GEOTECHNIQUE® PTY LTD

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ADDITIONAL CONTAMINATION ASSESSMENT
&
REMEDIAL ACTION PLAN

PROPOSED NARWEE PARKLAND CARE COMMUNITY

LOTS D & C DP403467, LOT 2 DP518877 AND LOTS 2 & 3 DP16063
59-67 KARNE STREET NORTH, NARWEE

REPORT NO 20219/6-AA 8 DECEMBER 2022

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ABN 64 002 841 063

Job No: 20219/6
Our Ref: 20219/6-AA
8 December 2022

Cyre Projects Pty Ltd
Level 8, Suite 18, 100 Walker Street
NORTH SYDNEY NSW 2060
Email: marlon@cyreprojects.com.au

Attention: Mr M Zunac

Dear Sir

re: **Proposed Narwee Parkland Care Community**
Lots D & C DP403467, Lot 2 DP518877 and Lots 2 & 3 DP16063
59-67 Karne Street North, Narwee
Additional Contamination Assessment & Remedial Action Plan

Please find herewith our Additional Contamination Assessment (ACA) and Remedial Action Plan (RAP) for the above site.

A brief of the outcome of the assessment was summarised in the Executive Summary.

If you have any questions, please do not hesitate to contact the undersigned.

Yours faithfully
GEOTECHNIQUE PTY LTD

ANWAR BARBHUYIA
Senior Associate
B.E (Civil), MEngSc (Enviro), MIEAust

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EXECUTIVE SUMMARY

Further to the following reports and documents:

- Phase 1 preliminary contamination assessment (PCA) report (Our Ref: 13977/1-AA dated 31 March 2017), prepared by Geotechnique Pty Ltd (Geotechnique) for the property registered as Lots D and C in DP403467, Lot 2 in DP518877 and Lot 2 in DP16063, located at 59-65 Karne Street North, Narwee
- Phase 2 contamination assessment (CA) report (Our Ref: 13977/2-AA dated 9 May 2017) prepared by Geotechnique for a parcel of land currently registered as Lots D and C in DP403467, Lot 2 in DP518877 and Lot 2 in DP16063, located at 59-65 Karne Street North, Narwee
- Updated detailed site investigation (DSI) (Phase 2 CA) report (Our Ref: 20219/5-AA dated 27 October 2022), prepared by Geotechnique Pty Ltd (Geotechnique) for a parcel of land currently registered Lots D and C DP403467, Lot 2 DP518877 and Lots 2 and 3 DP16063, located at 59-67 Karne Street North, Narwee

This executive summary presents a synopsis of an Additional Contamination Assessment (ACA) and Remedial Action Plan (RAP) for the parcel of land currently registered Lots D and C DP403467, Lot 2 DP518877 and Lots 2 and 3 DP16063, located at 59-67 Karne Street North, Narwee (hereafter referred as the site), indicated on Figure 1 (page 1 of the report).

We understand that the proposed development includes demolition of existing structures, and construction of a new aged care facility with basement car park.

The objective of the ACA was to delineate the extent of previously identified asbestos contamination.

The objectives of the RAP were to provide methods of remediation that can be implemented and validated so that a statement can be made declaring the site environmentally suitable for the proposed aged care facility development; to ensure all remediation works are carried out with due regard to the protection of the environment; to ensure all remediation works comply with current regulations and guidelines; and to provide details of the validation processes to be adopted during and at completion of remediation.

In order to achieve the objectives of the ACA and RAP, the scope of works included review of the previous contamination assessment reports, detailed sampling and testing of soil in the vicinity of previously identified asbestos [fibrous asbestos (FA) and asbestos containing material (ACM) fragments] contaminated soil in borehole location (BH120) within the site, developing suitable remediation and validation strategies for the site and preparation of this report.

The general soil profile comprised fill materials overlying natural clayey soil and siltstone bedrock. Topsoil underlain by natural clayey soil and siltstone bedrock was encountered at a few locations. The boreholes and test pits did not reveal any visual evidence of asbestos or other indicators of significant contamination, such as staining, odours or significant foreign matter, with the exception of the presence of one fibro-cement piece in the fill profile at borehole BH12, one fibro-cement piece on the ground surface at borehole FCP1, and a number of fibro-cement pieces in the fill profile at borehole BH120 and test pits TP120-3, TP120-5 and TP120-6. The laboratory confirmed that the fibro-cement pieces within the fill profile at BH12, BH120 TP120-3, TP120-5 and TP120-6, and on the surface at FCP1 contained asbestos containing material (ACM). As no asbestos-cement pieces were observed on the ground surface at and in the vicinity of FCP1 after collecting the asbestos-cement piece, asbestos is no longer considered an issue at FCP1.

Based on the Phase 2 CA, updated DSI and ACA, four locations within the site contain asbestos (FA and/or ACM fragments) contaminated fill materials. Asbestos (FA) presents a risk of harm to human health due to the exceedance of relevant Health Screening Level for Residential setting, whilst Asbestos (ACM fragments) present a potential risk of harm to human health as these fragments, whose concentration exceeded of relevant Health Screening Level for Residential setting, may release asbestos dust or fibres if tooled, cut etc. Therefore, remediation is deemed necessary.

Based on the contaminant concentrations and locations identified from the contamination assessments, one area (Area 1) requiring remediation was identified as indicated on Drawing No 20219/6-AA3.

Based on the advantages, disadvantages and risks of each of the remediation options, we consider that remediation by disposal of the asbestos (FA and ACM fragments) contaminated fill materials in Area 1 at an appropriately licensed landfill facility, as indicated on Drawing No 20219/6-AA3, is appropriate for the site.

This RAP has been prepared to provide guidance to contractor cleaning up / manage the contaminated soils within the site.

The asbestos (FA and ACM fragments) contaminated fill materials in Area 1 to be excavated and removed from the site for off-site disposal is classified as Asbestos Waste. Excavated soil will not be retested to confirm the adopted waste classification.

The waste must be disposed as Asbestos Waste at a licensed landfill facility which will meet their licence requirement to receive Asbestos Waste. All landfill delivery dockets shall be provided to the appointed Asbestos Assessor and Environmental Consultant for inclusion in asbestos clearance and final validation report. The records of the disposal (tonnage) will be correlated with the extent of remediation (volume of soil removed).

Removal and/or disposal of the waste must be carried out in accordance with the requirements of the regulators, such as NSW EPA and SafeWork NSW.

The proposed remediation works are considered to be Category 2 (subject to agreement by Canterbury-Bankstown Council). A minimum of 30 days notice of the intention to proceed with remedial works must be given to Canterbury-Bankstown Council.

The Site Management Plan, Occupational Health & Safety Plan and Contingency Plan, outlined in Sections 15.0, 16.0 and 18.0 of the report are required to be implemented during remediation works.

After completion of the remediation works, validation must be carried out in accordance with Section 17.0 of the report.

A validation report will be then prepared on the suitability of the site for the proposed aged care facility development.

Based on this assessment, it is our opinion that the site is considered suitable for the proposed aged care facility development subject to implementation of the following recommendations, prior to earthworks:

- Sampling and testing of soils beneath the houses, building, and concrete covered areas after demolition and removal of site features.
- Revise this RAP, if required, to remediate any other contamination that might be identified through the recommended additional sampling and testing, followed by appropriate validation. If no other contamination is detected beneath the site features after removal, carry out appropriate remediation and validation of only Area 1 as detailed in this report.
- A validation report will be produced at completion of successful remediation by the appointed environmental consultant. The format of the report will follow that recommended in the NSW Environment Protection Authority (EPA), “Consultants Reporting on Contaminated Land" – 2020.

Based on the available information and nature of identified contamination, it appears that preliminary long-term environmental management plan will not be required for the site after successful remediation and validation of the site, as the contaminated asbestos soil will be removed from the site as a part of remediation works.

Reference should be made to Section 19.0 of the report for details of the recommendations regarding any materials to be excavated and removed from the site, and any fill to be imported to the site.

Reference should be made to Section 20.0 of the report and Appendix E, which set out details of the limitations of this ACA and RAP.

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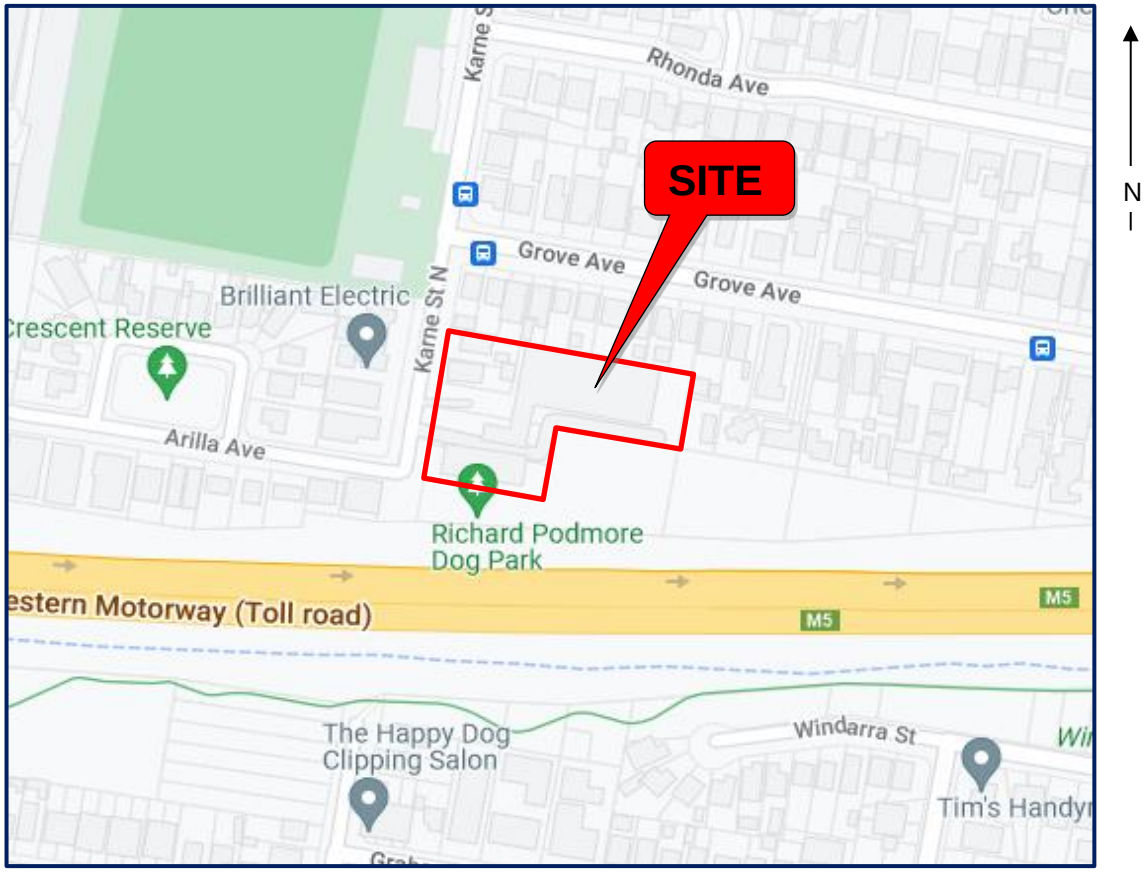
1.0 INTRODUCTION

Further to the following reports and documents:

- Phase 1 preliminary contamination assessment (PCA) report (Our Ref: 13977/1-AA dated 31 March 2017), prepared by Geotechnique Pty Ltd (Geotechnique) for the property registered as Lots D and C in DP403467, Lot 2 in DP518877 and Lot 2 in DP16063, located at 59-65 Karne Street North, Narwee
- Phase 2 contamination assessment (CA) report (Our Ref: 13977/2-AA dated 9 May 2017) prepared by Geotechnique for a parcel of land currently registered as Lots D and C in DP403467, Lot 2 in DP518877 and Lot 2 in DP16063, located at 59-65 Karne Street North, Narwee
- Updated detailed site investigation (DSI) (Phase 2 CA) report (Our Ref: 20219/5-AA dated 27 October 2022), prepared by Geotechnique Pty Ltd (Geotechnique) for a parcel of land currently registered Lots D and C DP403467, Lot 2 DP518877 and Lots 2 and 3 DP16063, located at 59-67 Karne Street North, Narwee

As requested, we have completed an Additional Contamination Assessment (ACA) and Remedial Action Plan (RAP) to address part of Condition 17 of the Planning Secretary's Environmental Assessment Requirement for the parcel of land currently registered Lots D and C DP403467, Lot 2 DP518877 and Lots 2 and 3 DP16063, located at 59-67 Karne Street North, Narwee (hereafter known as the site), in the local government area of City of Canterbury-Bankstown, as indicated on Figure 1 below:

FIGURE 1



Map Data ©2022 Google

We understand that the proposed development includes demolition of existing structures, and construction of a new aged care facility with basement car park.

The objective of the ACA was to delineate the extent of previously identified asbestos contamination.

The objectives of the RAP were to provide methods of remediation that can be implemented and validated so that a statement can be made declaring the site environmentally suitable for the proposed aged care facility development; to ensure all remediation works are carried out with due regard to the protection of the environment; to ensure all remediation works comply with current regulations and guidelines; and to provide details of the validation processes to be adopted during and at completion of remediation.

This report was prepared in accordance with the NSW Environment Protection Authority (EPA), "Consultants Reporting on Contaminated Land" – 2020, and in consideration of State Environmental Planning Policy (Resilience and Hazards, 2021-Chapter 4 Remediation of Land) under the Environmental Planning and Assessment Act 1979.

2.0 SCOPE OF WORK

In order to achieve the objectives of the ACA and RAP, the following scope of work was conducted:

- Review and summary of the *PSA, phase 2 CA* and *updated DSI (phase 2 CA)* reports prepared by Geotechnique in 2017 and 2022
- Inspection by an Environmental Engineer from Geotechnique Pty Ltd (Geotechnique) to identify current site activities, site features and any visible or olfactory indicators of potential contamination.
- Detailed soil sampling by the Environmental Engineer in the vicinity of asbestos contaminated test pit location identified during the recently completed updated DSI.
- Preparation of a rinsate sample as a part of quality assurance (QA) and quality control (QC) measures. Rinsate sample was forwarded to the laboratory for analysis.
- Carrying out on-site sieving tests to determine the concentration of any asbestos containing materials (ACM) in the fill materials at and in the vicinity of the asbestos contaminated test pit location identified during the recently completed updated DSI.
- Asbestos and chemical analysis by laboratories accredited by the National Association of Testing Authorities (NATA), in accordance with Chains of Custody (COC) prepared by Geotechnique.
- Assessment of the laboratory analytical results.
- Assessment of laboratory and field QA/QC.
- Developing suitable remedial and validation strategies for the site.
- Preparation of this report.

3.0 SITE INFORMATION

The site is located at 59-67 Karne Street, Narwee, in the local government area of City of Canterbury-Bankstown, and is registered as Lots D and C in DP403467, Lot 2 in DP518877 and Lots 2 and 3 in DP16063. Reference may be made to Drawing No 20219/5-AA1 for the lot layout.

During the Phase 1 PSA and Phase 2 CA in 2017, Lot 3 in DP16063 (67 Karne Street North) was not part of the site but was included for the recently completed updated DSI and current ACA.

As shown on Drawing No 20219/5-AA1, the site is irregular in shape, covering an area of approximately 7,160m^2.

During the inspection for the updated DSI and ACA on 6 July 2022 and 6 October 2022 respectively, the site primarily comprised a former nursing home, and also two disused residential properties in the north-west corner of the site. Although the residential land and former nursing home remained almost unchanged as observed during PSA and Phase 2 CA in 2017, the following changes in Site Features (SF) were noted including those in the additional residential land in the north western corner of the site:

- Metal sheds with concrete floor (SF#7) have been removed.
- Aviary/chicken pen (SF#8) has been removed.
- Chemical storage area (SF#9) has been removed.
- Black rubbish bag, bag with asbestos and scattered asbestos pieces (SF#11) has been removed.
- Metal shed with hot water heater (SF#12) has been removed.
- Scattered fibro-cement pieces on the concrete floor have been removed. One fibro-cement piece on the grass surface was observed in the south eastern portion of the site (SF#13).
- Rubbish covered with blue tarpaulin (SF#14) has been removed.
- Plastic foam/mulch (SF#15) has been removed.
- Solar panels (SF#16) have been removed.
- Brick building with tile roof has been removed. Concrete slab remains (SF#18).
- Fibro-cement eaves lining in the buildings (SF#19) has been removed.
- Presence of fibro building with asbestos roof in the disused residential land in the north western corner of the site (SF#20).
- Presence of fibro building with tile roof in the disused residential land in the north western corner of the site (SF#21).
- Presence of shipping container in the former nursing home (SF#22).
- Presence of relocatable house/shed in the former nursing home (SF#23).

The updated site features are indicated on Drawing No 20219/5-AA1.

There was no petroleum hydrocarbon staining on the ground surface of the site that would indicate the potential for contamination. There were no visual or olfactory indicators of potential contamination. There were no obvious features associated with underground storage tanks (bowsers, breather pipe, inlet valve and piping).

The site is bound to the north and east by residential properties, to the south by Richard Podmore Dog Park, and to the west by Karne Street North and further west, residential properties.

4.0 TOPOGRAPHY, GEOLOGY & HYDROGEOLOGY

In general, ground surface gently slopes (decline) from north to south and east to west.

The Geological Map of Sydney (Geological Series Sheet 9130, Scale 1:100,000, 1983), published by the Department of Mineral Resources indicates the residual soils within the site to be underlain by Triassic Age Shale of the Wianamatta Group, comprising black to dark grey shale and laminite.

The Soil Landscape Map of Sydney (Soil Landscape Series Sheet 9130, Scale 1:100,000, 2002), prepared by the Soil Conservation Service of NSW, indicates that the site is primarily located within the Blacktown and Birrong landscape areas. Blacktown group soils typically consist of highly plastic and relatively impermeable residual soil. Birrong group soils usually occur where they may be localised.

There was no water body such as a creek, river or wetland in close proximity to the site. Salt Pan Creek is located approximately 2.3km to the west of the site. Obvious local depressions that might capture or divert stormwater run-off were not observed within the site. Anticipated stormwater run-off would be towards the south of the site.

A site-specific groundwater analysis was outside the scope of this assessment. However, a search was carried out on 7 July 2022 through the website of Department of Primary Industries Office of Water for any registered groundwater bore data within a radius of 500m of the site as a part of updated DSI. The search revealed no bores within a radius of 500m of the site.

Groundwater or perched water was not encountered during sampling to a maximum depth of about 1.2m below existing ground level. Based on previous experience in the region, groundwater in the site is anticipated to be in excess of 3.0m below the existing ground surface. Groundwater flow is anticipated to be towards the south of the site.

5.0 SITE HISTORY INFORMATION

Geotechnique carried out a review of site history information in 2017 as part of the Phase 1 PSA. The review included historical aerial photographs, certificates of land titles (past and present), Planning Certificates issued by Council under Section 149 of the Environmental Planning and Assessment Act 1979, EPA records, and SafeWork NSW information pertaining to storage of hazardous chemicals. For details, reference should be made to Report 13977/1-AA.

Due to the 5 year gap since the review of site history information, and the addition of Lot 3 in DP16063, located at 67 Karne Street North, to the site area, Geotechnique obtained and/or reviewed information including historical aerial photographs, NSW Land Registry Services records, Planning Certificates issued by Council under Section 10.7 of the Environmental Planning and Assessment Act 1979 and NSW EPA records regarding notices for contaminated land as a part of the site history for the updated DSI. For details, reference should be made to Report 20219/5-AA.

Historical aerial photographs revealed that the site was residential land prior to 1970s, and then centre and eastern portions of the site modified into nursing homes in the 1970s. The northern, eastern and western adjoining properties were residential land since at least the 1950s/1970s. The southern adjoining land was vacant land since at least the 1950s.

NSW Department of Lands records indicated that private proprietors owned the site from the 1950s/1960s to late 1960s/1980s/2010s. Based on the occupation of the private proprietors, the eastern and centre portion of the site might have been used for carpentry activities between 1940 and 1959, and for welding activities between 1959 and 1966. Several commercial enterprises owned the site afterwards. The eastern and centre portion of the site was used as a Convalescent Hospital between 1968 and 1991.

The Section 10.7 (2 & 5) Planning Certificates revealed no matters arising under the Contaminated Land Management (CLM) Act 1997.

A search of the NSW EPA records revealed no EPA Notices issued for the site. A search of the Protection of the Environment Operations (POEO) Public Register found no records for the site.

A search of the records held by SafeWork NSW has not located any records on storage of hazardous chemicals pertaining to the site.

6.0 SUMMARY OF PREVIOUS ASSESSMENTS

Contamination assessments were carried out for the subject site in 2017. The relevant reports are as follows:

- *Phase 1* PSA Report (Our Ref: 13977/1-AA dated 31 March 2017), prepared by Geotechnique.
- *Phase 2* CA Report (Our Ref: 13977/2-AA dated 9 May 2017), prepared by Geotechnique.
- *Updated DSI (Phase 2 CA)* (Our Ref: 20219/5-AA dated 27 October 2022), prepared by Geotechnique.

This section presents a summary of the scope of works involved in each assessment stage, and the subsequent findings and recommendations.

6.1 Phase 1 Preliminary Site Assessment (PSA) Report

A Phase 1 PSA was carried out for the site currently registered as Lots D and C in DP403467, Lot 2 in DP518877 and Lot 2 in DP16063, located at 59-65 Karne Street North, Narwee, in the local government area of City of Canterbury-Bankstown. The results were presented in the Geotechnique report *Phase 1 PSA* (Our Ref: 13977/1-AA dated 31 March 2017). The site was proposed for a new aged care home.

The objectives of the assessment were to identify any areas of potential contamination, and to assess if the site potentially presents a risk of harm to human health and the environment under the conditions of the proposed use.

In order to achieve the objectives of the assessment, the scope of work included a study of site history, geological information and a site inspection.

An inspection of the site was carried out by an Environmental Engineer from Geotechnique on 16 March 2017, and the following observations were made:

- The site is located in close proximity to the corner of Karne Street North and Arilla Avenue, Narwee.
- The site was utilised primarily as a nursing home, with the one property in the north-west corner being used for residential purposes.

- The residential property consisted of possible fibro house with metal roofing. There was also another brick building with a metal roof.
- The areas which were utilised for the nursing home consisted of brick buildings with tiled roofing and solar panels.
- The areas forming the perimeter of the building were predominantly concreted areas.
- A couple of areas were discovered to have buildings which were previously used for chemical storage.
- An asphaltic concrete parking area was situated at the eastern boundary of the site.
- Scattered fibro cement pieces and a black plastic bag containing fibro cement pieces were found toward the far southern boundary of the site.
- There were no obvious features associated with any underground storage tanks (bowser, breather pipe, inlet valve and piping).

There were no air emissions emanating from the site and neighbouring properties.

The site is bound to the north and east by residential properties, to the south by an off leash dog area, and to the west by Karne Street North and further west, residential properties.

Based on the information obtained in preparation of this report, it is considered that the site has potential for contamination due to past and present site activities.

As the site is proposed for a new aged care home after demolition of existing structures, implementation of a suitable sampling and testing plan as a phase 2 contamination assessment to target the potential for contamination listed in Section 7.0 of the report was recommended. If any contaminants are identified, the site could be made suitable for the proposed use following appropriate remediation and validation.

