assessments where applicable (e.g. waste classification, validation);
- Provide advice and recommendations arising from monitoring and/or inspections, including unexpected finds; and
- Notify the Client with any results of assessments, and any observed non-conformances.

2.7 Site workers

All workers on the site are responsible for observing the requirements of this RAP and other management plans. These responsibilities include the following:

- Being inducted on the site and advised of the general nature of the remediation/environmental issues at the site;
- Being aware of the requirements of this plan;
- Wearing appropriate personal protective equipment (PPE) as required by this plan;
- Only entering restricted areas when permitted; and

- Requesting clarification when unclear of requirements of this or any other plans (e.g. safe work method statements (SWMS)).

3. Water management

3.1 Stormwater

Stormwater must be managed during the remediation works such that potential adverse impacts from surface runoff (e.g. cross contamination, mobilisation of contaminants in soil particles, etc.) are appropriately mitigated. Accordingly, the Remediation Contractor will take appropriate measures which may include:

- Construction, where necessary, of stormwater diversion channels, bunding and linear drainage sumps with catch pits in and around the remediation areas to divert stormwater from the contaminated areas;
- Provision of appropriately located sediment traps including geotextiles; and
- Discharge of excess water in excavations / low points on a regular basis to limit the potential for flooding.

3.2 Dewatering of excavations

Any runoff or seepage water accumulated in site excavations that requires removal must initially be sampled and tested for suspended solids, pH and any contaminants of potential concern (CoPC) as identified by the Environmental Consultant. The options for management of excavation pump-out water, dependent upon the test results, are for disposal of the water as follows:

- Discharge to stormwater with prior approval from Council. Provided the test results comply with relevant ANZG *Australian and New Zealand Guidelines for Fresh and Marine Water Quality* (ANZG, 2018), or any other compliance requirements stipulated by Council. The Environmental Consultant must consider the most appropriate criteria to be used; or
- Discharge to sewer, as industrial trade wastewater, with prior approval from Sydney Water. This option would require the analysis of a larger list of analytes, and compliance with the Sydney Water acceptance standards; or
- Pumping by a liquid waste contractor for removal of the water off-site, in accordance with regulatory requirements.

Note that, depending on the type and scale of the dewatering required, a permit (water use approval) may need to be obtained through NSW Water.

4. Soil management plan

The Remediation Contractor will develop a plan to mitigate cross contamination as part of the CEMP to be implemented throughout the works.

4.1 Stockpiling of contaminated material

Contaminated material shall be excavated and stockpiled at a suitably segregated location(s) away from sensitive areas (e.g. water bodies, drainage lines, stormwater pits, etc.) and ongoing excavations, and in a manner that will not cause nuisance to the neighbouring properties. Soil stockpiles are to be managed as follows:

- An impermeable membrane such as plastic sheeting should be provided at the surface by the Remediation Contractor prior to stockpiling. Plastic sheeting should be taped at joins, as necessary;
- All stockpiles of contaminated material shall be surrounded by star pickets and marking tape or other suitable material to clearly delineate their boundaries;
- Stockpiles shall be lightly conditioned by sprinkler or covered by geotextile or similar cover to prevent dust generation (if remaining overnight);
- Stockpiles impacted, or potentially impacted, with asbestos must be covered by geotextile or similar cover to prevent dust generation;
- Measures should be taken by the Remediation Contractor to prevent the migration of stockpile materials (i.e. perimeter bunds, hay bales, silt fences, etc.); and
- A record of stockpile locations (stockpile register), dimensions, descriptions, environmental controls, etc. should be maintained by the Remediation Contractor.

All movement of soil within the site is to be tracked by the Remediation Contractor, from cradle to grave. Copies of tracking records must be provided to the Environmental Consultant.

