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Report on
Preliminary Site Investigation for Contamination

Proposed Hastings Secondary College Port Macquarie
Campus Upgrade
16 Owen Street, Port Macquarie

Prepared for
School Infrastructure NSW

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

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Report on Preliminary Site Investigation for Contamination
Proposed Hastings Secondary College Port Macquarie Campus Upgrade
16 Owen Street, Port Macquarie

1. Introduction

Douglas Partners Pty Ltd (DP) has been commissioned by School Infrastructure NSW (SINSW) on behalf of the Department of Education (DOE) to prepare this Preliminary Site Investigation (PSI) for Contamination to accompany a State Significant Development Application (SSDA) to the NSW Department of Planning, Industry and Environment (DPIE) for proposed upgrades to Hastings Secondary College (Port Macquarie Campus), previously known as Port Macquarie High School.
Hastings Secondary College consists of two campuses, being Westport and Port Macquarie. This report has been prepared for proposed works at the Port Macquarie Campus, which consists of two properties, the main campus and the Ag Plot.

The works subject to this proposal are to be carried out on the main Port Macquarie campus which is located at 16 Owen Street, Port Macquarie (the site). The site has a secondary street frontage to Burrawan Street and adjoins Oxley Oval along the eastern boundary.

On 23 December 2020, the Secretary of the DPIE issued Secretary's Environmental Assessment Requirements (SEARs) for SSD Application No. 11920082. This report has been prepared in accordance with the SEARs requirements.

The objective of the PSI was to assess the potential for contamination at the site based on past and present land uses and to comment on the need for further investigation and/or management (if any) with regard to the proposed development. The proposed upgrade and redevelopment works constitutes a State Significant Development (SSD No. 11920082). It is understood that the report will be used to support a development application for the proposed upgrades. The client-supplied architectural plans by fjmt Architecture for the project.

This report must be read in conjunction with all appendices including the notes provided in Appendix A.

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

- NEPC *National Environment Protection (Assessment of Site Contamination) Measure 1999 (as amended 2013) [NEPM]* (NEPC, 2013)
- DUAP *Managing Land Contamination – Planning Guidelines (SEPP 55 – Remediation of Land)* (DUAP 1998); and
- NSW EPA *Guidelines for Consultants Reporting on Contaminated Land* (NSW EPA, 2020).

2. Scope of Works

The investigation comprised the following:

- Review of available published information on the site including geological, topographical, acid sulfate soil and soil landscape maps;
- Review of previous investigations completed by DP within the site;
- Brief site history review to assess the potential for contamination at the site comprising a review of selected aerial photograph records, search of registered groundwater bores in the area and review of Council records for the site,
- Site inspection to identify areas of potential contamination and assess current site condition;
- Discussions with site personnel familiar with current and previous site activities;
- Preparation of a conceptual site model (CSM);
- Drilling of five (5) boreholes (Bores 201 to 205) to depths of 5.0 m to 6.0 m below ground level using a track mounted drill rig;
- Collection of soil samples from boreholes at regular depth intervals for identification and testing purposes under contamination sampling protocols;
- Laboratory testing for potential contaminants on selected soil samples retrieved from boreholes; and
- Preparation of this report presenting the findings of assessment.

3. Site Identification

The site is located approximately 1.2km south east of the Port Macquarie town centre, with access from Oxley Highway (Gordon Street) via Owen Street to the centre, William Street via Owen Street to the north and Burrawan Street via Owen Street to the south. A maintenance access road exists to the east of the site along Burrawan Street.

The site is located at 16 Owen Street, Port Macquarie and is legally known as Lot 111 in DP 1270315. The Port Macquarie Campus site is located within a coastal setting (east), with residential (single two storey and residential flat buildings) located to the west and south and Port Macquarie Bowling Club to the north. The surrounding street network provides on-street parking. Maintenance vehicular access is located off Burrawan Street.

No Natural watercourses are mapped as traversing the site. Scattered vegetation is located throughout the site, with a small area of vegetation concentrated towards the pedestrian access area.

The Port Macquarie Campus site is gently sloping downwards in three general ‘platforms’ towards the north, with distinct views out towards the ocean and the Hastings River. It also has a distinct view line to the row of Norfolk pine trees along the coastline. The siting of the campus provides many opportunities for ongoing cultural connection to Country. Current built form has an established language of two (2) story, face brick, low pitched metal roof buildings.

The investigation focussed on the following two main areas proposed for redevelopment within the greater Port Macquarie Campus of Hastings Secondary College at 16 Owen Street, Port Macquarie (the site) as indicated on Figure 1:

- Site 1 - Proposed PCYC building; and
- Site 2 - Proposed CAPA building.

Details of the site are shown in Table 1 below.

Table 1: Site details for 16 Owen Street, Port Macquarie

	Site 1 (proposed PCYC building)	Site 2 (proposed CAPA building)
Site Address	16 Owen Street, Port Macquarie	
Legal Description	Lot 111 in Deposited Plan (D.P.) 1270315	
Zoning	Port Macquarie Local Environmental Plan (LEP) 2011 (refer Figure 2): Zone R3 Medium Density Residential (Landuse – Secondary School);	
Local Council Area	Port Macquarie Hastings Council	
Current Use	Vacant land functioning as a school sports oval	Walkways between existing structures, lunchtime recreational area
Surrounding Uses	**North** – Port City Bowling Club **East** – School Oval and Oxley Oval (cricket ground) **South** – Existing MPC hall **West** – Bound by Owen Street, and residential developments.	**North** – Existing MPC Hall **East** – Existing building “S” and building “B” **South** – Covered entrance to the school **West** – Bound by Owen Street, and residential developments.

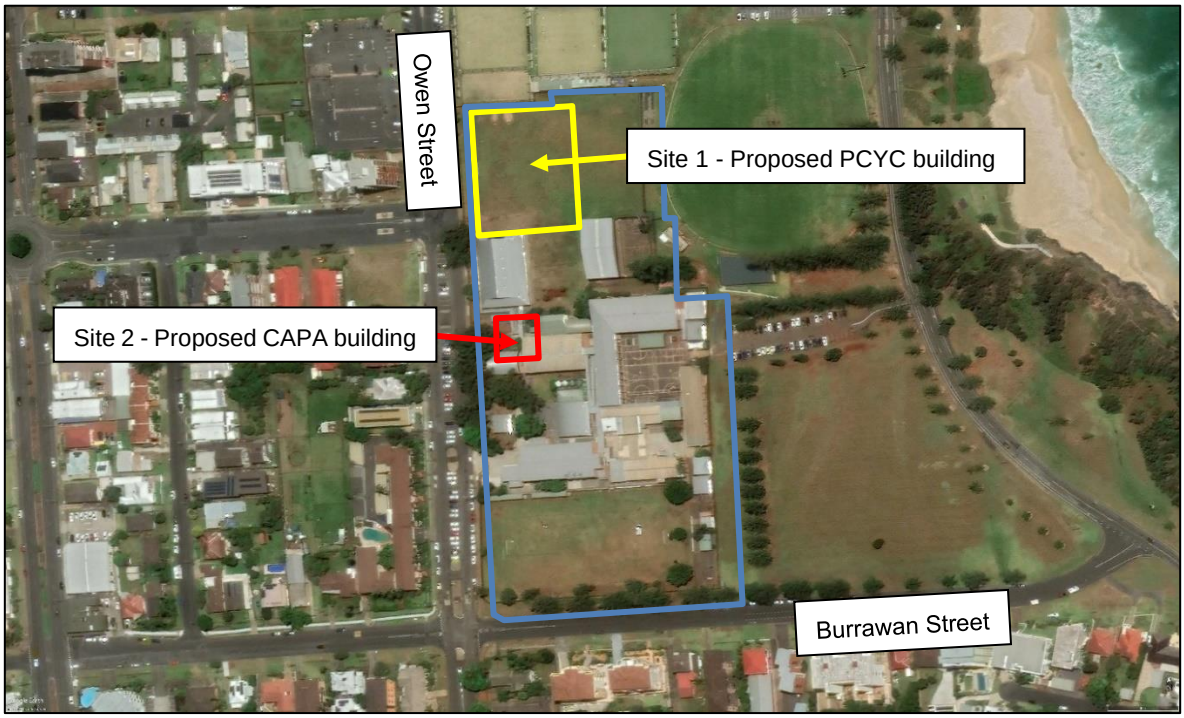


Figure 1: Boundary of Hastings Secondary College (blue outline), proposed PCYC building extent (yellow outline) and proposed CAPA building extent (red outline) (image sourced from Google Earth, dated January 2020)

Figure 2: Land Use Zonings – Port Macquarie Hastings Council LEP 2011 (image sourced from NSW Planning Portal Spatial Viewer, February 2020)

4. Proposed Development

The upgrades will support high-quality educational outcomes to meet the needs of students within the local community and deliver innovative learning and teaching spaces as follows:

- Demolition works to accommodate new works;
- Upgrade to school entry;
- Construction of new two (2) storey Creative and Performing Arts (CAPA) building;
- Construction of new Police Citizens Youth Club (PCYC);
- Partial refurbishment of Building L;
- Refurbishment and alteration to Building B;
- Removal of Building S and demountable buildings;
- New lift connections, covered outdoor learning area (COLA) and covered walkways;
- Associated earthworks, landscaping, stormwater works, service upgrades; and
- Tree removal/ tree safety works.

No change to current staff or student numbers is proposed.

Accordingly, the investigation undertaken focussed on the areas noted above (i.e. Site 1 and Site 2). The proposed development is shown on the fjmt Site Plan (Ref SSDA-120010 Rev 05) in Appendix E.

5. Summary of Previous Investigations

The following relevant reports have been previously prepared by DP within the Port Macquarie Campus of Hastings Secondary College at 16 Owen Street, Port Macquarie (the site):

- DP (2019a) *Report on Desktop Geotechnical Assessment, Proposed School Upgrade, Hastings Secondary College, Port Macquarie Campus, Owen Street, Port Macquarie*", Report 89754.00.R.001.Rev0, dated 3 December 2019;
- DP (2019b) *Report on Preliminary Site Investigation for Contamination, Proposed School Upgrade, Hastings Secondary College, Port Macquarie, Port Macquarie Campus*, Report 89754.00.R.002.Rev0, dated 17 December 2019; and
- DP (2020a) *Report on Geotechnical Investigation, Proposed School Upgrade, Owen Street, Port Macquarie*, Report 89754.00.R.005.Rev0, dated 11 March 2020;
- DP (2020b) *Report on Supplementary Contamination Investigation, Proposed School Upgrade, 16 Owen Street, Port Macquarie*, Report 89754.00.R.007.Rev0, 21 April 2020;
- DP (2020c) *Report on Preliminary Contamination Testing, Proposed Demountable Classrooms, 16 Owen Street, Port Macquarie,* Report 89754.02.R.001.Rev0, 1 December 2020

A summary of the relevant findings of previous reports is provided below.

DP (2019b)

The DP (2019b) investigation was limited to a desktop review of the greater campus site and a separate agricultural plot (AG plot) and did not involve any intrusive works or a walkover. Based on the desktop review and review of site history information, the following potential sources of contamination were identified for the greater campus site:

- Importation and / or placement of fill (source unknown);
- Demolition of buildings and potential contamination of underlying soils; and
- Naturally occurring asbestos.

DP (2019b) considered that the site would generally be compatible with the continued school use (from a site contamination perspective), subject to the results of further intrusive contamination investigations to confirm the site's contamination status. Reference should be made to DP (2019b) for further details.

DP (2020b)

The DP (2020b) supplementary assessment included drilling of five (5) bores (Bores 1 to 5) and testing of selected soil samples for contamination. Bores 2, 3 and 4 were drilled within the extent of the proposed PCYC, CAPA and TAS buildings respectively (refer to Drawing 1 in Appendix E). Generally, the subsurface profile comprised surficial fill overlying residual silty clay / clay underlain by extremely weathered bedrock.

The results of testing of selected soils within the site generally indicated the absence of gross soil contamination. Elevated concentrations of total chromium (assumed to be naturally occurring) were identified within site soils (up to 710 mg/kg). Concentrations of hexavalent chromium (chromium VI), however, were below the laboratory detection limits and therefore within Human Health Investigation Levels for continued school use. The report indicated that naturally occurring asbestos may also be present within the site associated with underlying soils/bedrock with serpentinite origins.

Further investigation of site soils was recommended to assess the presence, extent (both laterally and vertically), implications and management requirements (if any) associated with naturally occurring chromium and asbestos. Further testing was recommended within areas of the site that were likely to be disturbed during development. Reference should be made to DP (2020b) for further details.

DP (2020c)

The DP (2020c) preliminary contamination testing assessment included the drilling of three (3) bores (Bores 101 to 103) to depths of 0.6 m and testing of selected soil samples for contamination. The bores were drilled within the Sports Oval (demountable classrooms are now in place) immediately south of the proposed TAS building (refer to Drawing 1 in Appendix E).

The results of testing of selected soils generally indicated the absence of gross soil contamination. Elevated naturally occurring concentrations of total chromium were identified within site soils (up to 450 mg/kg). Concentrations of hexavalent chromium (chromium VI), however, was below the laboratory detection limits. In addition, no naturally occurring asbestos was detected within the samples tested. The results were generally consistent with previous site investigations.

Further investigation of site soils was recommended if soil disturbance is required at depths of greater than 0.6 m. A preliminary waste classification of General Solid Waste should be considered for excess soils excavated from within depths of 0.6 m within the investigation area. Further confirmatory testing was recommended prior to the disposal of excess soils (if required) due to the preliminary nature of the testing conducted. An unexpected finds protocol was also recommended for proposed developments due to the observed presence of filling within the investigation area (i.e. variable fill conditions may be present). Reference should be made to DP (2020c) for further details.

6. Environmental Setting

6.1 Topography, Soils and Geology

Regional Topography	The general topography of the surrounding area typically comprises near level open space areas and low undulating hills with minor slopes toward creek lines which ultimately drain to the Hasting's River
Site Topography	The site generally sits on the northern slope of a broad shaped hill, with its peak situated to the south-east at Windmill Hill Reserve. The site gently slopes to the north towards Port City Bowling Club at a slope of between 5º to 10º. Review of the local topographical mapping indicates that surface levels for the total site generally fall to the north from approximately RL 24 m AHD (south-east corner of the site) to approximately RL 11 m AHD (northern boundary). The site of the proposed PCYC building is currently levelled and acts as a sports oval. The site of the proposed CAPA building generally slopes to the north at an approximate slope of between 2º to 5º.
Soil Landscape (refer Figure 3)	The site is located within the residual soils of the Thrumster landscape, characterised by undulating and rolling rises of 30 – 60 m elevation. Slopes are <15%, local relief is up to 60 m and elevation to 60 m. Limits include moderately reactive subsoils, low wet bearing strength and high permeability.
Geology (refer Figure 4)	Reference to the NSW Geological Survey 1:250,000 map indicates that the site is underlain by Silurian to Devonian aged Watonga Formation which typically comprises slate, chert, slaty sandstone and rare metabasalt. The north eastern extent of the proposed PCYC building is also underlain by Cambrian to Permian aged Tacking Point Complex, which typically comprises melange, serpentinite. A review of NCCA naturally occurring asbestos (NOA) mapping indicates the site is within a high risk area.
Acid Sulfate Soils	No known mapped occurrence on the site, however Wright's Creek which is approximately 300 m from the south west corner of the site is mapped as comprising a high probability of occurrence between 1 and 3 m below the ground surface.

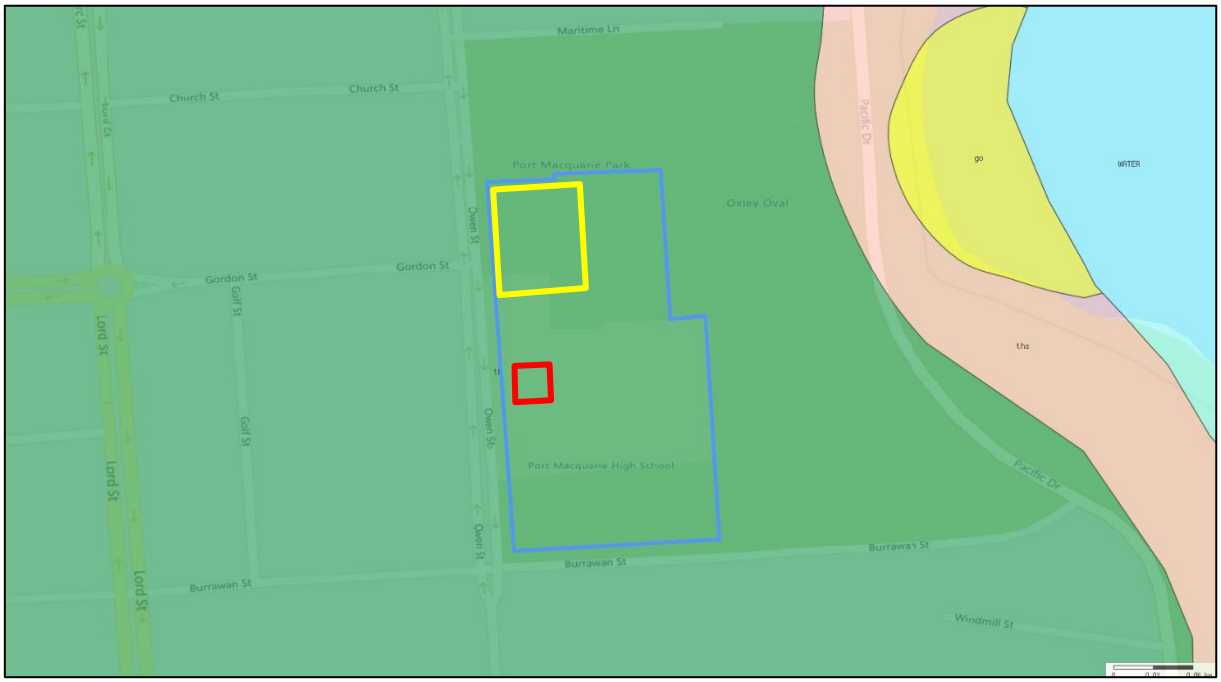


Figure 3: Soil landscape map with Hastings Secondary College outline (blue line), proposed PCYC building extent (yellow outline) and proposed CAPA building extent (red outline)

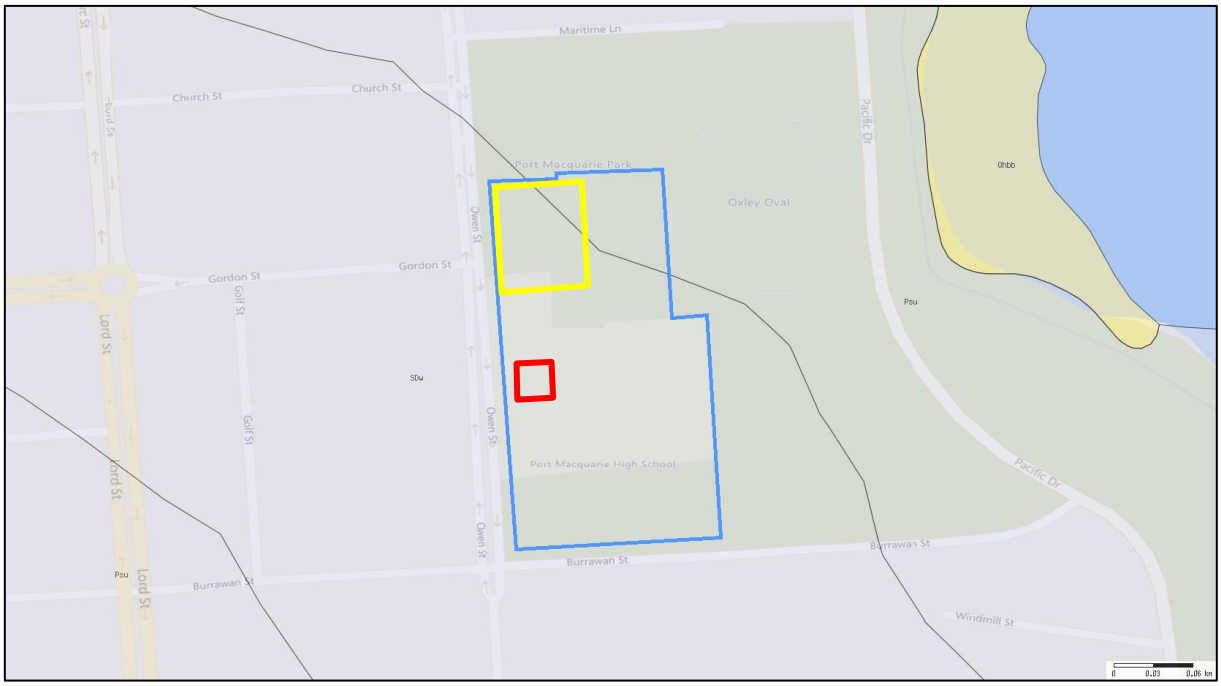


Figure 4: NCCA Quaternary and bedrock geology map with approximate Hastings Secondary College outline (blue line) and proposed PCYC building extent (yellow outline), proposed CAPA building extent (red outline)

6.2 Surface Water and Groundwater

The site did not contain any observable bodies of surface water. An old remnant creek line is understood to have been present at the northern part of the site which drains to the west to Wright's Creek and then Kooloonbung Creek.