6.2 Phase 2 Contamination Assessment (CA) Report

A Phase 2 CA was carried out for the site currently registered as Lots D and C in DP403467, Lot 2 in DP518877 and Lot 2 in DP16063, located at 59-65 Karne Street North, Narwee, in the local government area of City of Canterbury-Bankstown. The results were presented in the Geotechnique report *Phase 2 CA* (Ref 13977/2-AA dated 9 May 2017). The site was proposed for new aged care home.

We understand that the proposed development includes demolition of existing structures and construction of a new aged care home for 144 to 160 beds. Details on the new structures have not yet been finalised, however construction of the proposed structure is anticipated to involve excavation up to about 3.0m deep and some fill placement.

The objective of the Phase 2 CA was to supplement the Phase 1 PSA Report with appropriate soil sampling and testing, in order to ascertain whether the site is likely to present a risk of harm to human health and/or the environment.

In order to achieve the objective of this assessment, the scope of work included review of the preliminary site assessment report, site reconnaissance, borehole drilling and test pit digging, soil sampling and testing, and preparation of a report.

During the inspection for the phase 2 CA, the site was utilised primarily as a nursing home, with one property in the north-west corner being used for residential purposes. The site remained unchanged as observed during Phase 1 PSA in March 2017, as shown on Drawing No 13977/1-AA1.

There were no air emissions emanating from the site or neighbouring properties.

The site is bound to the north and east by residential properties, to the south by an off leash dog area, and to the west by Karne Street North and further west, residential properties.

Based on the "Sampling Design Guidelines for Contaminated Sites" 1995 EPA, seventeen systematic sampling locations were adopted across the site, aimed at maximising coverage of the site area. Six sampling locations were drilled by a track mounted drilling rig (BH1 to BH6), nine locations were drilled by a bobcat fitted with auger (BH8 to BH13 and BH15 to BH17) and two locations (TP7 and TP14) were dug by mattock due to the access limitations. Three judgmental material samples (FCP1 to FCP3) were also taken from scattered fibro-cement pieces on concrete surface.

The borehole, test pit and sample locations are shown on Drawing No 13977/2-AA1.

Based on information from the sample locations, the sub-surface profile across the site is generalised as follows:

Hardstand	60mm to 150mm thick asphaltic concrete and 50mm to 160mm thick concrete was encountered on the surface of most of the site. A 50mm thick 2nd concrete layer was also encountered at BH6, underneath 1m of fill material.
Basecourse	160mm thick roadbase gravel was encountered in BH10 beneath the asphaltic concrete, underlain by fill material.
Topsoil	200mm to 400mm thick topsoil comprising sandy clay, low plasticity, grey at BH2 and BH3, and comprising silty clay, low to medium plasticity, brown, with root fibres was encountered at BH11, underlain by natural clayey soil.
Fill	The following 9 types of fill were encountered: Type 1: 150mm thick sandy clay, medium plasticity, grey, was encountered at BH1, underlain by natural clayey soil. Type 2: 80mm thick gravelly sand, medium grained, yellow, was encountered at BH4, underlain by natural clayey soil. Type 3: 450mm thick gravelly sandy clay, medium plasticity, grey, was encountered at BH5, underlain by natural clayey soil. Type 4: 950mm thick sandy clay, low plasticity, grey, was encountered at BH6, underlain by a layer of concrete. Type 5: 200mm thick silty clay, medium plasticity, brown, with inclusion of sand and gravel was encountered at BH12 underlain by natural clayey soil. Type 5 fill was also encountered at TP7 up to 300mm below existing ground level (EGL); however, the thickness of Type 5 fill was unknown due to limitation of manual digging by hand tools. Type 6: 200mm to 280mm thick silty clay, medium plasticity, brown, was encountered at BH8 and BH10, underlain by Type 7 fill and natural clayey soil, respectively. Type 7: 200mm to 600mm thick silty clay, high plasticity, brown, was encountered at BH8 and BH17, underlain by natural clayey soil. Type 7 fill was also encountered at BH13 from 460mm to 600mm. The thickness of Type 7 fill was unknown due to limitation of manual digging by hand tools.

Fill (Continue)	Type 8: 100mm to 200mm thick silty sand, fine to medium grained, brown, was encountered at BH13, TP14 and BH15, underlain by Type 9 fill. Type 8 fill was also encountered at BH16 from 80mm to 180mm; however, the thickness of Type 8 fill was unknown due to auger refusal on possible roadbase or gravelly fill. Type 9: 160mm to 300mm thick silty sand, fine to medium grained, yellow, was encountered at BH13 and BH15, underlain by Type 8 fill and natural clayey soil respectively. Type 9 fill was also encountered at TP14 from 200mm to 500mm. The thickness of Type 9 fill was unknown due to limitation of manual digging by hand tools. Based on the contents of the fill, the natural soil profiles and regional geological information, it appears that Types 1, 6 and 7 fill could have originated from within the site, whilst Types 2 to 5, 8 and 9 fill, and basecourse could be imported to the site.
Natural Soil	Silty/Shaley/Sandy Clay, low to high plasticity, brown, grey, red, yellow, was encountered below asphaltic concrete and/or fill material across the site except for TP7, BH13 and TP14 due to limitation of manual digging by hand tools, and in BH16 due to auger refusal on possible roadbase or gravelly fill. Natural silty clay, high plasticity, red was encountered on the surface at BH9.
Bedrock	Siltstone, grey, extremely weathered, very low strength bedrock was encountered at depths ranging from 1.3m to 2.7m below the EGL.

In summary, most of the site was covered with concrete or asphaltic concrete. The general soil profile comprised fill materials overlying natural clayey soil and siltstone bedrock. Topsoil underlain by natural clayey soil and siltstone bedrock was encountered at three locations. Roadbase gravel was also encountered at one location.

The boreholes and test pits did not reveal any visual evidence of asbestos or other indicators of significant contamination, such as staining, odours or significant foreign matter, with the exception of the presence of a fibro-cement piece in the fill profile at borehole BH12. Scattered fibro-cement pieces and a bag with fibro-cement pieces were observed on the concrete surface along part of the southern boundary of the site.

As a result, and generally based on the potential for contamination identified in the *Phase 1 Preliminary Site Assessment* report, discrete fill, topsoil, roadbase and surface natural soil samples were analysed for Metals (arsenic, cadmium, chromium, copper, mercury, nickel, titanium and/or zinc), TPH, BTEX, PAH, OCP, PCB, Phenols, Cyanides, VOC, Formaldehyde and/or asbestos. A number of fibro-cement pieces found on the surface and in the borehole were analysed for asbestos for screening purposes. Reference may be made to Appendix H of the updated DSI report for the actual laboratory analytical reports for the Phase 2 CA.

The findings of the Phase 2 CA are summarised as follows:

- The site primarily comprised a nursing home, and one residential property in the north-west corner of the site.
- The site is proposed for a new aged care and includes demolition of existing structures and construction of a new aged care home.
- The general soil profile comprised fill materials overlying natural clayey soil and siltstone bedrock. Topsoil underlain by natural clayey soil and siltstone bedrock was encountered at a couple of locations. The boreholes and test pits did not reveal any visual evidence of asbestos or other indicators of significant contamination, such as staining, odours or significant foreign matter, with the exception of the presence of one fibro-cement piece in the fill profile at borehole BH12.

- All the laboratory test results satisfied the criteria for stating that the analytes selected are either not present, i.e. concentrations less than laboratory limits of reporting, or present in the sampled soil at concentrations that do not pose a risk of hazard to human health or the environment under a "residential with minimal opportunities for soil access" form of development. The laboratory confirmed that the fibro-cement piece within the fill profile at BH12 and the fibro-cement pieces observed on the surface at locations FCP1 to FCP3 contained ACM, as shown on Drawing No 13977/2-AA2. ACM presents a potential risk of harm to human health.
- The data quality objectives outlined in the report have been satisfied.

Based on the assessment, it is considered that the site can be made suitable for the proposed new aged care home development, subject to implementation of the following recommendations, prior to site preparation and earthworks:

- Detailed sampling and/or testing in the vicinity of BH12 to delineate the extent of potential asbestos contamination.
- Sampling and testing of soils beneath the house, sheds, buildings and concrete covered areas after demolition and removal of site features and hardstand area.
- Development of a remedial action plan (RAP) to remediate potential asbestos contaminated fill and areas with scattered ACM fragments, plus any other contamination identified through the recommended additional sampling and testing, followed by appropriate validation.

6.3 Updated Detailed Site Investigation (Phase 2 Contamination Assessment) Report

An updated detailed site investigation (DSI) (Phase 2 CA) was carried out for a parcel of land currently registered as Lots D and C DP403467, Lot 2 DP518877 and Lots 2 and 3 DP16063, located at 59-67 Karne Street North, Narwee (hereafter referred as site), in the local government area of City of Canterbury-Bankstown to address part of Condition 17 of the Planning Secretary's Environmental Assessment Requirement.

We understand that the proposed development includes demolition of existing structures, and construction of a new aged care facility with basement car park.

The objectives of the assessment were to ascertain whether the site presents a risk of harm to human health and the environment, and to determine the suitability of the site for the proposed aged care facility development, in consideration of State Environmental Planning Policy (Resilience and Hazards, 2021-Chapter 4 Remediation of Land) under the Environmental Planning and Assessment Act 1979.

The scope of work included review of the phase 1 PSA and phase 2 CA reports, site reconnaissance, review of site history information and geological maps, borehole drilling, soil sampling and testing, and preparation of this report.

During the inspection for the updated DSI on 6 July 2022, the site primarily comprised a former nursing home, and also two disused residential properties in the north-west corner of the site. Although the residential land and former nursing home remained almost unchanged as observed during PSA and Phase 2 CA in 2017, the following changes in Site Features (SF) were noted including those in the additional residential land in the north western corner of the site:

- Metal sheds with concrete floor (SF#7) have been removed.

- Aviary/chicken pen (SF#8) has been removed.
- Chemical storage area (SF#9) has been removed.
- Black rubbish bag, bag with asbestos and scattered asbestos pieces (SF#11) has been removed.
- Metal shed with hot water heater (SF#12) has been removed.
- Scattered fibro-cement pieces on the concrete floor have been removed. One fibro-cement piece on the grass surface was observed in the south eastern portion of the site (SF#13).
- Rubbish covered with blue tarpaulin (SF#14) has been removed.
- Plastic foam/mulch (SF#15) has been removed.
- Solar panels (SF#16) have been removed.
- Brick building with tile roof has been removed. Concrete slab remains (SF#18).
- Fibro-cement eaves lining in the buildings (SF#19) has been removed.
- Presence of fibro building with asbestos roof in the disused residential land in the north western corner of the site (SF#20).
- Presence of fibro building with tile roof in the disused residential land in the north western corner of the site (SF#21).
- Presence of shipping container in the former nursing home (SF#22).
- Presence of relocatable house/shed in the former nursing home (SF#23).

The updated site features are indicated on Drawing No 20219/5-AA1.

There was no petroleum hydrocarbon staining on the ground surface of the site that would indicate the potential for contamination. There were no visual or olfactory indicators of potential contamination. There were no obvious features associated with underground storage tanks (bowsers, breather pipe, inlet valve and piping).

The site is bound to the north and east by residential properties, to the south by Richard Podmore Dog Park, and to the west by Karne Street North and further west, residential properties.

As part of the updated DSI, judgemental sampling beneath the site features (BH101 to BH119 and FCP1) and systematic sampling (BH120 & BH121) in the open area of the disused residential land in the north western corner of the site was also carried out on on 6 July 2022 by the Environmental Engineer from Geotechnique, using an excavator fitted with auger.

As a part of the updated DSI, detailed sampling in the vicinity of BH12 (BH12a and BH12-1 to BH12-4) was also carried out to delineate the extent of potential asbestos contamination at BH12. During the Phase 2 CA in 2017, one asbestos-cement piece was observed in the fill profile at borehole BH12.

The borehole locations are shown on Drawing No 20219/5-AA2.

Based on information from the sample locations, the sub-surface profile beneath the site features and open area of the disused residential land in the north western corner of the site is generalised as follows:

Hardstand	Concrete hardstand was encountered beneath site features, ranging in thickness from 70mm to 180m below the EGL, underlain by natural clayey soil or fill materials. Bitumen hardstand was encountered at BH104 & BH105, to a depth of 40mm below the EGL, underlain by fill materials.
Fill	The following 8 types of fill were encountered: Type 1: Silty Sandy Clay, low to medium plasticity, brown was encountered in BH101, to 400mm below the EGL, underlain by natural clayey soil. Type 2: Clayey Gravel, dark brown / black, was encountered beneath site features ranging in thickness from 40mm to 150mm, overlain by bitumen hardstand or below the EGL, and underlain by natural clayey soil. Type 3: Silty Sand, fine to medium grained, brown, inclusion of bricks, concrete and timber, was encountered beneath site features ranging from 150mm to 200mm in thickness, overlain by bitumen hardstand or below the EGL, and underlain Type 5 fill. Type 4: Silty Clay, medium to high plasticity, brown, red, grey, with black gravel, was encountered at BH107, 690mm thick, overlain by concrete hardstand and underlain natural clayey soil. Type 5: Silty Sand, fine to medium grained, yellow, with or without inclusion of glass, bricks, timber and concrete, was encountered beneath site features ranging from 100mm to 200mm in thickness, overlain by Type 3 fill, concrete hardstand or below the EGL, and underlain by natural clayey soil. Type 6: Silty Clay, medium to high plasticity, brown, with inclusion of terracotta fragments, rusted metal and asbestos fragments, was encountered at BH120, 200mm thick below the EGL, and underlain Type 7 fill. Type 7: Silty Sandy Clay, high plasticity, yellow, was encountered at BH120, 50mm thick below the EGL and underlain natural clayey soil. Type 8: Silty Clay, medium to high plasticity, dark grey, with gravel, was encountered beneath site features, ranging from 120mm to 160mm in thickness, overlain by concrete hardstand and underlain natural clayey soil. Based on the contents of the fill materials, the natural soil profiles and regional geological information, it appears that all types of fill have probably been imported to the site.
Topsoil	Silty Clay, low to medium plasticity, brown, with root fibres, was encountered in the open area, to a depth of 200mm below the EGL, underlain by natural clayey soil
Natural Soil	Silty clay, medium to high plasticity, brown and red mottled grey, was encountered below concrete hardstand, topsoil or fill material across the site.

In summary, the general soil profile beneath the site features and within the open area of the disused residential land in the north western corner of the site comprised fill materials underlain by natural clayey soil. Topsoil was encountered at one location in the disused residential area, underlain by natural clayey soil.

The boreholes did not reveal any visual evidence of asbestos or other indicators of significant contamination, such as staining, odours, or significant foreign matter, with the exception of the presence of fibro-cement pieces in the fill profile at BH120 and one fibro-cement piece on the ground surface at FCP1. No other fibro-cement pieces were observed on the ground surface at FCP1.

The findings of the Phase 2 CA and updated DSI are summarised as follows:

- The site primarily comprises a former nursing home, and two disused residential properties in the north-west corner of the site.
- We understand that the proposed development includes demolition of existing structures, and construction of a new aged care facility with basement car park.
- The general soil profile comprised fill materials overlying natural clayey soil and siltstone bedrock. Topsoil underlain by natural clayey soil and siltstone bedrock was encountered at a few locations. The boreholes and test pits did not reveal any visual evidence of asbestos or other indicators of significant contamination, such as staining, odours or significant foreign matter, with the exception of the presence of one fibro-cement piece in the fill profile at borehole BH12, one fibro-cement piece on the ground surface at borehole FCP1, and a number of fibro-cement pieces in the fill profile at borehole BH120. The laboratory confirmed that the fibro-cement pieces within the fill profile at BH12 and BH120, and on the surface at FCP1 contained asbestos containing material (ACM). As no asbestos-cement pieces were observed on the ground surface at and in the vicinity of FCP1 after collecting the asbestos-cement piece, asbestos is no longer considered an issue at FCP1.
- All the laboratory test results satisfied the criteria for stating that the analytes selected are either not present, i.e. at concentrations less than laboratory limits of reporting, or present in the sampled soil at concentrations that do not pose a risk of hazard to human health or the environment under a "residential with minimal opportunities for soil access" form of development, with the exception of asbestos [fibrous asbestos (FA)] contamination in the fill profile at borehole location BH120, as shown on Drawing No 20219/5-AA3. Asbestos (FA) presents a risk of harm to human health due to the exceedance of relevant Health Screening Levels for a Residential setting.
- On-site sieving tests in accordance with gravimetric procedures as per NEPM 1999 (April 2013) indicated that the concentrations of ACM in all soil samples recovered from at and in the vicinity previously identified asbestos contaminated location BH12 were equal to zero. Therefore, asbestos is no longer considered an issue at BH12. On-site sieving test also indicated that the bonded ACM fragments were in excess of relevant Health Screening Levels for Residential setting in the fill materials at borehole BH120, as shown on Drawing No 20219/5-AA3. Bonded ACM fragments present a potential risk of harm to human health as these fragments may release asbestos dust or fibres if tooled, cut, etc.
- The data quality objectives outlined in the report have been satisfied.

Based on this assessment, it is our opinion that the site is suitable for the proposed new aged care facility development, subject to implementation of the following recommendations prior to earthworks:

- Detailed sampling and/or testing in the vicinity of BH120 to delineate the extent of asbestos contamination.
- Sampling and testing of soils beneath the houses, building, and concrete covered areas after demolition and removal of site features.
- Development of a remedial action plan (RAP) to remediate asbestos contaminated fill, plus any other contamination identified through the recommended additional sampling and testing, followed by appropriate validation.

FA 0.0002% w/w was detected in the surface fill sample at borehole location BH115, which can remain in the site, as the level is below the relevant Health Screening Levels (HSL) for Residential setting, 0.001% w/w. As borehole location BH115 is located in the proposed basement car park area, the soil at and in the vicinity of BH115 must be disposed at a landfill facility as asbestos waste during bulk earthworks.

7.0 CONCEPTUAL SITE MODELS

The sources, the exposure pathways and the receptors would be as follows:

Source	Exposure Pathway	Receptor
➢ Asbestos (FA and ACM fragments) contaminated fill ➢ Soil dust	➢ Inhalation of asbestos fibres ➢ Inhalation of soil dust via wind	**On-site:** Workers and future residents **Off-site:** Nearby residents and environment

This conceptual site model illustrates source-pathway-receptors includes Asbestos (FA and ACM fragments) contaminated fill materials, inhalation of asbestos fibres and soil dust, on-site workers, future residents, nearby residents and environment.

The exposure pathways of concern are inhalation of any asbestos fibres and soil dust. As such, consideration must be given to the potential for activities at the site to generate asbestos fibres and dust.

A precautionary approach is taken that an exposure pathway is complete where there are people at the site and nearby by, and a recipient could interact with the contaminated soil/material and soil dust.

According to the International Agency for Research on Cancer (IARC), asbestos is a human carcinogen. The health effects of asbestos are well understood and result from inhalation of airborne respirable fibres. If deposited in the lungs, the fibres can initiate diseases that take many years to produce serious health effects. These effects include asbestosis (scar-like tissue in the lungs and in the pleural membrane that surrounds the lungs), lung cancer and mesothelioma.

People with asbestosis have difficulty breathing, often a cough and in severe cases heart enlargement. Asbestosis is a serious disease and can eventually lead to disability and death. The likelihood of asbestos-related disease is related to the concentration and duration of exposure to respirable asbestos fibres.

Bonded asbestos fragments generally do not present a significant health risk unless tooled, cut, sanded, abraded or machined, which may release asbestos dust or fibres. Asbestos dust contains tiny almost indestructible fibres, which can cause damage to the lungs when breathed in.

8.0 DETAILED SAMPLING & ANALYSIS PLAN AND SAMPLING METHODOLOGY

As part of the ACA, detailed sampling TP120-1 to TP120-13 was carried out in the vicinity of asbestos (FA and ACM fragments) contaminated location BH120, identified during previous contamination assessment. The sampling was carried out using an excavator on 6 October 2022 by the Environmental Engineer from Geotechnique by using an excavator and fill materials samples were recovered.

The Environmental Engineer was responsible for visually assessing the site, locating the nominated test pits, supervised (full time) the excavation of test pits, recovery of soil samples and fibro-cement pieces, carrying out on-site sieve testing of detailed samples at and in the vicinity of BH120, preparation of samples for delivery to NATA accredited laboratories, and logging the sub-surface profile encountered at each sampling location. Detailed test pit locations are shown on Drawing No 20219/6-AA1.

The soil sampling and decontamination procedures adopted were as follows:

- The test pits were excavated using an excavator, over the depth interval nominated by the Environmental Engineer. The representative soil sample was recovered directly from the excavator bucket using a stainless-steel trowel. Decontamination of the trowel involved the following;
  - Removal of soils adhering to the trowel by scrubbing with a brush.
  - Washing the trowel thoroughly in a solution of phosphate free detergent (Decon 90) using brushes and disposable towels.
  - Rinsing the trowel thoroughly with distilled water.
  - Repeating the washing / rinsing steps and rinsing with water.
  - Drying the trowel with a clean cloth.
- To minimise the potential loss of volatiles, the soil sample was immediately transferred to a labelled, laboratory supplied, 250ml glass jar and sealed with an airtight, Teflon screw top lid. The fully filled jar was then placed in a chilled container.
- The recovered soil sample for asbestos analysis was transferred into a small plastic zip-lock bag, which was placed in a container.
- The recovered fibro-cement piece for asbestos testing was transferred into a small plastic bag and placed in a container.

A rinsate water sample was collected and placed in a glass bottle and vial supplied by the laboratory at completion of sampling. The fully filled bottle and vial were labelled and placed in a chilled container.

At completion of field sampling, the chilled containers were transported to our Penrith office and the chilled container was kept to a refrigerator where the temperature was maintained below 4°C.

For asbestos testing, all fill samples and fibro-cement pieces in the container was sent to Australian Safer Environment & Technology Pty Ltd (ASET) under COC conditions. Selected soil sample were forwarded under COC conditions to SGS Environmental Services (SGS) for chemical analysis. Both ASET and SGS are NATA accredited.

On receipt of the samples, the laboratories returned the Sample Receipt Confirmation verifying the integrity of all samples received.

Reference should be made to Table 1 in Appendix A for descriptions of the soils encountered during sampling using an excavator for the ACA. In general, the following profile was identified during field work:

Table 8.1

Fill	The following 2 types of fill were encountered: Type 1: 200mm to 400mm thick, Silty Clay, medium to high plasticity, brown, inclusion of terracotta fragments, rusted metal, brick, timber, concrete fragments, glass fragments and/or road base gravel, underlain by natural clayey soil or Type 2 fill. Type 2: 100mm thick Silty Sandy Clay, high plasticity, yellow, was encountered at TP120-5, underlain by natural clayey soil. Based on the contents of the fill materials, the natural soil profiles and regional geological information, it appears that both types of fill have probably been imported to the site. Similar types of fill materials were also encountered within the site during the updated DSI.
Natural Soil	Silty Clay, medium to high plasticity, brown, was encountered below fill material.

There were no obvious ash materials, fibro-cement pieces and odour in the test pits locations, with the exception of fibro-cement pieces within the fill profile in test pits TP120-3, TP120-5 and TP120-6.

As a result, in order to delineate the extent of asbestos contamination, the detailed fill samples at and in the vicinity of BH120 were analysed for asbestos.

For waste classification purposes, fill macerals at TP120-3, TP120-5 and TP120-6 were also analysed for Metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc).

A summary of the laboratory test results is presented in Section 12.0 of this report.

9.0 FIELD QUALITY ASSURANCE & QUALITY CONTROL (QA & QC)

The following QA and QC procedure was implemented for the sampling and analytical program. Reference may be made to Appendix B for actual details of the laboratory test results for the QA and QC sample.