4.2 Stockpiling imported material

Imported material shall be stockpiled at a suitably segregated location(s) away from sensitive areas (e.g. water bodies, drainage lines, stormwater pits, etc.) and ongoing excavations, and in a manner that will not cause nuisance to the neighbouring properties. Soil stockpiles are to be managed as follows:

- Imported material should not be stockpiled within un-remediated areas of the site. If this is unavoidable an impermeable membrane such as plastic sheeting should be provided at the surface by the Remediation Contractor prior to stockpiling. Plastic sheeting should be taped at joins, as necessary;
- All stockpiles shall be surrounded by star pickets and marking tape or other suitable material to clearly delineate their boundaries;
- Stockpiles shall be lightly conditioned by sprinkler or covered by geotextile or similar cover to prevent dust generation (if remaining overnight); and
- A record of stockpile locations (stockpile register), dimensions, descriptions, environmental controls, etc. should be maintained by the Remediation Contractor.

All movement of soil within the site is to be tracked by the Remediation Contractor, from cradle to grave. Copies of tracking records must be provided to the Environmental Consultant.

4.3 Transport of material off-site and on to site

Transport of contaminated material from the site and imported material to the site shall be via a clearly delineated haul route(s) and this route shall be used exclusively for entry and egress of vehicles used to transport contaminated materials within and away from the site, and onto and within the site. The proposed transport route(s) (to be determined by the Remediation Contractor) will be notified to Council and truck dispatch shall be logged and recorded by the Remediation Contractor for each load leaving or arriving the site. A record of the truck dispatch will be provided to the Environmental Consultant.

All haulage routes for trucks transporting soil, materials, equipment or machinery to and from the site should be selected to meet the following objectives:

- Comply with all road traffic rules;
- Minimise noise, vibration and dust to adjacent premises; and
- Use State roads and minimise use of local roads as far as practicable.

The remediation work will be conducted such that all vehicles:

- Conduct deliveries of soil, materials, equipment or machinery only during the specified hours of remediation;
- Have securely covered loads to prevent any dust or odour emissions during transportation; and
- Exit the site in a forward direction.

In addition, measures will be implemented to ensure no contaminated material is spilled onto public roadways or tracked off-site on vehicle wheels. Roadways will be kept clean throughout the remediation works and will be broomed, if necessary, to achieve a clean environment.

All loads will be securely covered and may be lightly wetted, if required, to ensure that no materials or dust are dropped or deposited outside or within the site. Prior to exiting the site each truck should be inspected by Remediation Contractor personnel and either noted as clean (wheels and chassis) or broomed prior to leaving the site. Any soil spilled onto surrounding streets will be cleaned by mechanical or hand methods, on a daily basis.

Removal of waste materials from the site shall only be carried out by contractors holding the appropriate license(s), consent or approvals to dispose the waste materials according to the waste classification and with the appropriate approvals obtained from the EPA, where required.

Materials imported onto the site shall only be carried out by contractors holding the appropriate license(s), consent or approvals to transport the materials with the appropriate approvals obtained from the EPA, where required.

All movement of soil within the site is to be tracked by the Remediation Contractor, from cradle to grave. Copies of tracking records must be provided to the Environmental Consultant.

5. Noise and vibration control plan

All equipment and machinery should be operated in an efficient manner to minimise the emission of noise. The use of any plant and/or machinery should not cause unacceptable vibrations to nearby properties and should meet Council requirements.

6. Dust control plan

Dust emissions must be confined within the site boundary as far as is practicable. The following example dust control procedures could be employed to comply with this requirement, as necessary:

- Erection of dust screens around the perimeter of the site (as applicable);
- Securely covering all loads entering or exiting the site;
- Use of water sprays across the site to suppress dust;
- Stockpiles shall be lightly conditioned by sprinkler or covered by geotextile or similar cover to prevent dust generation (if remaining overnight);
- Stockpiles impacted, or potentially impacted, with asbestos must be covered by geotextile or similar cover to prevent dust generation;
- Include wheel wash (if applicable); and
- Keeping excavation and stockpile surfaces moist.

Regular checking of the fugitive dust issues is to be undertaken. Remedial measures are to be undertaken to rectify any cases of excessive dust.