Given the site's topography and geology, it is considered likely that a permanent groundwater table is present within the underlying soil/weathered rock profile at depths of approximately 5 m to 15 m. Intermittent seepage may however be encountered, at shallower depths, at localised permeability boundaries such as at the interface of fill and natural soils, sand and clay soils or at the weathered rock interface following periods of wet-weather. It should be noted that groundwater levels are potentially transient and can be affected by factors such as soil permeability and recent weather conditions.

A search for registered groundwater bores in the WaterNSW groundwater bore database indicated the following registered bores in the vicinity of the site (refer to Figure 5 above):

- GW065478 – Approx. 50 m north of the school site, registered for recreational use with a standing water level of 3 m (Port Mac Bowling Club);
- GW303216 – Approx. 150 m east of the school site, registered for domestic use (standing water level unknown).

A copy of the search results is provided in Appendix D. Figure 5 is a street map of the local area and shows the site in relation to the local registered groundwater bores.

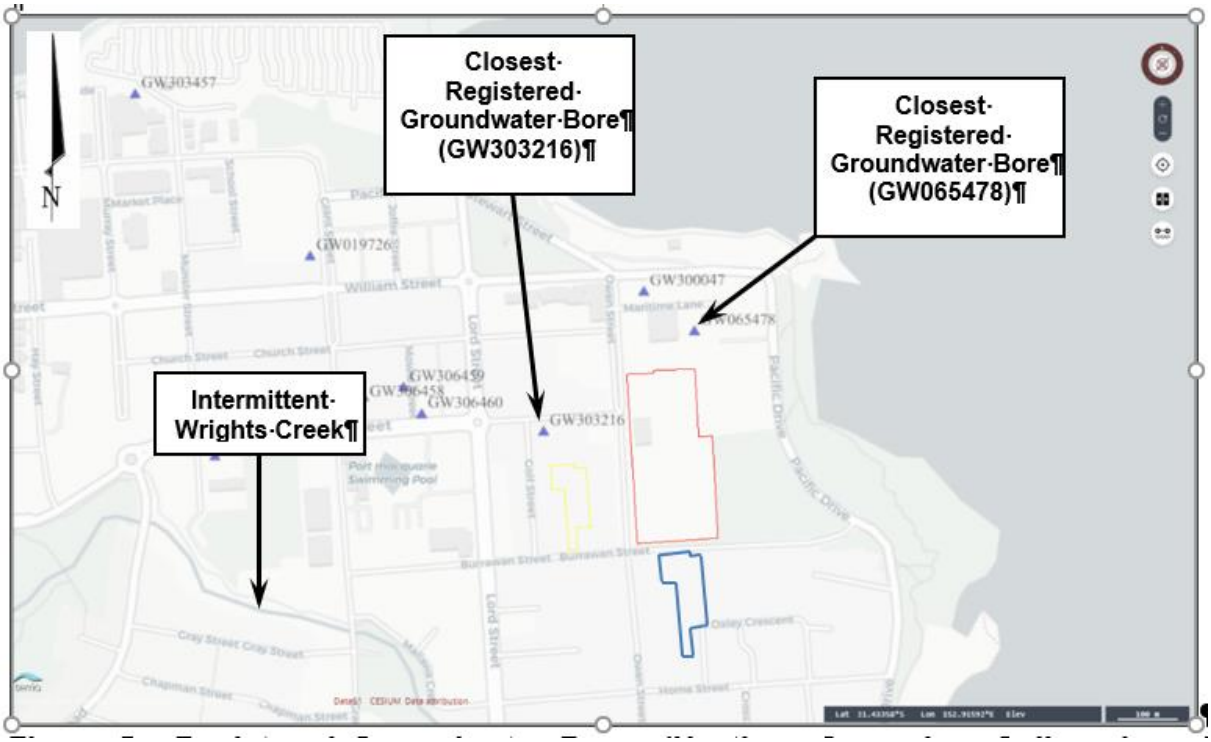


Figure 5: Registered Groundwater Bores (Hastings Secondary College in red outline) (data sourced from WaterNSW, dated March 2019)

Given the site generally sits on the northern slopes of a broad shaped hill, groundwater is expected to flow to the northern extent of the site, and then to the west to Wright's Creek.

7. Site History

7.1 Historical Aerial Photography

Readily available historical aerial photographs were reviewed dating back to the earliest available record (1956) through to 2019 to assess possible changes to the site and surrounding areas during this period.

Table 2 summarises the observations made during the aerial photograph review. It should be noted that the review was limited due to the low quality of some of the images.

Table 2: Summary of Historical Aerial Photographs

Year	Site	Surrounding Land Use
1956 (black and white)	• Majority of the site appears to be cleared area but undeveloped; and • Some small structures appear to be present in the extent of the school.	• Numerous buildings, likely residential buildings; and • Port City Bowling Club and Oxley Oval are present with surrounding pine trees.
1975 (black and white)	• Sports oval present (proposed PCYC building); • No evidence of covered walkway entrance to school (proposed CAPA building); • No trees around the western entrance to the school; and • Canteen, woodwork building, and amenities block appear to be present (proposed TAS building).	• No significant changes were observed, other than a general increase in the overall development in the local area; and • Additional bowling greens present.
2009 to 2019 (colour)	• Covered walkway present (proposed CAPA building); • Additional school buildings present and basketball court, permanent shade structure over one basketball court; • Structure in between MPC and basketball court removed between 2009 and 2011; • Trees are present around the western entrance to the school; and • Some of the buildings present in the 1975 photograph appear to have been removed / demolished and replaced.	• No significant changes were observed, other than a general increase in the overall development in the local area;

7.2 Public Registers and Planning Records

The following public registers and planning records were accessed on 17 February 2021:

NSW EPA Notices	No notices issued under the Protection of Environment Operations Act 1997 (POEO) on the site or within 1 km of the site.
NSW EPA Licences	No licenses issued under the POEO on the site or within 1 km of the site.
NSW EPA per- and polyfluoroalkyl substances (PFAS) Investigation Sites	The site and surrounding properties are not mapped on the NSW Government PFAS Investigation Program map.
Council Online Records (BA/DA search)	**Lot 2, DP1141185** • 2009 – Development application for "Fun & Fitness Vacation Care for School Age Children" – approved; • 2020 – Complying development certificate for "Demolition of Existing TAS and Building C and Internal Demolition of Building" – approved • 2021 – Development application for "Tree removal" – pending; **Lot 597 DP754434** • 1997 – Development application for "Construction of new food serving unit" – approved; • 2002 – Development application for "Specialist Classroom for School" – approved; • 2005 – Development application for "Additional Shade Structure within School Grounds" – approved; • 2008 – Development application for "Bus Storage Shed and Shade Structure" – approved; • 2011 – Section 68 (680) for "Additions to School - Demountable Classroom (Port Macquarie High School)" – approved; • 2011 – Development application for "Additions To Educational Establishment (School) - Temporary Demountable Classroom" – approved; 2021 – Complying development certificate for "Demolition of Existing TAS and Building C and Internal Demolition of Building" – approved.

A Safe Work NSW search was not conducted for the site based on discussions with the General Assistant for the school (see below), which indicated the general absence of any significant chemical or fuel storage within the site. The Section 10.7 planning certificate was also not available for review for the current PSI.

7.3 Interview with Site Personnel

Greg Parsey, who has been the General Assistant of Hastings Secondary College – Port Macquarie Campus for the last 11 years, provided the following information relating to current and former site activities:

Proposed PCYC Building:

- The site has been used as playing fields since at least 2010;
- There were previously demountable classrooms and associated underground services to the south of the basketball courts;
- No new topsoil or fill material has been placed on the site within the last 11 years; and
- Localised weed control is conducted (using Roundup). There has been no chemical treatment over the playing fields within the last 11 years.

Proposed CAPA Building:

- The area previously contained buildings (since demolished).
- Unlikely that the site had undergone any significant cut or fill based on topography; and
- Used as bus bay and as a lunch area.

7.4 Summary of Site History

The site history information suggests that the site has historically been used as a school as early as the 1975. Prior to this the site may have been vacant or possibly used for agricultural purposes. Some cut/fill is likely to have been conducted for the development of the school grounds. Imported fill materials may be present in the northern and southern parts of the school site to level out the playing fields. In general, the review suggested the absence of gross potentially contaminating activities within the site.

8. Site Condition

A site walkover was undertaken by a senior environmental engineer from DP on 8 February 2021. The general site topography was consistent with that described in Section 3. The site layout appears to have remained unchanged from the 2019 aerial photograph.

8.1 Proposed PCYC Building

The following key site features pertinent to the PSI were observed in the area of the proposed PCYC building:

- The proposed building footprint is located within the existing grassed playing fields (refer to Figure 6 and 7);
- Site vegetation mainly consisted of a good covering of grass with a few mature trees on the north-western corner. Some localised bare areas were present which are likely to be associated with normal wear and tear of the sporting fields;

- Localised exposed surface soils were observed to comprise silty sand filling with some gravel (refer to Figure 8);
- Sand pits (long jump), concrete pad (shotput) and steel football posts were present within the playing fields;
- Some cut/fill may have been conducted to form the playing field together with possible imported fill, based on site topography;
- Rock outcrops were not observed;
- There were no obvious indicators of gross contamination at the surface of the site (i.e. staining/odours);
- South of the playing fields there was a covered concrete basketball court, an uncovered concrete basketball court, an MPC hall and two grassed volleyball courts (refer to Figure 7 - background);
- It is noted that a detailed inspection of the surface was precluded by the presence of vegetation.

Figure 6: View from south west corner of proposed PCYC building - looking north-east at playing fields, Hastings Secondary College – Port Macquarie Campus

Figure 7: View from north west corner of proposed PCYC building View looking south-east at playing fields, volleyball courts and MPC hall

Figure 8: Exposed surface soils on playing field (SW corner of proposed PCYC building footprint)

8.2 Proposed CAPA Building

The following key site features pertinent to the PSI were observed in the area of the proposed CAPA building:

- Generally grassed and paved area containing the following (refer to Figures 9 and 10):
  - Some mature trees;
  - Above ground LPG tank;
  - Concrete lined surface drains with subsurface stormwater pits/pipe;
  - Paved access area with garden beds;
  - Exposed soils within garden beds generally comprised brown silty sands (refer to Figure 11)
- No obvious indication of gross contamination (staining/odours) at the surface or within exposed soils;
- It is noted that a detailed inspection of the surface was precluded by the presence of vegetation and paved surfaces.

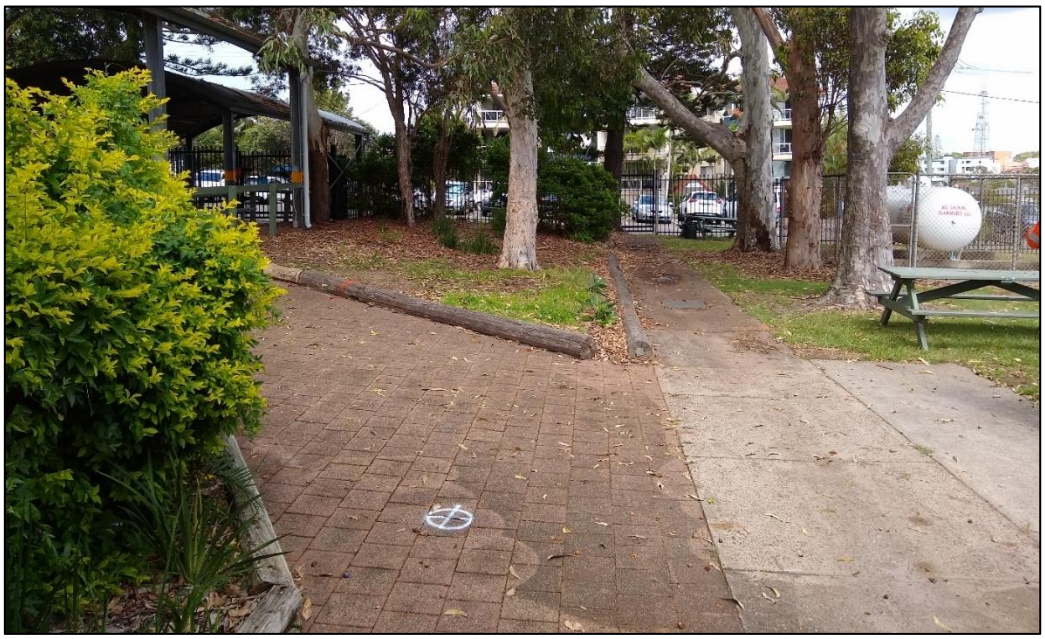


Figure 9: View from western boundary of the proposed CAPA building - looking west towards Owen Street

Figure 10: View from the southern boundary of the CAPA building looking north east

Figure 11: Typical exposed surface soils - proposed CAPA building footprint

9. Conceptual Site Model

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

Table 3, below summarises the potential sources of contamination and associated contaminants of concern that have been identified at the site based on the results of previous investigations and the current PSI.

Table 3: Potential Contamination Sources and Contaminants of Potential Concern

Potential Contamination Source / Activity	Description of Potential Contaminating Activity	Primary Contaminants of Potential Concern
Importation and / or placement of potentially contaminated fill	Possible importation of fill (source unknown) or reuse of site-won fill.	Various - Common contaminants associated with fill materials are metals (As, Cd, Cr, Cu, Pb, Hg, Ni and Zn), TRH, BTEX, PAH, PCB, OCP and asbestos
Demolition of buildings and potential contamination of underlying soils	Site historical review identified some building were removed / demolished within the site area and the surrounding areas. These building may have contained hazardous building material such as asbestos and have the potential to contaminate soils during demolition and site development activities.	Metals (As, Cd, Cr, Cu, Pb, Hg, Ni and Zn), PCB, OCP and asbestos
Naturally occurring asbestos and chromium	Mapping indicates a high potential for naturally occurring asbestos at the site. Previous testing also indicated the presence of elevated concentrations of total chromium in natural soils (i.e. naturally occurring).	Asbestos, Cr (total), Cr (VI)

Notes to Table 3:
As = arsenic, Cd = cadmium, Cr = chromium, Cu = copper, Pb = lead, Hg = mercury, Ni = nickel and Zn = zinc, Cr (VI) = hexavalent chromium
TRH = total recoverable hydrocarbons, BTEX = benzene, toluene, ethylbenzene and xylene, PAH = polycyclic aromatic hydrocarbons,
PCB = polychlorinated biphenyls, OCP = organochlorine pesticides

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

Table 4: Conceptual Site Model

Source	Transport Pathway	Receptor	Risk Management Action Recommended
S1: Fill and surficial soil.	P1 – Ingestion and dermal contact.	R1 - Construction workers / current site users. R2 – Future site users.	An intrusive investigation of site soils and associated contamination sampling is recommended to assess possible contamination issues.
	P2 – Inhalation of fibres/ dust and/or vapours.	R1 - Construction workers / current site users. R2 – Future site users. R3 – Land users in adjacent areas.	
	P3 – Leaching of contaminants and vertical migration into groundwater.	R4 – Local groundwater.	
	P4 – Surface water run-off. P5 – Lateral migration of groundwater.	R5 – Surface water bodies.	
	P6 – Contact with terrestrial ecology.	R6 – Terrestrial ecosystems.	
S2: Hazardous building materials in existing structures S3: Naturally occurring chromium and asbestos	P1 – Ingestion and dermal contact.	R1 - Construction workers / current site users. R2 – Future site users.	S2: A hazardous materials survey should be conducted prior to demolition. Areas beneath the building should be assessed post-demolition. S3: An intrusive investigation of site soils and associated contamination sampling is recommended to assess possible contamination issues.
	P2 – Inhalation of fibres/ dust.	R1 - Construction workers / current site users. R2 – Future site users. R3 – Land users in adjacent areas.	

10. Site Assessment Criteria

10.1 Guidelines

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

- NEPC *National Environment Protection (Assessment of Site Contamination) Measure 1999 (as amended 2013) [NEPM]* (NEPC, 2013);
- CRC CARE *Health screening levels for petroleum hydrocarbons in soil and groundwater* (CRC CARE, 2011).

10.2 General

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

The HIL and HSL are considered to be appropriate for the assessment of contamination at the site. As the site forms part of a secondary school, the HIL C (secondary schools) criteria has been adopted. NEPC (2013) states that secondary school buildings should be assessed against HSL A, therefore the HSL A&B criteria has been adopted. In summary, the SAC is as follows:

- HIL C; and
- HSL A&B.

Based on borehole logs, the variables soil types were found – sand, silt and clay. Therefore, the HSL has been adopted for the relevant soil type encountered in each sample. The selected HSL inputs are summarised in Table 5, and the HIL / HSL values are given in Table 6 and Table 7.

Table 5: Inputs to the Derivation of HSLs

Variable	Input	Rationale
Potential exposure pathway	Inhalation of vapours	Potential exposure pathways
Soil Type	Sand / Silt / Clay	Based on soil type encountered (see logs)
Depth to contamination	As sampled/tested	Based on depth of samples collected (see logs)

10.3 Health Investigation and Screening Levels

The generic health investigation levels (HIL) and health screening levels (HSL) are considered to be appropriate for the assessment of human health risk via all relevant pathways of exposure associated with contamination at the site. The adopted soil HIL and HSL for the contaminants of concern are in Table 6 and Table 7.

Table 6: Health Investigation Levels (mg/kg)

Contaminant	HIL-C
Metals	
Arsenic	300
Cadmium	90
Chromium (VI)	300
Copper	17 000
Lead	600
Mercury (inorganic)	80
Nickel	1200
Zinc	30 000
PAH	
B(a)P TEQ	3
Total PAH	300
OCP	
DDT+DDE+DDD	400
Aldrin and dieldrin	10
Chlordane	70
Endosulfan	340
Endrin	20
Heptachlor	10
HCB	10
Methoxychlor	400
OPP	
Chlorpyrifos	250
PCB	
PCB	1

Table 7: Health Screening Levels (mg/kg)

Contaminant	HSL-A&B	HSL-A&B	HSL-A&B
SAND	**0 m to <1 m**	**1 m to <2 m**	**2 m to <4 m**
Benzene	0.5	0.5	0.5
Toluene	160	220	310
Ethylbenzene	55	NL	NL
Xylenes	40	60	95
Naphthalene	3	NL	NL
TRH F1	45	70	110
TRH F2	110	240	440
SILT	**0 m to <1 m**	**1 m to <2 m**	**2 m to <4 m**
Benzene	0.6	0.7	1
Toluene	390	NL	NL
Ethylbenzene	NL	NL	NL
Xylenes	95	210	NL
Naphthalene	4	NL	NL
TRH F1	40	65	100
TRH F2	230	NL	NL
CLAY	**0 m to <1 m**	**1 m to <2 m**	**2 m to <4 m**
Benzene	0.7	1	2
Toluene	480	NL	NL
Ethylbenzene	NL	NL	NL
Xylenes	110	310	NL
Naphthalene	5	NL	NL
TRH F1	50	90	150
TRH F2	280	NL	NL

Notes: TRH F1 is TRH F1 minus BTEX

TRH F2 is TRH F2 minus naphthalene

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

The HSL for direct contact derived from CRC CARE (2011) are in Table 8.

Table 8: Health Screening Levels for Direct Contact (mg/kg)

Contaminant	DC HSL-C	DC HSL-IMW
Benzene	120	1100
Toluene	18 000	120 000
Ethylbenzene	5300	85 000
Xylenes	15 000	130 000
Naphthalene	1900	29 000
TRH F1	5100	82 000
TRH F2	3800	62 000
TRH F3	5300	85 000
TRH F4	7400	12 000

Notes: TRH F1 is TRH F1 minus BTEX
TRH F2 is TRH F2 minus naphthalene
IMW intrusive maintenance worker

10.4 Asbestos in Soil

Based on the CSM and/or current site access limitations, a detailed asbestos assessment was not considered to be warranted at this stage. However, due to the history of widespread use of ACM products across Australia, ACM can be encountered unexpectedly and sporadically at a site.

It is understood that the site is mapped within an area potentially containing Naturally Occurring Asbestos (NOA). NOA is found in some rocks, sediments and in soils. Appropriate precautions are required to ensure NOA is identified and managed safely in accordance with the relevant regulations including developing an Asbestos Management Plan.