Rinsate

One rinsate water sample was recovered on completion of field work (RS1) in order to identify possible cross contamination between the sampling locations.

The rinsate was analysed for Metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc). The test result for the rinsate water sample is summarised in Table A.

As indicated in Table A, all Metals concentrations in the rinsate blank sample were less than the laboratory limit of reporting (LOR), which indicates that adequate decontamination had been carried out in the field.

10.0 LABORATORY QA & QC

Geotechnique uses only laboratories accredited by the NATA for chemical analyses. The laboratories also incorporate quality laboratory management systems to ensure that trained analysts using validated methods and suitably calibrated equipment produce reliable results.

In addition to the QC samples, the laboratories also ensure that all analysts receive certification as to their competence in carrying out the analysis and participate in national and international proficiency studies.

ASET and SGS are both accredited by NATA and operate a Quality System designed to comply with ISO/IEC 17025.

It should be noted that there is no specific holding time for asbestos analysis. The discrete soil samples were analysed within the allowable holding times detailed in Schedule B(3) of The *NEPM 1999 (April 2013)*. The rinsate sample was analysed within the allowable holding times for water detailed in Standard Methods for the Examination of Water and Wastewater (APHA).

The test methods adopted by the laboratories are indicated with the laboratory test results certificates. As part of the analytical run for the project, the laboratories included laboratory blanks, duplicate samples, laboratory control samples, matrix spikes and/or matrix spike duplicates.

We have checked the QA/QC procedures and results adopted by the laboratories against the appropriate guidelines. The QC sample numbers adopted by SGS is considered adequate for the analyses undertaken.

The methods used by SGS have been validated and endorsed by NATA.

Reported laboratory LOR were less than the assessment criteria adopted for Metals.

Overall, the QC elements adopted by SGS indicate that the analytical data falls within acceptable levels of accuracy and precision for the analysis of soils. The analytical data provided is therefore considered to be reliable and useable for this assessment.

11.0 ASSESSMENT CRITERIA

Investigation levels and screening levels developed in the NEPM 2013 were used in this assessment, as follows:

- Risk-based HIL for a broad range of metals and organic substances. The HIL are applicable for assessing human health risk via all relevant pathways of exposure. The HIL as listed in Table 1A(1) of Schedule B1 "*Guideline on Investigation Levels for Soil and Groundwater*" are provided for different land uses and applicable to the top 3m of soil for residential use.

  We understand that the proposed development includes demolition of existing structures and construction of a new aged care facility with basement car park. Therefore, with regard to human health, analytical results were assessed against risk based HIL for *residential with minimal opportunities for soil access* (HIL B).

- Ecological Investigation Levels (EIL), a specific type of Soil Quality Guidelines (SQG) for selected metals, is applicable for assessing the risk to terrestrial ecosystems. EIL listed in Table 1B(1-5) of Schedule B1 "*Guideline on Investigation Levels for Soil and Groundwater*" depend on specific soil physicochemical properties and land use scenarios and generally apply to the top 2m of soil. For arsenic and lead, generic EIL are adopted, for *urban residential* land use for aged contamination. For other metals, where available, EIL are calculated using the EIL calculator developed by CSIRO for NEPC.

For discrete soil samples, the individual concentrations of analytes were assessed against the HIL B / EIL.

For asbestos, the assessed soil must not contain ACM in excess of 0.04%w/w, surface soil within the site is free of visible ACM, and AF and FA in the soil is <0.001% w/w.

The site will be deemed contaminated or containing contamination "hot spots" if the above criteria are unfulfilled. Further investigation, remediation and/or management will be recommended if the area of concern is found to be contaminated or containing contamination "hot spots".

The adopted assessment criteria for the soil samples are detailed in Tables B to D.

12.0 FIELD & LABORATORY TEST RESULTS, ASSESSMENT & DISCUSSION

12.1 Field Results

Details of the sub-surface conditions encountered during field work for this assessment are presented in Table 1 in Appendix A of this report. As discussed in Section 8.0, the general soil profile of detailed test pits in the vicinity of BH120 comprised imported fill materials underlain by natural clayey soil.

The test pits did not reveal any visual evidence of asbestos or other indicators of significant contamination, such as staining, odours or significant foreign matter with the exception of the presence of fibro-cement pieces within fill profile at test pits TP120-3, TP120-5 and TP120-6.

12.2 Analytical Results

The laboratory test results certificates are included in Appendix B. The test results are also presented in Tables B to D together with the assessment criteria adopted. A discussion of the test data is presented in the following sub-section.

12.2.1 Metals (As, Cd, Cr, Cu, Pb, Hg, Ni & Zn)

Test results of CEC and pH were adopted to calculate Ecological Investigation Levels (EIL) in Table B.

The Metals test result for selected discrete fill sample are presented in Table B and as indicated, all concentrations of Metals were below the relevant available EIL and Health Investigation Levels (HIL) for residential with minimal opportunities for soil access (HIL B).

12.2.2 Asbestos

The asbestos test results for the detailed fill samples at and in the vicinity of BH120 are presented in Table C. As indicated, AF and FA in excess of 0.001%w/w were not found in any fill samples. Bonded ACM (>7mm) (ranging from 0.02%w/w to 0.18%w/w) was detected by the laboratory in fill samples TP120-1, TP120-6, TP120-11 and TP120-12.

The asbestos test results for the fibro-cement pieces observed in the fill profile at TP120-3, TP120-5 and TP120-6 contained ACM, as also indicated in Table C, which presents a potential risk of harm to human health as these fragments may release asbestos dust or fibres if tooled, cut, etc.

12.2.3 Asbestos Sieve Test

In total, thirteen samples (each about 10L volume) were recovered for on-site sieving test in accordance with gravimetric procedures as per NEPM 1999 (April 2013), at and in the vicinity of the previously identified asbestos contaminated location BH120 where friable asbestos (FA) and bonded ACM fragments were detected in the fill profile during the updated DSI.

The on-site sieving test results for asbestos are presented in Table D.

As indicated in Table D, bonded ACM in excess of 0.04%w/w were detected in the fill materials at TP120-3 (0.776%w/w), TP120-5 (3.439%w/w) and TP120-6 (1.179%w/w), which presents a potential risk of harm to human health as these fragments may release asbestos dust or fibres if tooled, cut, etc.

As also indicated in Table D, the concentrations of ACM in all remaining fill samples were equal to zero.

13.0 SITE CHARACTERISATION

Based on the Phase 2 CA, updated DSI and ACA, the identified 2nd revised locations of contamination within the site which is indicated and tabulated on Drawing No 20219/6-AA2 and summarised below:

- Location where asbestos (FA) in the soil presents a risk of harm to human health due to the exceedance of relevant Health Screening Levels for Residential setting.
- Locations where ACM fragments in the fill profile present a potential risk of harm to human health due to the exceedance of relevant Health Screening Level for Residential setting as these fragments may release asbestos dust or fibres if tooled, cut, etc.

The absence of chemical contaminants within the soils indicates that the potential for groundwater contamination beneath the site is low.

As site is grass covered or sealed by hard stand (house, sheds, buildings, asphalt concrete, and concrete covered areas) across most of the surface, it is considered that surface water drainage from the property would be primarily lost to ground via infiltration or directed off-site by gravity. Based on observation and site topography, surface run-off would generally follow the topography and may eventuate in the southern adjoining property and at the frontage of Karne Street North. There was no water body such as a creek, river or wetland in close proximity to the site.

As the analyte concentrations were either non-detected or low, there is little potential for contaminants to be collected by surface water run-off.

Based on the above, potential off-site impacts of contaminants on groundwater and other waterbodies are considered negligible.

14.0 SITE REMEDIATION

Based on the Phase 2 CA, updated DSI and ACA, four locations within the site contain asbestos (FA and/or ACM fragments) contaminated fill materials. Asbestos (FA) presents a risk of harm to human health due to the exceedance of Health Screening Levels for Residential setting, whilst Asbestos (ACM fragments) present a potential risk of harm to human health due to the exceedance of relevant Health Screening Level for Residential setting as these fragments may release asbestos dust or fibres if tooled, cut, etc. Therefore, remediation is required.

14.1 Site Remediation Policy

The preferred hierarchy of options for site clean-up and/or management set out in s.6(16) Assessment of Site Contamination Policy Framework of Schedules A and B of the NEPM 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 the above are not practicable;

- Consolidation and isolation of the soil on-site by containment within 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.

When deciding which option to choose, the sustainability (environmental, economic and social) of each option should be considered, in terms of achieving an appropriate balance between the benefits and effects of undertaking the option.

The criteria for disposal of contaminated waste is generally governed by the "Waste Classification Guidelines Part 1: Classifying Waste" *EPA* 2014. This guideline outlines a clear step-by-step process for classifying waste. There are six waste classes to be used:

- Specific Waste including clinical and related waste, asbestos waste, as well as waste tyres.
- Liquid Waste.
- Hazardous Waste.
- Restricted Solid Waste.
- General Solid Waste (Putrescible).
- General Solid Waste (Non-putrescible).

Each category has separate requirements in terms of licensing for transportation and landfill sites. NSW EPA consent is required for disposal, treatment and/or storage of Hazardous waste.

The criteria for re-use of soils removed from a site are currently governed by the following:

- Guidelines on Resource Recovery Exemptions (Land Application of Waste Materials as Fill), DECC, NSW (February 2011).
- POEO (Waste) Regulation 2005 – General Exemption Under Part 6, Clause 51 and 51A – The Excavated Natural Material Order and Exemption 2014.
- NSW EPA Certification: Virgin excavated natural material.

14.2 Remediation Area

Based on the contaminant concentrations and locations identified from the contamination assessments, one indicative remediation area (Area 1) has been developed and is shown on Drawing No 20219/6-AA3. This area also encompass test pit locations TP120-1, TP120-11 and TP120-12, where laboratory testing of fill samples detected bonded ACM (>7mm) during ACA. Included on the plan is a table indicating the estimated area and volume of contaminated soil, types of soil and contaminants.

The defined remediation area is estimates only and could extend beyond the boundaries shown. This will be confirmed by the necessary visual inspection, validation sampling and testing.

14.3 Remediation Goal

The goal of remediation is to enable a statement by the appointed Environmental Consultant declaring the site environmentally suitable for the proposed aged care facility development. In order to achieve this goal, the remedial works outlined within "Site Remediation" section will be implemented and validated.

14.4 Remedial Options

As discussed in this report, the contaminant identified on-site is primarily asbestos (FA & ACM fragments). Based on the contaminant identified (refer to Drawing No 20219/6-AA3) the following remediation options were considered:

ADVANTAGES AND DISADVANTAGES OF REMEDIATION OPTIONS

REMEDIATION METHOD	ADVANTAGE	DISADVANTAGE	REMAINING SITE RISK
Excavation and Landfill Disposal	- Simple & straightforward process; - Short time frame; - All contaminants removed from site; - Not overly expensive for smaller volumes of soil to be disposed off.	- Adds to already filling landfill; - Requires movement of contaminated soil on public roads; - Importing clean fill required to fill void.	None
On-site Burial and Containment	- Retains soils within the site, thereby minimising land filling; - Cost saving (of Landfill Disposal) for large volumes; - Short time frame.	- May be subject to Council approval; - Retains contaminants within the site; - Additional investigations required prior to on-site burial; - Requires preparation, implementation and monitoring of an ongoing environmental management plan (EMP); - Long term cost involved; - Owner of contaminated soils remains liable; - Notation on Section 10.7 Certificate may be required; - Potential devaluation of land.	- Breaching of capping layer; - Potential risk to human health.

Many factors such as advantages, disadvantages, risks and the costs of separating relatively small amounts of waste, compared to apparently less complicated disposal off-site, etc., need to be considered in adoption of the final remediation strategy.

Based on the advantages, disadvantages and risks of each of the remediation options, we consider that remediation by excavation of the contaminated soil in Area 1, and disposal at a licensed landfill facility, as shown on Drawing No 20219/6-AA3, is considered appropriate for the site.

14.4.1 Off-site Landfill Disposal

Area 1 contains asbestos (FA & ACM fragments) contaminated fill materials.

Due to the presence of FA, a contractor with a Class A Licence for friable asbestos must supervise removal and loading of the asbestos contaminated fill materials from Area 1 in a covered, leak-proof vehicle for transport to an NSW EPA licensed landfill facility.

Approval from the landfill must be provided prior to disposal and 24 hours' notice is required. Reference should be made to Section 14.5 below for waste classification details of soil in Area 1.

14.5 Waste Classification

The fill materials in Area 1 are classified as "General Solid Waste" based on the total concentrations of analytes within the soils according to the "Waste Classification Guidelines Part 1: Classifying Waste", the NSW EPA 2014.

Reference may be made to Appendix C for classification details for fill materials in Area 1. Due to presence of asbestos contamination, as indicated in Appendix C, the final classification of the fill materials in Area 1 is "Asbestos Waste".

The above-mentioned waste classification will be adopted to dispose contaminated soil into landfill facility from Area 1. Excavated soil will not be retested to confirm the adopted waste classification.

14.6 Remediation Schedule

This section provides the schedule of remediation works:

- Excavation and disposal of the asbestos (FA & ACM fragments) contaminated fill materials from Area 1.
- Backfilling any excavated area(s) with validated soil, if required, once all remediation and validation is complete.

The anticipated duration for remediation works is about 1 working day. Following remediation of Area 1, the anticipated duration of the validation sampling and testing is about 1 working day. If all validation results are within the acceptable limits, the entire remediation and validation will take about 1 week to complete. However, additional time for further remediation and validation will be required if any residue of contaminate is identified during validation in Area 1.

14.7 Preparation for Remedial Works

Prior to conducting remedial works on-site, the following procedures will be carried out:

- The category of remedial works proposed is considered Category 2 (subject to agreement by Canterbury-Bankstown Council), as defined under the Chapter 4 Remediation of Land in the *State Environmental Planning Policy (Resilience and Hazards) 2021 under the Environmental Planning and Assessment Act 1979*, which has repealed "*Managing Land Contamination: Planning Guidelines*"-*SEPP 55 Remediation of Land*. Development consent to carry out the works is not likely to be required. Under Clause 4.13 of the *State Environmental Planning Policy (Resilience and Hazards)*, a minimum of 30 days notice of the intention to proceed with remedial works must be given to Canterbury-Bankstown Council.
- Notification must be provided by the remediation contractor to SafeWork NSW to excavate and dispose of asbestos contaminated soil at an EPA licensed landfill facility, specifically by the Class A Licenced contractor for friable asbestos.
- The nominated licensed landfill shall be contacted and informed of the soil classification details in order to obtain an approval for acceptance of the contaminated soil. All documentation required by the landfill facility shall be completed as required.
- Marking of the contaminated area by an Environmental Representative. If Geotechnique is appointed, contact person is Anwar Barbhuyia (Ph: 02 4722 2700).
- As a part of site establishment, a meeting between the Remediation Contractor and Environmental Consultant as a minimum, need to be carried to be carried out to discuss the requirements of this RAP, the contractors programme and requirements from the Environmental Consultant or Remediation Contractor. All intended environmental management measures (refer to Section 15.0) will be installed by the appointed Remediation Contractor. An appointed Environmental Consultant will inspect all measures prior to remedial works commencing.
- All workers involved in the remediation works will be inducted into the Occupational Health & Safety (OH&S) requirements and in particular, the personal protective equipment required (refer to Section 16.0).
- No waste should be transported before acceptance of the application.
- Signage shall be placed at the site entrance, identifying the contact details of the appointed remediation contractor.
- The site shall remain secure during non-working hours.

14.8 Aesthetic Issue to be Considered Remediated and Addressed

Anthropogenic inclusions of building debris including terracotta fragments, rusted metal, brick, timber, concrete fragments, glass fragments and/or road base gravel were identified within the subsurface fill material within the site.

In accordance with Section 3.6 of Schedule B1 of NEPM 2013, the presence on ground surface and anthropogenic inclusions in subsurface fill of building debris including fragments of brick, concrete, glass, plastic, tile, timber, PVC / terracotta pipe, metal and / or bitumen commonly occur and are widely distributed in urban areas during demolition and construction works. These mentioned building debris were considered inert, non-hazardous and low concern under a residential land use scenario; however, are unsightly and some of which (for example, glass, PVC pipe, broken tile, metal) might be unsafe to children in unpaved / landscape areas.

Following the completion of remediation and validation, the aesthetic issue will be reassessed. If the residual surface soil / fill is found to contain materials deemed not suitable for residential land use from an aesthetic perspective in line with section 3.6 of NEMP 2013, the aesthetic issue will be addressed.

For safety precaution and unsightly concern, cover with a layer of clean soil of the anthropogenic inclusions of building debris in subsurface fill will be recommended especially in the unpaved and landscape areas.

If a cover layer of clean soil is to be adopted to address items of aesthetic concern, the surface of these materials should be at depth of approximately 0.3m to 0.5m below the final RL post cutting and filling activities. It is our opinion that a thickness of approximately 0.3m to 0.5m clean soil cover is considered appropriate.

15.0 SITE / ENVIRONMENTAL MANAGEMENT PLAN

The appointed remediation contractor will be provided with a copy of this RAP, so that they are aware of the contamination status of the soils and the remediation methodology to be adopted.

All remediation works will be carried out with due regard to the environment and to all statutory requirements. The works shall comply with the requirements of the following Acts:

- Protection of the Environment Operations Act 1997
- Construction Safety Act 1912
- Occupational Health and Safety Act 2000

All site works will comply with the provisions set out in the following:

- WorkCover NSW: Working with Asbestos Guide – 2008
- New South Wales Work Health and Safety Regulation 2017
- SafeWork NSW Code of Practice 2019: How to safely remove asbestos
- NSW EPA: Waste Classification Guidelines Part 1: Classifying Waste – November 2014
- NSW EPA Contaminated Sites: Guidelines for the NSW Site Auditor Scheme (3RD Edition) – 2017
- State Environmental Planning Policy (Resilience and Hazards, 2021-Chapter 4 Remediation of Land) under the Environmental Planning and Assessment Act 1979

In addition to any statutory requirements, the contractor will be responsible for carrying out the remediation works with all due care to ensure that the following conditions are specifically complied with:

- Minimal wind borne dust leaves the confines of the site.
- Water containing suspended matter or contaminants will not leave the confines of the site, as this might pollute watercourses, either directly or indirectly, through the stormwater drainage system.
- Material from exposed non-validated surfaces is not to be tracked onto other areas of the site by personnel or equipment.
- Vehicles will be cleaned and secured so that mud, soil or water is not deposited on any public roadway or adjacent areas.
- Noise levels at the site boundaries will comply with the noise quality objectives of the region or legislative requirements.

The Project Manager will ensure that the contractor and the contractor's employees are familiar with the contents of the Environmental Management Plan.

The following sub-sections provide details of the environmental management practices to be employed at the site in order to comply with the statutory requirements and the previously mentioned items.

15.1 Working Hours

All remediation works will be carried out between the hours specified or required by Canterbury-Bankstown Council (Monday to Friday: 7am to 6pm and Saturday: 8am to 1pm).

15.2 Security / Safety Measures

Prior to any remediation works being carried out, adequate signage containing a "no unauthorised entry" statement, as well as the contractor's name and contact details during and after working hours will be erected at the site entrance.

A site superintendent appointed by the remediation and/or earthworks contractor will be in attendance for the duration of the works to ensure implementation of the day-to-day works and maintenance of the environmental safeguards. The superintendent will also be responsible for locking any gate at the completion of each day.

All earthworks machinery used on the site will be fitted with warning lights and reversing signals.

All remediation works will be completed and validated prior to any construction works proceeding within the site.

15.3 Traffic Management / Truck Monitoring

Access into the site will be via the gate on Karne Street North. Prior to exiting, the site trucks will pass over a shaker grid or truck wash bay.

At completion of removal of soil from the site, the adjacent public road will be inspected for any soil deposits from exiting trucks, which will be cleaned up and returned to the site.

All loaded trucks will be fitted with secured covers over the entire load, thereby preventing any loss of the load on public roads. Each load of contaminated soil leaving the site shall be such that the origin, dispatch time, cleanliness of the vehicle, route, destination and arrival time are recorded. Appropriate (trip ticket) docket information confirming disposal shall be maintained for inspection.

15.4 Dust Control

Generation of dust will be kept to a minimum at all times.

During working hours, water sprays will be used to keep the surface of the excavation and any stockpiled soils (which will be kept to a minimum) reasonably damp in order to suppress any dust. Water used for dust suppression will be only the minimum required and will not be allowed to escape the confines of the excavation areas. Polythene sheets will be used to cover any contaminated soil stockpile to minimise generation of dust. If excessive dust is being generated, works will cease until the dust is sufficiently suppressed.

A complaints register will be set up on-site for recording complaints from residents, with regard to dust. The complaints register will be completed by the Site Superintendent, as well as the corrective actions implemented.

15.5 Sediment and Stormwater Containment

Industry standard sediment control fencing will be installed along the downslope of the remediation area. The fencing will comprise geofabric filter stretched between posts at appropriate spacing. The base of the fabric will be buried in the ground and / or adequately weighted. The fabric will be an approved material.

The sediment control measures will be regularly inspected and maintained by the superintendent. Should any section be damaged or not perform to satisfaction it will be immediately repaired or replaced.

15.6 Stockpile Management

All materials stockpiled onsite will be managed by the Contractor. Unique numbers will be provided for each stockpile, the source of the stockpile, its estimated volume, material characterisation and its location onsite will also be recorded.

The following procedures will be implemented by the Contractor:

- No stockpiles of soil or other materials shall be placed on footpaths or road reserves unless prior Council approval has been obtained;
- All stockpiles of soil or other materials shall be placed away from drainage lines, gutters or stormwater pits or inlets;
- A silt fence or straw bales must be placed around any soils temporarily stockpiled on site in order to prevent the loss of soils during rain periods;
- All stockpiles of soil or other materials likely to generate dust or odours shall be covered (where practical); and
- All stockpiles of chemically contaminated soil shall be stored in a secure area and be covered if remaining more than 24 hours (where practical).

15.7 Run-off

Run-off water, including that due to rain that has not been in contact with any contaminated soil is not of concern. Contaminated soil may be exposed at the surface and any surface water that comes into contact with soil must be collected. If the contaminated soil needs to be stockpiled on site temporarily, excavated material will be placed on the up-gradient side of the excavation and will be covered with tarpaulins. This method ensures that minimal rainwater will come into contact with contaminated soil and where it does, run-off water will be contained within the excavation.

Water suspected to be contaminated will be sampled and analysed by the laboratory to determine the most appropriate manner of disposal in accordance with the relevant guidelines.

It should be noted that excavation into contaminated soil is best commenced if fine, dry weather is forecast for the next 48 hour working period.

15.8 Noise Management

Noise impacts will generally result from the excavators and truck movements within the site and surrounding streets, all of which have noise levels within levels normally expected at a construction site.

In order to minimise noise impacts during the remediation works, the following measures will be implemented:

- Construction noise will be confined to the hours stipulated by Council. No machinery / trucks will be permitted to access the site outside these hours of operation.
- Signage at the site entrance providing contact details for the site superintendent so that noise complaints can be readily addressed.
- Establishment and monitoring of a complaints log.

15.9 Odour Control

In order to control odours at the site boundaries, the following processes will be adopted:

- All plant and equipment exhaust levels will be monitored by the site foreman / superintendent to ensure acceptable levels. If unacceptable levels are determined, the equipment will be replaced or repaired.
- If strong hydrocarbon odours are detected from any of the machinery, a hydrocarbon mitigating agent will be used.
- A complaints register will be set up on-site for recording complaints from residents, or tenants with regard to odours. The complaints register will be completed by the Site Superintendent, as well as the corrective actions implemented.