7. Odour control plan

No odours should be detected at any boundary of the site during remediation works by an authorised Council Officer relying solely on sense of smell. The following example procedures could be employed to comply with this requirement as necessary:

- Use of appropriate covering techniques such as plastic sheeting, polythene or geotextile membranes to cover excavation faces or stockpiles;
- Fine spray of water and/or hydrocarbon mitigating agent on impacted areas/stockpiles or loads to lightly condition the material;
- If required, restrict uncovered stockpiles to appropriate sizes to minimise odour generation;
- Ceasing works during periods of inclement weather such as high winds or heavy rain;
- Regular checking of the fugitive dust and odour issues to ensure compliance. Undertake immediate remediation measures to rectify any cases of excessive dust or odour (e.g. use of misting sprays or odour masking agent); and
- Adequate maintenance of equipment and machinery to minimise exhaust emissions.

8. Work health and safety plan

8.1 General

It is the Remediation Contractor's responsibility to devise a SWMS¹ (or series thereof, for various respective tasks) and to implement proper controls that enable the personnel undertaking the remediation to work in a safe environment. This RAP and SMP does not relieve the Remediation Contractor or other contractors of their ultimate responsibility for occupational health and safety of their workforce and to prevent contamination of areas outside the 'remediation' workspace. This RAP and SMP sets out general procedures and the minimum standards and guidelines for remediation that will need to be used in preparing the safe work method statement.

This work health safety plan (WHSP) has been prepared with reference to CRC CARE *Remediation Action Plan: Implementation - Guideline on Health and Safety* (CRC CARE, 2019). The requirements of this WHSP must be incorporated into the Remediation Contractor's SWMS.

All site work must be undertaken in a controlled and safe manner with due regard to potential hazards, training and safe work practices. To attain this the SWMS developed by the Remediation Contractor must comply with policies specified in the Work Health and Safety Regulation 2011.

All appropriate permits, licences and notifications required for the remediation activities must be obtained prior to the commencement of remediation works.

8.2 Site access

Appropriate fencing and signage must be installed around and within the site to prevent unauthorised access and restrict access to remediation areas and/or deep excavations. Access restrictions and administrative arrangements for management of entry of workers or related personnel on site is the responsibility of the Remediation Contractor.

Any existing pits or unstable areas on site that may generate potential safety, or operational risk should be demarcated and taped off, with appropriate rectification action undertaken (e.g. backfilling of pits).

8.3 Personnel and responsibilities

Before undertaking works on site, all personnel will be made aware of the officer responsible for implementing WHS procedures. All personnel must read and understand this WHSP and overarching SWMS prior to commencing site works and sign a statement to that effect. Contractors employed at the site will be responsible for ensuring that their employees are aware of, and comply with, the requirements of this WHSP and Remediation Contractor's SWMS.

¹ Either a SWMS or construction environmental management plan (CEMP), or other equivalent document incorporating health and safety aspects of the proposed remedial works.

8.4 Chemical contamination hazards

Chemical compounds or substances that may be present in the soils at the site include the key CoPC metals. There is also a lower probability of other contaminants being present.

The risks associated with the identified contaminants to site personnel and workers involved in the remediation are considered to be low due to the concentrations within groundwater and soil vapour and limited exposure durations. These risks are associated with:

- Ingestion of contaminated soil and/or water;
- Dermal contact with contaminated soil and/or water; and
- Inhalation of dusts or vapours of the CoPC.

If asbestos is encountered in fill, this risk evaluation should be revised.

Personnel will endeavour, wherever possible, to avoid direct contact with potentially contaminated material. Workers must avoid the potential exposures listed above as far as is practicable. Appropriate personal protective equipment (PPE) must be used to mitigate potential risks.

8.5 Physical hazards

The following physical hazards are associated with conditions that may be created during remediation works:

- Heat exposure;
- Excavations;
- Buried services;
- Noise;
- Dust;
- Electrical equipment;
- Heavy equipment and truck operation; and
- Asbestos.

Safe work practices must be employed to manage the physical risks identified above. For the most part these risks can be managed through appropriate demarcation, access controls and the use of appropriate PPE.