The presence or absence of asbestos at a limit of reporting of 0.1 g/kg (AS:4964) has been adopted for this investigation / assessment as an initial screen.

10.5 Ecological Investigation Levels

Ecological investigation levels (EIL) and added contaminant limits (ACL), where appropriate, have been derived in NEPC (2013) for arsenic, copper, chromium (III), nickel, lead, zinc, DDT and naphthalene. The adopted EIL, derived using the interactive (excel) calculation spreadsheet on the NEPM toolbox website are shown in Tables B1, B2 and B3 in Appendix B, with inputs into their derivation shown in Table 9 based on the subsurface profile encountered and the results of soil testing.

Table 9: Inputs to the Derivation of the Ecological Investigation Levels

Sample ID	Sample Depth	Soil Type	Soil Texture	Clay Content	CEC	pH
BH201	0.05 m	Sand	Coarse	10.00	5.70	5.60
BH201	0.5 m	Sand	Coarse	10.00	4.10	5.50
BH201	15 - 195 m	Clay	Fine	10.00	9.50	5.30
BH202	0.05 m	Silt	Fine	10.00	4.70	6.10
BH202	0.7 - 1m	Silt	Fine	10.00	3.90	5.50
BH202	3.5 - 4 m	Clay	Fine	10.00	17.00	7.60
BH203	0.5 m	Clay	Fine	10.00	4.40	7.00
BH203	1m	Clay	Fine	10.00	4.00	4.10
BH203	2.5 - 2.95 m	Clay	Fine	10.00	2.20	4.30
BH204	0.3 m	Clay	Fine	10.00	38.00	9.90
BH205	0.1m	Silt	Fine	10.00	6.10	6.30
BH205	0.5 m	Clay	Fine	10.00	4.30	5.50
BH205	1- 145 m	Clay	Fine	10.00	5.00	5.10

The calculated EILs based on the results of relevant testing and soil conditions for each sample are presented in the results tables in Appendix B.

10.6 Ecological Screening Levels

Ecological screening levels (ESL) are used to assess the risk of selected petroleum hydrocarbon compounds, BTEX and benzo(a)pyrene to terrestrial ecosystems. The adopted ESL are shown in Table 10.

Table 10: Ecological Screening Levels (mg/kg)

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

Notes: ESL are of low reliability except where indicated by * which indicates that the ESL is of moderate reliability
TRH F1 is TRH F1 minus BTEX
TRH F2 is TRH F2 including naphthalene

10.7 Management Limits

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

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

The adopted management limits are in Table 11.

Table 11: Management Limits (mg/kg)

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

Notes: TRH F1 is TRH F1 including BTEX
TRH F2 is TRH F2 including naphthalene

11. Field Work

11.1 Sampling Rationale

Potential sources of site contamination have been identified based on the site history review and the site walkover conducted as part of this assessment. Sampling and testing was conducted within proposed development areas for the potential contaminant of concern identified in the CSM in Section 9.

Subsurface investigation was conducted within the proposed development areas to supplement previous investigations. Bore locations were nominated by the structural engineer for the project to supplement previous subsurface investigations. The sampling rationale is summarised in Table 12.

Table 12: Summary of Sampling Rationale

Test Location ID	Area of Site
Bore 201, 202	Proposed PCYC building
Bore 203	Proposed CAPA building
Bore 204, 205	Proposed TAS building (no longer part of the development)

Based on the NSW EPA Sampling Design Guidelines (EPA 1995), ten and five sampling points are recommended for the characterisation of the PCYC and CAPA footprints respectively. Based on the previous and current investigations, a total of three and two bores were drilled within the PCYC and CAPA building footprints respectively to assess subsurface conditions. The scope of work for the preliminary contamination assessment was considered to be appropriate, considering the general absence of identified gross contamination within the site, based on the results of previous sampling and analysis, the site history review, and the conditions observed in the site inspection.

The field work was undertaken on 8 and 9 February 2021 and comprised services checking with a professional underground service locator and subsurface investigation, which included the drilling of five (5) boreholes (Bore 201 to 205) within the three investigation areas (refer Drawing 1 in Appendix E and Figure 1, above). The locations of previous bores are also included on Drawing 1 (i.e. Bores 1 to 5 and 101 to 103). The current boreholes were drilled using a track mounted drilling rig fitted with solid flight augers to depths of 5.0 m and 6.0 m.

Soil samples were collected from each bore at regular depth intervals and changes in lithology or signs of potential contamination.

Soil samples were selected for laboratory analysis on the basis of the likely presence of contamination, based on material type, visual or olfactory evidence of possible contamination (i.e. odour or staining), proximity to a possible source of contamination, and whether generally representative of soil/fill conditions.

The approximate test locations based on handheld GPS survey by DP are shown on Drawing 1 in Appendix E.

11.2 Methods

The field work was undertaken on 8 and 9 February 2021 and comprised the following:

- Drilling of five boreholes (Bores 201 to 105) to depths of 5 m to 6 m below ground level using a track mounted drilling rig fitted with solid flight augers;
- Logging of the soil profile at each location;
- Collection of soil samples for contamination testing purposes from the bores with reference to environmental sampling protocols.

The borehole locations were set out by an engineer from DP as permitted by services and site accessibility. The locations of the boreholes were recorded using a hand held GPS which generally has an accuracy of about ±5 m depending on satellite coverage and surrounding site conditions, to Map Grid of Australia (MGA). The surface levels for the bores were obtained by interpolating from 2 m elevation contours data obtained from the NSW Department of Planning. The coordinates and surface level of the bores are presented on the borehole logs in Appendix A and should be considered as approximate.

Soil samples were collected from the auger and from SPT samples during drilling. Care was taken to remove any extraneous material deposited on the sample.

The general sampling procedure comprised:

- The use of new disposable gloves for each sampling event;
- Transfer of samples into laboratory-prepared jars and capping immediately;
- Collection of replicate soil samples in zip-lock plastic bags at each depth for PID screening;
- Collection of replicate samples for quality assurance /quality control (QA / QC) purposes;
- Labelling of sample containers with individual and unique identification, including project number, sample location and sample depth;
- Placement of the sample containers and replicate sample bags into a cooled, insulated and sealed container for transport to the laboratory.

The process of obtaining samples and their transportation, storage and delivery to laboratories for analysis was documented on a DP standard chain of custody (COC) form. Copies of completed forms are provided in Appendix C.

Replicate samples for each soil sample were screened for the presence of volatile organic compounds (VOCs), using MiniRAE LITE PIDs with a 10.6 eV lamp, calibrated to 100 ppm Isobutylene.

Information on quality assurance and quality control, including analysis of replicate samples, is found in Appendix C.

11.3 Data Quality Objectives (DQOs)

The scope of the targeted contamination testing was devised generally in accordance with the seven-step data quality objective (DQO) process, as documented in Appendix B of Schedule B2, of NEPC (2013). The DQO process is outlined in Table 13.

Table 13: Data Quality Objectives

DQO	Achievement Evaluation Procedure
Step 1 – State the problem	Confirm the contamination status of development areas considering potential areas of environmental concern (PAEC); Confirm whether or not the site is suitable for the proposed redevelopment.
Step 2 – Identify the decision	Do PAEC pose a potential risk to identified receptors? Is the data sufficient to make a decision regarding the suitability of the site for the intended land use from a contamination perspective? Does contamination at the site, if encountered, trigger the Duty to Report requirements under the CLM Act 1997? Is the data from the PSI and targeted preliminary contamination testing sufficient to enable the preparation of a Remediation Action Plan (RAP), if one is required? Refer Section 10 for adopted site assessment criteria (SAC) to inform the decision.
Step 3 - Identify the inputs to the decision	Site history review from this PSI; Review of regional setting including geology, topography and hydrogeology; Selection of appropriate contaminants of concern; Collection of soil samples from targeted locations, i.e. targeting PAEC; Laboratory QA/QC data to assess the suitability of the environmental data for the assessment; The lithology of the site as described in the soil logs; Analysis undertaken at a NATA accredited laboratory; The results will be assessed against SAC in Section 10.
Step 4 – Define the Boundary of the Assessment	As defined in Figure 1 in Section 3 and Drawing 1 in Appendix E.
Step 5 – Develop of decision rule	Selected soil samples were analysed for the contaminants of concern as outlined in Section 9; The field and laboratory data was assessed as reliable by reference to the Data Quality Indicators (DQI) as outlined in Step 7; Given the targeted scope of the current assessment, statistical analysis is unlikely to inform the decision rule; Further investigation, remediation and/or management will be recommended if the site is found to be contaminated or containing contamination “hot spots”.
Step 6 – Specify the acceptance criteria	The site assessment criteria was developed through reference to NEPC (2013) and for the current and future land use scenario (secondary school); The acceptance limits for laboratory QA/QC parameters were based on the laboratory reported acceptance limits and those stated in NEPC (2013).
Step 7 – Optimise the design for obtaining data	Design was optimised by the development of a plan for sample collection, handling and analysis, including undertaking quality assurance and quality control measures to allow assessment of the suitability of the data collected; Measurement to assess the project DQOs using data quality indicators (DQIs) as follows: **Completeness** – completion of field and laboratory chain of custody documentation, use of experienced field staff, compliance with holding times and documentation correct; **Comparability** – consistent sampling procedures, use of NATA certified laboratory and experienced field staff; **Representativeness** – appropriate media sampled; **Precision** - Analysis of laboratory replicates and achievement of acceptable RPDs, acceptable levels for laboratory QC criteria; **Accuracy** – Analysis of duplicates, matrix spikes and surrogate spikes.

11.4 Quality Assurance / Quality Control

11.4.1 Field QA / QC

Quality assurance (QA) and quality control (QC) procedures were adopted throughout the field sampling programme and comprised the following:

- Following DP standard operating procedures;
- Storage of samples under secure, temperature-controlled conditions; and
- Use of COC documentation for the handling, transport and delivery of samples to the selected laboratory.

11.4.2 Laboratory QA/QC

The NATA accredited chemical laboratories undertook in-house QA/QC procedures involving the routine testing of:

- Reagent blanks;
- Spike recovery analysis;
- Laboratory duplicate analysis;
- Analysis of control standards;
- Calibration standards and blanks; and
- Statistical analysis of QC data.

Further details are provided in the quality control report in Appendix C.

11.5 Results

The subsurface conditions encountered at the test locations are presented in detail in the borehole logs included in Appendix A. These should be read in conjunction with the accompanying notes in Appendix A, which explain the descriptive terms and classification methods used in the logs.

The subsurface conditions encountered within the bores for the current investigation are summarised below in Table 14.

Table 14: Summary of Subsurface Profile (Current Investigation, Bores 201 to 205)

Depth (m)		Stratum	Description
From	To		
Surface (0.0)	0.05 / 0.7	Topsoil / Fill	Generally brown, sandy silt / silty sand, trace clay and gravel, dry, M<Wp (encountered in Bores 201 and 202 50 mm thick concrete pavers and bedding sand was encountered in Bore 203. 100 mm thick concrete layer was encountered in Bore 204.
Surface (0.0) / 0.7	0.15 / 2.0	Fill	Generally brown, red brown, dark grey, clay, gravelly clay, sandy silt and silty clay, M<Wp to M~Wp (encountered in all bores)
0.4 / 2.0	2.0 / 5.5	Clay	Generally, very stiff to hard, grey, red brown, pale brown, with silt, trace gravel, M<Wp (encountered in all bores)
2.0 / 5.5	>5.0 / >6.0	Extremely Weathered Bedrock	Very stiff to hard, green grey, brown clay with rock like structure. Based on limited penetration of SPT and parent rock structure visible (encountered in all bores except Bore 205)

Notes to Table 14:

M = Moisture content of soil W_p = Plastic limit of soil

Bore 203 encountered concrete pavers and bedding sand of 50 mm thickness. Bore 204 encountered a 100 mm thick concrete layer at the surface.

Free groundwater was encountered at 5.7 m depth in Bore 201. Seepage was observed at 2 m depth in Bore 202 which is likely to be associated with perched water within fill overlying clayey soils. No free groundwater was encountered in the remaining bores whilst they remained open. It should be noted that groundwater levels are affected by factors such as flooding, climatic conditions and soil permeability and will therefore vary with time.

The following table summarises the general soil profile observed in all tests undertaken at the school site.

Table 15: Summary of All Test Locations within School Site

Location	Total Depth (m)	Depth to base of profile (m)			
		Topsoil / Fill	Clay	Extremely Weathered Bedrock	Groundwater (observed during drilling)
1	4.0	0.4	3.55	>4.0	NE
2	4.0	0.6	3.55	>4.0	NE
3	4.0	0.2	3.5	>4.0	NE
4	4.0	0.18	2.5	>4.0	NE
5	4.45	0.15	2.5	>4.45	NE
101	1.0	0.55	>1.0	NE	NE
102	1.0	0.2	>1.0	NE	NE
103	1.0	0.2	>1.0	NE	NE
201	6.0	1.0	5.5	>6.0	5.7
202	5.0	2.0	3.5	>5.0	2.0 (perched)
203	5.0	0.6	2.5	>5.0	NE
204	5.0	0.4	2.0	>5.0	NE
205	5.0	0.6	>5.0	NE	NE

Notes to Table 15: NE – Not encountered

There were no obvious indicators of gross contamination (i.e. staining, odours) in bores to the depths investigated.

Minor anthropogenic inclusions (i.e. terracotta fragments) were observed within some underlying fill materials. Building waste (i.e. concrete/brick fragments, timber fragments, glass, ceramic tile, PVC plumbing, copper pipe, electrical cable, yellow foam insulation, yellow fibreglass insulation) was observed at the surface within the proposed TAS building which was associated with current demolition activities. There were no observations of potential ACM in bores or in areas of exposed surface soils.

The results of PID screening on soil samples are shown on the borehole logs in Appendix A. All readings were less than 1 ppm indicating a low likelihood for significant volatile impact to be present in the soils sampled.

In summary, visual or olfactory observations made during drilling suggested the potential for gross contamination to be present in the soils is low.

12. Laboratory Testing

12.1 Overview

Laboratory testing was undertaken on a total of 13 selected samples for the current PSI, comprising topsoil, fill and natural soils, for the contaminants of potential concern outlined in the CSM in Section 9, as well as additional parameters to assist with derivation of ecological criteria (i.e. pH, cation exchange capacity (CEC)).

Selected samples were tested for the following:

- BTEX - Benzene, Toluene, Ethyl Benzene, Xylene;
- CEC – cation exchange capacity;
- Metals:
  - arsenic (As), cadmium (Cd), total chromium (Cr), hexavalent chromium (CrVI), copper (Cu), mercury (Hg), nickel (Ni), lead (Pb), zinc (Zn),
- OCP - organochlorine pesticides;
- OPP - organophosphorus pesticides ;
- PAH - polycyclic aromatic hydrocarbons ;
- PCB - polychlorinated biphenyls ;
- TRH - total recoverable hydrocarbons.

In addition to the analysis of total contaminant concentrations, TCLP (toxicity characteristic leaching procedure) was conducted on two soil samples for Ni to confirm waste classification.

Additional testing for EC and ESP was conducted for the preliminary assessment of soil salinity which was reported separately in the geotechnical assessment for the proposed development.

The laboratory testing was undertaken by Envirolab Services Pty Ltd, a NATA registered laboratory. Analytical methods used are shown in the laboratory report sheets in Appendix B.

12.2 Analytical Results

The results of chemical analysis undertaken on soils samples for the current assessment are summarised in Tables B1 to B3 in Appendix B.

All sample analysis was conducted by Envirolab Services Pty Ltd with reference to the chain-of-custody prepared by DP. Based on a review of the laboratory reported QC results, it is considered that the laboratory test data obtained are reliable and useable for this assessment. The laboratory test results certificates are in Appendix B.

The results of previous testing conducted within the site are also included in Appendix B in the following tables:

- 89754.00.R.007.Rev0 – Tables B1 & B2 (Bores 1 to 5);
- 89754.02.R.007.Rev0 – Tables B1 & B2 (Bores 101 to 103).

13. Assessment of Contamination

The analytical results for the current soil samples are summarised in Tables B1 to B3, Appendix B together with the adopted SAC. Laboratory certificates of analysis are also provided in Appendix B. A summary of the laboratory testing on soil samples for the current assessment (Bores 201 to 205) is provided below:

- The recorded concentrations of TRH, BTEX, PAH, OCP/OPP and PCB were below the laboratory limit of reporting (LOR) and the SAC in all samples;
- Total chromium was identified in the samples tested (ranging from 27 to 530 mg/kg), which are generally commensurate with similar testing on soils within the site;
- Additional testing for hexavalent chromium (VI), however, were all <2 mg/kg (i.e. within the relevant SAC) (also commensurate with previous testing on similar soils);
- Minor exceedances of EIL for nickel, copper and chromium were found in some samples. It is noted that the elevated concentration does not appear to have adversely affected vegetation growth within the sporting field area, and the remainder to the samples were tested within concrete sealed areas. The minor EIL exceedances are therefore not considered to be of concern;
- Asbestos was not detected at the reporting limit of 0.1 g / kg in the soil samples analysed for asbestos; and
- The soils tested are within NSW EPA Waste Classification guidelines (EPA, 2014) for “General Solid Waste non-putrescible” (GSW) considering both total and leachable test results. The soils tested could therefore be disposed directly to a licensed landfill as GSW, if required.

The results of testing for the current investigation were generally commensurate with previous testing conducted on similar soils within the site.

14. Discussion

The current investigation comprised the drilling of five (5) boreholes across the site at locations nominated by the structural engineer within the approximate footprint of the proposed PCYC, CAPA and TAS buildings. Subsurface conditions encountered during the investigation indicated the presence of surficial fill overlying natural residual clays and weathered rock.

The laboratory analysis of selected soil samples indicated that concentrations of contaminants were generally below the SAC. Elevated concentrations of total chromium in the natural soil samples are likely to be attributed to naturally occurring chromium which has been identified in residual soils and serpentinite bedrock within the general region. The elevated concentration of chromium in the fill samples suggest the potential use of site won material as fill (as indicated in (DP, 2019b)), and therefore is considered likely to be associated with naturally occurring chromium, as opposed to a contamination point source.

It is noted that the laboratory results for chromium present total chromium concentrations, whereas the HIL is based upon hexavalent chromium. As such, hexavalent chromium analysis was conducted on the soil samples collected. The results indicated that the hexavalent chromium concentrations were below the practical quantitation limit (PQL). Therefore, the elevated concentration of total chromium is not considered to be an exceedance of the HIL. Total chromium concentrations were also generally within the EIL criteria in the soil samples tested. Based on the current and previous testing on natural soils, naturally occurring chromium concentrations may also increase with depth.

The desktop review identified that serpentinite bedrock may be present at depth within the site; and also that the site is mapped as having a high potential for naturally occurring asbestos. Limited testing on weathered rock in the current assessment indicated the absence of asbestos.

The historical aerial photograph review identified that the site was previously a cleared, undeveloped area, prior to being developed as a school. The historical review also suggested that some of the buildings within the school were demolished over time. Given the age of the existing school buildings, it is considered possible that hazardous building materials, including asbestos may have been used in the construction materials.

The current preliminary investigation indicated that the soils tested are classified GSW with reference to NSW EPA guidelines. Further testing would be recommended during development if excess soils are proposed to be removed from the site, due to the preliminary nature of the testing conducted.

A detailed contamination assessment was not considered to be warranted due to the general absence of gross contamination in the preliminary assessment. As a precautionary measure, however, an unexpected finds protocol is recommended (refer to Section 15 below) for the proposed development due to the observed presence of fill within the investigation area (ie fill conditions may vary between our testing locations).

15. Conclusions and Recommendations

The results of the investigation and testing on selected soils from Bore 201 to 205 within the development areas generally indicated the absence of gross soil contamination. The results were within the adopted SAC with the exception of the marginal exceedance of the EIL for nickel, copper and chromium in some samples which is not considered to be of concern. The results were also commensurate with previous testing on similar soils within the site. The soils tested are therefore considered to be suitable for the proposed school use from a contamination perspective.

It is noted that geological mapping indicated that naturally occurring asbestos may be present within the site associated with underlying soils/bedrock with serpentinite origins. Naturally occurring chromium and possibly nickel concentrations may also be present and may increase with depth within the site.

Although the results of testing indicated the absence of asbestos in the underlying weathered rock (serpentinite) based on the results of limited testing (i.e. 3.5 m depth in Bore 202), precautionary measures should be taken if excavations/development result in the disturbance of such materials (in the Construction Environmental Management Plan (CEMP) should include procedures to safely handle/manage such materials including confirmatory testing where required as a precautionary measure).