15.10 Waste and Asbestos Management

Disposal of contaminated soils (waste) from Area 1, generated by the remediation works will be in accordance with Section 14.0 of this RAP.

All contaminated soil must be transported in a covered, leak-proof vehicle, and disposed of in accordance with NSW EPA and SafeWork NSW requirements.

During working hours, a water cart should be used to suppress any dust. Water used for dust suppression will be only the minimum required and will not be allowed to escape the confines of the site.

The remediation contractor will keep records of all off-site waste disposals.

Procedures for waste and asbestos management will include but not be limited to:

- Documenting the results of the visual and sample assessment, and the safe system of management throughout the remediation works.
- Notifying SafeWork NSW for removal of asbestos contaminated soil. This is generally done by the Class A Licensed contractor.
- Dampening, not saturating, the excavated fill materials and work area with water spray to minimise the potential for asbestos fibres from the asbestos contaminated soil becoming airborne.
- Wearing appropriate personal protection equipment (PPE) as detailed in the OH&S Plan in Section 16.0.
- NATA accredited asbestos air monitoring in the vicinity of the exclusion zone (a minimum of 10m from the perimeter of the asbestos contaminated area) for airborne asbestos during excavation and loading of asbestos contaminated soil from Area 1. If monitoring indicates the presence of airborne asbestos, all works must cease immediately and the remediation methods re-assessed.
- Appropriate documentation of trucks that are used to transport contaminated soil before leaving the site and after disposing of the contaminated soil at an EPA licensed landfill facility.

Information relating to asbestos contamination in soils and safe disposal and transport is presented in WorkCover NSW (2008) Working with asbestos and NOHSC (2005) Code of Practice for the management and control of asbestos in the work place.

The remediation contractor will keep records of all off-site waste disposals.

The works area will be kept in a tidy condition so that waste materials generated by the earthworks or workers on-site will be contained. Rubbish disposal bins with heavy lids will be provided within the site compound for personal litter. These bins will be monitored and emptied on a regular basis when near full. Any loose rubbish generated by the earthworks, capable of being blown off the site in high winds, will be hand collected and deposited into the bins provided. No burning of rubbish will be permitted.

All employees will be informed of the necessity to maintain a tidy environment. The site superintendent will carry out a daily inspection at the completion of works, prior to leaving the compound.

15.11 Re-use of Site Originated Soil

After completion of remediation and validation, site originated soil from outside the remediation area can be re-use as fill in the remediated areas. Periodic inspection should be carried out by the appointed Environmental Consultant during excavation of the soil.

If any suspect materials (identified by unusual staining, odour, discolouration or inclusions such as building rubble, asbestos sheets/pieces/pipes, ash material, etc.) are encountered during the placement of site originated soil, Unexpected Finds Management Protocol (Appendix D) should be implemented. In the event of contamination, detailed assessment, remediation and validation will be necessary.

15.12 Re-use of Imported Soil

After completion of remediation and validation, VENM, ENM or resource recovery order material exempted under the POEO act imported to the site and validated as per Section 17.3, can be re-use as fill in the remediated areas.

If any suspect materials (identified by unusual staining, odour, discolouration or inclusions such as building rubble, asbestos sheets/pieces/pipes, ash material, etc.) are encountered during the placement of imported soil, Unexpected Finds Management Protocol (Appendix D) should be implemented. In the event of contamination, detailed assessment, remediation and validation will be necessary.

16.0 OCCUPATIONAL HEALTH & SAFETY

A site-specific Occupational Health and Safety (OH&S) Plan has been developed to ensure that the remediation works are conducted in a safe manner. Personnel working on the site are required to read and understand the OH&S Plan prior to works commencing.

16.1 Potential Contaminants Associated with Human Health Issue

The contaminants identified in the soil and associated with human health issue are detailed in Section 7.0, with brief descriptions of physical form and some general health and safety information. Note that the effects listed are usually the result of prolonged exposure to high concentrations. These extremes are not likely to be achieved during the works proposed.

16.2 Personal Protective Equipment (PPE)

In order to minimise exposure to the contaminants within the soils and to ensure the safety of workers by providing adequate protection, the minimum level of PPE for workers actively involved in handling the contaminated soil (particularly asbestos) includes:

- Disposable long sleeve worker coveralls/overalls to be disposed of at the completion of each day.
- Highly visible safety vests.
- Waterproof boots with steel toe and shank, complying with relevant Australian Standard.
- Safety glasses with side shields, complying with relevant Australian Standard.
- Hard hat, meeting relevant Australian Standard.
- Dust masks, complying relevant Australian Standard for filtering asbestos fibres.
- Nitrile work gloves, complying with relevant Australian Standard.

It should be noted that wearing PPE can reduce the dexterity of workers and senses of vision, hearing and smell. Heat stress is another important consideration that must be taken into account during hot weather.

Eating or drinking on-site will only be carried out in a designated lunchroom. Hands are to be washed thoroughly upon completion of work and prior to eating, drinking or any other hand-to-mouth activity. Smoking can only be carried out in a dedicated area outdoor and away from hazard.

Visitors to the site, who will be observing activities being undertaken in or around excavations, should follow appropriate guidelines to prevent excessive dermal contact or inhalation of dust arising from the handling of contaminated materials. All visitors should wear the following PPE during remediation works:

- Highly visible safety vests.
- Waterproof boots with steel toe and shank.
- Safety glasses with side shields.
- Hard hat.
- Dust masks, complying relevant Australian Standard for filtering asbestos fibres.

The abovementioned PPE will also be required for site workers, or consultants not directly associated with the remedial works, but present on the site.

16.3 Safety Measures around Excavations

The safety measures to be adopted during any deep excavation works (i.e. deeper than 1.2m) are as follows:

- During non-working hours, the entire site will be secured.
- All personnel performing the works in and around the excavation will wear appropriate personal protective equipment, as listed above.
- Excavation works should not take place during periods of high wind, elevated temperature or heavy rain.

16.4 Air Monitoring

During excavation and loading of asbestos contaminated fill materials from Area 1, air quality/asbestos monitoring devices should be set up in the vicinity of the exclusion zone (a minimum of 10m) from the perimeter of Area 1 and monitored by a suitably experienced consultant. Monitoring should be carried out in accordance with the Worksafe Australia Code of Practice and Guidance Notes on Asbestos – Membrane Filter Method for Airborne Asbestos Dust – August 1988. The positions of monitoring devices should be determined through consultation with the appointed monitoring consultant and Class A licensed contractor for bonded asbestos.

16.5 Key Personnel and Contact Telephone Numbers

Remediation Contractor's Representative:	Not known at this stage
Superintendent:	Mr Marlon Zunac Cyre Projects Pty Ltd Phone: 02 9602 6398
Asbestos Assessor	Not known at this stage
Environmental Consultant	Not known at this stage
If Geotechnique is appointed, contact person	Mr A Barbhuyia Phone: 02 4722 2700
Nearest Hospital:	St George Hospital Gray Street, Kogarah NSW 2217 Phone: 02 9113 1111
Emergency Response:	000

17.0 SITE VALIDATION

Validation sampling and testing forms a crucial part of the site remediation process, in that it monitors the success or otherwise of the adopted remediation strategy and confirms the suitability of the site for the proposed use.

The objective of the site validation plan is to obtain sufficient information and data to make the following conclusions:

1. All previously identified contaminated soil is appropriately remediated.
2. Any soil with aesthetic issues such as unacceptable odour or discolouration is removed from the site.
3. All waste disposal is carried out in accordance with current legislation.
4. The risks that the retained soils pose to human health or the environment are minimal and acceptable.
5. The site is suitable for the proposed development.

The data qualitative objectives (DQO) for the validation process will be developed in accordance with NEPM 1999 (April 2013). The performance of the validation in achieving the DQO will be assessed through the application of Data Quality Indicators (DQI) defined as follows:

Precision	A quantitative measure of the variability (or reproducibility) of data;
Accuracy	A quantitative measure of the closeness of reported data to the "true" value;
Representativeness	The confidence (expressed qualitatively) that data is representative of each media present on the site;
Completeness	A measure of the amount of useable data from a data collection activity;
Comparability	The confidence (expressed qualitatively) that data can be considered equivalent for each sampling and analytical event.

The following table provides a list of the DQI for the proposed validation and the methods adopted to ensure that the DQI are met.

DATA QUALITY INDICATOR	METHODS OF ACHIEVEMENT
Documentation Completeness	Preparation of COC records. Laboratory sample receipt information. NATA registered laboratory results certificates.
Data Completeness	On site visual assessment of soils. On site assessment of odour. Analysis for contaminants of concern.
Data Comparability	Using appropriate techniques for sample recovery. Using appropriate sample storage and transportation methods. Use of a NATA registered laboratories.
Data Representativeness	Reasonable validation sampling coverage. Representative validation sampling. Representative coverage of contaminants.
Data Precision and Accuracy	Use of trained and qualified field staff. Appropriate industry standard sampling equipment and decontamination procedures.

The remediation works carried out will be validated through the following processes:

- Monitoring and documentation of the works by an appointed Asbestos Assessor and an Environmental Consultant.
- Collection and review of waste transportation and disposal documentation.
- Visual inspection, sampling and/or testing of soils upon removal of identified contaminated materials.

Following removal of asbestos contaminated fill materials from Area 1, an independent SafeWork NSW licensed asbestos assessor must be engaged to issue clearance of Area 1 for the proposed aged care facility development. A qualified asbestos assessor will undertake all necessary visual inspection and/or sampling as a part asbestos clearance of the remediated areas.

A suitably qualified Environmental Consultant must also be engaged to carry out supervision of remediation work of Area 1, and validation of Area 1 after completion of remediation work.

17.1 Sampling & Testing Plan-Soil Impacted by Asbestos (FA & ACM fragments) (Area 1)

After removal of asbestos (FA & ACM fragments) contaminated fill materials from Area 1, an independent SafeWork NSW licensed asbestos assessor must be engaged to issue clearance of Area 1 for the proposed aged care facility development. A qualified asbestos assessor will undertake all necessary visual inspection (asbestos assessor will systematically and thoroughly inspect the base of the excavation pit at an interval of 2m and entire perimeter of the wall). Any identified asbestos fragments will be picked for landfill disposal) and sampling as a part asbestos clearance of the remediated area. No soil with unacceptable odour or discoloration or inclusions of ash, charcoal, fibro-cement pieces etc., can remains in the pit.

After completion of remediation works and completion of visual inspection by Asbestos Assessor for Area 1, a thorough visual inspection of the excavation pit in Area 1 must be carried out by the appointed environmental consultant to confirm that no soil with unacceptable odour or discoloration or inclusions of ash, charcoal, fibro-cement pieces etc. remains in the pits.

The following samples will be recovered using a stainless steel trowel from the excavation of pit of Area 1: The stainless steel trowel will be regularly decontaminated using Decon 90 and distilled water:

- Excavation of side wall samples, 1 location per 5 linear metres or at least 1 per excavation wall, recovered from the top of the excavation to the full depth of the wall (at least one sample in every 500mm of soil or change of soil profile, with allowable maximum sampling thickness of 300mm).
- Excavation base samples, 1 location per 25 square metres or at least 2 per excavation base, recovered from the excavation base surface to a depth of 0.1m.

In summary, the samples to be recovered and analysed are presented below.

Area	Estimated Excavation Area (m^2)	Estimated Excavated Depth	Number of Samples to be Collected	Analysis	Remarks
1	54	Average 350mm (Full depth of fill)	10	Asbestos	➢ 2 samples (2 samples from 2 sampling locations along the northern wall) at depth interval of 0-0.15m; 1 sample (1 sample from 1 sampling location along the eastern wall) at depth interval of 0-0.15m; 2 samples (2 samples from 2 sampling locations along the southern wall) at depth interval of 0-0.15m; 1 sample (1 sample from 1 sampling location along the western wall) at depth interval of 0-0.15m; ➢ 2 samples from the base at depth interval of 0.1m

In total, ten samples (each about 10L volume) will be recovered for on-site sieving test in accordance with gravimetric procedures as per NEPM 1999 (April 2013).

Disposable gloves will be used to transfer validation samples into large plastic bag (each about 10L volume) for on-site sieving test in accordance with gravimetric procedures as per NEPM 1999 (April 2013). Samples will also be collected in separate small plastic bag (1kg) for asbestos analysis by NATA accredited laboratory under COC condition.

If any excavated soil from Area 1 is temporally stored on the ground of the site prior to disposal, generally the following samples will be recovered using a stainless steel trowel from the footprint of the former stockpile:

- 1 location per 25 square metres or at least 8 locations per footprint, recovered from the ground surface to a depth of 0.1m.

17.2 Validation Criteria

The site is proposed for community title subdivision. As such, with regard to human health, analytical results will be assessed against risk health screening level for *residential with minimal opportunities for soil access* (Residential B).

For asbestos assessment, the adopted validation assessment criteria are:

- 0.04% w/w for bonded ACM;
- 0.001% for friable asbestos in soil; and
- No visible asbestos on ground surface.

If the validation test results meet the adopted acceptance criteria the remediation area will be deemed as satisfactorily remediated.

If the validation test results do not meet the validation criteria, remediation will continue followed by additional validation sampling and testing. This process will continue until the test results meet the acceptance criteria.

17.3 Imported Material

If any material is to be imported to the site, the material will be validated as being suitable for use within the site prior to use. The imported fill must be free from asbestos, ash and odour, not be discoloured and acid sulphate soil. Environmentally, virgin excavated natural material (VENM) or excavated natural material (ENM) or resource recovery order material exempted under the POEO act, will be suitable for use as fill for the site. Salinity assessment might be required.

The validation process will be as follows:

- Review of VENM or ENM classification or Resource Recovery Order material exemption reports prepared by suitably qualified consultant(s) made available by the supplier of the materials.
- Inspection of incoming material at the source site and during importation, if the documentation provided is found to be adequate, to ensure the material comply with those validated.
- If the documentation provided is found to be inadequate or if the incoming material is suspect, appropriate sampling and testing will be carried out by suitably qualified consultant(s) prior to acceptance within the site.

18.0 CONTINGENCY PLAN

18.1 Unexpected Finds

Contamination assessment had been undertaken to assess the identified contaminants of potential concern within the site. However, ground conditions between sampling points may vary, and further hazards may arise from unexpected sources and / or in unexpected locations during remediation. Residual hazards that may be present at the site are generally detectable through visual or olfactory means, for example:

- 10m^2 of ACM sheets / fragments encountered in any location;
- Friable ACM such as lagging encountered in any location;
- Bottles / containers / drums of chemicals;
- Odorous, unusual coloured or stained hydrocarbons impacted soils; and
- Ash and / or slag contaminated soils / fill materials.

As a precautionary measure to ensure the protection of the workforce and surrounding community, should any of the abovementioned substances, any other unexpected potentially hazardous substance, imported fill materials (which are different to those encountered during the previous assessments), etc., be identified, we recommend that this office is contacted for assessment and an unexpected finds management protocol in Appendix D of this report should be implemented.

The procedure to be followed in the event of an unexpected find is presented below:

- In the event of an unexpected find, all work in the immediate vicinity should cease and an environmental consultant should be contacted immediately;
- Temporary barricades should be erected to isolate the area from access to the public and works;
- The environmental consultant should attend the site and assess the extent of remediation that may be required;
- In the event additional remediation is required, the procedures outlined within this report should be adopted where appropriate, alternatively an addendum RAP should be prepared;
- An additional sampling and analytical rationale should be established by the consultant and should be implemented with reference to the relevant guideline documents; and
- Appropriate validation sampling should be undertaken by the appointed Environmental Consultant in accordance with the RAP and the results should be included in the validation report.

18.2 Contingency Scenarios & Corrective Actions

In some circumstances, remediation works can be unpredictable. The following table presents anticipated possible problems or events and the corresponding corrective actions to be implemented:

Incident / Event	Corrective Action
Spillage / leakage of oil, hydraulic fluid, or other fuels from the excavator and / or trucks	For major spill; place sandbags down slope, cover area in sand, excavate impacted sand and soils and dispose of at an appropriate EPA approved facility. If groundwater and/or water bodies are impacted, the appointed Environmental Consultant will assess the contamination and need to remediation based on the available information and relevant guidelines. If remediation is required, an addendum to the RAP will be prepared. Assessment and any remediation details will be added in the final validation report. For minor spill; cover area in sand, excavate impacted sand and soils and dispose at an EPA approved facility. Stop spillage / leakage where apparent.
Failure of sediment control measures	Replace or repair failed control measure. Determine reason for failure and ensure no repeat. Clean up any materials penetrating the safeguard and return to either the stockpile or excavation (origin).
Excessive dust generation	Cease activities until more appropriate dust control measures can be implemented. Cover all areas generating dust with plastic sheeting. Improve water control (i.e. sprays) where appropriate. Assess measures being implemented.
Discovery of asbestos cement pieces / fragments in locations other than identified locations / areas during remediation	An unexpected finds management protocol (Appendix D to be implemented.
Discovery of unexpected contamination and suspect materials that are not identified from the previous assessment	An unexpected finds management protocol (Appendix D) to be implemented.
Complaint from neighbouring property or sensitive receptor	Initiate pro-active consultation process with all neighbouring properties to ensure any concern and complaints will be resolved prior to commencement of any remediation work. The future appointed principal contractor (who is likely to be the future appointed civil contractor) will have responsibility to initiate a pro-active consultation process in the event of complaints from neighbouring properties.
Excessive noise	Identify source and add or amend noise attenuation equipment.
Failure of selected remediation strategy, as validation cannot be achieved.	The containment or capping of contaminated soil on-site can be considered. Technical issues associated with physically capping and containing contaminants on-site must be proven effective. An ongoing environmental management plan (EMP) would be required to be prepared by the appointed Environmental Consultant to the satisfaction of the Council. The EMP would need to be legally enforceable. Where containment and/or capping of contaminants is undertaken either the land owner will place a covenant on the land title or the requirements for the ongoing EMP to be legally enforceable would be as a condition of consent. For the latter option, the council must agree in writing to having a conditional sign-off and be satisfied of the legality of the EMP.

19.0 CONCLUSION AND RECOMMENDATIONS

The Phase 1 PCA and Phase 2 CA revealed that the site comprised a nursing home primarily and also one residential property in the north-west corner of the site. Lot 3 in DP16063 (67 Karne Street North) was not part of the site during Phase 1 PCA and Phase 2 CA in 2017, but was included for the recently completed updated DSI and current ACA. The updated DSI and ACA revealed that the site primarily comprises a former nursing home, and two disused residential properties in the north-west corner of the site.

The general soil profile comprises fill materials overlying natural clayey soil and siltstone bedrock. Topsoil underlain by natural clayey soil and siltstone bedrock was encountered at a couple of locations. The boreholes and test pits did not reveal any visual evidence of asbestos or other indicators of significant contamination, such as staining, odours or significant foreign matter, with the exception of the presence of one fibro-cement piece in the fill profile at borehole BH12, one fibro-cement piece on the ground surface at borehole FCP1, and a number of fibro-cement pieces in the fill profile at borehole BH120 and test pits TP120-3, TP120-5 and TP120-6. The laboratory confirmed that the fibro-cement pieces within the fill profile at BH12, BH120 TP120-3, TP120-5 and TP120-6, and on the surface at FCP1 contained ACM. As no asbestos-cement pieces were observed on the ground surface at and in the vicinity of FCP1 after collecting the asbestos-cement piece for laboratory testing, asbestos is no longer considered an issue for the location FCP1.

Based on the Phase 2 CA, updated DSI and ACA, four locations within the site contain asbestos (FA and/or ACM fragments) contaminated fill materials. Asbestos (FA) presents a risk of harm to human health due to the exceedance of Health Screening Levels for Residential setting, whilst Asbestos (ACM fragments) present a potential risk of harm to human health due to the exceedance of relevant Health Screening Level for Residential setting as these fragments may release asbestos dust or fibres if tooled, cut, etc. Therefore, remediation is deemed necessary.

Based on the contaminant concentrations and locations identified from the contamination assessments, one area (Area 1) requiring remediation was identified as indicated on Drawing No 20219/6-AA3.

Based on the advantages, disadvantages and risks of each of the remediation options, we consider that remediation by disposal of the asbestos (FA and ACM fragments) contaminated fill materials in Area 1 at an appropriately licensed landfill facility, as indicated on Drawing No 20219/6-AA3, is appropriate for the site.

This RAP has been prepared to provide guidance to contractor cleaning up / manage the contaminated soils within the site.

The asbestos (FA and ACM fragments) contaminated fill materials in Area 1 to be excavated and removed from the site for off-site disposal is classified as Asbestos Waste. Excavated soil will not be retested to confirm the adopted waste classification.

The waste must be disposed as Asbestos Waste at a licensed landfill facility which will meet their licence requirement to receive Asbestos Waste. All landfill delivery dockets shall be provided to the appointed Asbestos Assessor and Environmental Consultant for inclusion in asbestos clearance and final validation report. The records of the disposal (tonnage) will be correlated with the extent of remediation (volume of soil removed).

Removal and/or disposal of the waste must be carried out in accordance with the requirements of the regulators, such as NSW EPA and SafeWork NSW.

The proposed remediation works are considered to be Category 2 (subject to agreement by Canterbury-Bankstown Council). A minimum of 30 days notice of the intention to proceed with remedial works must be given to Canterbury-Bankstown Council.

The Site Management Plan, Occupational Health & Safety Plan and Contingency Plan, outlined in Sections 15.0, 16.0 and 18.0 of the report are required to be implemented during remediation works.

After completion of the remediation works, validation must be carried out in accordance with Section 17.0 of the report.

A validation report will be then prepared on the suitability of the site for the proposed aged care facility development.

Based on this assessment, it is our opinion that the site is considered suitable for the proposed aged care facility development subject to implementation of the following recommendations, prior to earthworks:

- Sampling and testing of soils beneath the houses, building, and concrete covered areas after demolition and removal of site features.
- Revise this RAP, if required, to remediate any other contamination that might be identified through the recommended additional sampling and testing, followed by appropriate validation. If no other contamination is detected beneath the site features after removal, carry out appropriate remediation and validation of only Area 1 as detailed in this report.
- A validation report will be produced at completion of successful remediation by the appointed environmental consultant. The format of the report will follow that recommended in the NSW Environment Protection Authority (EPA), “Consultants Reporting on Contaminated Land" – 2020.

After completion of remediation and validation, if any materials to be excavated and removed from the site, it is recommended that waste classification of the materials, in accordance with the "Waste Classification Guidelines Part 1: Classifying Waste" NSW EPA 2014; NSW EPA resource recovery exemptions and orders under the Protection of the Environment Operations (Waste) Regulation 2014; or NSW EPA *Certification: Virgin excavated natural material* is undertaken prior to disposal at a facility that can lawfully accept the materials. FA 0.0002% w/w was detected in the surface fill sample at borehole location BH115 (refer to Drawing No 20219/5-AA2), which can remain in the site, as the level is below the relevant HSL for Residential setting 0.001% w/w. As borehole location BH115 is located in the proposed basement car park area, the soil at and in the vicinity of BH115 must be disposed at a landfill facility as asbestos waste during bulk earthworks. Any soil disposed off-site need to track and documented and shall be provided to the appointed Environmental Consultant for inclusion in a final validation report.

Based on the available information and nature of identified contamination, it appears that preliminary long-term environmental management plan will not be required for the site after successful remediation and validation of the site, as the contaminated asbestos soil will be removed from the site as a part of remediation works.