8.6 Safe work practices

The appropriate safe work practices should be clearly defined by the Remediation Contractor in their SWMS. As a minimum, all personnel on site will be required to wear the following PPE:

- Steel-capped boots (mandatory);
- High visibility clothing / vest (mandatory);
- Safety glasses or safety goggles with side shields requirements (as necessary);

- Hard hat (as necessary);
- Appropriate respiratory and protective equipment for any works involving asbestos (as necessary); and
- Hearing protection when working in the vicinity of machinery or plant equipment if noise levels exceed exposure standards (as necessary).

Each item of PPE should meet the corresponding relevant Australian Standard(s).

Specific safe work practices will be adopted when working with asbestos, in accordance with (but not limited to) the following codes of practice:

- SafeWork NSW *Code of Practice, How to Manage and Control Asbestos in the Workplace* (SafeWork NSW, 2019a)
- SafeWork NSW *Code of Practice, How to Safely Remove Asbestos* (SafeWork NSW, 2019b);
- WorkCover NSW *Managing Asbestos in or on Soil* (WorkCover NSW, 2014); and
- NOHSC *Guidance Note on the Membrane Filter Method for Estimating Airborne Asbestos Fibres 2nd Ed* (NOHSC, 2005).

9. Remediation schedule and hours of operation

The remediation works will be conducted within the days and hours specified in the development consent.

10. Response to incidents

The key to effective management of incidents is the timely action taken before any situation reaches a reportable or critical level. Therefore, surveillance activities are extremely important and should be conducted for the measures prescribed herein and any other measures prescribed in any additional environmental management plan developed subsequently. During construction activities on the site, the following inspection or preventative actions should be performed by the Remediation Contractor:

- Regular inspection of works;
- Completion of routine environmental checklists and follow-up of non-compliance situations;
- Maintenance and supervision on-site; and
- An induction process for site personnel involved in the remediation works that includes relevant information on the contamination status of the site, the remediation works being undertaken, worker health and environmental protection requirements and ensures that all site personnel are familiar with the site emergency procedures.

An emergency response plan will be in place for all aspects of site works. Any emergency will be reported immediately to the site office and/or the Site Manager (and Safety Officer), and the appropriate emergency assistance should be sought. The Site Manager should be responsible for initiating an immediate emergency response using the resources available on the site. Where external assistance is required, the relevant emergency services should be contacted. A table such as that below, containing contact details for key personnel who may be involved in an

environmental emergency response should be completed and be readily available to personnel at all times. The table should be completed, and thereafter amended, as required.

The Remediation Contractor will be responsible for ensuring that site personnel are aware of the emergency services available and the appropriate contact details. A site Safety Officer should be contactable, or available, on-site during remediation and development works.

Contact details for key utilities are included in the event of needing to respond to incidents. Blank cells are 'to be confirmed' and should be completed prior to works commencing when all entities are confirmed.

Table 1: Summary of roles and contact details

Role	Personnel / contact	Phone contact details
Principal		
Principal's Representative		
Site Manager		
Remediation Contractor and Builder		
Site Office		
Environmental Consultant		
Consent Authority		
Regulator	NSW EPA (pollution line and general enquiries)	131 555
Utility Provider	Water (Sydney Water Corporation)	13 20 92
Utility Provider	Power (Ausgrid)	13 13 88
Utility Provider	Gas (Jemena Limited)	131 909
Utility Provider	Telecommunications (Telstra Corporation Limited)	13 22 03
Utility Provider	Telecommunications (Optus)	1800 505 777
Utility Provider	Telecommunications (NBN Co Limited)	1800 687 626

11. References

ANZG. (2018). *Australian and New Zealand Guidelines for Fresh and Marine Water Quality*. Canberra, ACT: Australian and New Zealand Governments and Australian state and territory governments.

CRC CARE. (2019). *Remediation Action Plan: Implementation - Guideline on Health and Safety*. National Remediation Framework: CRC for Contamination Assessment and Remediation of the Environment.