A preliminary waste classification of “General Solid Waste” should be considered for excess soils excavated from within the development areas. The presence of naturally occurring asbestos, chromium and nickel should also be considered for the classification of excess soils if off-site disposal or reuse is proposed. Further confirmatory testing is recommended, however, prior to the disposal or reuse of excess soils (if required) due to the preliminary nature of the testing conducted.

As a precautionary measure, the CEMP should also include an unexpected finds protocol for the proposed development due to the observed presence of fill within the investigation area (ie variable fill conditions may be present). The UFP should outline the appropriate action should suspected contamination be observed during clearing or earthworks, such as potential asbestos containing materials.

16. References

DP (2019a) *Report on Desktop Geotechnical Assessment, Proposed School Upgrade, Hastings Secondary College, Port Macquarie Campus, Owen Street, Port Macquarie*", Report 89754.00.R.001.Rev0, dated 3 December 2019;

DP (2019b) *Report on Preliminary Site Investigation for Contamination, Proposed School Upgrade, Hastings Secondary College, Port Macquarie, Port Macquarie Campus*, Report 89754.00.R.002.Rev0, dated 17 December 2019; and

DP (2020a) *Report on Geotechnical Investigation, Proposed School Upgrade, Owen Street, Port Macquarie*, Report 89754.00.R.005.Rev0, dated 11 March 2020;

DP (2020b) *Report on Supplementary Contamination Investigation, Proposed School Upgrade, 16 Owen Street, Port Macquarie*, Report 89754.00.R.007.Rev0, 21 April 2020;

DP (2020c) *Report on Preliminary Contamination Testing, Proposed Demountable Classrooms, 16 Owen Street, Port Macquarie,* Report 89754.02.R.001.Rev0, 1 December 2020

ANZECC. (2000). *Australian and New Zealand Guidelines for Fresh and Marine Water Quality.* Australia and New Zealand Environment and Conservation Council.

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

CRC CARE. (2011). *Health screening levels for petroleum hydrocarbons in soil and groundwater.* Parts 1 to 3, Technical Report No. 10: Cooperative Research Centre for Contamination Assessment and Remediation of the Environment.

CRC CARE. (2017). *Risk-based Management and Remediation Guidance for Benzo(a)pyrene.* Technical Report no. 39: Cooperative Research Centre for Contamination Assessment and Remediation of the Environment.

HEPA. (2020). *PFAS National Environmental Management Plan (NEMP).* Version 2.0: Heads of EPAs Australia and New Zealand and Australian Government Department of the Environment.

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

NHMRC. (2008). *Guidelines for Managing Risks In Recreational Water.*

NHMRC, NRMMC. (2016). *Australian Drinking Water Guidelines 6 2011, Version 3.2.* Canberra: National Health and Medical Research Council, National Resource Management Ministerial Council.

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

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

17. Limitations

Douglas Partners (DP) has prepared this report for this project at Owen Street, Port Macquarie with reference to DP's proposal PMQ200104 dated 9 December 2020 and subsequent emails dated 29 January 2021 and 9 February 2021. The work was undertaken at the request of Tarren Miller of Currie & Brown on behalf of School Infrastructure NSW. The work was carried out as a variation to the original SINSW contract number: SINSW00285/19 dated 2 December 2019.

This report is provided for the exclusive use of School Infrastructure NSW for this project only and for the purposes as described in the report. It should not be used by or relied upon for other projects or purposes on the same or other site or by a third party. Any party so relying upon this report beyond its exclusive use and purpose as stated above, and without the express written consent of DP, does so entirely at its own risk and without recourse to DP for any loss or damage. In preparing this report DP has necessarily relied upon information provided by the client and/or their agents.

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

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

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

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

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

Asbestos has not been detected by observation or by laboratory analysis, either on the surface of the site, or in filling materials at the test locations sampled and analysed. Some building demolition materials were observed, and these are considered as indicative of the possible presence of hazardous building materials (HBM), including asbestos.

Although the sampling plan adopted for this investigation is considered appropriate to achieve the stated project objectives, there are necessarily parts of the site that have not been sampled and analysed. This is either due to undetected variations in ground conditions or to budget constraints, or to parts of the site being inaccessible and not available for inspection/sampling, or to vegetation preventing visual inspection and reasonable access. It is therefore considered possible that HBM, including asbestos, and naturally occurring asbestos and elevated contaminants, may be present in unobserved or untested parts of the site, between and beyond sampling locations, and hence no warranty can be given that such materials are not present.

Douglas Partners Pty Ltd

Appendix A

About This Report
Sampling Methods
Soil Descriptions
Symbols and Abbreviations
Borehole Logs (201 to 205) – current investigation
Borehole Logs (BH1 to BH5) – Project 89754.00
Borehole Logs (101 to 103) – Project 89754.02

About this Report

Douglas Partners

Introduction

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

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

Copyright

Borehole and Test Pit Logs

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

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

Groundwater

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

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

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

Reports

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

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

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

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

About this Report

Site Anomalies

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

Information for Contractual Purposes

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

Site Inspection

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

Sampling

Sampling is carried out during drilling or test pitting to allow engineering examination (and laboratory testing where required) of the soil or rock.

Disturbed samples taken during drilling provide information on colour, type, inclusions and, depending upon the degree of disturbance, some information on strength and structure.

Undisturbed samples are taken by pushing a thin-walled sample tube into the soil and withdrawing it to obtain a sample of the soil in a relatively undisturbed state. Such samples yield information on structure and strength, and are necessary for laboratory determination of shear strength and compressibility. Undisturbed sampling is generally effective only in cohesive soils.

Test Pits

Test pits are usually excavated with a backhoe or an excavator, allowing close examination of the in-situ soil if it is safe to enter into the pit. The depth of excavation is limited to about 3 m for a backhoe and up to 6 m for a large excavator. A potential disadvantage of this investigation method is the larger area of disturbance to the site.

Large Diameter Augers

Boreholes can be drilled using a rotating plate or short spiral auger, generally 300 mm or larger in diameter commonly mounted on a standard piling rig. The cuttings are returned to the surface at intervals (generally not more than 0.5 m) and are disturbed but usually unchanged in moisture content. Identification of soil strata is generally much more reliable than with continuous spiral flight augers, and is usually supplemented by occasional undisturbed tube samples.

Continuous Spiral Flight Augers

The borehole is advanced using 90-115 mm diameter continuous spiral flight augers which are withdrawn at intervals to allow sampling or in-situ testing. This is a relatively economical means of drilling in clays and sands above the water table. Samples are returned to the surface, or may be collected after withdrawal of the auger flights, but they are disturbed and may be mixed with soils from the sides of the hole. Information from the drilling (as distinct from specific sampling by SPTs or undisturbed samples) is of relatively low reliability, due to the remoulding, possible mixing or softening of samples by groundwater.

Non-core Rotary Drilling

The borehole is advanced using a rotary bit, with water or drilling mud being pumped down the drill rods and returned up the annulus, carrying the drill cuttings. Only major changes in stratification can be determined from the cuttings, together with some information from the rate of penetration. Where drilling mud is used this can mask the cuttings and reliable identification is only possible from separate sampling such as SPTs.

Continuous Core Drilling

A continuous core sample can be obtained using a diamond tipped core barrel, usually with a 50 mm internal diameter. Provided full core recovery is achieved (which is not always possible in weak rocks and granular soils), this technique provides a very reliable method of investigation.

Standard Penetration Tests

Standard penetration tests (SPT) are used as a means of estimating the density or strength of soils and also of obtaining a relatively undisturbed sample. The test procedure is described in Australian Standard 1289, Methods of Testing Soils for Engineering Purposes - Test 6.3.1.

The test is carried out in a borehole by driving a 50 mm diameter split sample tube under the impact of a 63 kg hammer with a free fall of 760 mm. It is normal for the tube to be driven in three successive 150 mm increments and the 'N' value is taken as the number of blows for the last 300 mm. In dense sands, very hard clays or weak rock, the full 450 mm penetration may not be practicable and the test is discontinued.

The test results are reported in the following form.

- In the case where full penetration is obtained with successive blow counts for each 150 mm of, say, 4, 6 and 7 as:

  4,6,7
  N=13

- In the case where the test is discontinued before the full penetration depth, say after 15 blows for the first 150 mm and 30 blows for the next 40 mm as:

  15, 30/40 mm

The results of the SPT tests can be related empirically to the engineering properties of the soils.

Dynamic Cone Penetrometer Tests / Perth Sand Penetrometer Tests

Dynamic penetrometer tests (DCP or PSP) are carried out by driving a steel rod into the ground using a standard weight of hammer falling a specified distance. As the rod penetrates the soil the number of blows required to penetrate each successive 150 mm depth are recorded. Normally there is a depth limitation of 1.2 m, but this may be extended in certain conditions by the use of extension rods. Two types of penetrometer are commonly used.

- Perth sand penetrometer - a 16 mm diameter flat ended rod is driven using a 9 kg hammer dropping 600 mm (AS 1289, Test 6.3.3). This test was developed for testing the density of sands and is mainly used in granular soils and filling.
- Cone penetrometer - a 16 mm diameter rod with a 20 mm diameter cone end is driven using a 9 kg hammer dropping 510 mm (AS 1289, Test 6.3.2). This test was developed initially for pavement subgrade investigations, and correlations of the test results with California Bearing Ratio have been published by various road authorities.

Description and Classification Methods

The methods of description and classification of soils and rocks used in this report are generally based on Australian Standard AS1726:2017, Geotechnical Site Investigations. In general, the descriptions include strength or density, colour, structure, soil or rock type and inclusions.

Soil Types

Soil types are described according to the predominant particle size, qualified by the grading of other particles present:

Type	Particle size (mm)
Boulder	>200
Cobble	63 - 200
Gravel	2.36 - 63
Sand	0.075 - 2.36
Silt	0.002 - 0.075
Clay	<0.002

The sand and gravel sizes can be further subdivided as follows:

Type	Particle size (mm)
Coarse gravel	19 - 63
Medium gravel	6.7 - 19
Fine gravel	2.36 – 6.7
Coarse sand	0.6 - 2.36
Medium sand	0.21 - 0.6
Fine sand	0.075 - 0.21

Definitions of grading terms used are:

- Well graded - a good representation of all particle sizes
- Poorly graded - an excess or deficiency of particular sizes within the specified range
- Uniformly graded - an excess of a particular particle size
- Gap graded - a deficiency of a particular particle size with the range

The proportions of secondary constituents of soils are described as follows:

In fine grained soils (>35% fines)

Term	Proportion of sand or gravel	Example
And	Specify	Clay (60%) and Sand (40%)
Adjective	>30%	Sandy Clay
With	15 – 30%	Clay with sand
Trace	0 - 15%	Clay with trace sand

In coarse grained soils (>65% coarse)
- with clays or silts

Term	Proportion of fines	Example
And	Specify	Sand (70%) and Clay (30%)
Adjective	>12%	Clayey Sand
With	5 - 12%	Sand with clay
Trace	0 - 5%	Sand with trace clay

In coarse grained soils (>65% coarse)
- with coarser fraction

Term	Proportion of coarser fraction	Example
And	Specify	Sand (60%) and Gravel (40%)
Adjective	>30%	Gravelly Sand
With	15 - 30%	Sand with gravel
Trace	0 - 15%	Sand with trace gravel

The presence of cobbles and boulders shall be specifically noted by beginning the description with ‘Mix of Soil and Cobbles/Boulders’ with the word order indicating the dominant first and the proportion of cobbles and boulders described together.

Soil Descriptions

Cohesive Soils

Cohesive soils, such as clays, are classified on the basis of undrained shear strength. The strength may be measured by laboratory testing, or estimated by field tests or engineering examination. The strength terms are defined as follows:

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

Cohesionless Soils

Cohesionless soils, such as clean sands, are classified on the basis of relative density, generally from the results of standard penetration tests (SPT), cone penetration tests (CPT) or dynamic penetrometers (PSP). The relative density terms are given below:

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

Soil Origin

It is often difficult to accurately determine the origin of a soil. Soils can generally be classified as:

- Residual soil - derived from in-situ weathering of the underlying rock;
- Extremely weathered material – formed from in-situ weathering of geological formations. Has soil strength but retains the structure or fabric of the parent rock;
- Alluvial soil – deposited by streams and rivers;
- Estuarine soil – deposited in coastal estuaries;
- Marine soil – deposited in a marine environment;
- Lacustrine soil – deposited in freshwater lakes;
- Aeolian soil – carried and deposited by wind;
- Colluvial soil – soil and rock debris transported down slopes by gravity;
- Topsoil – mantle of surface soil, often with high levels of organic material.
- Fill – any material which has been moved by man.

Moisture Condition – Coarse Grained Soils

For coarse grained soils the moisture condition should be described by appearance and feel using the following terms:

- Dry (D) Non-cohesive and free-running.
- Moist (M) Soil feels cool, darkened in colour.
  Soil tends to stick together.
  Sand forms weak ball but breaks easily.
- Wet (W) Soil feels cool, darkened in colour.
  Soil tends to stick together, free water forms when handling.

Moisture Condition – Fine Grained Soils

For fine grained soils the assessment of moisture content is relative to their plastic limit or liquid limit, as follows:

- ‘Moist, dry of plastic limit’ or ‘w <PL’ (i.e. hard and friable or powdery).
- ‘Moist, near plastic limit’ or ‘w ≈ PL (i.e. soil can be moulded at moisture content approximately equal to the plastic limit).
- ‘Moist, wet of plastic limit’ or ‘w >PL’ (i.e. soils usually weakened and free water forms on the hands when handling).
- ‘Wet’ or ‘w ≈LL’ (i.e. near the liquid limit).
- ‘Wet’ or ‘w >LL’ (i.e. wet of the liquid limit).

Symbols & Abbreviations

Introduction

These notes summarise abbreviations commonly used on borehole logs and test pit reports.

Drilling or Excavation Methods

C	Core drilling
R	Rotary drilling
SFA	Spiral flight augers
NMLC	Diamond core - 52 mm dia
NQ	Diamond core - 47 mm dia
HQ	Diamond core - 63 mm dia
PQ	Diamond core - 81 mm dia

Water

▷	Water seep
▽	Water level

Sampling and Testing

A	Auger sample
B	Bulk sample
D	Disturbed sample
E	Environmental sample
U_{50}	Undisturbed tube sample (50mm)
W	Water sample
pp	Pocket penetrometer (kPa)
PID	Photo ionisation detector
PL	Point load strength Is(50) MPa
S	Standard Penetration Test
V	Shear vane (kPa)

Description of Defects in Rock

The abbreviated descriptions of the defects should be in the following order: Depth, Type, Orientation, Coating, Shape, Roughness and Other. Drilling and handling breaks are not usually included on the logs.

Defect Type

B	Bedding plane
Cs	Clay seam
Cv	Cleavage
Cz	Crushed zone
Ds	Decomposed seam
F	Fault
J	Joint
Lam	Lamination
Pt	Parting
Sz	Sheared Zone
V	Vein

Orientation

The inclination of defects is always measured from the perpendicular to the core axis.

h	horizontal
v	vertical
sh	sub-horizontal
sv	sub-vertical

Coating or Infilling Term

cln	clean
co	coating
he	healed
inf	infilled
stn	stained
ti	tight
vn	veneer

Coating Descriptor

ca	calcite
cbs	carbonaceous
cly	clay
fe	iron oxide
mn	manganese
slt	silty

Shape

cu	curved
ir	irregular
pl	planar
st	stepped
un	undulating

Roughness

po	polished
ro	rough
sl	slickensided
sm	smooth
vr	very rough

Other

fg	fragmented
bnd	band
qtz	quartz

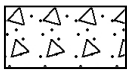
Symbols & Abbreviations

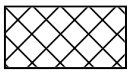
Graphic Symbols for Soil and Rock

General

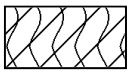

Asphalt

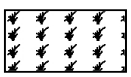

Road base

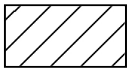

Concrete

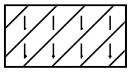

Filling

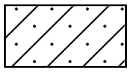
Soils


Topsoil

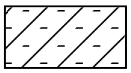

Peat

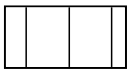

Clay

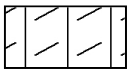

Silty clay

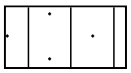

Sandy clay

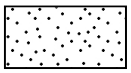

Gravelly clay

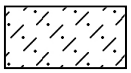

Shaly clay

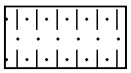

Silt


Clayey silt


Sandy silt

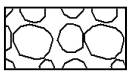

Sand

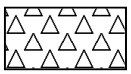

Clayey sand


Silty sand


Gravel

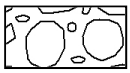

Sandy gravel


Cobbles, boulders

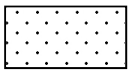

Talus

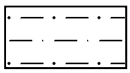
Sedimentary Rocks

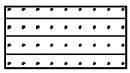

Boulder conglomerate

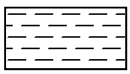

Conglomerate


Conglomeratic sandstone

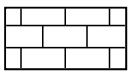

Sandstone


Siltstone

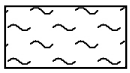

Laminite

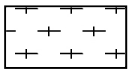

Mudstone, claystone, shale

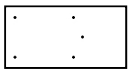

Coal


Limestone

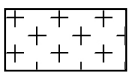
Metamorphic Rocks

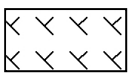

Slate, phyllite, schist

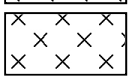

Gneiss

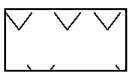

Quartzite

Igneous Rocks


Granite


Dolerite, basalt, andesite


Dacite, epidote


Tuff, breccia


Porphyry

BOREHOLE LOG

CLIENT: School Infrastructure NSW
PROJECT: Proposed Hastings Secondary College Upgrade
LOCATION: Owen Street, Port Macquarie

SURFACE LEVEL: 11 AHD
EASTING: 492396
NORTHING: 6522494
DIP/AZIMUTH: 90°/--

BORE No: 201
PROJECT No: 89754.03
DATE: 8/2/2021
SHEET 1 OF 2

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per 150mm)
11		FILL/TOPSOIL - Brown, fine grained, sandy silt/silty sand, trace gravel and terracotta, abundant rootlets, (gravel predominantly subangular, up to 40mm in size), dry/M<Wp		D/E	0.05		PID<1		
				D/E	0.5		PID<1		
	0.7	FILL - Brown, clay, with silt, trace gravel (iron stained), (gravel predominantly subangular, up to 40mm in size), M~Wp		D/E	0.7		pp = 100-125 PID<1		
10	1 1.0	CLAY - Stiff, grey mottled red brown and pale brown, high plasticity, with silt, (residual), M~Wp		U50	1.0		pp = 150-200		1
					1.3				
				S/E	1.5		pp = 150 2,2,4 N = 6 PID<1		
9	2				1.95 2.0				2
				D/E			pp = 150 PID<1		
		From 2.5m, trace iron stained gravel, (gravel predominantly subangular, up to 30mm in size)		S	2.5		pp = 150 3,3,4 N = 7		
8	3				2.95				3
				D/E	3.5		pp = 150 PID<1		
7	4	From 4.0m, red brown mottled grey		S	4.0		pp = 200 4,4,5 N = 9		4
					4.45 4.5				
				D/E			PID<1		
					5.0				

RIG: Geo305 **DRILLER:** Ground Test **LOGGED:** Cudmore **CASING:** Nil

TYPE OF BORING: Solid Flight Auger to 6.0 (tc bit)

WATER OBSERVATIONS: Free groundwater observed at 5.7m

REMARKS:

☐ Sand Penetrometer AS1289.6.3.3
☒ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

BOREHOLE LOG

CLIENT: School Infrastructure NSW
PROJECT: Proposed Hastings Secondary College Upgrade
LOCATION: Owen Street, Port Macquarie

SURFACE LEVEL: 11 AHD
EASTING: 492396
NORTHING: 6522494
DIP/AZIMUTH: 90°/--

BORE No: 201
PROJECT No: 89754.03
DATE: 8/2/2021
SHEET 2 OF 2

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per 150mm) 5 10 15 20
6		CLAY - Stiff, grey mottled red brown and pale brown, high plasticity, with silt, (residual), M~Wp *(continued)*							
		From 5.5m, grey mottled pale brown, grading to weathered serpentinite, (slight rock structure visible)		S	5.5		pp = 150-200 3,4,4 N = 8	▼	
5	6 6.0	Bore discontinued at 6.0m, limit of investigation			5.95				6
4	7								7
3	8								8
2	9								9

RIG: Geo305 **DRILLER:** Ground Test **LOGGED:** Cudmore **CASING:** Nil

TYPE OF BORING: Solid Flight Auger to 6.0 (tc bit)

WATER OBSERVATIONS: Free groundwater observed at 5.7m

REMARKS:

☐ Sand Penetrometer AS1289.6.3.3
☒ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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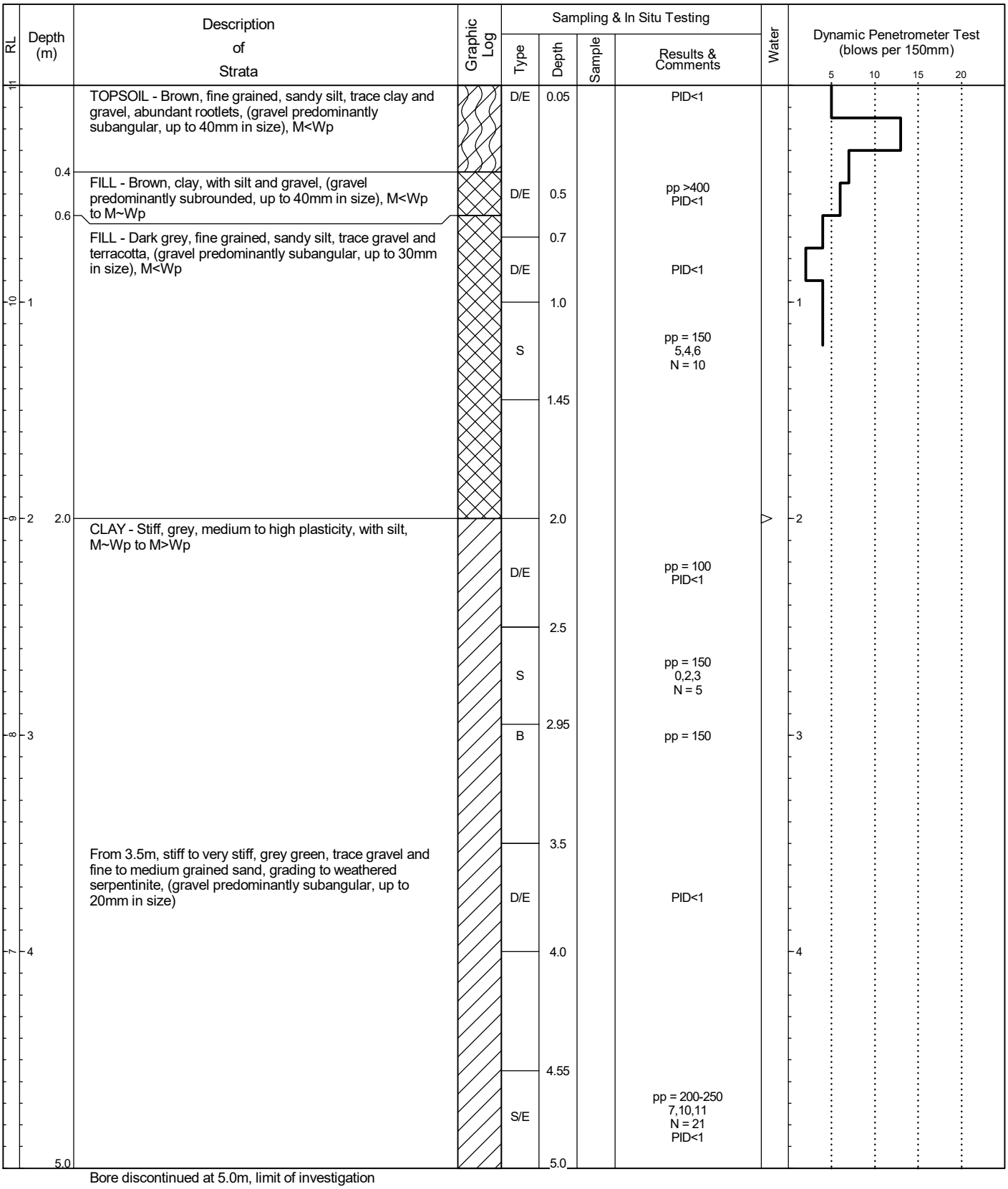
Geotechnics / Environment / Groundwater

BOREHOLE LOG

CLIENT: School Infrastructure NSW
PROJECT: Proposed Hastings Secondary College Upgrade
LOCATION: Owen Street, Port Macquarie

SURFACE LEVEL: 11 AHD
EASTING: 492450
NORTHING: 6522498
DIP/AZIMUTH: 90°/--

BORE No: 202
PROJECT No: 89754.03
DATE: 8/2/2021
SHEET 1 OF 1



Bore discontinued at 5.0m, limit of investigation

RIG: Geo305 **DRILLER:** Ground Test **LOGGED:** Cudmore **CASING:** Nil

TYPE OF BORING: Solid Flight Auger to 5.0 (tc bit)

WATER OBSERVATIONS: Seepage observed at 2.0m

REMARKS:

☐ Sand Penetrometer AS1289.6.3.3
☒ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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Geotechnics / Environment / Groundwater

BOREHOLE LOG

CLIENT: School Infrastructure NSW
PROJECT: Proposed Hastings Secondary College Upgrade
LOCATION: Owen Street, Port Macquarie

SURFACE LEVEL: 15 AHD
EASTING: 492419
NORTHING: 6522369
DIP/AZIMUTH: 90°/--

BORE No: 203
PROJECT No: 89754.03
DATE: 9/2/2021
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	VWP Construction Details
15	0.05	CONCRETE PAVERS - (50mm thick)							
	0.075	FILL - Grey, fine grained, silty sand, dry to moist		D/E	0.1		PID<1		
		FILL - Dark grey, silty clay, with gravel and rootlets, trace fine to medium grained sand, (gravel predominantly subrounded, up to 30mm in size), M<Wp to M~Wp		D/E	0.5		PID<1		
	0.6	CLAY - Very stiff to hard, grey mottled red brown and pale brown, with silt, M<Wp to M~Wp							
14	1			D/E	1.0				1
					1.0				
				U50			pp = 400		
					1.34				
13	2			D/E	2.0		pp = 250-300 PID<1		2
		From 2.5m, pale grey mottled red brown, (weathered rock)			2.5				
				S/E			pp >400 6,9,16 N = 25 PID<1		
12	3				2.95				3
				D/E	3.5		pp = 300-350 PID<1		
11	4								4
					4.55				
				S/E			pp >400 2,2,6 N = 8 PID<1		
	5.0				5.0				

Bore discontinued at 5.0m, limit of investigation

RIG: Geo305 **DRILLER:** Ground Test **LOGGED:** Cudmore **CASING:** Nil

TYPE OF BORING: Solid Flight Auger to 5.0 (tc bit)

WATER OBSERVATIONS: No free groundwater observed

REMARKS: SPT result at 4.55m to 5.0m potentially erroneous due to equipment dropped in hole

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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Geotechnics / Environment / Groundwater

BOREHOLE LOG

CLIENT: School Infrastructure NSW
PROJECT: Proposed Hastings Secondary College Upgrade
LOCATION: Owen Street, Port Macquarie

SURFACE LEVEL: 20 AHD
EASTING: 492480
NORTHING: 6522309
DIP/AZIMUTH: 90°/--

BORE No: 204
PROJECT No: 89754.03
DATE: 9/2/2021
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	VWP Construction Details
20	0.1	CONCRETE SLAB - (100mm thick)							
		FILL - Red brown, gravelly clay, with fine grained sand, (gravel predominantly subangular, up to 40mm in size), M~Wp		D/E	0.3		PID<1		
	0.4	CLAY - Very stiff to hard, red brown and pale brown, with silt, trace iron stained gravel, (gravel predominantly subangular, up to 30mm in size) (residual), M<Wp		D/E	0.6		PID<1		
19	1			S/E	1.0		pp = 400 5,6,10 N = 16 PID<1		1
					1.45				
				U50	1.5		pp >400		
18	2	From 2.0m, pale grey mottled red brown, (weathered rock)		D/E	1.92 2.0		pp >400 PID<1		2
				S/E	2.5		pp >400 8,12,16 N = 28 PID<1		
17	3				2.95				3
				D/E	3.8		PID<1 QA1		
16	4				4.55				4
				S/E			pp >400 5,12,19 N = 31 PID<1		
	5.0	Bore discontinued at 5.0m, limit of investigation			5.0				

RIG: Geo305 **DRILLER:** Ground Test **LOGGED:** Cudmore **CASING:** Nil

TYPE OF BORING: Solid Flight Auger to 5.0 (tc bit)

WATER OBSERVATIONS: No free groundwater observed

REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: School Infrastructure NSW
PROJECT: Proposed Hastings Secondary College Upgrade
LOCATION: Owen Street, Port Macquarie

SURFACE LEVEL: 20 AHD
EASTING: 492482
NORTHING: 6522295
DIP/AZIMUTH: 90°/--

BORE No: 205
PROJECT No: 89754.03
DATE: 9/2/2021
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per 150mm)
20	0.15	FILL - Red brown, sandy silt, with clay, gravel and building rubble, M<Wp		D/E	0.1		PID<1		
		FILL - Red brown, gravelly clay, with silt, (gravel predominantly subangular, up to 20mm in size), M<Wp to M~Wp		D/E	0.5		pp >400 PID<1		
	0.6	CLAY - Very stiff to hard, red brown mottled pale brown, with silt, trace iron stained gravel, (gravel predominantly subangular, up to 40mm in size), M<Wp to M~Wp							
19	1			S/E	1.0		pp >400 5,9,13 N = 22 PID<1		1
					1.45				
18	2			D/E	2.0		pp >400 PID<1		2
		From 2.5m, pale grey mottled red brown			2.5				
				S/E			pp >400 6,12,17 N = 29 PID<1		
17	3				2.95				3
				D/E	3.7		pp >400 PID<1		
16	4								4
					4.55				
				S			pp >400 7,12,21 N = 33		
	5.0				5.0				

Bore discontinued at 5.0m, limit of investigation

RIG: Geo305 **DRILLER:** Ground Test **LOGGED:** Cudmore **CASING:** Nil

TYPE OF BORING: Solid Flight Auger to 5.0 (tc bit)

WATER OBSERVATIONS: No free groundwater observed

REMARKS:

☐ Sand Penetrometer AS1289.6.3.3
☒ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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Geotechnics / Environment / Groundwater

BOREHOLE LOG

CLIENT: School Infrastructure NSW
PROJECT: Proposed School Upgrade
LOCATION: Owen Street, Port Macquarie

SURFACE LEVEL: 12 AHD
EASTING: 492453
NORTHING: 6522430
DIP/AZIMUTH: 90°/--

BORE No: 1
PROJECT No: 89754.00
DATE: 15/1/2020
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per 150mm)
12		FILL - Grey brown, fine to medium grained, silty sand, abundant rootlets (grass covered), dry		D/E	0.05		PID<1		
	0.4	CLAY - Very stiff to hard, red brown, with silt, trace fine grained sand, M<Wp		D/E	0.5		PID<1		
					0.55				
				U50					
					0.81				
11	1	From 1.0m, red brown mottled light grey			1.0				1
				S/E			pp >400 6,8,9 N = 17 PID<1		
					1.45				
10	2								2
		From 2.5m, light grey mottled red brown, stiff to very stiff			2.5				
				S/E			pp >400 3,6,8 N = 14 PID<1		
9	3				2.95				3
		From 3.55m, green grey (possible extremely weathered serpentinite)			3.55				
				S/E			pp = 350-400 2,7,9 N = 16 PID<1		
8	4 4.0	Bore discontinued at 4.0m, limit of investigation			4.0				4

RIG: DT100 **DRILLER:** Hickman **LOGGED:** Cudmore **CASING:** Nil

TYPE OF BORING: Solid flight auger to 4.0m

WATER OBSERVATIONS: No free groundwater observed

REMARKS:

☐ Sand Penetrometer AS1289.6.3.3
☒ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

BOREHOLE LOG

CLIENT: School Infrastructure NSW
PROJECT: Proposed School Upgrade
LOCATION: Owen Street, Port Macquarie

SURFACE LEVEL: 12 AHD
EASTING: 492412
NORTHING: 6522453
DIP/AZIMUTH: 90°/--

BORE No: 2
PROJECT No: 89754.00
DATE: 15/1/2020
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per 150mm)
12		FILL - Grey brown, fine to medium grained, silty sand, trace clay and gravel, abundant rootlets (gravel predominantly up to 20mm in size) (grass covered), dry		D/E	0.05		PID<1		
				D/E	0.5		PID<1		
	0.6	SILTY CLAY - Hard, brown, trace fine grained sand, M<Wp		D/E	0.7		PID<1		
	0.9	CLAY - Very stiff to hard, red brown, with silt, M<Wp			1.0				
11	1			S/E			pp >400 5,11,11 N = 22 PID<1		1
					1.45				
10	2	From 2.4m, light grey mottled light brown, M~Wp, (medium to high plasticity)			2.5				2
				S/E			pp >400 5,7,7 N = 14 PID<1		
9	3				2.95				3
		From 3.55m, stiff to very stiff, green grey (possible extremely weathered serpentinite)			3.55				
				S/E			pp = 300 3,7,7 N = 14 PID<1		
8	4 4.0	Bore discontinued at 4.0m, limit of investigation			4.0				4

RIG: DT100 **DRILLER:** Hickman **LOGGED:** Cudmore **CASING:** Nil

TYPE OF BORING: Solid flight auger to 4.0m

WATER OBSERVATIONS: No free groundwater observed

REMARKS:

☐ Sand Penetrometer AS1289.6.3.3
☒ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

BOREHOLE LOG

CLIENT: School Infrastructure NSW
PROJECT: Proposed School Upgrade
LOCATION: Owen Street, Port Macquarie

SURFACE LEVEL: 14 AHD
EASTING: 492403
NORTHING: 6522381
DIP/AZIMUTH: 90°/--

BORE No: 3
PROJECT No: 89754.00
DATE: 16/1/2020
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per 150mm)
14	0.2	FILL - Grey brown, silty sand, trace clay and gravel, abundant rootlets (gravel predominantly subangular, up to 60mm in size) (grass covered), dry		D/E	0.05		PID<1		
		SILTY CLAY - Hard, brown, trace fine to medium grained sand, M<Wp		D/E	0.5		PID<1		
	0.6	CLAY - Very stiff to hard, red brown mottled light grey, with silt, M<Wp							
13	1			S/E	1.0		pp >400 5,9,13 N = 22 PID<1		1
					1.45				
12	2	From 2.5m, light grey mottled red brown (possible extremely weathered bedrock)		S/E	2.5		pp >400 8,16,25/50 refusal PID<1		2
					2.85				
11	3	From 3.6m, green grey (possible extremely weathered serpentinite)		S/E	3.55		pp >400 6,12,23 N = 35 PID<1		3
10	4 4.0	Bore discontinued at 4.0m, limit of investigation			4.0				4

RIG: DT100 **DRILLER:** Hickman **LOGGED:** Cudmore **CASING:** Nil

TYPE OF BORING: Solid flight auger to 4.0m

WATER OBSERVATIONS: No free groundwater observed

REMARKS:

☐ Sand Penetrometer AS1289.6.3.3
☒ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: School Infrastructure NSW
PROJECT: Proposed School Upgrade
LOCATION: Owen Street, Port Macquarie

SURFACE LEVEL: 20 AHD
EASTING: 492508
NORTHING: 6522310
DIP/AZIMUTH: 90°/--

BORE No: 4
PROJECT No: 89754.00
DATE: 15/1/2020
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per 150mm)
20	0.15	CONCRETE - (150mm thick)							
	0.18	FILL - Fine to medium grained, sand fill, trace silt, dry		D/E	0.2		PID<1		
		CLAY - Stiff to very stiff, red brown, with silt, M<Wp		D/E	0.5		PID<1		
19	1			S/E	1.0		pp = 150-200 2,6,5 N = 11 PID<1		1
					1.45				
				U50	1.5				
					1.83				
18	2	From 2.5m, very stiff to hard, red mottled yellow brown (possible extremely weathered bedrock, parent rock structure visible)		S/E	2.5		pp >400 4,10,13 N = 23 PID<1		2
					2.95				
17	3			S	3.55		pp >400 3,11,16 N = 27 PID<1		3
16	4 4.0	Bore discontinued at 4.0m, limit of investigation			4.0				4

RIG: DT100 **DRILLER:** Hickman **LOGGED:** Cudmore **CASING:** Nil

TYPE OF BORING: Solid flight auger to 4.0m

WATER OBSERVATIONS: No free groundwater observed

REMARKS:

☐ Sand Penetrometer AS1289.6.3.3
☒ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: School Infrastructure NSW
PROJECT: Proposed School Upgrade
LOCATION: Owen Street, Port Macquarie

SURFACE LEVEL: 22 AHD
EASTING: 492505
NORTHING: 6522272
DIP/AZIMUTH: 90°/--

BORE No: 5
PROJECT No: 89754.00
DATE: 15/1/2020
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per 150mm)
22	0.15	FILL - Grey brown, fine to medium grained, silty sand, trace clay, abundant rootlets (grass covered), dry		D/E	0.05		PID<1		
		SILTY CLAY - Very stiff to hard, brown, trace fine grained sand, M<Wp		D/E	0.5		PID<1		
21	1				1.0				1
				S/E			pp >400 7,9,12 N = 21 PID<1 QA1		
	1.4	CLAY - Hard, red brown, with silt, M<Wp			1.45				
20	2			D/E	2.0		PID<1		2
		From 2.5m, possible extremely weathered bedrock, parent rock structure visible			2.5				
				S/E			pp >400 10,19,20 N = 39 PID<1		
19	3				2.95				3
18	4				4.0				4
				S/E			pp >400 14,14,17 N = 31 PID<1		
	4.45	Bore discontinued at 4.45m, limit of investigation			4.45				

RIG: DT100 **DRILLER:** Hickman **LOGGED:** Cudmore **CASING:** Nil

TYPE OF BORING: Solid flight auger to 4.45m

WATER OBSERVATIONS: No free groundwater observed

REMARKS:

☐ Sand Penetrometer AS1289.6.3.3
☒ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: School Infrastructure NSW
PROJECT: Proposed School Upgrade
LOCATION: Owen Street, Port Macquarie

SURFACE LEVEL: --
EASTING: 492435
NORTHING: 6522266
DIP/AZIMUTH: 90°/--

BORE No: 101
PROJECT No: 89754.02
DATE: 26/11/2020
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	VWP Construction Details
		FILL - Brown, fine grained, silty sand, trace clay, abundant rootlets, dry		D/E	0.05		PID<1		
	0.2	FILL - Red brown, clay, with silt, trace gravel and fine grained sand, (gravel predominantly subangular, up to 10mm in size), M<Wp to M~Wp		D/E	0.5		pp >400 PID<1		
	0.55	SILTY CLAY - Stiff, dark grey, trace fine grained sand, M~Wp		D/E	0.75		pp = 150-200 PID<1		
	0.8	CLAY - Very stiff, grey mottled red brown, with silt, trace gravel, (gravel predominantly subangular, up to 10mm in size) (residual), M<Wp to M~Wp		D/E	0.95		pp = 350 PID<1		
1	1.0	Bore discontinued at 1.0m, limit of investigation							1

RIG: DT100 / Hand Tools **DRILLER:** Hickman / Cudmore **LOGGED:** Cudmore **CASING:** Nil
TYPE OF BORING: 75mm ϕ Hand Auger to 0.3m, Solid Flight Auger to 1.0m
WATER OBSERVATIONS: No free groundwater observed
REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: School Infrastructure NSW
PROJECT: Proposed School Upgrade
LOCATION: Owen Street, Port Macquarie

SURFACE LEVEL: --
EASTING: 492453
NORTHING: 6522260
DIP/AZIMUTH: 90°/--

BORE No: 102
PROJECT No: 89754.02
DATE: 26/11/2020
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	VWP Construction Details
		FILL - Brown, fine grained, silty sand, trace gravel, abundant rootlets, (gravel predominantly subangular, up to 15mm in size), dry		D/E	0.05		PID<1		
	0.2	SILTY CLAY - Stiff, dark grey, with fine grained sand, M<Wp		D/E	0.3		PID<1		
	0.5	CLAY - Very stiff to hard, red brown, with silt, trace gravel, (gravel predominantly subangular, up to 10mm in size) (residual), M<Wp to M~Wp		D/E	0.55		pp >400 PID<1 QA1		
				D/E	0.95		pp = 350-400 PID<1		
1	1.0	Bore discontinued at 1.0m, limit of investigation							1

RIG: DT100 / Hand Tools **DRILLER:** Hickman / Cudmore **LOGGED:** Cudmore **CASING:** Nil
TYPE OF BORING: 75mm ϕ Hand Auger to 0.2m, Solid Flight Auger to 1.0m
WATER OBSERVATIONS: No free groundwater observed
REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: School Infrastructure NSW
PROJECT: Proposed School Upgrade
LOCATION: Owen Street, Port Macquarie