Should VENM or ENM or resource recovery order material exempted under the POEO act be imported from other sites, the material classification shall be assessed by the appointed Environmental Consultant prior to such importation, as detailed in Section 17.3.

20.0 REPORT / ASSESSMENT LIMITATIONS

Within the scope of work outlined in the fee proposal dated 2 June 2022 (Reference Q-Revised-Narwee) and variation 20216/6-LV1 dated 16 September 2022, the services performed by Geotechnique were conducted in a manner consistent with the level of quality and skill generally exercised by members of the profession and consulting practice.

To the best of our knowledge, all information obtained and contained in this report is true and accurate. No further investigation has been carried out to authenticate the information provided. Supporting documentation was obtained where possible, some of which is contained in this report.

This report has been prepared for Cyre Projects Pty Ltd for the purposes stated within. Canterbury Bankstown City Council may rely upon the report for development and/or construction application determinations. Reliance on this report by other parties shall be at such parties' sole risk as the report might not contain sufficient information for other purposes.

This report shall only be presented in full and may not be used to support any objective other than those set out in the report, except where written approval is provided by Geotechnique Pty Ltd.

The information in this report is considered accurate at the completion of field work for the ACA (6 October 2022). Any variations to the site from or use beyond that date will nullify the conclusion stated.

Whilst the assessment conducted at the site was carried out in accordance with current NSW guidelines, the potential always exists for contaminated soils to be present between sampled locations.

Presented in Appendix E is a document entitled "Environmental Notes", which should be read in conjunction with this report.

LIST OF REFERENCES

Contaminated Land Management Act 1997

Contaminated Land Management Regulation 1998

Contaminated Sites: Consultants Reporting on Contaminated Land – NSW Environment Protection Authority 2020

Contaminated Sites: Guidelines for the NSW Site Auditor Scheme (3rd Edition) –NSW EPA 2017

Contaminated Sites: Sampling Design Part 1- Application - NSW Environment Protection Authority 2022

Geology of Sydney 1:100,000 Sheet (9130) – Geological Survey of New South Wales, Department of Mineral Resources 1983

Guidelines on Resource Recovery Exemptions (Land Application of Waster Materials as Fill), DECC, NSW (February 2011)

National Environmental Protection (Assessment of Site Contamination) Amendment Measures 1999, National Environmental Protection Council 2013

National Environment Protection (Assessment of Site Contamination) Measure – National Environmental Protection Council (NEPM) 1999 (April 2013)

Protection of the Environment Operations (Waste) Regulation 2005 – General Exemption Under Part 6, Clause 51 and 51A – The Excavated Natural Material Exemption and Order 2014

Soil Landscape of Sydney 1:100,000 Sheet (9130) – Department of Land & Water Conservation 2002

Standard Methods for the Examination of Water and Wastewater – American Public Health Association (APHA) 2017

State Environmental Planning Policy (Resilience and Hazards, 2021) under the Environmental Planning and Assessment Act 1979

Waste Classification Guidelines Part 1: Classifying Waste - NSW EPA (November 2014)

DRAWINGS

Drawing No 20219/5-AA1	*Lot Layout and Updated Site Features*
Drawing No 13977/1-AA1	*Lot layout & Site Features*
Drawing No 13977/2-AA1	*Borehole, Test Pit and Sample Locations*
Drawing No 13977/2-AA2	*Locations of Concern*
Drawing No 20219/5-AA2	*Borehole Locations*
Drawing No 20219/5-AA3	*Revised Location of Contamination*
Drawing No 20219/6-AA1	*Detailed Test Pit Locations in the vicinity of BH120*
Drawing No 20219/6-AA2	*2nd Revised Locations of Contamination*
Drawing No 20219/6-AA3	*Indicative Area to be Remediated*

S/F#	Description
1	Possible fibro house with metal roof
2	Possible fill area
3	Grassed area
4	Metal shed/hazardous chemicals
5	Plastic sheeting
6	Brick building with metal roof
7	Former metal shed with concrete floor
8	Former aviary/chicken pen
9	Former chemical storage area
10	Carpark/bitumen/asphalt
11	Former black rubbish bag, bag with asbestos, and scattered asbestos pieces
12	Former metal shed with hot water heater
13	Fibro-cement piece
14	Former rubbish covered with blue tarpaulin
15	Former plastic foam/mulch
16	Former solar panels
17	Concrete pathway
18	Former brick building with tile roof, concrete slab remains
19	Former fibro-cement eaves lining adjacent to gutter (underneath the roof perimeter for both buildings)
20	Fibro building/asbestos roof
21	Fibro building/tiled roof
22	Shipping container
23	Temporary relocatable house/shed

S/F#: Site Feature Number

LEGEND

(#) Site Feature Number

Slope

0 10 20 30 40 50m

Scale 1:1000

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NOTES

1. Site features are indicative and are not to scale.
2. This drawing has been produced using a base plan provided by others to which additional information e.g test pits, borehole locations or notes have been added. Some or all of the plan may not be relevant at the time of producing this drawing

Cyre Projects Pty Limited
Proposed Aged Care Facility
Lots C & D DP403467, Lot 2 DP518877, Lots 2 & 3 DP16063
59-67 Karne Street North, Narwee

Lot Layout and Updated Site Features

Drawing No: 20219/5-AA1
Job No: 20219/5
Drawn By: MH
Date: 12 August 2022
Checked By: SS/AB

File No: 20219-5
Layers: 0, AA1

S/F#	Description
1	Possible fibro house with metal roof
2	Possible fill area
3	Grassed area
4	Metal shed/hazardous chemicals
5	Plastic sheeting
6	Brick building with metal roof
7	Metal shed with concrete floor
8	Aviary/chicken pen
9	Chemical storage area
10	Carpark/bitumen/asphalt
11	Black rubbish bag, bag with asbestos, and scattered asbestos pieces
12	Metal shed with hot water heater
13	Scattered asbestos pieces
14	Rubbish covered with blue tarpaulin
15	Plastic foam/mulch
16	Solar panels
17	Concrete pathway
18	Brick building with tile roof
19	Fibro-cement eaves lining adjacent to gutter (underneath the roof perimeter for both buildings)

S/F#: Site Feature Number

LEGEND

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Slope

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0 10 20 30 40 50m

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Nix Anderson Pty Ltd
Proposed New Ages Care Home
Lots D & C DP403467, Lot 2 DP518877 & Lot 2 DP16063
59-65 Karne Street North, Narwee

Lot Layout & Site Features

Drawing No: 13977/1-AA1
Job No: 13977/1
Drawn By: MH
Date: 30 March 2017
Checked By: AB/SS

File No: 13977-1
Layers: 0, AA1

Imagery ©2017 NearMap.com

0 10 20 30 40 50m

Scale 1:1000

LEGEND

- Borehole
- Test Pit
- Sample

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Nix Anderson Pty Ltd
Proposed New Ages Care Home
Lots D & C DP403467, Lot 2 DP518877 & Lot 2 DP16063
59-65 Karne Street North, Narwee

Borehole, Test Pit and Sample Locations

Drawing No: 13977/2-AA1
Job No: 13977/2
Drawn By: MH
Date: 30 March 2017
Checked By: AB/SS

File No: 13977-2
Layers: 0, AA1

Sample Location	Depth (m)	Concern
BH12	0.16-0.36	Asbestos Containing Material (ACM) fragments
FCP1	Surface	ACM fragments
FCP2	Surface	ACM fragments
FCP3	Surface	ACM fragments

LEGEND

- Borehole
- Sample

Imagery ©2017 NearMap.com

0 10 20 30 40 50m

Scale 1:1000

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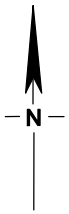
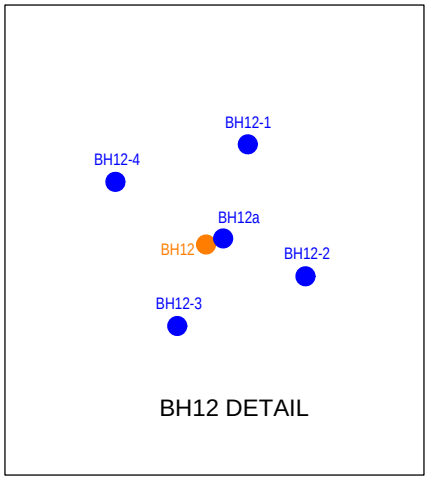
Nix Anderson Pty Ltd
Proposed New Ages Care Home
Lots D & C DP403467, Lot 2 DP518877 & Lot 2 DP16063
59-65 Karne Street North, Narwee

Locations of Concern

Drawing No: 13977/2-AA2
Job No: 13977/2
Drawn By: MH
Date: 11 April 2017
Checked By: AB

File No: 13977-2
Layers: 0, AA2





Imagery ©2022 NearMap.com

LEGEND

- Borehole
- Borehole (March 2017)

0 10 20 30 40 50m

Scale 1:1000

0 1 2 3 4 5m

Scale 1:100

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Proposed Aged Care Facility
Lots C & D DP403467, Lot 2 DP518877, Lots 2 & 3 DP16063
59-67 Karne Street North, Narwee

Borehole Locations

Drawing No: 20219/5-AA2
Job No: 20219/5
Drawn By: MH
Date: 12 August 2022
Checked By: SS/AB

File No: 20219-5
Layers: 0, AA2

N

Location of Contamination	Depth (m)	Contaminant	Concentration
BH120	0-0.15	Asbestos (bonded ACM fragments)	**0.308% w/w**
BH120	0-0.15	Asbestos (<7mm FA)	**0.034% w/w**
Assessment Criteria	**0.04% w/w** for ACM in soil for residential land use **0.001% w/w** for AF & FA in soil **No visual asbestos (ACM)** for surface soil		

Notes:

ACM: Asbestos Containing Material

AF / FA: Asbestos Fine / Fibrous Asbestos

Imagery ©2022 NearMap.com

LEGEND

- Borehole

0 10 20 30 40 50m

Scale 1:1000

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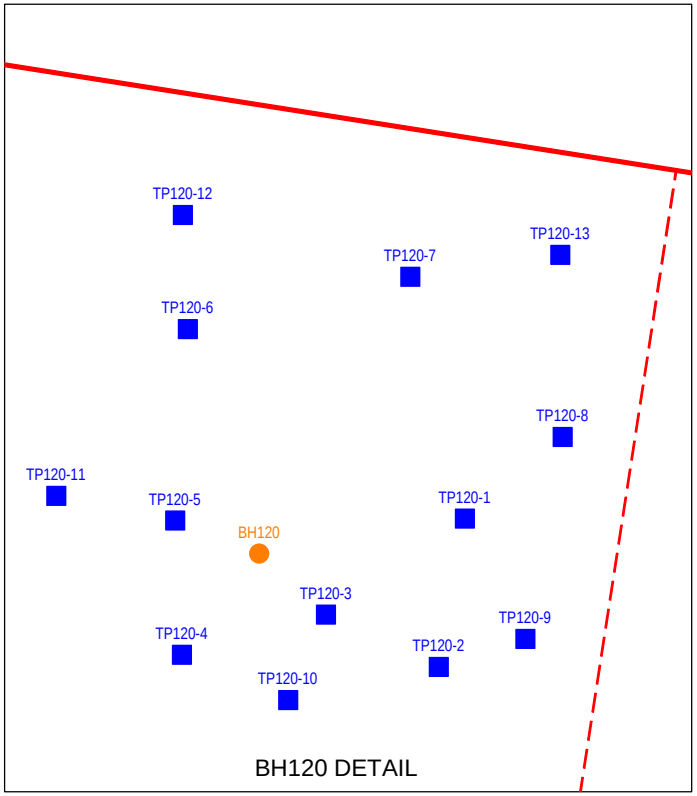
Proposed Aged Care Facility
Lots C & D DP403467, Lot 2 DP518877, Lots 2 & 3 DP16063
59-67 Karne Street North, Narwee

Revised Location of Contamination

Drawing No: 20219/5-AA3
Job No: 20219/5
Drawn By: MH
Date: 12 August 2022
Checked By: AB

File No: 20219-5
Layers: 0, AA3

Imagery ©2022 NearMap.com



BH120 DETAIL

N

LEGEND

- Test Pit (October 2022)
- Borehole (July 2022)

0 10 20 30 40 50m

Scale 1:1000

0 1 2 3 4 5m

Scale 1:100

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Cyre Projects Pty Limited
Proposed Aged Care Facility
Lots C & D DP403467, Lot 2 DP518877, Lots 2 & 3 DP16063
59-67 Karne Street North, Narwee

Detailed Test Pit Locations in the vicinity of BH120

Drawing No: 20219/6-AA1
Job No: 20219/6
Drawn By: MH
Date: 13 October 2022
Checked By: SS/AB

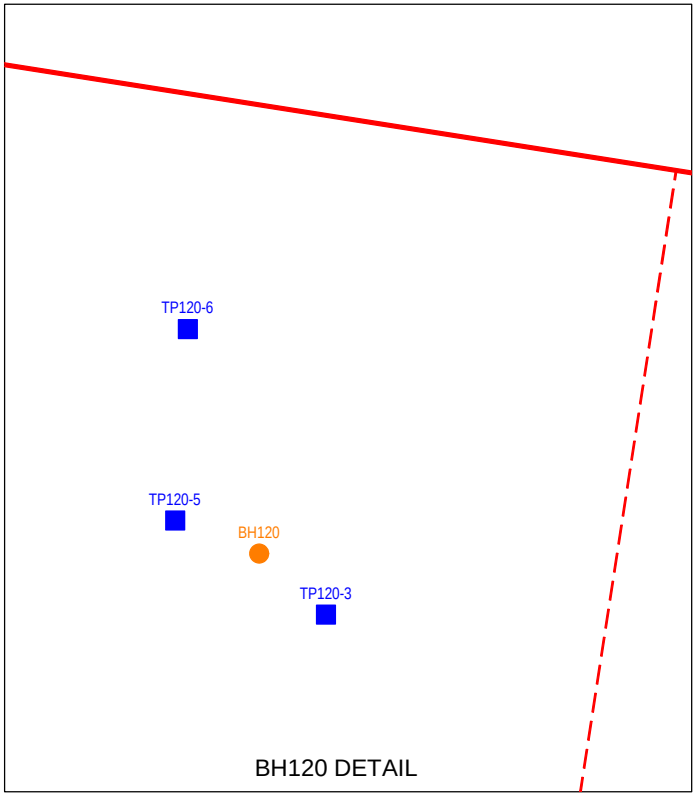
File No: 20219-6
Layers: 0, AA1

Location of Contamination	Depth (m)	Contaminant	Concentration
BH120	0-0.15	Asbestos (bonded ACM fragments)	**0.308%w/w**
BH120	0-0.15	Asbestos (<7mm FA)	**0.034%w/w**
TP120-3	0-0.15	Asbestos (bonded ACM fragments)	**0.776%w/w**
TP120-5	0-0.15	Asbestos (bonded ACM fragments)	**3.439%w/w**
TP120-6	0-0.15	Asbestos (bonded ACM fragments)	**1.179%w/w**
Assessment Criteria	**0.04%w/w** for ACM in soil for residential land use **0.001%w/w** for AF & FA in soil **No visual asbestos (ACM)** for surface soil		

Notes:

ACM:	Asbestos Containing Material
AF:	Asbestos Fine
FA:	Fibrous Asbestos

N



BH120 DETAIL

LEGEND

- Test Pit (October 2022)
- Borehole (July 2022)

Imagery ©2022 NearMap.com

0 10 20 30 40 50m

Scale 1:1000

0 1 2 3 4 5m

Scale 1:100

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Cyre Projects Pty Limited
Proposed Aged Care Facility
Lots C & D DP403467, Lot 2 DP518877, Lots 2 & 3 DP16063
59-67 Karne Street North, Narwee

2nd Revised Locations of Contamination

Drawing No: 20219/6-AA2
Job No: 20219/6
Drawn By: MH
Date: 26 October 2022
Checked By: AB

File No: 20219-6
Layers: 0, AA2

LEGEND

Area to be Remediated

Imagery ©2022 NearMap.com

0 10 20 30 40 50m

Scale 1:1000

AREA	MATERIAL	ESTIMATED AREA (sq. m)	ESTIMATED DEPTH	ESTIMATED VOLUME (cu.m)	CONTAMINANT	REMEDIATION METHOD
1	Fill (Silty Clay, medium to high plasticity, brown, inclusion of terracotta fragments, rusted metal, brick, timber, concrete fragments, glass fragments, road base gravel and ACM fragments)	54	Full Depth of Fill (Average 350mm)	19	Asbestos (<7mm FA and bonded ACM fragments)	Disposal as "Asbestos Waste" at an EPA licensed Landfill

Notes:
ACM: Asbestos Containing Material
FA: Fibrous Asbestos

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Proposed Aged Care Facility
Lots C & D DP403467, Lot 2 DP518877, Lots 2 & 3 DP16063
59-67 Karne Street North, Narwee

Indicative Area to be Remediated

Drawing No: 20219/6-AA3
Job No: 20219/6
Drawn By: MH
Date: 27 October 2022
Checked By: AB

File No: 20219-6
Layers: 0, AA3

TABLES

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TABLE A
RINSATE
(Ref No: 20219/6-AA)

SAMPLE	RS1
DATE	06/10/2022
METAL	**(mg/L)**
Arsenic	<0.02
Cadmium	<0.001
Chromium	<0.005
Copper	<0.005
Lead	<0.02
Mercury	<0.0001
Nickel	<0.005
Zinc	<0.01

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TABLE B
METAL, CATION EXCHANGE CAPACITY (CEC) & pH TEST RESULTS
DISCRETE SAMPLES
(Ref No: 20219/6-AA)

Sample Location	Depth (m)	METAL (mg/kg) ARSENIC	CADMIUM	CHROMIUM (Total)	COPPER	LEAD	MERCURY	NICKEL	ZINC	CEC ($cmol_c/kg$)	pH
TP120-3	0.0-0.15	6	<0.3	13	20	72	0.07	6	120	13	7.4
TP120-5	0.0-0.15	2	<0.3	8.1	14	120	0.06	4.4	120	6.8	7
TP120-6	0.0-0.15	7	0.4	14	24	78	0.13	5.5	180	16	7.2
Limit of Reporting (LOR)		1	0.3	0.5	0.5	1	0.05	0.5	2	0.02	0.1
NATIONAL ENVIRONMENT PROTECTION AMENDMENT MEASURE (2013)											
Health-based Investigation Levels (HIL) [a] B - Residential B		500	150	500 [c]	30000	1200	30 [d]	1200	60000		
Ecological Investigation Levels (EIL) [b]- Urban residential		100 [e]	-	190[f]	150	1100 [g]	-	70	370		

Notes:

a: Residential with minimal opportunities for soil access; includes dwellings with fully and permanently paved yard space such as high-rise buildings and apartments.

b: EIL of aged chromium (III), copper, nickel & zinc were derived from calculation spreadsheet developed by CSIRO for NEPC; Old Suburb with Low Traffic; the lowest CEC=6.8 cmolc/kg & pH=7; the assumed clay content=1 % were selected for derivation of EIL; a conservative approach.

c: Chromium (VI)

d: Methyl Mercury

e: Generic EIL for aged arsenic

f: Chromium (III)

g: Generic added contaminant limit for aged lead.

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TABLE C
ASBESTOS TEST RESULTS
DISCRETE SAMPLES
(Ref No: 20219/6-AA)

Sample Location	Depth (m)	ASBESTOS (% w/w)		
Soil Sample		Bonded ACM (>7mm)	AF	FA
TP120-1	0.0-0.15	0.02	<0.001	<0.001
TP120-2	0.0-0.15	<0.01	<0.001	<0.001
TP120-3	0.0-0.15	<0.01	<0.001	<0.001
TP120-4	0.0-0.15	<0.01	<0.001	<0.001
TP120-5	0.0-0.15	<0.01	<0.001	<0.001
TP120-5	0.3-0.4	<0.01	<0.001	<0.001
TP120-6	0.0-0.15	0.03	<0.001	<0.001
TP120-7	0.0-0.15	<0.01	<0.001	<0.001
TP120-8	0.0-0.15	<0.01	<0.001	<0.001
TP120-9	0.0-0.15	<0.01	<0.001	<0.001
TP120-10	0.0-0.15	<0.01	<0.001	<0.001
TP120-11	0.0-0.15	0.025	0.001	<0.001
TP120-12	0.0-0.15	0.18	0.001	<0.001
TP120-13	0.0-0.15	<0.01	<0.001	<0.001
Limits of Reporting (LOR)		0.01	0.001	0.001
NATIONAL ENVIRONMENT PROTECTION AMENDMENT MEASURE (2013)				
Health Screening Levels [a] - Residential B		-	0.001	0.001
Fibro-cement Piece				
TP120-3FCP	0.0-0.15	**ACM**		
TP120-5FCP	0.0-0.15	**ACM**		
TP120-6FCP	0.0-0.15	**ACM**		

Notes: ACM: Asbestos Containing Material

AF: Asbestos Fines

FA: Fibrous Asbestos

a: Residential with minimal opportunities for soil access; includes dwellings with fully and permanently paved yard space such as high-rise buildings and apartments.