NOHSC. (2005). *Guidance Note on the Membrane Filter Method for Estimating Airborne Asbestos Fibres 2nd Ed.* Canberra, April 2005, NOHSC:3003: National Occupational Health and Safety Commission, Commonwealth of Australia.

NSW EPA. (2020). *Guidelines for Consultants Reporting on Contaminated Land*. Contaminated Land Guidelines: NSW Environment Protection Authority.

SafeWork NSW. (2019a). *Code of Practice, How to Manage and Control Asbestos in the Workplace*. August 2019.

SafeWork NSW. (2019b). *Code of Practice, How to Safely Remove Asbestos*. August 2019: SafeWork NSW, NSW Government.

WorkCover NSW. (2014). *Managing Asbestos in or on Soil*. March 2014: WorkCover NSW, NSW Government.

Appendix F

Contingency Plan and Unexpected Finds Protocol

1. General

Where the site conditions are found to be different than that anticipated during the remediation works, the proposed remediation approach may not be appropriate for the contamination encountered. In such cases the Environmental Consultant is to re-assess the contamination and remediation approach. Where necessary the Environmental Consultant will prepare an addendum to, or revision of, this RAP.

2. Contingency plan

This contingency plan has been developed to provide guidance on processes to follow if contamination (or indicators of contamination), other than that included in the remediation strategy, (Section 10) is encountered during the remediation works. Any such finds shall be surveyed and the location documented.

Although the site has been subject to previous investigation(s), there remains a potential for soil contamination to be present between sampled locations. In the event that signs of soil contamination, other than that included in the remediation strategy, are encountered during remediation e.g. evidence of asbestos containing material (ACM), petroleum, or other chemical odours which weren't previously identified the following protocols will apply:

- The Site Manager is to be notified and the affected area closed off by the use of barrier tape and warning signs;
- The Environmental Consultant is to be notified to inspect the area and assess the significance of the potential contamination and determine extent of remediation works (if deemed necessary) to be undertaken. An assessment report and management plan detailing this information will be compiled by the Environmental Consultant and provided to the Principal's Representative;
- The assessment results together with a suitable management plan shall be provided by the Principal's Representative to the Consent Authority (if required by the development consent);
- The agreed management / remedial strategy, based on the RAP and relevant guidelines (e.g. WA DoH (2021), for asbestos issues), shall be implemented; and
- All details of the assessment and remedial works are to be included in the site validation report.

3. Unexpected finds protocol

This unexpected finds protocol (UFP) has been developed to provide guidance on processes to follow if any unexpected find is encountered during the remediation or future civil and construction works. Any unexpected finds should be surveyed and the location documented.

All site personnel are to be inducted into their responsibilities under this (UFP), which should be included or referenced in the Remediation Contractors Environmental Management Plan.

All site personnel are required to report unexpected signs of environmental concern to the Site Manager if observed during the course of their works e.g. presence of potential unexploded ordinance, unnatural staining, potential contamination sources (such as buried drums or tanks) or chemical spills.

Should signs of concern be observed, the Site Manager, as soon as practical, will:

- Stop work in the affected area and ensure the area is barricaded to prevent unauthorised access;
- Notify authorities needed to obtain emergency response for any health or environmental concerns (e.g. fire brigade);
- Notify the Principal's Representative of the occurrence;
- Notify any of the authorities that the Remediation Contractor is legally / contractually required to notify (e.g. EPA, Council); and
- Notify the Environmental Consultant.

The Principal's Representative is to notify any of the authorities which the Principal is legally / contractually required to notify (e.g. EPA, Council). Where appropriate the Principals Representative will also implement appropriate community consultation in accordance with the Communications Plan.

The Environmental Consultant will assess the extent and significance of the find and develop an investigation, remediation or management approach using (where possible) the principles and procedures already outlined in the RAP.

4. References

NEPC. (2013). *National Environment Protection (Assessment of Site Contamination) Measure 1999 (as amended 2013) [NEPM]*. Australian Government Publishing Services Canberra: National Environment Protection Council.

WA DoH. (2021). *Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia*. WA Department of Health.