SURFACE LEVEL: --
EASTING: 492471
NORTHING: 6522269
DIP/AZIMUTH: 90°/--

BORE No: 103
PROJECT No: 89754.02
DATE: 26/11/2020
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	VWP Construction Details
		FILL - Brown, fine grained, silty sand, abundant rootlets, dry		D/E	0.05		PID<1		
				D	0.1				
	0.2	CLAY - Very stiff to hard, red brown mottled dark grey, with silt, trace gravel and organics, (gravel predominantly subangular, up to 15mm in size) (residual), M<Wp to M~Wp		D/E	0.3		pp = 300-350 PID<1		
		From 0.5m, red brown		D/E	0.6		pp >400 PID<1		
				D/E	0.95		pp >400 PID<1		
	1.0	Bore discontinued at 1.0m, limit of investigation							

RIG: DT100 / Hand Tools **DRILLER:** Hickman / Cudmore **LOGGED:** Cudmore **CASING:** Nil
TYPE OF BORING: 75mm ϕ Hand Auger to 0.2m, Solid Flight Auger to 1.0m
WATER OBSERVATIONS: No free groundwater observed
REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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Appendix B

Table B1: Summary of Laboratory Results – Metals, TRH, BTEX, PAH
Table B2: Summary of Laboratory Results – Summary of Laboratory Results –OCP, OPP, PCB, Asbestos
Table B3: Summary of Laboratory Results – Metals, TRH, BTEX, PAH, OCP, OPP, PCB, Asbestos (Waste Classification Comparison)
Laboratory Testing Reports (Envirolab Report 261469 and 261469-A)
Previous Laboratory Testing Tables:

- Table B1 and B2 - 89754.00.R.007.Rev0 – (April 2020)
- Table B1 and B2 - 89754.02.R.001.Rev0 – (Dec 2020)

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Table B1: Summary of Laboratory Results – Metals, TRH, BTEX, PAH

			Metals									TRH						BTEX				PAH			
			Arsenic	Cadmium	Total Chromium	Hexavalent Chromium	Copper	Lead	Mercury (inorganic)	Nickel	Zinc	TRH C6 - C10	TRH >C10-C16	F1 ((C6-C10)-BTEX)	F2 (>C10-C16 less Naphthalene)	F3 (>C16-C34)	F4 (>C34-C40)	Benzene	Toluene	Ethylbenzene	Total Xylenes	Naphthalene [b]	Benzo(a)pyrene (BaP)	Benzo(a)pyrene TEQ	Total PAHs
		PQL	4	0.4	1	1-Feb	1	1	0.1	1	1	25	50	25	50	100	100	0.2	0.5	1	1	1	0.05	0.5	0.05
Sample ID	Depth	Sample Date	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
BH201	0.05 m	8/02/2021	<4	<0.4	**150**	<2	**4**	**28**	<0.1	**12**	**26**	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<0.05	<0.5	<0.05
			300 100	90 -	300 410		17000 120	600 1100	80 -	1200 50	30000 290	- -	- 120	45 180	110 -	- 300	- 2800	0.5 50	160 85	55 70	40 105	3 170	- 0.7	3 -	300 -
BH201	0.5 m	8/02/2021	<4	<0.4	**340**	<2	**2**	**11**	<0.1	**10**	**5**	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<0.05	<0.5	<0.05
			300 100	90 -	300 410	300 -	17000 95	600 1100	80 -	1200 25	30000 230	- -	- 120	45 180	110 -	- 300	- 2800	0.5 50	160 85	55 70	40 105	3 170	- 0.7	3 -	300 -
BH201	1.5 - 1.95 m	8/02/2021	<4	<0.4	**62**	<1	**20**	**4**	<0.1	**22**	**13**	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<0.05	<0.5	<0.05
			300 100	90 -	300 410	300 -	17000 130	600 1100	80 -	1200 150	30000 310	- -	- 120	90 180	NL -	- 1300	- 5600	1 65	NL 105	NL 125	310 45	NL 170	- 0.7	3 -	300 -
BH202	0.05 m	8/02/2021	<4	<0.4	**530**	<2	**8**	**17**	**0.1**	**31**	**21**	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<0.05	<0.5	<0.05
			300 100	90 -	300 410	300 -	17000 100	600 1100	80 -	1200 35	30000 300	- -	- 120	40 180	230 -	- 1300	- 5600	0.6 65	390 105	NL 125	95 45	4 170	- 0.7	3 -	300 -
BH202	0.7 - 1 m	8/02/2021	<4	<0.4	**110**	<2	**3**	**8**	<0.1	**50**	**4**	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<0.05	<0.5	<0.05
			300 100	90 -	300 410	300 -	17000 90	600 1100	80 -	1200 25	30000 230	- -	- 120	40 180	230 -	- 1300	- 5600	0.6 65	390 105	NL 125	95 45	4 170	- 0.7	3 -	300 -
BH202	3.5 - 4 m	8/02/2021	<4	<0.4	**210**	1	**4**	<1	**0.3**	**310**	**2**	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<0.05	<0.5	<0.05
			300 100	90 -	300 410	300 -	17000 220	600 1100	80 -	1200 240	30000 690	- -	- 120	150 180	NL -	- 1300	- 5600	2 65	NL 105	NL 125	NL 45	NL 170	- 0.7	3 -	300 -
BH203	0.5 m	9/02/2021	<4	<0.4	**72**	<2	**2**	**15**	<0.1	**9**	**12**	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<0.05	<0.5	<0.05
			300 100	90 -	300 410	300 -	17000 100	600 1100	80 -	1200 30	30000 290	- -	- 120	50 180	280 -	- 1300	- 5600	0.7 65	480 105	NL 125	110 45	5 170	- 0.7	3 -	300 -
BH203	1 m	9/02/2021	<4	<0.4	**69**	<1	<1	**5**	<0.1	**1**	**1**	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<0.05	<0.5	<0.05
			300 100	90 -	300 410	300 -	17000 60	600 1100	80 -	1200 25	30000 140	- -	- 120	90 180	NL -	- 1300	- 5600	1 65	NL 105	NL 125	310 45	NL 170	- 0.7	3 -	300 -
BH203	2.5 - 2.95 m	9/02/2021	<4	<0.4	**27**	<1	**2**	**8**	<0.1	**4**	<1	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<0.05	<0.5	<0.05
			300 100	90 -	300 410	300 -	17000 55	600 1100	80 -	1200 10	30000 130	- -	- 120	150 180	NL -	- 1300	- 5600	2 65	NL 105	NL 125	NL 45	NL 170	- 0.7	3 -	300 -
BH204	0.3 m	9/02/2021	<4	<0.4	**260**	<2	**380**	**6**	<0.1	**39**	**22**	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<0.05	<0.5	<0.05
			300 100	90 -	300 410	300 -	17000 240	600 1100	80 -	1200 420	30000 1200	- -	- 120	50 180	280 -	- 1300	- 5600	0.7 65	480 105	NL 125	110 45	5 170	- 0.7	3 -	300 -
BH205	0.1 m	9/02/2021	<4	<0.4	**400**	<2	**1**	**7**	<0.1	**12**	**3**	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<0.05	<0.5	<0.05
			300 100	90 -	300 410	300 -	17000 130	600 1100	80 -	1200 55	30000 350	- -	- 120	40 180	230 -	- 1300	- 5600	0.6 65	390 105	NL 125	95 45	4 170	- 0.7	3 -	300 -
BH205	0.5 m	9/02/2021	<4	<0.4	**380**	<1	<1	**7**	**0.1**	**12**	**2**	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<0.05	<0.5	<0.05
			300 100	90 -	300 410	300 -	17000 95	600 1100	80 -	1200 30	30000 240	- -	- 120	50 180	280 -	- 1300	- 5600	0.7 65	480 105	NL 125	110 45	5 170	- 0.7	3 -	300 -
BH205	1 - 1.45 m	9/02/2021	<4	<0.4	**250**	2	<1	**5**	**0.1**	**3**	**1**	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<0.05	<0.5	<0.05
			300 100	90 -	300 410	300 -	17000 110	600 1100	80 -	1200 35	30000 220	- -	- 120	90 180	NL -	- 1300	- 5600	1 65	NL 105	NL 125	310 45	NL 170	- 0.7	3 -	300 -

Lab result

HIL/HSL value EIL/ESL value

HIL/HSL exceedance EIL/ESL exceedance HIL/HSL and EIL/ESL exceedance ML exceedance ML and HIL/HSL or EIL/ESL exceedance

Indicates that asbestos has been detected by the lab, refer to the lab report **Blue** = DC exceedance HSL 0-<1 Exceedance

Bold = Lab detections - = Not tested or No HIL/HSL/EIL/ESL (as applicable) or Not applicable NL = Non limiting AD = Asbestos detected NAD = No Asbestos detected

HIL = Health investigation level HSL = Health screening level (excluding DC) EIL = Ecological investigation level ESL = Ecological screening level ML = Management Limit DC = Direct Contact HSL

Notes:

b Reported naphthalene laboratory result obtained from BTEXN suite

Site Assessment Criteria (SAC):

Refer to the SAC section of report for information of SAC sources and rationale. Summary information as follows:

SAC based on generic land use thresholds for recreational landuse (HIL C), including secondary schools and residential landuse (HSL A/B)

HIL C	Recreational / Open Space (NEPC, 2013)
HSL A/B	Residential / Low - High Density (vapour intrusion) (NEPC, 2013)
DC HSL C	Direct contact HSL C Recreational /Open space (direct contact) (CRC CARE, 2011)
EIL/ESL UR/POS	Urban Residential and Public Open Space (NEPC, 2013)
ML R/P/POS	Residential, Parkland and Public Open Space (NEPC, 2013)

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Table B2: Summary of Laboratory Results – OCP, OPP, PCB, Asbestos

			OCP											OPP	PCB	Asbestos		
			DDD	DDT+DDE+DDD [c]	DDE	DDT	Aldrin & Deldrin	Total Chlordane	Endrin	Total Endosulfan	Heptachlor	Hexachlorobenzene	Methoxychlor	Chlorpyriphos	Total PCB	Asbestos ID in soil >0.1g/kg	Trace Analysis	Asbestos (50 g)
		PQL	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1			
Sample ID	Depth	Sample Date	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	-	-	-
BH201	0.05 m	8/02/2021	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NAD	NAD	NAD
			- -	400 180	- -	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	250 -	1 -			
BH201	0.5 m	8/02/2021	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NAD	NAD	NAD
			- -	400 180	- -	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	250 -	1 -			
BH201	1.5 - 1.95 m	8/02/2021	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NAD	NAD	NAD
			- -	400 180	- -	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	250 -	1 -			
BH202	0.05 m	8/02/2021	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NAD	NAD	NAD
			- -	400 180	- -	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	250 -	1 -			
BH202	0.7 - 1 m	8/02/2021	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NAD	NAD	NAD
			- -	400 180	- -	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	250 -	1 -			
BH202	3.5 - 4 m	8/02/2021	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NAD	NAD	NAD
			- -	400 180	- -	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	250 -	1 -			
BH203	0.5 m	9/02/2021	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NAD	NAD	NAD
			- -	400 180	- -	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	250 -	1 -			
BH203	1 m	9/02/2021	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NAD	NAD	NAD
			- -	400 180	- -	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	250 -	1 -			
BH203	2.5 - 2.95 m	9/02/2021	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NAD	NAD	NAD
			- -	400 180	- -	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	250 -	1 -			
BH204	0.3 m	9/02/2021	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NAD	NAD	NAD
			- -	400 180	- -	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	250 -	1 -			
BH205	0.1 m	9/02/2021	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NAD	NAD	NAD
			- -	400 180	- -	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	250 -	1 -			
BH205	0.5 m	9/02/2021	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NAD	NAD	NAD
			- -	400 180	- -	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	250 -	1 -			
BH205	1 - 1.45 m	9/02/2021	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NAD	NAD	NAD
			- -	400 180	- -	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	250 -	1 -			

Lab result
HIL/HSL value EIL/ESL value

HIL/HSL exceedance EIL/ESL exceedance HIL/HSL and EIL/ESL exceedance ML and HIL/HSL or EIL/ESL exceedance

Indicates that asbestos has been detected by the lab, refer to the lab report

Bold = Lab detections - = Not tested or No HIL/HSL/EIL/ESL (as applicable) or Not applicable AD = Asbestos detected NAD = No Asbestos detected

HIL = Health investigation level HSL = Health screening level (excluding DC) EIL = Ecological investigation level ESL = Ecological screening level ML = Management Limit DC = Direct Contact HSL

Notes:

[c] Criteria applies to DDT only

Site Assessment Criteria (SAC):

Refer to the SAC section of report for information of SAC sources and rationale. Summary information as follows:

SAC based on generic land use thresholds for recreational landuse (HIL C), including secondary schools and residential landuse (HSL A/B)

HIL C	Recreational / Open Space (NEPC, 2013)
HSL A/B	Residential / Low - High Density (vapour intrusion) (NEPC, 2013)
DC HSL C	Direct contact HSL C Recreational / Open space (direct contact) (CRC CARE, 2011)
EIL/ESL UR/POS	Urban Residential and Public Open Space (NEPC, 2013)
ML R/P/POS	Residential, Parkland and Public Open Space (NEPC, 2013)

Douglas Partners
Geotechnics / Environment / Groundwater

Table B3: Summary of Laboratory Results – Metals, TRH, BTEX, PAH, OCP, OPP, PCB, Asbestos - Preliminary Waste Classification

			Metals										TRH		BTEX						PAH																OCP		OPP	PCB	Asbestos		
			Arsenic	Cadmium	Total Chromium	Chromium (VI)	Copper	Lead	Mercury (inorganic)	Nickel	TCLP Nickel	Zinc	TRH C6 - C9	C10-C36 (Sum of total) hydrocarbons	Benzene	Toluene	Ethylbenzene	m+p-Xylene	o-Xylene	Xylenes (total)	Benz(a)pyrene (BaP)	Acenaphthene	Acenaphthylene	Anthracene	Benzo(a)anthracene	Benzo(b+j)fluoranthene	Benzo(g,h,i)perylene	Chrysene	Dibenz(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-cd)pyrene	Naphthalene	Phenanthrene	Pyrene	Total PAHs	Total Endosulfan	Total Analysed OCP	Total Analysed OPP	Total PCB	Asbestos ID in soil >0.1g/kg	Trace Analysis	Total Asbestos
		PQL	4	0.4	1	1	1	1	0.1	1	0.02	1	25	50	0.2	0.5	1	2	1	3	0.05	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.1	1	0.1	0.1	0.05	0.1	0.1	0.1	0.1			
Sample ID	Depth	Sample Date	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/l	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	-	-	-
BH201	0.05 m	8/02/2021	<4	<0.4	**150**	<2	**4**	**28**	<0.1	**12**	-	**26**	<25	<50	<0.2	<0.5	<1	<2	<1	<3	<0.05	<0.1	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<1	<0.1	<0.1	<0.05	<0.1	<0.1	<0.1	<0.1	**NAD**	**NAD**	**NAD**
BH201	0.5 m	8/02/2021	<4	<0.4	**340**	<2	**2**	**11**	<0.1	**10**	-	**5**	<25	<50	<0.2	<0.5	<1	<2	<1	<3	<0.05	<0.1	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<1	<0.1	<0.1	<0.05	<0.1	<0.1	<0.1	<0.1	**NAD**	**NAD**	**NAD**
BH201	1.5 - 1.95 m	8/02/2021	<4	<0.4	**62**	<1	**20**	**4**	<0.1	**22**	-	**13**	<25	<50	<0.2	<0.5	<1	<2	<1	<3	<0.05	<0.1	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<1	<0.1	<0.1	<0.05	<0.1	<0.1	<0.1	<0.1	**NAD**	**NAD**	**NAD**
BH202	0.05 m	8/02/2021	<4	<0.4	**530**	<2	**8**	**17**	**0.1**	**31**	-	**21**	<25	<50	<0.2	<0.5	<1	<2	<1	<3	<0.05	<0.1	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<1	<0.1	<0.1	<0.05	<0.1	<0.1	<0.1	<0.1	**NAD**	**NAD**	**NAD**
BH202	0.7 - 1 m	8/02/2021	<4	<0.4	**110**	<2	**3**	**8**	<0.1	<0.1	**55**	**0.03**	**4**	<25	<50	<0.2	<0.5	<1	<2	<1	<3	<0.05	<0.1	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<1	<0.1	<0.1	<0.05	<0.1	<0.1	<0.1	<0.1	**NAD**	**NAD**	**NAD**
BH202	3.5 - 4 m	8/02/2021	<4	<0.4	**210**	**1**	**4**	<1	**0.3**	**310**	**0.3**	**2**	<25	<50	<0.2	<0.5	<1	<2	<1	<3	<0.05	<0.1	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<1	<0.1	<0.1	<0.05	<0.1	<0.1	<0.1	<0.1	**NAD**	**NAD**	**NAD**
BH203	0.5 m	9/02/2021	<4	<0.4	**72**	<2	**2**	**15**	<0.1	**9**	-	**12**	<25	<50	<0.2	<0.5	<1	<2	<1	<3	<0.05	<0.1	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<1	<0.1	<0.1	<0.05	<0.1	<0.1	<0.1	<0.1	**NAD**	**NAD**	**NAD**
BH203	1 m	9/02/2021	<4	<0.4	**69**	<1	<1	**5**	<0.1	**1**	-	**1**	<25	<50	<0.2	<0.5	<1	<2	<1	<3	<0.05	<0.1	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<1	<0.1	<0.1	<0.05	<0.1	<0.1	<0.1	<0.1	**NAD**	**NAD**	**NAD**
BH203	2.5 - 2.95 m	9/02/2021	<4	<0.4	**27**	<1	**2**	**8**	<0.1	**4**	-	<1	<25	<50	<0.2	<0.5	<1	<2	<1	<3	<0.05	<0.1	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<1	<0.1	<0.1	<0.05	<0.1	<0.1	<0.1	<0.1	**NAD**	**NAD**	**NAD**
BH204	0.3 m	9/02/2021	<4	<0.4	**260**	<2	**380**	**6**	<0.1	**39**	-	**22**	<25	<50	<0.2	<0.5	<1	<2	<1	<3	<0.05	<0.1	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<1	<0.1	<0.1	<0.05	<0.1	<0.1	<0.1	<0.1	**NAD**	**NAD**	**NAD**
BH205	0.1 m	9/02/2021	<4	<0.4	**400**	<2	**1**	**7**	<0.1	**12**	-	**3**	<25	<50	<0.2	<0.5	<1	<2	<1	<3	<0.05	<0.1	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<1	<0.1	<0.1	<0.05	<0.1	<0.1	<0.1	<0.1	**NAD**	**NAD**	**NAD**
BH205	0.5 m	9/02/2021	<4	<0.4	**380**	<1	<1	**7**	**0.1**	**12**	-	**2**	<25	<50	<0.2	<0.5	<1	<2	<1	<3	<0.05	<0.1	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<1	<0.1	<0.1	<0.05	<0.1	<0.1	<0.1	<0.1	**NAD**	**NAD**	**NAD**
BH205	1 - 1.45 m	9/02/2021	<4	<0.4	**250**	**2**	<1	**5**	**0.1**	**3**	-	**1**	<25	<50	<0.2	<0.5	<1	<2	<1	<3	<0.05	<0.1	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<1	<0.1	<0.1	<0.05	<0.1	<0.1	<0.1	<0.1	**NAD**	**NAD**	**NAD**
BH203	0 m	9/02/2021	-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Summary Statistics																																										
Min			4	0.4	27	1	1	1	0.1	1	0.03	1	25	50	0.2	0.5	1	2	1	3	0.05	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.1	1	0.1	0.1	0.05	0.1	0.1	0.1	0.1	-	-	-
Max			4	0.4	530	2	380	28	0.3	310	0.3	26	25	50	0.2	0.5	1	2	1	3	0.05	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.1	1	0.1	0.1	0.05	0.1	0.1	0.1	0.1	-	-	-
Mean			4	0.4	220	2	33	9	0.1	40	0.16	9	25	50	0.2	0.5	1	2	1	3	0.05	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.1	1	0.1	0.1	0.05	0.1	0.1	0.1	0.1	-	-	-
Waste Classification Criteria [f]																																									
CT1			100	20	NC	100	NC	100	4	40	N/A	NC	650	10000	10	288	600	NC	NC	1000	0.8	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	200	60	<50	4	<50	NC	NC	NC
SCC1			500	100	NC	1900	NC	1500	50	1050	NA	NC	650	10000	18	518	1080	NC	NC	1800	10	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	200	108	<50	7.5	<50	NC	NC	NC
TCLP1			N/A	N/A	NC	N/A	NC	N/A	N/A	N/A	2	NC	N/A	N/A	N/A	N/A	N/A	NC	NC	N/A	N/A	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	N/A	N/A	N/A	N/A	N/A	NC	NC	NC
CT2			400	80	NC	400	NC	400	16	160	N/A	NC	2600	40000	40	1152	2400	NC	NC	4000	3.2	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	800	240	<50	16	<50	NC	NC	NC
SCC2			2000	400	NC	7600	NC	6000	200	4200	N/A	NC	2600	40000	72	2073	4320	NC	NC	7200	23	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	800	432	<50	30	<50	NC	NC	NC
TCLP2			N/A	N/A	NC	N/A	NC	N/A	N/A	N/A	8	NC	N/A	N/A	N/A	N/A	N/A	NC	NC	N/A	N/A	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	N/A	N/A	N/A	N/A	N/A	NC	NC	NC