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Table D

ASBESTOS IN-SITU SIEVING TEST RESULTS

Ref. No. (20219/6-AA)

Location	Depth (m)	In-Situ 10L Sieve Test						
		Soil Mass (kg)	Weight of Bonded ACM [a] (g)	% ACM in Soil w/w [b]	Criterion [c] (% w/w)	Weight of FA [a] (g)	FA (% w/w)	Criterion [d] (% w/w)
TP120-1	0.0-0.15	13.25	0.00	0.000	0.04	0.00	0.0000	0.001
TP120-2	0.0-0.15	12.05	0.00	0.000	0.04	0.00	0.0000	0.001
TP120-3	0.0-0.15	12.56	**65.00**	**0.776**	0.04	0.00	0.0000	0.001
TP120-4	0.0-0.15	12.95	0.00	0.000	0.04	0.00	0.0000	0.001
TP120-5	0.0-0.15	13.52	**310.00**	**3.439**	0.04	0.00	0.0000	0.001
TP120-5	0.3-0.4	13.74	0.00	0.000	0.04	0.00	0.0000	0.001
TP120-6	0.0-0.15	13.99	**110.00**	**1.179**	0.04	0.00	0.0000	0.001
TP120-7	0.0-0.15	13.04	0.00	0.000	0.04	0.00	0.0000	0.001
TP120-8	0.0-0.15	12.59	0.00	0.000	0.04	0.00	0.0000	0.001
TP120-9	0.0-0.15	13.66	0.00	0.000	0.04	0.00	0.0000	0.001
TP120-10	0.0-0.15	13.66	0.00	0.000	0.04	0.00	0.0000	0.001
TP120-11	0.0-0.15	13.66	0.00	0.000	0.04	0.00	0.0000	0.001
TP120-12	0.0-0.15	14.02	0.00	0.000	0.04	0.00	0.0000	0.001
TP120-13	0.0-0.15	13.66	0.00	0.000	0.04	0.00	0.0000	0.001

Notes a: Retained on 7mm sieve

b: NEPM 1999 (April 2013) (page 31): % Asbestos in Soil = % Asbestos Content x ACM (kg) / {Soil Volume (L) x Soil Density (kg/L)}, based on asbestos content of 15% and soil volume of 10L.

c: Health Screeing Level B (NEPM 1999 [April 2013]) for bonded ACM

d: Health Screeing Level B (NEPM 1999 [April 2013]) for friable asbestos

APPENDIX A

TABLE 1
TEST PIT LOGS

GEOTECHNIQUE PTY LTD

Project:	Proposed Aged Care Facility	**Job No:**	20219/6
Location:	59-67 Karne Street North, Narwee	**Drawing No:**	20219/6-AA1
		Logged & Sampled by:	SS

Table 1

Borehole	Depth (m)	Sample Depth (m)	Date	Material Description	Remarks*
TP120-1	0.0-0.4	0.0-0.15	6/10/2022	FILL: Silty Clay, medium to high plasticity, brown	Brick and terracotta fragments observed in fill
	0.4-0.6	NS		(CH) Silty CLAY, high plasticity, red-brown	
TP120-2	0.0-0.4	0.0-0.15	6/10/2022	FILL: Silty Clay, medium to high plasticity, brown	Brick and terracotta fragments observed in fill
	0.4-0.6	NS		(CH) Silty CLAY, high plasticity, red-brown	
TP120-3	0.0-0.3	0.0-0.15	6/10/2022	FILL: Silty Clay, medium to high plasticity, brown	Brick and terracotta fragments observed in fill
	0.3-0.5	NS		(CH) Silty CLAY, high plasticity, red-brown	
TP120-4	0.0-0.4	0.0-0.15	6/10/2022	FILL: Silty Clay, medium to high plasticity, brown	Timber observed in fill
	0.4-0.6	NS		(CH) Silty CLAY, high plasticity, red-brown	
TP120-5	0.0-0.3	0.0-0.15	6/10/2022	FILL: Silty Clay, medium to high plasticity, brown	Terracotta fragments, brick fragments, concrete slab and fibro-cement pieces observed in fill
	0.3-0.4	0.3-0.4		FILL: Silty Sandy Clay, high plasticity, yellow	
	0.4-0.6	NS		(CH) Silty CLAY, high plasticity, red-brown	
TP120-6	0.0-0.3	0.0-0.15	6/10/2022	FILL: Silty Clay, medium to high plasticity, brown	Brick, terracotta, glass fragments, road base gravel and fibro-cement pieces observed in fill
	0.3-0.6	NS		(CH) Silty CLAY, high plasticity, red-brown	
TP120-7	0.0-0.3	0.0-0.15	6/10/2022	FILL: Silty Clay, medium to high plasticity, brown	Gravel and brick fragments observed in fill
	0.3-0.6	NS		(CH) Silty CLAY, high plasticity, red-brown	
TP120-8	0.0-0.3	0.0-0.15	6/10/2022	FILL: Silty Clay, medium to high plasticity, brown	Possible natural
	0.3-0.6	NS		(CH) Silty CLAY, high plasticity, red-brown	
TP120-9	0.0-0.4	0.0-0.15	6/10/2022	FILL: Silty Clay, medium to high plasticity, brown	Terracotta and concrete fragments observed in fill
	0.4-0.6	NS		(CH) Silty CLAY, high plasticity, red-brown	

NS = No Sample

*Odour (O), Discolouration (D), Petroleum Hydrocarbon Staining (PHS), Asbestos Containing Material (ACM), Ash Material (ASHM), Demolition Waste (DW), Groundwater (GW), Perched Water (PW) PID reading etc.

GEOTECHNIQUE PTY LTD

Project:	Proposed Aged Care Facility	**Job No:**	20219/6
Location:	59-67 Karne Street North, Narwee	**Drawing No:**	20219/6-AA1
		Logged & Sampled by:	SS

Table 1

Borehole	Depth (m)	Sample Depth (m)	Date	Material Description	Remarks*
TP120-10	0.0-0.4	0.0-0.15	6/10/2022	FILL: Silty Clay, medium to high plasticity, brown	Trace bricks observed in fill
	0.4-0.6	NS		(CH) Silty CLAY, high plasticity, red-brown	
TP120-11	0.0-0.3	0.0-0.15	6/10/2022	FILL: Silty Clay, medium to high plasticity, brown	Possible natural
	0.3-0.6	NS		(CH) Silty CLAY, high plasticity, red-brown	
TP120-12	0.0-0.4	0.0-0.15	6/10/2022	FILL: Silty Clay, medium to high plasticity, brown	Trace bricks observed in fill
	0.4-0.6	NS		(CH) Silty CLAY, high plasticity, red-brown	
TP120-13	0.0-0.4	0.0-0.15	6/10/2022	FILL: Silty Clay, medium to high plasticity, brown	Possible natural
	0.4-0.6	NS		(CH) Silty CLAY, high plasticity, red-brown	

NS = No Sample
*Odour (O), Discolouration (D), Petroleum Hydrocarbon Staining (PHS), Asbestos Containing Material (ACM), Ash Material (ASHM), Demolition Waste (DW), Groundwater (GW), Perched Water (PW) PID reading etc.

APPENDIX B

LABORATORY TEST RESULTS REPORTS/CERTIFICATES

ANALYTICAL REPORT

Accreditation No. 2562

CLIENT DETAILS

Contact	Anwar Barbhuyia
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Project	**20219/6 Narwee**
Order Number	**20219/6**
Samples	4

LABORATORY DETAILS

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Facsimile	+61 2 8594 0499
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SGS Reference	**SE237557 R0**
Date Received	7/10/2022
Date Reported	17/10/2022

COMMENTS

Accredited for compliance with ISO/IEC 17025 - Testing. NATA accredited laboratory 2562(4354).

SIGNATORIES

Bennet LO
Senior Chemist

Dong LIANG
Metals/Inorganics Team Leader

Huong CRAWFORD
Production Manager

Kamrul AHSAN
Senior Chemist

Shane MCDERMOTT
Inorganic/Metals Chemist

pH in soil (1:5) [AN101] Tested: 10/10/2022

PARAMETER	UOM	LOR	TP120-3 CLAY 0.0-0.15 6/10/2022 SE237557.001	TP120-5 CLAY 0.0-0.15 6/10/2022 SE237557.002	TP120-6 CLAY 0.0-0.15 6/10/2022 SE237557.003
pH	pH Units	0.1	**7.4**	**7.0**	**7.2**

Exchangeable Cations and Cation Exchange Capacity (CEC/ESP/SAR) [AN122] Tested: 14/10/2022

PARAMETER	UOM	LOR	TP120-3 CLAY 0.0-0.15 6/10/2022 SE237557.001	TP120-5 CLAY 0.0-0.15 6/10/2022 SE237557.002	TP120-6 CLAY 0.0-0.15 6/10/2022 SE237557.003
Exchangeable Calcium, Ca	mg/kg	2	2400	1200	3000
Exchangeable Calcium, Ca	meq/100g	0.01	12	6.0	15
Exchangeable Calcium Percentage*	%	0.1	94.0	88.2	92.2
Exchangeable Potassium, K	mg/kg	2	50	87	130
Exchangeable Potassium, K	meq/100g	0.01	0.13	0.22	0.33
Exchangeable Potassium Percentage*	%	0.1	1.0	3.3	2.0
Exchangeable Magnesium, Mg	mg/kg	2	54	62	94
Exchangeable Magnesium, Mg	meq/100g	0.02	0.44	0.51	0.77
Exchangeable Magnesium Percentage*	%	0.1	3.4	7.5	4.7
Exchangeable Sodium, Na	mg/kg	2	45	15	39
Exchangeable Sodium, Na	meq/100g	0.01	0.20	0.07	0.17
Exchangeable Sodium Percentage*	%	0.1	1.5	1.0	1.1
Cation Exchange Capacity	meq/100g	0.02	13	6.8	16

Total Recoverable Elements in Soil/Waste Solids/Materials by ICPOES [AN040/AN320] Tested: 12/10/2022

PARAMETER	UOM	LOR	TP120-3 CLAY 0.0-0.15 6/10/2022 SE237557.001	TP120-5 CLAY 0.0-0.15 6/10/2022 SE237557.002	TP120-6 CLAY 0.0-0.15 6/10/2022 SE237557.003
Arsenic, As	mg/kg	1	6	2	7
Cadmium, Cd	mg/kg	0.3	<0.3	<0.3	0.4
Chromium, Cr	mg/kg	0.5	13	8.1	14
Copper, Cu	mg/kg	0.5	20	14	24
Lead, Pb	mg/kg	1	72	120	78
Nickel, Ni	mg/kg	0.5	6.0	4.4	5.5
Zinc, Zn	mg/kg	2	120	120	180

Mercury in Soil [AN312] Tested: 12/10/2022

PARAMETER	UOM	LOR	TP120-3 CLAY 0.0-0.15 6/10/2022 SE237557.001	TP120-5 CLAY 0.0-0.15 6/10/2022 SE237557.002	TP120-6 CLAY 0.0-0.15 6/10/2022 SE237557.003
Mercury	mg/kg	0.05	**0.07**	**0.06**	**0.13**

Moisture Content [AN002] Tested: 12/10/2022

PARAMETER	UOM	LOR	TP120-3 CLAY 0.0-0.15 6/10/2022 SE237557.001	TP120-5 CLAY 0.0-0.15 6/10/2022 SE237557.002	TP120-6 CLAY 0.0-0.15 6/10/2022 SE237557.003
% Moisture	%w/w	1	**24.8**	**21.0**	**26.3**

Metals in Water (Dissolved) by ICPOES [AN320] Tested: 13/10/2022

PARAMETER	UOM	LOR	RS1 WATER - 6/10/2022 SE237557.004
Arsenic, As	mg/L	0.02	<0.02
Cadmium, Cd	mg/L	0.001	<0.001
Chromium, Cr	mg/L	0.005	<0.005
Copper, Cu	mg/L	0.005	<0.005
Lead, Pb	mg/L	0.02	<0.02
Nickel, Ni	mg/L	0.005	<0.005
Zinc, Zn	mg/L	0.01	<0.01

Mercury (dissolved) in Water [AN311(Perth)/AN312] Tested: 10/10/2022

PARAMETER	UOM	LOR	RS1 WATER - 6/10/2022 SE237557.004
Mercury	mg/L	0.0001	<0.0001

METHOD	METHODOLOGY SUMMARY
AN002	The test is carried out by drying (at either 40°C or 105°C) a known mass of sample in a weighed evaporating basin. After fully dry the sample is re-weighed. Samples such as sludge and sediment having high percentages of moisture will take some time in a drying oven for complete removal of water.
AN020	Unpreserved water sample is filtered through a 0.45µm membrane filter and acidified with nitric acid similar to APHA3030B.
AN040/AN320	A portion of sample is digested with nitric acid to decompose organic matter and hydrochloric acid to complete the digestion of metals. The digest is then analysed by ICP OES with metals results reported on the dried sample basis. Based on USEPA method 200.8 and 6010C.
AN040	A portion of sample is digested with Nitric acid to decompose organic matter and Hydrochloric acid to complete the digestion of metals and then filtered for analysis by ASS or ICP as per USEPA Method 200.8.
AN101	pH in Soil Sludge Sediment and Water: pH is measured electrometrically using a combination electrode and is calibrated against 3 buffers purchased commercially. For soils, sediments and sludges, an extract with water (or 0.01M CaCl2) is made at a ratio of 1:5 and the pH determined and reported on the extract. Reference APHA 4500-H+.
AN122	Exchangeable Cations, CEC and ESP: Soil sample is extracted in 1M Ammonium Acetate at pH=7 (or 1M Ammonium Chloride at pH=7) with cations (Na, K, Ca & Mg) then determined by ICP OES/ICP MS and reported as Exchangeable Cations. For saline soils, these results can be corrected for water soluble cations and reported as Exchangeable cations in meq/100g or soil can be pre-treated (aqueous ethanol/aqueous glycerol) prior to extraction. Cation Exchange Capacity (CEC) is the sum of the exchangeable cations in meq/100g.
AN122	The Exchangeable Sodium Percentage (ESP) is calculated as the exchangeable sodium divided by the CEC (all in meq/100g) times 100. ESP can be used to categorise the sodicity of the soil as below: ESP < 6% non-sodic ESP 6-15% sodic ESP >15% strongly sodic Method is referenced to Rayment and Lyons, 2011, sections 15D3 and 15N1.-
AN311(Perth)/AN312	Mercury by Cold Vapour AAS in Waters: Mercury ions are reduced by stannous chloride reagent in acidic solution to elemental mercury. This mercury vapour is purged by nitrogen into a cold cell in an atomic absorption spectrometer or mercury analyser. Quantification is made by comparing absorbances to those of the calibration standards. Reference APHA 3112/3500.
AN312	Mercury by Cold Vapour AAS in Soils: After digestion with nitric acid, hydrogen peroxide and hydrochloric acid, mercury ions are reduced by stannous chloride reagent in acidic solution to elemental mercury. This mercury vapour is purged by nitrogen into a cold cell in an atomic absorption spectrometer or mercury analyser. Quantification is made by comparing absorbances to those of the calibration standards. Reference APHA 3112/3500
AN320	Metals by ICP-OES: Samples are preserved with 10% nitric acid for a wide range of metals and some non-metals. This solution is measured by Inductively Coupled Plasma. Solutions are aspirated into an argon plasma at 8000-10000K and emit characteristic energy or light as a result of electron transitions through unique energy levels. The emitted light is focused onto a diffraction grating where it is separated into components.
AN320	Photomultipliers or CCDs are used to measure the light intensity at specific wavelengths. This intensity is directly proportional to concentration. Corrections are required to compensate for spectral overlap between elements. Reference APHA 3120 B.

FOOTNOTES

*	NATA accreditation does not cover the performance of this service.	-	Not analysed.	UOM	Unit of Measure.
**	Indicative data, theoretical holding time exceeded.	NVL	Not validated.	LOR	Limit of Reporting.
***	Indicates that both * and ** apply.	IS	Insufficient sample for analysis.	↑↓	Raised/lowered Limit of Reporting.
		LNR	Sample listed, but not received.		

Unless it is reported that sampling has been performed by SGS, the samples have been analysed as received.
Solid samples expressed on a dry weight basis.

Where "Total" analyte groups are reported (for example, Total PAHs, Total OC Pesticides) the total will be calculated as the sum of the individual analytes, with those analytes that are reported as <LOR being assumed to be zero. The summed (Total) limit of reporting is calculated by summing the individual analyte LORs and dividing by two. For example, where 16 individual analytes are being summed and each has an LOR of 0.1 mg/kg, the "Totals" LOR will be 1.6 / 2 (0.8 mg/kg). Where only 2 analytes are being summed, the " Total" LOR will be the sum of those two LORs.

Some totals may not appear to add up because the total is rounded after adding up the raw values.

If reported, measurement uncertainty follow the ± sign after the analytical result and is expressed as the expanded uncertainty calculated using a coverage factor of 2, providing a level of confidence of approximately 95%, unless stated otherwise in the comments section of this report.

Results reported for samples tested under test methods with codes starting with ARS-SOP, radionuclide or gross radioactivity concentrations are expressed in becquerel (Bq) per unit of mass or volume or per wipe as stated on the report. Becquerel is the SI unit for activity and equals one nuclear transformation per second.
Note that in terms of units of radioactivity:

a. 1 Bq is equivalent to 27 pCi
b. 37 MBq is equivalent to 1 mCi

For results reported for samples tested under test methods with codes starting with ARS-SOP, less than (<) values indicate the detection limit for each radionuclide or parameter for the measurement system used. The respective detection limits have been calculated in accordance with ISO 11929.

The QC and MU criteria are subject to internal review according to the SGS QAQC plan and may be provided on request or alternatively can be found here: www.sgs.com.au/en-gb/environment-health-and-safety.

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STATEMENT OF QA/QC PERFORMANCE

SE237557 R0

CLIENT DETAILS

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Project	**20219/6 Narwee**
Order Number	**20219/6**
Samples	4

LABORATORY DETAILS

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SGS Reference	**SE237557 R0**
Date Received	07 Oct 2022
Date Reported	17 Oct 2022

COMMENTS

All the laboratory data for each environmental matrix was compared to SGS' stated Data Quality Objectives (DQO). Comments arising from the comparison were made and are reported below.

The data relating to sampling was taken from the Chain of Custody document.
This QA/QC Statement must be read in conjunction with the referenced Analytical Report.
The Statement and the Analytical Report must not be reproduced except in full.

All Data Quality Objectives were met with the exception of the following:

Matrix Spike	Total Recoverable Elements in Soil/Waste Solids/Materials by ICPOES	2 items

SAMPLE SUMMARY

Samples clearly labelled	Yes	Complete documentation received	Yes
Sample container provider	SGS	Sample cooling method	Ice Bricks
Samples received in correct containers	Yes	Sample counts by matrix	3 Clay, 1 Water
Date documentation received	7/10/2022	Type of documentation received	COC
Samples received in good order	Yes	Samples received without headspace	Yes
Sample temperature upon receipt	14C	Sufficient sample for analysis	Yes
Turnaround time requested	Standard		

HOLDING TIME SUMMARY

SE237557 R0

SGS holding time criteria are drawn from current regulations and are highly dependent on sample container preservation as specified in the SGS "Field Sampling Guide for Containers and Holding Time" (ref: GU-(AU)-ENV.001). Soil samples guidelines are derived from NEPM "Schedule B(3) Guideline on Laboratory Analysis of Potentially Contaminated Soils". Water sample guidelines are derived from "AS/NZS 5667.1 : 1998 Water Quality - sampling part 1" and APHA "Standard Methods for the Examination of Water and Wastewater" 21st edition 2005.

Extraction and analysis holding time due dates listed are calculated from the date sampled, although holding times may be extended after laboratory extraction for some analytes. The due dates are the suggested dates that samples may be held before extraction or analysis and still be considered valid.

Extraction and analysis dates are shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria. If the

Exchangeable Cations and Cation Exchange Capacity (CEC/ESP/SAR) — Method: ME-(AU)-[ENV]AN122

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
TP120-3	SE237557.001	LB260737	06 Oct 2022	07 Oct 2022	03 Nov 2022	14 Oct 2022	03 Nov 2022	17 Oct 2022
TP120-5	SE237557.002	LB260737	06 Oct 2022	07 Oct 2022	03 Nov 2022	14 Oct 2022	03 Nov 2022	17 Oct 2022
TP120-6	SE237557.003	LB260737	06 Oct 2022	07 Oct 2022	03 Nov 2022	14 Oct 2022	03 Nov 2022	17 Oct 2022

Mercury (dissolved) in Water — Method: ME-(AU)-[ENV]AN311(Perth)/AN312

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
RS1	SE237557.004	LB260257	06 Oct 2022	07 Oct 2022	03 Nov 2022	10 Oct 2022	03 Nov 2022	12 Oct 2022

Mercury in Soil — Method: ME-(AU)-[ENV]AN312

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
TP120-3	SE237557.001	LB260586	06 Oct 2022	07 Oct 2022	03 Nov 2022	12 Oct 2022	03 Nov 2022	13 Oct 2022
TP120-5	SE237557.002	LB260586	06 Oct 2022	07 Oct 2022	03 Nov 2022	12 Oct 2022	03 Nov 2022	13 Oct 2022
TP120-6	SE237557.003	LB260586	06 Oct 2022	07 Oct 2022	03 Nov 2022	12 Oct 2022	03 Nov 2022	13 Oct 2022

Metals in Water (Dissolved) by ICPOES — Method: ME-(AU)-[ENV]AN320

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
RS1	SE237557.004	LB260617	06 Oct 2022	07 Oct 2022	04 Apr 2023	13 Oct 2022	04 Apr 2023	13 Oct 2022

Moisture Content — Method: ME-(AU)-[ENV]AN002

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
TP120-3	SE237557.001	LB260588	06 Oct 2022	07 Oct 2022	20 Oct 2022	12 Oct 2022	17 Oct 2022	14 Oct 2022
TP120-5	SE237557.002	LB260588	06 Oct 2022	07 Oct 2022	20 Oct 2022	12 Oct 2022	17 Oct 2022	14 Oct 2022
TP120-6	SE237557.003	LB260588	06 Oct 2022	07 Oct 2022	20 Oct 2022	12 Oct 2022	17 Oct 2022	14 Oct 2022

pH in soil (1:5) — Method: ME-(AU)-[ENV]AN101

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
TP120-3	SE237557.001	LB260293	06 Oct 2022	07 Oct 2022	13 Oct 2022	10 Oct 2022	11 Oct 2022	10 Oct 2022
TP120-5	SE237557.002	LB260293	06 Oct 2022	07 Oct 2022	13 Oct 2022	10 Oct 2022	11 Oct 2022	10 Oct 2022
TP120-6	SE237557.003	LB260293	06 Oct 2022	07 Oct 2022	13 Oct 2022	10 Oct 2022	11 Oct 2022	10 Oct 2022

Total Recoverable Elements in Soil/Waste Solids/Materials by ICPOES — Method: ME-(AU)-[ENV]AN040/AN320

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
TP120-3	SE237557.001	LB260585	06 Oct 2022	07 Oct 2022	04 Apr 2023	12 Oct 2022	04 Apr 2023	14 Oct 2022
TP120-5	SE237557.002	LB260585	06 Oct 2022	07 Oct 2022	04 Apr 2023	12 Oct 2022	04 Apr 2023	14 Oct 2022
TP120-6	SE237557.003	LB260585	06 Oct 2022	07 Oct 2022	04 Apr 2023	12 Oct 2022	04 Apr 2023	14 Oct 2022

Surrogate results are evaluated against upper and lower limit criteria established in the SGS QA/QC plan (Ref: MP-(AU)-[ENV]QU-022). At least two of three routine level soil sample surrogate spike recoveries for BTEX/VOC are to be within 70-130% where control charts have not been developed and within the established control limits for charted surrogates. Matrix effects may void this as an acceptance criterion. Water sample surrogate spike recoveries are to be within 40-130%. The presence of emulsions, surfactants and particulates may void this as an acceptance criterion.

Result is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

No surrogates were required for this job.

Blank results are evaluated against the limit of reporting (LOR), for the chosen method and its associated instrumentation, typically 2.5 times the statistically determined method detection limit (MDL).

Result is shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria.

Exchangeable Cations and Cation Exchange Capacity (CEC/ESP/SAR)

Method: ME-(AU)-[ENV]AN122

Sample Number	Parameter	Units	LOR	Result
LB260737.001	Exchangeable Sodium, Na	mg/kg	2	0
	Exchangeable Potassium, K	mg/kg	2	0
	Exchangeable Calcium, Ca	mg/kg	2	0
	Exchangeable Magnesium, Mg	mg/kg	2	0

Mercury (dissolved) in Water

Method: ME-(AU)-[ENV]AN311(Perth)/AN312

Sample Number	Parameter	Units	LOR	Result
LB260257.001	Mercury	mg/L	0.0001	<0.0001

Mercury in Soil

Method: ME-(AU)-[ENV]AN312

Sample Number	Parameter	Units	LOR	Result
LB260586.001	Mercury	mg/kg	0.05	<0.05

Metals in Water (Dissolved) by ICPOES

Method: ME-(AU)-[ENV]AN320

Sample Number	Parameter	Units	LOR	Result
LB260617.001	Arsenic, As	mg/L	0.02	<0.02
	Cadmium, Cd	mg/L	0.001	<0.001
	Chromium, Cr	mg/L	0.005	<0.005
	Copper, Cu	mg/L	0.005	<0.005
	Lead, Pb	mg/L	0.02	<0.02
	Nickel, Ni	mg/L	0.005	<0.005
	Zinc, Zn	mg/L	0.01	<0.01

Total Recoverable Elements in Soil/Waste Solids/Materials by ICPOES

Method: ME-(AU)-[ENV]AN040/AN320

Sample Number	Parameter	Units	LOR	Result
LB260585.001	Arsenic, As	mg/kg	1	<1
	Cadmium, Cd	mg/kg	0.3	<0.3
	Chromium, Cr	mg/kg	0.5	<0.5
	Copper, Cu	mg/kg	0.5	<0.5
	Nickel, Ni	mg/kg	0.5	<0.5
	Lead, Pb	mg/kg	1	<1
	Zinc, Zn	mg/kg	2	<2

Duplicates are calculated as Relative Percentage Difference (RPD) using the formula: RPD = | OriginalResult - ReplicateResult | x 100 / Mean

The RPD is evaluated against the Maximum Allowable Difference (MAD) criteria and can be graphically represented by a curve calculated from the Statistical Detection Limit (SDL) and Limiting Repeatability (LR) using the formula: MAD = 100 x SDL / Mean + LR

Where the Maximum Allowable Difference evaluates to a number larger than 200 it is displayed as 200.

RPD is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

NOTE: The RPD reported is calculated from the unrounded data for the original and replicate result. Manual calculation of the RPD from the rounded data reported may

Mercury (dissolved) in Water

Method: ME-(AU)-[ENV]AN311(Perth)/AN312

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE237482.038	LB260257.014	Mercury	µg/L	0.0001	<0.0001	<0.0001	200	195
SE237558.031	LB260257.023	Mercury	µg/L	0.0001	<0.0001	<0.0001	200	0

Mercury in Soil

Method: ME-(AU)-[ENV]AN312

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE237557.002	LB260586.014	Mercury	mg/kg	0.05	0.06	0.05	119	17
SE237667.004	LB260586.021	Mercury	mg/kg	0.05	0.14	0.14	66	4

Moisture Content

Method: ME-(AU)-[ENV]AN002

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE237596.004	LB260588.008	% Moisture	%w/w	1	2.8	2.5	68	11

pH in soil (1:5)

Method: ME-(AU)-[ENV]AN101

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE237479.006	LB260293.014	pH	pH Units	0.1	7.6	7.6	31	0
SE237557.003	LB260293.020	pH	pH Units	0.1	7.2	7.3	31	1

Total Recoverable Elements in Soil/Waste Solids/Materials by ICPOES

Method: ME-(AU)-[ENV]AN040/AN320

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE237557.002	LB260585.014	Arsenic, As	mg/kg	1	2	3	69	13
		Cadmium, Cd	mg/kg	0.3	<0.3	<0.3	200	0
		Chromium, Cr	mg/kg	0.5	8.1	7.5	36	7
		Copper, Cu	mg/kg	0.5	14	13	34	6
		Nickel, Ni	mg/kg	0.5	4.4	4.4	41	1
		Lead, Pb	mg/kg	1	120	100	31	13
		Zinc, Zn	mg/kg	2	120	88	32	28
SE237667.004	LB260585.024	Arsenic, As	mg/kg	1	5	4	52	8
		Cadmium, Cd	mg/kg	0.3	0.6	0.5	85	5
		Chromium, Cr	mg/kg	0.5	10	12	34	12
		Copper, Cu	mg/kg	0.5	370	360	30	2
		Nickel, Ni	mg/kg	0.5	50	50	31	1
		Lead, Pb	mg/kg	1	320	370	30	15
		Zinc, Zn	mg/kg	2	190	180	31	2

Laboratory Control Standard (LCS) results are evaluated against an expected result, typically the concentration of analyte spiked into the control during the sample preparation stage, producing a percentage recovery. The criteria applied to the percentage recovery is established in the SGS QA /QC plan (Ref: MP-(AU)-[ENV]QU-022). For more information refer to the footnotes in the concluding page of this report.

Recovery is shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria.

Exchangeable Cations and Cation Exchange Capacity (CEC/ESP/SAR) — Method: ME-(AU)-[ENV]AN122

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB260737.002	Exchangeable Sodium, Na	meq/100g	0.01	0.21	0.194	80 - 120	110
	Exchangeable Potassium, K	meq/100g	0.01	0.60	0.63	80 - 120	95
	Exchangeable Calcium, Ca	meq/100g	0.01	5.9	6.3	80 - 120	94
	Exchangeable Magnesium, Mg	meq/100g	0.02	1.0	1.11	80 - 120	90

Mercury in Soil — Method: ME-(AU)-[ENV]AN312

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB260586.002	Mercury	mg/kg	0.05	0.20	0.2	70 - 130	99

Metals in Water (Dissolved) by ICPOES — Method: ME-(AU)-[ENV]AN320

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB260617.002	Arsenic, As	mg/L	0.02	0.49	0.5	80 - 120	98
	Cadmium, Cd	mg/L	0.001	0.47	0.5	80 - 120	94
	Chromium, Cr	mg/L	0.005	0.47	0.5	80 - 120	95
	Copper, Cu	mg/L	0.005	0.50	0.5	80 - 120	101
	Lead, Pb	mg/L	0.02	0.47	0.5	80 - 120	94
	Nickel, Ni	mg/L	0.005	0.47	0.5	80 - 120	94
	Zinc, Zn	mg/L	0.01	0.48	0.5	80 - 120	96

pH in soil (1:5) — Method: ME-(AU)-[ENV]AN101

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB260293.003	pH	pH Units	0.1	7.5	7.415	98 - 102	100

Total Recoverable Elements in Soil/Waste Solids/Materials by ICPOES — Method: ME-(AU)-[ENV]AN040/AN320

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB260585.002	Arsenic, As	mg/kg	1	350	318.22	80 - 120	109
	Cadmium, Cd	mg/kg	0.3	4.0	4.81	70 - 130	83
	Chromium, Cr	mg/kg	0.5	41	38.31	80 - 120	108
	Copper, Cu	mg/kg	0.5	330	290	80 - 120	113
	Nickel, Ni	mg/kg	0.5	190	187	80 - 120	103
	Lead, Pb	mg/kg	1	96	89.9	80 - 120	106
	Zinc, Zn	mg/kg	2	290	273	80 - 120	107

Matrix Spike (MS) results are evaluated as the percentage recovery of an expected result, typically the concentration of analyte spiked into a field sub -sample during the sample preparation stage. The original sample's result is subtracted from the sub-sample result before determining the percentage recovery. The criteria applied to the percentage recovery is established in the SGS QA/QC plan (ref: MP-(AU)-[ENV]QU-022). For more information refer to the footnotes in the concluding page of this report.

Recovery is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

Mercury (dissolved) in Water — Method: ME-(AU)-[ENV]AN311(Perth)/AN312

QC Sample	Sample Number	Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE237437.001	LB260257.004	Mercury	mg/L	0.0001	0.0021	<0.0001	0.008	104

Mercury in Soil — Method: ME-(AU)-[ENV]AN312

QC Sample	Sample Number	Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE237457.040	LB260586.004	Mercury	mg/kg	0.05	0.29	0.14	0.2	74

Total Recoverable Elements in Soil/Waste Solids/Materials by ICPOES — Method: ME-(AU)-[ENV]AN040/AN320

QC Sample	Sample Number	Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE237457.040	LB260585.004	Arsenic, As	mg/kg	1	50	2	50	96
		Cadmium, Cd	mg/kg	0.3	47	<0.3	50	94
		Chromium, Cr	mg/kg	0.5	48	4.8	50	87
		Copper, Cu	mg/kg	0.5	300	270	50	53 ⑨
		Nickel, Ni	mg/kg	0.5	47	1.3	50	92
		Lead, Pb	mg/kg	1	150	260	50	-221 ⑨
		Zinc, Zn	mg/kg	2	110	61	50	96

MATRIX SPIKE DUPLICATES

SE237557 R0

Matrix spike duplicates are calculated as Relative Percent Difference (RPD) using the formula: RPD = | OriginalResult - ReplicateResult | x 100 / Mean

The original result is the analyte concentration of the matrix spike. The Duplicate result is the analyte concentration of the matrix spike duplicate.

The RPD is evaluated against the Maximum Allowable Difference (MAD) criteria and can be graphically represented by a curve calculated from the Statistical Detection Limit (SDL) and Limiting Repeatability (LR) using the formula: MAD = 100 x SDL / Mean + LR

Where the Maximum Allowable Difference evaluates to a number larger than 200 it is displayed as 200.

RPD is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the

No matrix spike duplicates were required for this job.

Samples analysed as received.

Solid samples expressed on a dry weight basis.

QC criteria are subject to internal review according to the SGS QA/QC plan and may be provided on request or alternatively can be found here: https://www.sgs.com.au/~/media/Local/Australia/Documents/Technical Documents/MP-AU-ENV-QU-022 QA QC Plan.pdf

*	NATA accreditation does not cover the performance of this service.
**	Indicative data, theoretical holding time exceeded.
***	Indicates that both * and ** apply.
-	Sample not analysed for this analyte.
IS	Insufficient sample for analysis.
LNR	Sample listed, but not received.
LOR	Limit of reporting.
QFH	QC result is above the upper tolerance.
QFL	QC result is below the lower tolerance.
①	At least 2 of 3 surrogates are within acceptance criteria.
②	RPD failed acceptance criteria due to sample heterogeneity.
③	Results less than 5 times LOR preclude acceptance criteria for RPD.
④	Recovery failed acceptance criteria due to matrix interference.
⑤	Recovery failed acceptance criteria due to the presence of significant concentration of analyte (i.e. the concentration of analyte exceeds the spike level).
⑥	LOR was raised due to sample matrix interference.
⑦	LOR was raised due to dilution of significantly high concentration of analyte in sample.
⑧	Reanalysis of sample in duplicate confirmed sample heterogeneity and inconsistency of results.
⑨	Recovery failed acceptance criteria due to sample heterogeneity.
⑩	LOR was raised due to high conductivity of the sample (required dilution).
†	Refer to relevant report comments for further information.

SGS EHS Sydney COC

SE237557

GEOTECHNIQUE PTY LTD

1 LEMKO PLACE PENRITH NSW 2750

CHAIN OF CUSTODY

Results Required By: Normal Turnaround **Date:** Friday, 14 October 2022

Except pH Results Required By [redacted] **Date:**

Your Reference No.: [redacted]

TO: SGS
UNIT 16, 33 MADDOX STREET
ALEXANDRIA NSW 2015

Sampled By: SS Ref No: 20219/6 Project Manager: ANWAR BARBHUYIA

Location: Narwee

Location	Depth (m)	Date	Soil	Water	Material	Metals As Cd Cr Cu Pb Hg Ni Zn	pH	CEC	CL8 TRH BTEX PAH	CL10 Metals* TRH BTEX PAH	CL16 Metals* TRH BTEX PAH OC PCB	Be B Co Mn Se	Ti	BTEX	TRH & BTEX	PAH	OCP	PCB	OCP & PCB	OPP&PCB	OCP,OPP & PCB	Cyanide	VOC	Phenol	Formaldehyde	TCLP PAH	TCLP	Metals (Retest)
TP120-3	0.0-0.15	6/10/2022	G		Clay	✔	✔	✔																				
TP120-5	0.0-0.15	6/10/2022	G		Clay	✔	✔	✔																				
TP120-6	0.0-0.15	6/10/2022	G		Clay	✔	✔	✔																				
RS1		6/10/2022		WG		✔																						

F321

Relinquished by			Received by		
Name	Signature	Date	Name	Signature	Date
ANWAR BARBHUYIA	AB	7/10/2022	George Zhi		7/10/22 @ 2:45pm

WG: Water sample (glass bottle) G Soil sample (glass jar) FCP Fibro Cement Piece (plastic bag)
WP: Water sample (plastic bottle) P Soil sample (plastic bag) ✔ Test required

SAMPLE RECEIPT ADVICE

SE237557

CLIENT DETAILS

Contact	Anwar Barbhuyia
Client	Geotechnique
Address	P.O. Box 880 PENRITH NSW 2751
Telephone	02 4722 2700
Facsimile	02 4722 6161
Email	anwar@geotech.com.au
Project	**20219/6 Narwee**
Order Number	**20219/6**
Samples	4

LABORATORY DETAILS

Manager	Huong Crawford
Laboratory	SGS Alexandria Environmental
Address	Unit 16, 33 Maddox St Alexandria NSW 2015
Telephone	+61 2 8594 0400
Facsimile	+61 2 8594 0499
Email	au.environmental.sydney@sgs.com
Samples Received	Fri 7/10/2022
Report Due	Fri 14/10/2022
SGS Reference	**SE237557**

SUBMISSION DETAILS

This is to confirm that 4 samples were received on Friday 7/10/2022. Results are expected to be ready by COB Friday 14/10/2022. Please quote SGS reference SE237557 when making enquiries. Refer below for details relating to sample integrity upon receipt.

Samples clearly labelled	Yes	Complete documentation received	Yes
Sample container provider	SGS	Sample cooling method	Ice Bricks
Samples received in correct containers	Yes	Sample counts by matrix	3 Clay, 1 Water
Date documentation received	7/10/2022	Type of documentation received	COC
Samples received in good order	Yes	Samples received without headspace	Yes
Sample temperature upon receipt	14C	Sufficient sample for analysis	Yes
Turnaround time requested	Standard		

Unless otherwise instructed, water and bulk samples will be held for one month from date of report, and soil samples will be held for two months.

COMMENTS

SAMPLE RECEIPT ADVICE

SE237557

CLIENT DETAILS

Client Geotechnique

Project 20219/6 Narwee

SUMMARY OF ANALYSIS

No.	Sample ID	Exchangeable Cations and Cation Exchange Capacity	Mercury (dissolved) in Water	Mercury in Soil	Metals in Water (Dissolved) by ICPOES	Moisture Content	pH in soil (1:5)	Total Recoverable Elements in Soil/Waste
001	TP120-3 0.0-0.15	13	-	1	-	1	1	7
002	TP120-5 0.0-0.15	13	-	1	-	1	1	7
003	TP120-6 0.0-0.15	13	-	1	-	1	1	7
004	RS1	-	1	-	7	-	-	-

The above table represents SGS' interpretation of the client-supplied Chain Of Custody document.
The numbers shown in the table indicate the number of results requested in each package.
Please indicate as soon as possible should your request differ from these details .
Testing as per this table shall commence immediately unless the client intervenes with a correction .

AUSTRALIAN SAFER ENVIRONMENT & TECHNOLOGY PTY LTD

ABN 36 088 095 112

Our ref : ASET105106 / 108286 / 1 - 17
Your ref : 20219/6 – 59-67 Karne Street North Narwee
NATA Accreditation No: 14484

10 October 2022

Geotechnique Pty Ltd
PO Box 880
Penrith NSW 2751

Attn: Mr Anwar Barbhuyia

Accredited for compliance with ISO/IEC 17025 - Testing.

Dear Anwar

Asbestos Identification
This report presents the results of seventeen samples, forwarded by Geotechnique Pty Ltd on 7 October 2022, for analysis for asbestos.

1.Introduction: Seventeen samples forwarded were examined and analysed for the presence of asbestos on 10 October 2022.

2. Methods : The samples were examined under a Stereo Microscope and selected fibres were analysed by Polarized Light Microscopy in conjunction with Dispersion Staining method **(Australian Standard AS 4964 - 2004 and Safer Environment Method 1 as the supplementary work instruction) (Qualitative Analysis only).**

The report also provides approximate weights and percentages, categories of asbestos forms appearing in the sample, such as **AF**(Asbestos Fines), **FA**(Friable Asbestos) and **ACM** (Asbestos Containing Material), also satisfying the requirements of the NEPM Guidelines).

3. Results :

Sample No. 1. ASET105106 / 108286 / 1. 20219/6 - TP120-1 - 0.0-0.15.
Approx dimensions 10.0 cm x 10.0 cm x 9.0 cm
The sample consisted of a mixture of clayish sandy soil, stones, fragments of fibre cement* (ACM), sandstone, wood chips and plant matter.
Chrysotile* (Approximate estimated weight = 0.15g) asbestos detected.
Approximate total dry weight of soil = 895.0g.
Approximate estimated weight of asbestos in soil in the form of ACM = 0.15g.
Approximate w/w percentage of asbestos in soil in the form of ACM = 0.02%.

Sample No. 2. ASET105106 / 108286 / 2. 20219/6 - TP120-2 - 0.0-0.15.
Approx dimensions 10.0 cm x 10.0 cm x 7.3 cm
Approximate total dry weight of soil = 732.0g.
The sample consisted of a mixture of clayish sandy soil, stones, fragments of cement like material, sandstone and plant matter.
No asbestos detected.

Sample No. 3. ASET105106 / 108286 / 3. 20219/6 - TP120-3 - 0.0-0.15.
Approx dimensions 10.0 cm x 10.0 cm x 7.0 cm
Approximate total dry weight of soil = 696.0g.
The sample consisted of a mixture of clayish sandy soil, stones, fragments of cement like material and plant matter.
No asbestos detected.

Sample No. 4. ASET105106 / 108286 / 4. 20219/6 - TP120-4 - 0.0-0.15.
Approx dimensions 10.0 cm x 10.0 cm x 7.3 cm
Approximate total dry weight of soil = 732.0g.
The sample consisted of a mixture of clayish sandy soil, organic fibres, stones, fragments of cement like material, glass, plaster, plastic, wood chips and plant matter.
No asbestos detected.

Sample No. 5. ASET105106 / 108286 / 5. 20219/6 - TP120-5 - 0.0-0.15.
Approx dimensions 10.0 cm x 10.0 cm x 7.4 cm
Approximate total dry weight of soil = 740.0g.
The sample consisted of a mixture of clayish sandy soil, stones, fragments of sandstone and plant matter.
No asbestos detected.

Sample No. 6. ASET105106 / 108286 / 6. 20219/6 - TP120-5 - 0.3-0.4.
Approx dimensions 10.0 cm x 10.0 cm x 9.4 cm
Approximate total dry weight of soil = 938.0g.
The sample consisted of a mixture of clayish sandy soil, organic fibres, stones, fragments of cement like material, sandstone and plant matter.
No asbestos detected.

Sample No. 7. ASET105106 / 108286 / 7. 20219/6 - TP120-6 - 0.0-0.15.
Approx dimensions 10.0 cm x 10.0 cm x 7.9 cm
The sample consisted of a mixture of clayish sandy soil, stones, fragments of cement like material, fibre cement* (ACM), glass and plant matter.
Chrysotile* (Approximate estimated weight = 0.25g) asbestos detected.
Approximate total dry weight of soil = 792.0g.
Approximate estimated weight of asbestos in soil in the form of ACM = 0.25g.
Approximate w/w percentage of asbestos in soil in the form of ACM = 0.03%.

Sample No. 8. ASET105106 / 108286 / 8. 20219/6 - TP120-7 - 0.0-0.15.
Approx dimensions 10.0 cm x 10.0 cm x 7.6 cm
Approximate total dry weight of soil = 760.0g.
The sample consisted of a mixture of clayish sandy soil, stones, fragments of cement like material, glass, plastic, wood chips and plant matter.
No asbestos detected.

Sample No. 9. ASET105106 / 108286 / 9. 20219/6 - TP120-8 - 0.0-0.15.
Approx dimensions 10.0 cm x 10.0 cm x 7.3 cm
Approximate total dry weight of soil = 725.0g.
The sample consisted of a mixture of clayish sandy soil, organic fibres, stones, fragments of cement like material, glass, paint flakes, plastic, sandstone, wood chips and plant matter.
No asbestos detected.

Sample No. 10. ASET105106 / 108286 / 10. 20219/6 - TP120-9 - 0.0-0.15.
Approx dimensions 10.0 cm x 10.0 cm x 7.7 cm
Approximate total dry weight of soil = 769.0g.
The sample consisted of a mixture of clayish sandy soil, organic fibres, stones, fragments of glass, paint flakes and plant matter.
No asbestos detected.

Sample No. 11. ASET105106 / 108286 / 11. 20219/6 - TP120-10 - 0.0-0.15.
Approx dimensions 10.0 cm x 10.0 cm x 7.3 cm
Approximate total dry weight of soil = 729.0g.
The sample consisted of a mixture of clayish sandy soil, stones, fragments of plastic and plant matter.
No asbestos detected.

Sample No. 12. ASET105106 / 108286 / 12. 20219/6 - TP120-11 - 0.0-0.15.
Approx dimensions 10.0 cm x 10.0 cm x 7.5 cm
The sample consisted of a mixture of clayish soil, stones, fragments of cement like material, fibre cement#* (AF and ACM), sandstone, wood chips and plant matter.
Chrysotile#* (Approximate estimated weight as AF = 0.008g and as ACM = 0.19g) asbestos detected.
Approximate total dry weight of soil = 750.0g.
Approximate estimated weight of asbestos in soil in the form of ACM = 0.19g.
Approximate w/w percentage of asbestos in soil in the form of ACM = 0.025%.
Approximate estimated weight of asbestos in soil in the form of AF = 0.008g.
Approximate w/w percentage of asbestos in soil in the form of AF = 0.001%.

Sample No. 13. ASET105106 / 108286 / 13. 20219/6 - TP120-12 - 0.0-0.15.
Approx dimensions 10.0 cm x 10.0 cm x 7.7 cm
The sample consisted of a mixture of clayish sandy soil, organic fibres, stones, fragments of cement like material, fibre cement#* (AF and ACM), glass and plant matter.
Chrysotile#* (Approximate estimated weight as AF = 0.006g and as ACM = 1.17g) asbestos and Amosite* (Approximate estimated weight = 0.25g) asbestos detected.
Approximate total dry weight of soil = 765.0g.
Approximate estimated weight of asbestos in soil in the form of ACM = 1.42g.
Approximate w/w percentage of asbestos in soil in the form of ACM = 0.18%.
Approximate estimated weight of asbestos in soil in the form of AF = 0.006g.
Approximate w/w percentage of asbestos in soil in the form of AF = 0.001%.

Sample No. 14. ASET105106 / 108286 / 14. 20219/6 - TP120-13 - 0.0-0.15.
Approx dimensions 10.0 cm x 10.0 cm x 8.5 cm
Approximate total dry weight of soil = 851.0g.
The sample consisted of a mixture of clayish sandy soil, organic fibres, stones and plant matter.
No asbestos detected.

λ Sample No. 15. ASET105106 / 108286 / 15. 20219/66 - TP120-3FCP - 0.0-0.15.
Approx dimensions 24.0 cm x 9.0 cm x 0.5 cm
The sample consisted of fragments of a fibre cement material.
Chrysotile asbestos and Amosite asbestos detected.
Approximate total dry weight of fibre cement = 254.0g.

λ Sample No. 16. ASET105106 / 108286 / 16. 20219/6 - TP120-5FCP - 0.0-0.15.
Approx dimensions 17.2 cm x 13.0 cm x 0.5 cm
The sample consisted of fragments of a fibre cement material.
Chrysotile asbestos and Amosite asbestos detected.
Approximate total dry weight of fibre cement = 515.0g.

λ Sample No. 17. ASET105106 / 108286 / 17. 20219/6 - TP120-6FCP - 0.0-0.15.
Approx dimensions 9.5 cm x 7.5 cm x 0.3 cm
The sample consisted of fragments of a fibre cement material.
Chrysotile asbestos detected.
Approximate total dry weight of fibre cement = 18.0g.

Reported by,

Mahen De Silva. BSc, MSc, Grad Dip (Occ Hyg)
Occupational Hygienist / Approved Identifier.
Approved Signatory

WORLD RECOGNISED ACCREDITATION

Accredited for compliance with ISO/IEC 17025 - Testing.

This report is consistent with the analytical procedures and reporting recommendations in the Western Australia Guidelines for the Assessment Remediation and Management of Asbestos contaminated sites in Western Australia and it also satisfies the requirements of the current NEPM Guidelines. NATA Accreditation does not cover the performance of this service.