CT1 exceedance | TCLP1 and/or SCC1 exceedance | CT2 exceedance | TCLP2 and/or SCC2 exceedance | Asbestos detection

NT = Not tested NL = Non limiting NC = No criteria NA = Not applicable

Notes:

a QA/QC replicate of sample listed directly below the primary sample

b Total chromium used as initial screen for chromium(VI).

c Total recoverable hydrocarbons (TRH) used as an initial screen for total petroleum hydrocarbons (TPH)

d Criteria for scheduled chemicals used as an initial screen

e Criteria for Chlorpyrifos used as initial screen

f All criteria are in the same units as the reported results

PQL Practical quantitation limit

CT1 NSW EPA, 2014, Waste Classification Guidelines Part 1; Classifying Waste, Maximum values of specific contaminant concentration (SCC) for classification without TCLP: General solid waste

SCC1 NSW EPA, 2014, Waste Classification Guidelines Part 1; Classifying Waste, Maximum values for leachable concentration (TCLP) and specific contaminant concentration (SCC) when used together: General solid waste

TCLP1 NSW EPA, 2014, Waste Classification Guidelines Part 1; Classifying Waste, Maximum values for leachable concentration (TCLP) and specific contaminant concentration (SCC) when used together: General solid waste

CT2 NSW EPA, 2014, Waste Classification Guidelines Part 1; Classifying Waste, Maximum values of specific contaminant concentration (SCC) for classification without TCLP: Restricted solid waste

SCC2 NSW EPA, 2014, Waste Classification Guidelines Part 1; Classifying Waste, Maximum values for leachable concentration (TCLP) and specific contaminant concentration (SCC) when used together: Restricted solid waste

TCLP2 NSW EPA, 2014, Waste Classification Guidelines Part 1; Classifying Waste, Maximum values for leachable concentration (TCLP) and specific contaminant concentration (SCC) when used together: Restricted solid waste

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CERTIFICATE OF ANALYSIS 261469

Client Details

Client	Douglas Partners Pty Ltd (Port Macquarie)
Attention	Chris Bozinovski, James Cudmore
Address	PO Box 5463, Port Macquarie, NSW, 2444

Sample Details

Your Reference	**89754.03, Port Macquarie**
Number of Samples	14 SOIL
Date samples received	11/02/2021
Date completed instructions received	11/02/2021

Analysis Details

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

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

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

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

Report Details

Date results requested by	12/02/2021
Date of Issue	12/02/2021

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Asbestos Approved By
Analysed by Asbestos Approved Identifier: Panika Wongchanda
Authorised by Asbestos Approved Signatory: Matt Mansfield

Results Approved By
Jaimie Loa-Kum-Cheung, Metals Supervisor
Matt Mansfield, QHSE manager
Priya Samarawickrama, Senior Chemist
Steven Luong, Organics Supervisor

Authorised By

Nancy Zhang, Laboratory Manager

vTRH(C6-C10)/BTEXN in Soil						
Our Reference		261469-1	261469-2	261469-3	261469-4	261469-5
Your Reference	UNITS	BH201	BH201	BH201	BH202	BH202
Depth		0.05	0.5	1.5-1.95	0.05	0.7-1.0
Date Sampled		8/02/2021	8/02/2021	8/02/2021	8/02/2021	8/02/2021
Type of sample		SOIL	SOIL	SOIL	SOIL	SOIL
Date extracted	-	11/02/2021	11/02/2021	11/02/2021	11/02/2021	11/02/2021
Date analysed	-	11/02/2021	11/02/2021	11/02/2021	11/02/2021	11/02/2021
TRH C_6 - C_9	mg/kg	<25	<25	<25	<25	<25
TRH C_6 - C_{10}	mg/kg	<25	<25	<25	<25	<25
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
naphthalene	mg/kg	<1	<1	<1	<1	<1
Total +ve Xylenes	mg/kg	<3	<3	<3	<3	<3
Surrogate aaa-Trifluorotoluene	%	92	93	109	89	107

vTRH(C6-C10)/BTEXN in Soil						
Our Reference		261469-6	261469-7	261469-8	261469-9	261469-10
Your Reference	UNITS	BH202	BH203	BH203	BH203	BH204
Depth		3.5-4.0	0.5	1.0	2.5-2.95	0.3
Date Sampled		8/02/2021	9/02/2021	9/02/2021	9/02/2021	9/02/2021
Type of sample		SOIL	SOIL	SOIL	SOIL	SOIL
Date extracted	-	11/02/2021	11/02/2021	11/02/2021	11/02/2021	11/02/2021
Date analysed	-	11/02/2021	11/02/2021	11/02/2021	11/02/2021	11/02/2021
TRH C_6 - C_9	mg/kg	<25	<25	<25	<25	<25
TRH C_6 - C_{10}	mg/kg	<25	<25	<25	<25	<25
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
naphthalene	mg/kg	<1	<1	<1	<1	<1
Total +ve Xylenes	mg/kg	<3	<3	<3	<3	<3
Surrogate aaa-Trifluorotoluene	%	102	110	102	99	103

vTRH(C6-C10)/BTEXN in Soil				
Our Reference		261469-11	261469-12	261469-13
Your Reference	UNITS	BH205	BH205	BH205
Depth		0.1	0.5	1.0-1.45
Date Sampled		9/02/2021	9/02/2021	9/02/2021
Type of sample		SOIL	SOIL	SOIL
Date extracted	-	11/02/2021	11/02/2021	11/02/2021
Date analysed	-	11/02/2021	11/02/2021	11/02/2021
TRH C_6 - C_9	mg/kg	<25	<25	<25
TRH C_6 - C_{10}	mg/kg	<25	<25	<25
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1
naphthalene	mg/kg	<1	<1	<1
Total +ve Xylenes	mg/kg	<3	<3	<3
Surrogate aaa-Trifluorotoluene	%	105	107	102

svTRH (C10-C40) in Soil						
Our Reference		261469-1	261469-2	261469-3	261469-4	261469-5
Your Reference	UNITS	BH201	BH201	BH201	BH202	BH202
Depth		0.05	0.5	1.5-1.95	0.05	0.7-1.0
Date Sampled		8/02/2021	8/02/2021	8/02/2021	8/02/2021	8/02/2021
Type of sample		SOIL	SOIL	SOIL	SOIL	SOIL
Date extracted	-	11/02/2021	11/02/2021	11/02/2021	11/02/2021	11/02/2021
Date analysed	-	12/02/2021	12/02/2021	12/02/2021	12/02/2021	12/02/2021
TRH C_{10} - C_{14}	mg/kg	<50	<50	<50	<50	<50
TRH C_{15} - C_{28}	mg/kg	<100	<100	<100	<100	<100
TRH C_{29} - C_{36}	mg/kg	<100	<100	<100	<100	<100
TRH >C_{10} -C_{16}	mg/kg	<50	<50	<50	<50	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	mg/kg	<50	<50	<50	<50	<50
TRH >C_{16} -C_{34}	mg/kg	<100	<100	<100	<100	<100
TRH >C_{34} -C_{40}	mg/kg	<100	<100	<100	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	<50	<50	<50	<50	<50
Surrogate o-Terphenyl	%	77	82	83	85	78

svTRH (C10-C40) in Soil						
Our Reference		261469-6	261469-7	261469-8	261469-9	261469-10
Your Reference	UNITS	BH202	BH203	BH203	BH203	BH204
Depth		3.5-4.0	0.5	1.0	2.5-2.95	0.3
Date Sampled		8/02/2021	9/02/2021	9/02/2021	9/02/2021	9/02/2021
Type of sample		SOIL	SOIL	SOIL	SOIL	SOIL
Date extracted	-	11/02/2021	11/02/2021	11/02/2021	11/02/2021	11/02/2021
Date analysed	-	12/02/2021	12/02/2021	12/02/2021	12/02/2021	12/02/2021
TRH C_{10} - C_{14}	mg/kg	<50	<50	<50	<50	<50
TRH C_{15} - C_{28}	mg/kg	<100	<100	<100	<100	<100
TRH C_{29} - C_{36}	mg/kg	<100	<100	<100	<100	<100
TRH >C_{10} -C_{16}	mg/kg	<50	<50	<50	<50	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	mg/kg	<50	<50	<50	<50	<50
TRH >C_{16} -C_{34}	mg/kg	<100	<100	<100	<100	<100
TRH >C_{34} -C_{40}	mg/kg	<100	<100	<100	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	<50	<50	<50	<50	<50
Surrogate o-Terphenyl	%	78	76	80	76	77

svTRH (C10-C40) in Soil				
Our Reference		261469-11	261469-12	261469-13
Your Reference	UNITS	BH205	BH205	BH205
Depth		0.1	0.5	1.0-1.45
Date Sampled		9/02/2021	9/02/2021	9/02/2021
Type of sample		SOIL	SOIL	SOIL
Date extracted	-	11/02/2021	11/02/2021	11/02/2021
Date analysed	-	12/02/2021	12/02/2021	12/02/2021
TRH C_{10} - C_{14}	mg/kg	<50	<50	<50
TRH C_{15} - C_{28}	mg/kg	<100	<100	<100
TRH C_{29} - C_{36}	mg/kg	<100	<100	<100
TRH >C_{10} -C_{16}	mg/kg	<50	<50	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	mg/kg	<50	<50	<50
TRH >C_{16} -C_{34}	mg/kg	<100	<100	<100
TRH >C_{34} -C_{40}	mg/kg	<100	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	<50	<50	<50
Surrogate o-Terphenyl	%	76	78	79

PAHs in Soil						
Our Reference		261469-1	261469-2	261469-3	261469-4	261469-5
Your Reference	UNITS	BH201	BH201	BH201	BH202	BH202
Depth		0.05	0.5	1.5-1.95	0.05	0.7-1.0
Date Sampled		8/02/2021	8/02/2021	8/02/2021	8/02/2021	8/02/2021
Type of sample		SOIL	SOIL	SOIL	SOIL	SOIL
Date extracted	-	11/02/2021	11/02/2021	11/02/2021	11/02/2021	11/02/2021
Date analysed	-	11/02/2021	11/02/2021	11/02/2021	11/02/2021	11/02/2021
Naphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b,j+k)fluoranthene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Benzo(a)pyrene	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve PAH's	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Surrogate p-Terphenyl-d14	%	97	101	102	103	100

PAHs in Soil						
Our Reference		261469-6	261469-7	261469-8	261469-9	261469-10
Your Reference	UNITS	BH202	BH203	BH203	BH203	BH204
Depth		3.5-4.0	0.5	1.0	2.5-2.95	0.3
Date Sampled		8/02/2021	9/02/2021	9/02/2021	9/02/2021	9/02/2021
Type of sample		SOIL	SOIL	SOIL	SOIL	SOIL
Date extracted	-	11/02/2021	11/02/2021	11/02/2021	11/02/2021	11/02/2021
Date analysed	-	11/02/2021	11/02/2021	11/02/2021	11/02/2021	11/02/2021
Naphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b,j+k)fluoranthene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Benzo(a)pyrene	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve PAH's	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Surrogate p-Terphenyl-d14	%	101	101	100	98	97

PAHs in Soil				
Our Reference		261469-11	261469-12	261469-13
Your Reference	UNITS	BH205	BH205	BH205
Depth		0.1	0.5	1.0-1.45
Date Sampled		9/02/2021	9/02/2021	9/02/2021
Type of sample		SOIL	SOIL	SOIL
Date extracted	-	11/02/2021	11/02/2021	11/02/2021
Date analysed	-	11/02/2021	11/02/2021	11/02/2021
Naphthalene	mg/kg	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	<0.1	<0.1	<0.1
Anthracene	mg/kg	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	<0.1	<0.1	<0.1
Pyrene	mg/kg	<0.1	<0.1	<0.1
Benzo(a)anthracene	mg/kg	<0.1	<0.1	<0.1
Chrysene	mg/kg	<0.1	<0.1	<0.1
Benzo(b,j+k)fluoranthene	mg/kg	<0.2	<0.2	<0.2
Benzo(a)pyrene	mg/kg	<0.05	<0.05	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	<0.1	<0.1
Total +ve PAH's	mg/kg	<0.05	<0.05	<0.05
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5	<0.5	<0.5
Surrogate p-Terphenyl-d14	%	99	103	100

Organochlorine Pesticides in soil						
Our Reference		261469-1	261469-2	261469-3	261469-4	261469-5
Your Reference	UNITS	BH201	BH201	BH201	BH202	BH202
Depth		0.05	0.5	1.5-1.95	0.05	0.7-1.0
Date Sampled		8/02/2021	8/02/2021	8/02/2021	8/02/2021	8/02/2021
Type of sample		SOIL	SOIL	SOIL	SOIL	SOIL
Date extracted	-	11/02/2021	11/02/2021	11/02/2021	11/02/2021	11/02/2021
Date analysed	-	11/02/2021	11/02/2021	11/02/2021	11/02/2021	11/02/2021
alpha-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
HCB	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
beta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
delta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor Epoxide	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-Chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
alpha-chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan I	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dieldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan II	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDD	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDT	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan Sulphate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve DDT+DDD+DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	102	107	106	106	104

Organochlorine Pesticides in soil						
Our Reference		261469-6	261469-7	261469-8	261469-9	261469-10
Your Reference	UNITS	BH202	BH203	BH203	BH203	BH204
Depth		3.5-4.0	0.5	1.0	2.5-2.95	0.3
Date Sampled		8/02/2021	9/02/2021	9/02/2021	9/02/2021	9/02/2021
Type of sample		SOIL	SOIL	SOIL	SOIL	SOIL
Date extracted	-	11/02/2021	11/02/2021	11/02/2021	11/02/2021	11/02/2021
Date analysed	-	11/02/2021	11/02/2021	11/02/2021	11/02/2021	11/02/2021
alpha-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
HCB	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
beta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
delta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor Epoxide	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-Chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
alpha-chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan I	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dieldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan II	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDD	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDT	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan Sulphate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve DDT+DDD+DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	105	101	102	100	101

Organochlorine Pesticides in soil				
Our Reference		261469-11	261469-12	261469-13
Your Reference	UNITS	BH205	BH205	BH205
Depth		0.1	0.5	1.0-1.45
Date Sampled		9/02/2021	9/02/2021	9/02/2021
Type of sample		SOIL	SOIL	SOIL
Date extracted	-	11/02/2021	11/02/2021	11/02/2021
Date analysed	-	11/02/2021	11/02/2021	11/02/2021
alpha-BHC	mg/kg	<0.1	<0.1	<0.1
HCB	mg/kg	<0.1	<0.1	<0.1
beta-BHC	mg/kg	<0.1	<0.1	<0.1
gamma-BHC	mg/kg	<0.1	<0.1	<0.1
Heptachlor	mg/kg	<0.1	<0.1	<0.1
delta-BHC	mg/kg	<0.1	<0.1	<0.1
Aldrin	mg/kg	<0.1	<0.1	<0.1
Heptachlor Epoxide	mg/kg	<0.1	<0.1	<0.1
gamma-Chlordane	mg/kg	<0.1	<0.1	<0.1
alpha-chlordane	mg/kg	<0.1	<0.1	<0.1
Endosulfan I	mg/kg	<0.1	<0.1	<0.1
pp-DDE	mg/kg	<0.1	<0.1	<0.1
Dieldrin	mg/kg	<0.1	<0.1	<0.1
Endrin	mg/kg	<0.1	<0.1	<0.1
Endosulfan II	mg/kg	<0.1	<0.1	<0.1
pp-DDD	mg/kg	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	<0.1	<0.1	<0.1
pp-DDT	mg/kg	<0.1	<0.1	<0.1
Endosulfan Sulphate	mg/kg	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	<0.1	<0.1	<0.1
Total +ve DDT+DDD+DDE	mg/kg	<0.1	<0.1	<0.1
Surrogate TCMX	%	102	106	103

Organophosphorus Pesticides in Soil						
Our Reference		261469-1	261469-2	261469-3	261469-4	261469-5
Your Reference	UNITS	BH201	BH201	BH201	BH202	BH202
Depth		0.05	0.5	1.5-1.95	0.05	0.7-1.0
Date Sampled		8/02/2021	8/02/2021	8/02/2021	8/02/2021	8/02/2021
Type of sample		SOIL	SOIL	SOIL	SOIL	SOIL
Date extracted	-	11/02/2021	11/02/2021	11/02/2021	11/02/2021	11/02/2021
Date analysed	-	11/02/2021	11/02/2021	11/02/2021	11/02/2021	11/02/2021
Dichlorvos	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dimethoate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Diazinon	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyriphos-methyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ronnel	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fenitrothion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Malathion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyriphos	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Parathion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Bromophos-ethyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ethion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Azinphos-methyl (Guthion)	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	102	107	106	106	104

Organophosphorus Pesticides in Soil						
Our Reference		261469-6	261469-7	261469-8	261469-9	261469-10
Your Reference	UNITS	BH202	BH203	BH203	BH203	BH204
Depth		3.5-4.0	0.5	1.0	2.5-2.95	0.3
Date Sampled		8/02/2021	9/02/2021	9/02/2021	9/02/2021	9/02/2021
Type of sample		SOIL	SOIL	SOIL	SOIL	SOIL
Date extracted	-	11/02/2021	11/02/2021	11/02/2021	11/02/2021	11/02/2021
Date analysed	-	11/02/2021	11/02/2021	11/02/2021	11/02/2021	11/02/2021
Dichlorvos	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dimethoate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Diazinon	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyriphos-methyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ronnel	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fenitrothion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Malathion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyriphos	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Parathion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Bromophos-ethyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ethion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Azinphos-methyl (Guthion)	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	105	101	102	100	101

Organophosphorus Pesticides in Soil				
Our Reference		261469-11	261469-12	261469-13
Your Reference	UNITS	BH205	BH205	BH205
Depth		0.1	0.5	1.0-1.45
Date Sampled		9/02/2021	9/02/2021	9/02/2021
Type of sample		SOIL	SOIL	SOIL
Date extracted	-	11/02/2021	11/02/2021	11/02/2021
Date analysed	-	11/02/2021	11/02/2021	11/02/2021
Dichlorvos	mg/kg	<0.1	<0.1	<0.1
Dimethoate	mg/kg	<0.1	<0.1	<0.1
Diazinon	mg/kg	<0.1	<0.1	<0.1
Chlorpyriphos-methyl	mg/kg	<0.1	<0.1	<0.1
Ronnel	mg/kg	<0.1	<0.1	<0.1
Fenitrothion	mg/kg	<0.1	<0.1	<0.1
Malathion	mg/kg	<0.1	<0.1	<0.1
Chlorpyriphos	mg/kg	<0.1	<0.1	<0.1
Parathion	mg/kg	<0.1	<0.1	<0.1
Bromophos-ethyl	mg/kg	<0.1	<0.1	<0.1
Ethion	mg/kg	<0.1	<0.1	<0.1
Azinphos-methyl (Guthion)	mg/kg	<0.1	<0.1	<0.1
Surrogate TCMX	%	102	106	103

PCBs in Soil						
Our Reference		261469-1	261469-2	261469-3	261469-4	261469-5
Your Reference	UNITS	BH201	BH201	BH201	BH202	BH202
Depth		0.05	0.5	1.5-1.95	0.05	0.7-1.0
Date Sampled		8/02/2021	8/02/2021	8/02/2021	8/02/2021	8/02/2021
Type of sample		SOIL	SOIL	SOIL	SOIL	SOIL
Date extracted	-	11/02/2021	11/02/2021	11/02/2021	11/02/2021	11/02/2021
Date analysed	-	11/02/2021	11/02/2021	11/02/2021	11/02/2021	11/02/2021
Aroclor 1016	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1221	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1232	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1242	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1248	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1254	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1260	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve PCBs (1016-1260)	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	102	107	106	106	104