Disclaimers;

The approx; weights given above can be used only as a guide. They do not represent absolute weights of each kind of asbestos, as it is impossible to extract all loose fibres from soil and other asbestos containing building material samples using this method. However above figures may be used as closest approximations to the exact values in each case. Estimation and/ or reporting of asbestos fibre weights in asbestos containing materials and soil is out of the Scope of the NATA Accreditation. NATA Accreditation only covers the qualitative part of the results reported. This weight disclaimer also covers weight / weight percentages if given.

ACM - Asbestos Containing Material - Products or materials that contain asbestos in an inert bound matrix such as cement or resin. Here taken to be sound material, even as fragments and not fitting through a 7mm X 7 mm sieve.

AF -Includes asbestos free fibres, small fibre bundles and also ACM fragments that pass through a 7mm X 7 mm sieve.

FA -Friable asbestos material such as severely weathered ACM, and asbestos in the form of loose fibrous material such as insulation products.

^ denotes loose fibres of relevant asbestos types detected in soil/dust.
*** denotes asbestos detected in ACM in bonded form.**
 # denotes friable asbestos as soft fibro plaster, fragments of ACM smaller than 7mm which are considered as friable and / or highly weathered ACM that will easily crumble.
λ denotes samples that have been analysed only in accordance to AS 4964 – 2004.
Ω Sample volume criteria of 500mL have not been satisfied.

The results contained in this report relate only to the sample/s submitted for testing. Australian Safer Environment & Technology accepts no responsibility for whether or not the submitted sample/s is/are representative. Results indicating "No asbestos detected" indicates a reporting limit specified in AS4964 -2004 which is 0.1g/ Kg (0.01%). Any amounts detected at assumed lower level than that would be reported, however those assumed lower levels may be treated as

"No asbestos detected" as specified and recommended by A4964-2004. Trace / respirable level asbestos will be reported only when detected and trace analysis have been performed on each sample as required by AS4964-2004. When loose asbestos fibres/ fibre bundles are detected and reported that means they are larger handpicked fibres/ fibre bundles, and they do not represent respirable fibres. Dust/soil samples are always subjected to trace analysis except where the amounts involved are extremely minute and trace analysis is not possible to be carried out. When trace analysis is not performed on dust samples it will be indicated in the report that trace analysis has not been carried out due to the volume of the sample being extremely minute.

Estimation of asbestos weights involves the use of following assumptions;
Volume of each kind of Asbestos present in broken edges have been visually estimated and its been assumed that volumes remain similar throughout the binding matrix and those volumes are only approximate and not exact. Material densities have been assumed to be similar to commonly found similar materials and may not be exact.

All samples indicating "No asbestos detected" are assumed to be less than 0.001% for friable AF and FA portions detected and 0.01 % for ACM detected unless the approximate weight is given.

AUSTRALIAN SAFER ENVIRONMENT & TECHNOLOGY PTY LTD
SUITE 710 / 90 GEORGE STREET, HORNSBY NSW 2077 – P.O. BOX 1644 HORNSBY WESTFIELD NSW 1635
PHONE: (02) 99872183 FAX: (02)99872151 EMAIL: info@ausset.com.au

CHAIN OF CUSTODY RECORD

ASET JOB NO: ASET105706/108286/1-17				Contact Name:	ANWAR BARBHUYIA							
Name/ Company Name: Geotechnique				Job No:	20219/6							
Address: 1 Lemko Place Penrith				Project Address:	59-67 Karne Street North, Narwee							
				Purchase Order:								
Contact Ph: 0247222700				Email Results to:								
	Sample ID	Date	Type	Container	Sample Depth (m)	Asbestos in Material	Asbestos in Soil (+/-)	Asbestos WA/ NEPM 500mL	Asbestos Fibre Count	Asbestos in Water	Asbestos in Dust	Lead Analysis
1	TP120-1	6/07/2022	Soil	P	0.0-0.15			√				
2	TP120-2	6/10/2022	Soil	P	0.0-0.15			√				
3	TP120-3	6/10/2022	Soil	P	0.0-0.15			√				
4	TP120-4	6/10/2022	Soil	P	0.0-0.15			√				
5	TP120-5	6/10/2022	Soil	P	0.0-0.15			√				
6	TP120-5	6/10/2022	Soil	P	0.3-0.4			√				
7	TP120-6	6/10/2022	Soil	P	0.0-0.15			√				
8	TP120-7	6/10/2022	Soil	P	0.0-0.15			√				
9	TP120-8	6/10/2022	Soil	P	0.0-0.15			√				
10	TP120-9	6/10/2022	Soil	P	0.0-0.15			√				
11	TP120-10	6/10/2022	Soil	P	0.0-0.15			√				

RECEIVED
07 OCT 2022
BY: ...

Kmbr
7/10/22 3:15pm

AUSTRALIAN SAFER ENVIRONMENT & TECHNOLOGY PTY LTD
SUITE 710 / 90 GEORGE STREET, HORNSBY NSW 2077 – P.O. BOX 1644 HORNSBY WESTFIELD NSW 1635
PHONE: (02) 99872183 FAX: (02)99872151 EMAIL: info@ausset.com.au

ASET

CHAIN OF CUSTODY RECORD

ASET JOB NO:				Contact Name:	ANWAR BARBHUYIA								
Name/ Company Name: Geotechnique				Job No:	20219/6								
Address: 1 Lemko Place Penrith				Project Address:	59-67 Karne Street North, Narwee								
				Purchase Order:									
Contact Ph: 0247222700				Email Results to:									
	Sample ID	Date	Type	Container	Sample Depth (m)	Asbestos in Material	Asbestos in Soil (+/-)	Asbestos WA/ NEPM 500mL	Asbestos Fibre Count	Asbestos in Water	Asbestos in Dust	Lead Analysis	
12	TP120-11	6/10/2022	Soil	P	0.0-0.15			V					
13	TP120-12	6/10/2022	Soil	P	0.0-0.15			V					
14	TP120-13	6/10/2022	Soil	P	0.0-0.15			V					
15	TP120-3FCP	6/10/2022	Material	P	0.0-0.15	V							
16	TP120-5FCP	6/10/2022	Material	P	0.0-0.15	V							
17	TP120-6FCP	6/10/2022	Material	P	0.0-0.15	V							

RECEIVED
07 OCT 2022
BY:

Relinquished By:	ANWAR BARBHUYIA	Received By:	Turn around time					Shipment Method
Date & Time:	7/10/2022	Date & Time: 7/10/22 3.15pm	Same Day	24 hrs	48 hrs	3 Days	5 days	
Signature: AB		Signature:					V	

APPENDIX C

WASTE CLASSIFICATION OF FILL MATERIALS IN AREA 1

GEOTECHNIQUE
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TABLE CC1
METALS
59-67 KARNE STREET NORTH, NARWEE
(Ref No: 20219/6-AA)

Sample Location	Depth (m)	METAL (mg/kg)							
		ARSENIC	CADMIUM	CHROMIUM (Total)	COPPER	LEAD	MERCURY	NICKEL	ZINC
BH120	0.0-0.15	5	0.4	12	36	370	0.11	6.9	230
BH120	0.2-0.25	3	<0.3	7.7	9.7	54	<0.05	3.6	83
TP120-3	0.0-0.15	6	<0.3	13	20	72	0.07	6	120
TP120-5	0.0-0.15	2	<0.3	8.1	14	120	0.06	4.4	120
TP120-6	0.0-0.15	7	0.4	14	24	78	0.13	5.5	180
Limit of Reporting (LOR) (SGS)		1	0.3	0.5	0.5	1	0.05	0.5	2
Maximum		7	0.4	14	36	370	0.13	6.9	230

GEOTECHNIQUE PTY LTD

TABLE CC2
TOTAL PETROLEUM HYDROCARBONS (TPH), BTEX, POLYCYCLIC AROMATIC HYDROCARBONS (PAH) & ORGANOCHLORINE PESTICIDES (OCP) TEST RESULTS
59-67 KARNE STREET NORTH, NARWEE
(Ref No: 20219/6-AA)

		TRH (mg/kg)		BTEX (mg/kg)				PAH(mg/kg)		OCP (mg/kg)
Sample Location	Depth (m)	C6-C9	C10-C36	BENZENE	TOLUENE	ETHYLBENZENE	XYLENES (TOTAL)	BENZO(a)PYRENE (BaP)	TOTAL PAHs	ENDOSULFAN (TOTAL) [1]
BH120	0.0-0.15	-	-	-	-	-	-	-	-	<0.5
BH120	0.2-0.25	<20	<110	<0.1	<0.1	<0.1	<0.3	0.2	2.2	<0.5
Limit of Reporting (LOR) (SGS)		20	110	0.1	0.1	0.1	0.3	0.1	0.1	0.5
Maximum		<20	<110	<0.1	<0.1	<0.1	<0.3	0.2	2.2	<0.5

Notes:
1: Alpha, beta Endosulfan and Endosulfan Sulphate

GEOTECHNIQUE PTY LTD

TABLE CC3
SCHEDULED CHEMICALS
59-67 KARNE STREET NORTH, NARWEE
(Ref No: 20219/6-AA)

Sample Location	Depth (m)	Scheduled Chemicals [1](mg/kg)												
		HEXACHLOROBENZENE (HCB)	ALPHA, BETA, DELTA - BHC	GAMMA BHC (LINDANE)	HEPTACHLOR EPOXIDE	HEPTACHLOR	ALDRIN	DIELDRIN	ENDRIN	ENDRIN ALDEHYDE	ISODRIN	DDD+DDE+DDT	CHLORDANE (alpha & gamma)	**Scheduled Chemicals**
BH120	0.0-0.15	<0.1	<0.3	<0.1	<0.1	<0.1	<0.1	<0.05	<0.2	<0.1	<0.1	<0.6	<0.2	<50
BH120	0.2-0.25	<0.1	<0.3	<0.1	<0.1	<0.1	<0.1	<0.05	<0.2	<0.1	<0.1	<0.6	<0.2	<50
Limit of Reporting (LOR) (SGS)		0.1	0.3	0.1	0.1	0.1	0.1	0.2	0.2	0.1	0.1	0.6	0.2	-
Maximum		0.1	0.3	0.1	0.1	0.1	0.1	0.2	0.2	0.1	0.1	0.6	0.2	<50

Notes:

1: Includes only Aldrin, Alpha BHC, Beta BHC, gamma BHC (Lindane), delta BHC, Chlordane, DDD, DDE, DDT, Dieldrin, Endrin, Endrin Aldehyde, Heptachlor, Heptachlor Epoxide, HCB & Isodrin

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TABLE CC4
POLYCHLORINATED BIPHENYLS (PCB) TEST RESULT
59-67 KARNE STREET NORTH, NARWEE
(Ref No: 20219/6-AA)

Sample Location	Depth (m)	Polychlorinated Biphenyls (PCB) (mg/kg)
BH120	0.2-0.25	<1
Limit of Reporting (LOR) (SGS)		1
Maximum		<1

GEOTECHNIQUE
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TABLE CC5

ASBESTOS TEST RESULTS

59-67 KARNE STREET NORTH, NARWEE

(Ref No: 20219/6-AA)

Sample Location	Depth (m)	ASBESTOS
Soil Sample		
BH120	0.0-0.15	**DETECTED**
TP120-1	0.0-0.15	**DETECTED**
TP120-2	0.0-0.15	NOT DETECTED
TP120-3	0.0-0.15	NOT DETECTED
TP120-4	0.0-0.15	NOT DETECTED
TP120-5	0.0-0.15	NOT DETECTED
TP120-5	0.3-0.4	NOT DETECTED
TP120-6	0.0-0.15	**DETECTED**
TP120-7	0.0-0.15	NOT DETECTED
TP120-8	0.0-0.15	NOT DETECTED
TP120-9	0.0-0.15	NOT DETECTED
TP120-10	0.0-0.15	NOT DETECTED
TP120-11	0.0-0.15	**DETECTED**
TP120-12	0.0-0.15	**DETECTED**
Fibro-cement Piece		
TP120-3FCP	0.0-0.15	**DETECTED**
TP120-5FCP	0.0-0.15	**DETECTED**
TP120-6FCP	0.0-0.15	**DETECTED**

GEOTECHNIQUE PTY LTD

TABLE CC6
WASTE CLASSIFICATION OF FILL MATERIALS IN AREA 1
59-67 KARNE STREET NORTH, NARWEE
(Ref No: 20219/6-AA)

Analyte	Total Concentration (mg/kg)					Leachable Concentration (mg/L)			Classification
	Maximum	CT1	CT2	SCC1	SCC2	Maximum	TCLP1	TCLP2	
Asbestos	Friable asbestos detected in the soil samples and asbestos containing material fragments (ACM) were identified								Special (Asbestos) Waste
Metals									
Arsenic	7	100	400	500	2,000	ND	5	20	General Solid Waste **
Cadmium	0.4	20	80	100	400	ND	1	4	General Solid Waste **
Chromium (IV)	14*	100	400	1,900	7,600	ND	5	20	General Solid Waste **
Lead	370	100	400	1,500	6,000	ND	5	20	General Solid Waste @
Mercury	0.13	4	16	50	200	ND	0.2	0.8	General Solid Waste **
Nickel	6.9	40	160	1,050	4,200	ND	2	8	General Solid Waste **
Total Petroleum Hydrocarbons									
C6-C9	<20	650	2,600	650	2,600	NA	NA	NA	General Solid Waste **
C10-C36	<110	10,000	40,000	10,000	40,000	NA	NA	NA	General Solid Waste **
Benzene	<0.1	10	40	18	72	ND	0.5	2	General Solid Waste **
Toluene	<0.1	288	1,152	518	2,073	ND	14.4	57.6	General Solid Waste **
EthylBenzene	<0.1	600	2,400	1,080	4,320	ND	30	120	General Solid Waste **
Xylenes (Total)	<0.3	1,000	4,000	1,800	7,200	ND	50	200	General Solid Waste **
Polycyclic Aromatic Hydrocarbons									
Benzo(a)pyrene (BaP)	0.2	0.8	3.2	10	23	ND	0.04	0.16	General Solid Waste **
Total PAHs	2.2	200	800	200	800	NA	NA	NA	General Solid Waste **
Organochlorine Pesticides									
Endosulfan (total) [1]	<0.5	60	240	108	432	ND	3	12	General Solid Waste **
Scheduled Chemicals [2]	<50	<50	<50	<50	<50	NA	NA	NA	General Solid Waste **
Polychlorinated Biphenyls (PCB)	<1	<50	<50	<50	<50	NA	NA	NA	General Solid Waste **

NOTES:

ND:	Not Determined
NA:	Not Applicable
TCLP:	Toxicity Characteristic Leaching Procedure
1:	Alpha, beta Endosulfan and Endosulfan Sulphate
2:	Includes only Aldrin, Alpha BHC, Beta BHC, gamma BHC (Lindane), delta BHC, Chlordane, DDD, DDE, DDT, Dieldrin, Endrin, Endrin Aldehyde, Heptachlor, Heptachlor Epoxide, HCB & Isodrin
CT1:	Contaminant concentration for defining General Solid Waste (without TCLP)
CT2:	Contaminant concentration for defining Restricted Solid Waste (without TCLP)
SCC1:	Contaminant concentration for defining General Solid Waste when combined with TCLP
SCC2:	Contaminant concentration for defining Restricted Solid Waste when combined with TCLP
TCLP1:	Leachable concentration for defining General Solid Waste when combined with SCC1
TCLP2:	Leachable concentration for defining Restricted Solid Waste when combined with SCC2
*:	Total Chromium
**:	Non-putrescible
@:	Waste contaminated with lead (including lead paint waste) from residential premises is pre-classified as General Solid Waste, as detailed in "Waste Classification Guidelines Part 1: Classifying Waste" - NSW EPA (November 2014)

APPENDIX D

UNEXPECTED FINDS MANAGEMENT PROTOCOL

GEOTECHNIQUE® PTY LTD

ABN 64 002 841 063

UNEXPECTED FINDS MANAGEMENT PROTOCOL

LOTS D & C DP403467, LOT 2 DP518877 AND LOTS 2 & 3 DP16063 59-67 KARNE STREET NORTH, NARWEE

In the event that unexpected finds and/or suspect materials (identified by unusual staining, odour, discolouration or inclusions such as building rubble, asbestos sheeting/pieces/pipes, ash material, etc.) are encountered during any stage of future earthworks/site preparation, remediation, and demolition or between the sampling locations, the following actions are to be undertaken.

Management of unexpected finds and/or suspect materials
If unexpected finds and/or suspect materials are encountered:

- Works are to be ceased.
- An Environmental consultant is to be engaged to take appropriate sampling and testing of contaminants of potential concern at a nominated rate in accordance with current NSW EPA guidelines.
- If contamination is identified, the contaminated materials must be disposed of at an EPA licensed landfill facility with an appropriate waste classification.

Management of bonded asbestos containing material (ACM)
If ACM is encountered, the following measures are implemented:

- Engage a Class B Licence for bonded asbestos contractor.
- Removal of the asbestos waste must be carried out in accordance with the requirements of the regulators, such as SafeWork NSW and NSW EPA.
- Competent personnel or a SafeWork NSW Licensed Asbestos Assessor or a Professional Hygienist should be engaged to provide a clearance certificate.

Management of friable asbestos within the soil
It is recommended that the following measures are implemented if friable asbestos is encountered:

- Engage a Class A licensed contractor for friable asbestos
- Removal of the asbestos waste must be carried out in accordance with the requirements of the regulators, such as SafeWork NSW and NSW EPA
- A SafeWork NSW Licensed Asbestos Assessor or a Professional Hygienist must be engaged to provide a clearance certificate

Lemko Place, Penrith NSW 2750 PO Box 880, Penrith NSW 2751
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APPENDIX E

ENVIRONMENTAL NOTES

IMPORTANT INFORMATION REGARDING YOUR ENVIRONMENTAL SITE ASSESSMENT

These notes have been prepared by Geotechnique Pty Ltd, using guidelines prepared by the ASFE (Associated Soil and Foundation Engineers). The notes are offered to assist in the interpretation of your environmental site assessment report.

REASONS FOR AN ENVIRONMENTAL ASSESSMENT

Environmental site assessments are typically, though not exclusively, performed in the following circumstances:

- As a pre-acquisition assessment on behalf of either a purchaser or a vendor, when a property is to be sold
- As a pre-development assessment, when a property or area of land is to be redeveloped, or the land use has changed e.g. from a factory to a residential subdivision
- As a pre-development assessment of greenfield sites, to establish baseline conditions and assess environmental, geological and hydrological constraints to the development of e.g. a landfill
- As an audit of the environmental effects of previous and present site usage

Each circumstance requires a specific approach to the assessment of soil and groundwater contamination. In all cases the objective is to identify and if possible quantify the risks that unrecognised contamination poses to the ongoing proposed activity. Such risks may be both financial (clean-up costs or limitations in site use) and physical (health risks to site users or the public).

ENVIRONMENTAL SITE ASSESSMENT LIMITATIONS

Although information provided by an environmental site assessment can reduce exposure to the risk of the presence of contamination, no environmental site assessment can eliminate the risk. Even a rigorous professional assessment may not detect all contamination within a site. Contaminants may be present in areas that were not surveyed or sampled, or may migrate to areas which did not show signs of contamination when sampled. Contaminant analysis cannot possibly cover every type of contaminant that may occur; only the most likely contaminants are screened.

AN ENVIRONMENTAL SITE ASSESSMENT REPORT IS BASED ON A UNIQUE SET OF PROJECT SPECIFIC FACTORS

In the following events and in order to avoid cost problems, you should ask your consultant to assess any changes in the conclusion and recommendations made in the assessment:

- When the nature of the proposed development is changed e.g. if a residential development is proposed, rather than a commercial development
- When the size or configuration of the proposed development is altered e.g. if a basement is added
- When the location or orientation of the proposed structure is modified
- When there is a change of land ownership, or
- For application to an adjacent site

ENVIRONMENTAL SITE ASSESSMENT FINDINGS ARE PROFESSIONAL ESTIMATES

Site assessment identifies actual sub-surface conditions only at those points where samples are taken, when they are taken. Data obtained from the sampling and subsequent laboratory analyses are interpreted by geologists, engineers or scientists and opinions are drawn about the overall sub-surface conditions, the nature and extent of contamination, the likely impact on any proposed development and appropriate remediation measures. Actual conditions may differ from those inferred, because no professional, no matter how qualified and no sub-surface exploration program, no matter how comprehensive, can reveal what is hidden by earth, rock and time. The actual interface between materials may be far more gradual or abrupt than an assessment indicates. Actual conditions in areas not sampled may differ from predictions. Nothing can be done to prevent the unanticipated, however, steps can be taken to help minimise the impact. For this reason site owners should retain the services of their consultants throughout the development stages of the project in order to identify variances, conduct additional tests that may be necessary and to recommend solutions to problems encountered on site.

Soil and groundwater contamination is a field in which legislation and interpretation of legislation by government departments is changing rapidly. Whilst every attempt is made by Geotechnique Pty Ltd to be familiar with current policy, our interpretation of the investigation findings should not be taken to be that of the relevant authority. When approval from a statutory authority is required for a project, approval should be directly sought.

STABILITY OF SUB-SURFACE CONDITIONS

Sub-surface conditions can change by natural processes and site activities. As an environmental site assessment is based on conditions existing at the time of the investigation, project decisions should not be based on environmental site assessment data that may have been affected by time. The consultant should be requested to advise if additional tests are required.

ENVIRONMENTAL SITE ASSESSMENTS ARE PERFORMED FOR SPECIFIC PURPOSES AND CLIENTS

Environmental site assessments are prepared in response to a specific scope of work required to meet the specific needs of specific individuals e.g. an assessment prepared for a consulting civil engineer may not be adequate to a construction contractor or another consulting civil engineer.

An assessment should not be used by other persons for any purpose or by the client for a different purpose. No individual, other than the client, should apply an assessment, even for its intended purpose, without first conferring with the consultant. No person should apply an assessment for any purpose other than that originally contemplated, without first conferring with the consultant.

MISINTERPRETATION OF ENVIRONMENTAL SITE ASSESSMENTS

Costly problems can occur when design professionals develop plans based on misinterpretation of an environmental site assessment. In order to minimise problems, the environmental consultant should be retained to work with appropriate design professionals, to explain relevant findings and to review the adequacy of plans and specifications relative to contamination issues.

LOGS SHOULD NOT BE SEPARATED FROM THE REPORT

Borehole and test pit logs are prepared by environmental scientists, engineers or geologists, based upon interpretation of field conditions and laboratory evaluation of field samples. Logs are normally provided in our reports and these would not be redrawn for inclusion in site remediation or other design drawings, as subtle but significant drafting errors or omissions may occur in the transfer process. Photographic reproduction can eliminate this problem, however, contractors can still misinterpret the logs during bid preparation if separated from the text of the assessment. Should this occur, delays and disputes, or unanticipated costs may result.

To reduce the likelihood of borehole and test pit log misinterpretation, the complete assessment should be available to persons or organisations involved in the project, such as contractors, for their use. Denial of such access and disclaiming responsibility for the accuracy of sub-surface information does not insulate an owner from the attendant liability. It is critical that the site owner provides all available site information to persons and organisations, such as contractors.

READ RESPONSIBILITY CLAUSES CLOSELY

An environmental site assessment is based extensively on judgement and opinion; therefore, it is necessarily less exact than other disciplines. This situation has resulted in wholly unwarranted claims being lodged against consultants. In order to aid in prevention of this problem, model clauses have been developed for use in written transmittals. These are definitive clauses, designed to indicate consultant responsibility. Their use helps all parties involved recognise individual responsibilities and formulate appropriate action. Some of these definitive clauses are likely to appear in the environmental site assessment and you are encouraged to read them closely. Your consultant will be happy to give full and frank answers to any questions you may have.