PCBs in Soil						
Our Reference		261469-6	261469-7	261469-8	261469-9	261469-10
Your Reference	UNITS	BH202	BH203	BH203	BH203	BH204
Depth		3.5-4.0	0.5	1.0	2.5-2.95	0.3
Date Sampled		8/02/2021	9/02/2021	9/02/2021	9/02/2021	9/02/2021
Type of sample		SOIL	SOIL	SOIL	SOIL	SOIL
Date extracted	-	11/02/2021	11/02/2021	11/02/2021	11/02/2021	11/02/2021
Date analysed	-	11/02/2021	11/02/2021	11/02/2021	11/02/2021	11/02/2021
Aroclor 1016	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1221	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1232	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1242	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1248	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1254	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1260	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve PCBs (1016-1260)	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	105	101	102	100	101

PCBs in Soil				
Our Reference		261469-11	261469-12	261469-13
Your Reference	UNITS	BH205	BH205	BH205
Depth		0.1	0.5	1.0-1.45
Date Sampled		9/02/2021	9/02/2021	9/02/2021
Type of sample		SOIL	SOIL	SOIL
Date extracted	-	11/02/2021	11/02/2021	11/02/2021
Date analysed	-	11/02/2021	11/02/2021	11/02/2021
Aroclor 1016	mg/kg	<0.1	<0.1	<0.1
Aroclor 1221	mg/kg	<0.1	<0.1	<0.1
Aroclor 1232	mg/kg	<0.1	<0.1	<0.1
Aroclor 1242	mg/kg	<0.1	<0.1	<0.1
Aroclor 1248	mg/kg	<0.1	<0.1	<0.1
Aroclor 1254	mg/kg	<0.1	<0.1	<0.1
Aroclor 1260	mg/kg	<0.1	<0.1	<0.1
Total +ve PCBs (1016-1260)	mg/kg	<0.1	<0.1	<0.1
Surrogate TCMX	%	102	106	103

Acid Extractable metals in soil						
Our Reference		261469-1	261469-2	261469-3	261469-4	261469-5
Your Reference	UNITS	BH201	BH201	BH201	BH202	BH202
Depth		0.05	0.5	1.5-1.95	0.05	0.7-1.0
Date Sampled		8/02/2021	8/02/2021	8/02/2021	8/02/2021	8/02/2021
Type of sample		SOIL	SOIL	SOIL	SOIL	SOIL
Date prepared	-	12/02/2021	12/02/2021	12/02/2021	12/02/2021	12/02/2021
Date analysed	-	12/02/2021	12/02/2021	12/02/2021	12/02/2021	12/02/2021
Arsenic	mg/kg	<4	<4	<4	<4	<4
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	150	340	62	530	110
Copper	mg/kg	4	2	20	8	3
Lead	mg/kg	28	11	4	17	8
Mercury	mg/kg	<0.1	<0.1	<0.1	0.1	<0.1
Nickel	mg/kg	12	10	22	31	50
Zinc	mg/kg	26	5	13	21	4

Acid Extractable metals in soil						
Our Reference		261469-6	261469-7	261469-8	261469-9	261469-10
Your Reference	UNITS	BH202	BH203	BH203	BH203	BH204
Depth		3.5-4.0	0.5	1.0	2.5-2.95	0.3
Date Sampled		8/02/2021	9/02/2021	9/02/2021	9/02/2021	9/02/2021
Type of sample		SOIL	SOIL	SOIL	SOIL	SOIL
Date prepared	-	12/02/2021	12/02/2021	12/02/2021	12/02/2021	12/02/2021
Date analysed	-	12/02/2021	12/02/2021	12/02/2021	12/02/2021	12/02/2021
Arsenic	mg/kg	<4	<4	<4	<4	<4
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	210	72	69	27	260
Copper	mg/kg	4	2	<1	2	380
Lead	mg/kg	<1	15	5	8	6
Mercury	mg/kg	0.3	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	310	9	1	4	39
Zinc	mg/kg	2	12	1	<1	22

Acid Extractable metals in soil				
Our Reference		261469-11	261469-12	261469-13
Your Reference	UNITS	BH205	BH205	BH205
Depth		0.1	0.5	1.0-1.45
Date Sampled		9/02/2021	9/02/2021	9/02/2021
Type of sample		SOIL	SOIL	SOIL
Date prepared	-	12/02/2021	12/02/2021	12/02/2021
Date analysed	-	12/02/2021	12/02/2021	12/02/2021
Arsenic	mg/kg	<4	<4	<4
Cadmium	mg/kg	<0.4	<0.4	<0.4
Chromium	mg/kg	400	380	250
Copper	mg/kg	1	<1	<1
Lead	mg/kg	7	7	5
Mercury	mg/kg	<0.1	0.1	0.1
Nickel	mg/kg	12	12	3
Zinc	mg/kg	3	2	1

Moisture						
Our Reference		261469-1	261469-2	261469-3	261469-4	261469-5
Your Reference	UNITS	BH201	BH201	BH201	BH202	BH202
Depth		0.05	0.5	1.5-1.95	0.05	0.7-1.0
Date Sampled		8/02/2021	8/02/2021	8/02/2021	8/02/2021	8/02/2021
Type of sample		SOIL	SOIL	SOIL	SOIL	SOIL
Date prepared	-	11/02/2021	11/02/2021	11/02/2021	11/02/2021	11/02/2021
Date analysed	-	12/02/2021	12/02/2021	12/02/2021	12/02/2021	12/02/2021
Moisture	%	22	18	28	21	23

Moisture						
Our Reference		261469-6	261469-7	261469-8	261469-9	261469-10
Your Reference	UNITS	BH202	BH203	BH203	BH203	BH204
Depth		3.5-4.0	0.5	1.0	2.5-2.95	0.3
Date Sampled		8/02/2021	9/02/2021	9/02/2021	9/02/2021	9/02/2021
Type of sample		SOIL	SOIL	SOIL	SOIL	SOIL
Date prepared	-	11/02/2021	11/02/2021	11/02/2021	11/02/2021	11/02/2021
Date analysed	-	12/02/2021	12/02/2021	12/02/2021	12/02/2021	12/02/2021
Moisture	%	17	11	25	22	22

Moisture				
Our Reference		261469-11	261469-12	261469-13
Your Reference	UNITS	BH205	BH205	BH205
Depth		0.1	0.5	1.0-1.45
Date Sampled		9/02/2021	9/02/2021	9/02/2021
Type of sample		SOIL	SOIL	SOIL
Date prepared	-	11/02/2021	11/02/2021	11/02/2021
Date analysed	-	12/02/2021	12/02/2021	12/02/2021
Moisture	%	14	19	25

Asbestos ID - soils						
Our Reference		261469-1	261469-2	261469-3	261469-4	261469-5
Your Reference	UNITS	BH201	BH201	BH201	BH202	BH202
Depth		0.05	0.5	1.5-1.95	0.05	0.7-1.0
Date Sampled		8/02/2021	8/02/2021	8/02/2021	8/02/2021	8/02/2021
Type of sample		SOIL	SOIL	SOIL	SOIL	SOIL
Date analysed	-	12/02/2021	12/02/2021	12/02/2021	12/02/2021	12/02/2021
Sample mass tested	g	Approx. 45g	Approx. 40g	Approx. 30g	Approx. 40g	Approx. 50g
Sample Description	-	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks	Brown clayey soil & rocks	Red coarse-grained soil & rocks	Brown coarse-grained soil & rocks
Asbestos ID in soil	-	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected
Trace Analysis	-	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected

Asbestos ID - soils						
Our Reference		261469-6	261469-7	261469-8	261469-9	261469-10
Your Reference	UNITS	BH202	BH203	BH203	BH203	BH204
Depth		3.5-4.0	0.5	1.0	2.5-2.95	0.3
Date Sampled		8/02/2021	9/02/2021	9/02/2021	9/02/2021	9/02/2021
Type of sample		SOIL	SOIL	SOIL	SOIL	SOIL
Date analysed	-	12/02/2021	12/02/2021	12/02/2021	12/02/2021	12/02/2021
Sample mass tested	g	Approx. 65g	Approx. 60g	Approx. 40g	Approx. 35g	Approx. 70g
Sample Description	-	Grey clayey soil & rocks	Beige clayey soil & rocks	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks
Asbestos ID in soil	-	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected
Trace Analysis	-	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected

Asbestos ID - soils				
Our Reference		261469-11	261469-12	261469-13
Your Reference	UNITS	BH205	BH205	BH205
Depth		0.1	0.5	1.0-1.45
Date Sampled		9/02/2021	9/02/2021	9/02/2021
Type of sample		SOIL	SOIL	SOIL
Date analysed	-	12/02/2021	12/02/2021	12/02/2021
Sample mass tested	g	Approx. 50g	Approx. 50g	Approx. 45g
Sample Description	-	Brown fine-grained soil & rocks	Brown clayey soil & rocks	Brown clayey soil & rocks
Asbestos ID in soil	-	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected
Trace Analysis	-	No asbestos detected	No asbestos detected	No asbestos detected

Misc Inorg - Soil						
Our Reference		261469-1	261469-2	261469-3	261469-4	261469-5
Your Reference	UNITS	BH201	BH201	BH201	BH202	BH202
Depth		0.05	0.5	1.5-1.95	0.05	0.7-1.0
Date Sampled		8/02/2021	8/02/2021	8/02/2021	8/02/2021	8/02/2021
Type of sample		SOIL	SOIL	SOIL	SOIL	SOIL
Date prepared	-	12/02/2021	12/02/2021	12/02/2021	12/02/2021	12/02/2021
Date analysed	-	12/02/2021	12/02/2021	12/02/2021	12/02/2021	12/02/2021
pH 1:5 soil:water	pH Units	5.6	5.5	5.3	6.1	5.5
Electrical Conductivity 1:5 soil:water	µS/cm	33	31	190	35	40

Misc Inorg - Soil						
Our Reference		261469-6	261469-7	261469-8	261469-9	261469-10
Your Reference	UNITS	BH202	BH203	BH203	BH203	BH204
Depth		3.5-4.0	0.5	1.0	2.5-2.95	0.3
Date Sampled		8/02/2021	9/02/2021	9/02/2021	9/02/2021	9/02/2021
Type of sample		SOIL	SOIL	SOIL	SOIL	SOIL
Date prepared	-	12/02/2021	12/02/2021	12/02/2021	12/02/2021	12/02/2021
Date analysed	-	12/02/2021	12/02/2021	12/02/2021	12/02/2021	12/02/2021
pH 1:5 soil:water	pH Units	7.6	7.0	4.1	4.3	9.9
Electrical Conductivity 1:5 soil:water	µS/cm	29	22	150	92	200

Misc Inorg - Soil				
Our Reference		261469-11	261469-12	261469-13
Your Reference	UNITS	BH205	BH205	BH205
Depth		0.1	0.5	1.0-1.45
Date Sampled		9/02/2021	9/02/2021	9/02/2021
Type of sample		SOIL	SOIL	SOIL
Date prepared	-	12/02/2021	12/02/2021	12/02/2021
Date analysed	-	12/02/2021	12/02/2021	12/02/2021
pH 1:5 soil:water	pH Units	6.3	5.5	5.1
Electrical Conductivity 1:5 soil:water	µS/cm	160	78	89

ESP/CEC						
Our Reference		261469-1	261469-2	261469-3	261469-4	261469-5
Your Reference	UNITS	BH201	BH201	BH201	BH202	BH202
Depth		0.05	0.5	1.5-1.95	0.05	0.7-1.0
Date Sampled		8/02/2021	8/02/2021	8/02/2021	8/02/2021	8/02/2021
Type of sample		SOIL	SOIL	SOIL	SOIL	SOIL
Date prepared	-	12/02/2021	12/02/2021	12/02/2021	12/02/2021	12/02/2021
Date analysed	-	12/02/2021	12/02/2021	12/02/2021	12/02/2021	12/02/2021
Exchangeable Ca	meq/100g	2.6	1.9	0.8	2.8	1.9
Exchangeable K	meq/100g	0.2	0.1	<0.1	0.2	<0.1
Exchangeable Mg	meq/100g	2.8	2.0	7.5	1.7	1.8
Exchangeable Na	meq/100g	<0.1	<0.1	1.1	<0.1	0.11
Cation Exchange Capacity	meq/100g	5.7	4.1	9.5	4.7	3.9
ESP	%	[NT]	[NT]	11	[NT]	3

ESP/CEC						
Our Reference		261469-6	261469-7	261469-8	261469-9	261469-10
Your Reference	UNITS	BH202	BH203	BH203	BH203	BH204
Depth		3.5-4.0	0.5	1.0	2.5-2.95	0.3
Date Sampled		8/02/2021	9/02/2021	9/02/2021	9/02/2021	9/02/2021
Type of sample		SOIL	SOIL	SOIL	SOIL	SOIL
Date prepared	-	12/02/2021	12/02/2021	12/02/2021	12/02/2021	12/02/2021
Date analysed	-	12/02/2021	12/02/2021	12/02/2021	12/02/2021	12/02/2021
Exchangeable Ca	meq/100g	1.5	3.4	1.1	0.1	37
Exchangeable K	meq/100g	<0.1	<0.1	<0.1	<0.1	0.1
Exchangeable Mg	meq/100g	14	0.87	2.5	1.8	0.57
Exchangeable Na	meq/100g	1.4	<0.1	0.34	0.17	0.11
Cation Exchange Capacity	meq/100g	17	4.4	4.0	2.2	38
ESP	%	8	[NT]	8	8	<1

ESP/CEC				
Our Reference		261469-11	261469-12	261469-13
Your Reference	UNITS	BH205	BH205	BH205
Depth		0.1	0.5	1.0-1.45
Date Sampled		9/02/2021	9/02/2021	9/02/2021
Type of sample		SOIL	SOIL	SOIL
Date prepared	-	12/02/2021	12/02/2021	12/02/2021
Date analysed	-	12/02/2021	12/02/2021	12/02/2021
Exchangeable Ca	meq/100g	4.8	1.8	0.9
Exchangeable K	meq/100g	<0.1	<0.1	<0.1
Exchangeable Mg	meq/100g	1.0	2.2	3.8
Exchangeable Na	meq/100g	0.24	0.23	0.25
Cation Exchange Capacity	meq/100g	6.1	4.3	5.0
ESP	%	4	5	5

Misc Soil - Inorg						
Our Reference		261469-1	261469-2	261469-3	261469-4	261469-5
Your Reference	UNITS	BH201	BH201	BH201	BH202	BH202
Depth		0.05	0.5	1.5-1.95	0.05	0.7-1.0
Date Sampled		8/02/2021	8/02/2021	8/02/2021	8/02/2021	8/02/2021
Type of sample		SOIL	SOIL	SOIL	SOIL	SOIL
Date prepared	-	12/02/2021	12/02/2021	12/02/2021	12/02/2021	12/02/2021
Date analysed	-	12/02/2021	12/02/2021	12/02/2021	12/02/2021	12/02/2021
Hexavalent Chromium, Cr^{6+}	mg/kg	<2	<2	<1	<2	<2

Misc Soil - Inorg						
Our Reference		261469-6	261469-7	261469-8	261469-9	261469-10
Your Reference	UNITS	BH202	BH203	BH203	BH203	BH204
Depth		3.5-4.0	0.5	1.0	2.5-2.95	0.3
Date Sampled		8/02/2021	9/02/2021	9/02/2021	9/02/2021	9/02/2021
Type of sample		SOIL	SOIL	SOIL	SOIL	SOIL
Date prepared	-	12/02/2021	12/02/2021	12/02/2021	12/02/2021	12/02/2021
Date analysed	-	12/02/2021	12/02/2021	12/02/2021	12/02/2021	12/02/2021
Hexavalent Chromium, Cr^{6+}	mg/kg	1	<2	<1	<1	<2

Misc Soil - Inorg				
Our Reference		261469-11	261469-12	261469-13
Your Reference	UNITS	BH205	BH205	BH205
Depth		0.1	0.5	1.0-1.45
Date Sampled		9/02/2021	9/02/2021	9/02/2021
Type of sample		SOIL	SOIL	SOIL
Date prepared	-	12/02/2021	12/02/2021	12/02/2021
Date analysed	-	12/02/2021	12/02/2021	12/02/2021
Hexavalent Chromium, Cr^{6+}	mg/kg	<2	<1	2

Method ID	Methodology Summary
ASB-001	Asbestos ID - Qualitative identification of asbestos in bulk samples using Polarised Light Microscopy and Dispersion Staining Techniques including Synthetic Mineral Fibre and Organic Fibre as per Australian Standard 4964-2004.
Inorg-001	pH - Measured using pH meter and electrode in accordance with APHA latest edition, 4500-H+. Please note that the results for water analyses are indicative only, as analysis outside of the APHA storage times.
Inorg-002	Conductivity and Salinity - measured using a conductivity cell at 25°C in accordance with APHA latest edition 2510 and Rayment & Lyons.
Inorg-008	Moisture content determined by heating at 105+/-5 °C for a minimum of 12 hours.
Inorg-024	Hexavalent Chromium (Cr6+) - determined colourimetrically. Waters samples are filtered on receipt prior to analysis.
Metals-020	Determination of various metals by ICP-AES.
Metals-020	Determination of exchangeable cations and cation exchange capacity in soils using 1M Ammonium Chloride exchange and ICP-AES analytical finish.
Metals-021	Determination of Mercury by Cold Vapour AAS.
Org-020	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis.
Org-020	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis. Note, the Total +ve TRH PQL is reflective of the lowest individual PQL and is therefore "Total +ve TRH" is simply a sum of the positive individual TRH fractions (>C10-C40).
Org-021	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-ECD.
Org-021	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-ECD. Note, the Total +ve PCBs PQL is reflective of the lowest individual PQL and is therefore" Total +ve PCBs" is simply a sum of the positive individual PCBs.
Org-022	Determination of VOCs sampled onto coconut shell charcoal sorbent tubes, that can be desorbed using carbon disulphide, and analysed by GC-MS.
Org-022/025	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS/GC-MSMS.

Method ID	Methodology Summary
Org-022/025	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-MS/GC-MSMS. Note, the Total +ve reported DDD+DDE+DDT PQL is reflective of the lowest individual PQL and is therefore simply a sum of the positive individually report DDD+DDE+DDT.
Org-022/025	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS and/or GC-MS/MS. Benzo(a)pyrene TEQ as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater - 2013. For soil results:- 1. 'EQ PQL'values are assuming all contributing PAHs reported as <PQL are actually at the PQL. This is the most conservative approach and can give false positive TEQs given that PAHs that contribute to the TEQ calculation may not be present. 2. 'EQ zero'values are assuming all contributing PAHs reported as <PQL are zero. This is the least conservative approach and is more susceptible to false negative TEQs when PAHs that contribute to the TEQ calculation are present but below PQL. 3. 'EQ half PQL'values are assuming all contributing PAHs reported as <PQL are half the stipulated PQL. Hence a mid-point between the most and least conservative approaches above. Note, the Total +ve PAHs PQL is reflective of the lowest individual PQL and is therefore "Total +ve PAHs" is simply a sum of the positive individual PAHs.
Org-023	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS.
Org-023	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater.
Org-023	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater. Note, the Total +ve Xylene PQL is reflective of the lowest individual PQL and is therefore "Total +ve Xylenes" is simply a sum of the positive individual Xylenes.

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-17	261469-2
Date extracted	-			11/02/2021	1	11/02/2021	11/02/2021		11/02/2021	11/02/2021
Date analysed	-			11/02/2021	1	11/02/2021	11/02/2021		11/02/2021	11/02/2021
TRH C_6 - C_9	mg/kg	25	Org-023	<25	1	<25	<25	0	102	91
TRH C_6 - C_{10}	mg/kg	25	Org-023	<25	1	<25	<25	0	102	91
Benzene	mg/kg	0.2	Org-023	<0.2	1	<0.2	<0.2	0	107	94
Toluene	mg/kg	0.5	Org-023	<0.5	1	<0.5	<0.5	0	117	105
Ethylbenzene	mg/kg	1	Org-023	<1	1	<1	<1	0	95	84
m+p-xylene	mg/kg	2	Org-023	<2	1	<2	<2	0	96	85
o-Xylene	mg/kg	1	Org-023	<1	1	<1	<1	0	103	90
naphthalene	mg/kg	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
Surrogate aaa-Trifluorotoluene	%		Org-023	110	1	92	99	7	111	101

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	11	11/02/2021	11/02/2021		[NT]	[NT]
Date analysed	-			[NT]	11	11/02/2021	11/02/2021		[NT]	[NT]
TRH C_6 - C_9	mg/kg	25	Org-023	[NT]	11	<25	<25	0	[NT]	[NT]
TRH C_6 - C_{10}	mg/kg	25	Org-023	[NT]	11	<25	<25	0	[NT]	[NT]
Benzene	mg/kg	0.2	Org-023	[NT]	11	<0.2	<0.2	0	[NT]	[NT]
Toluene	mg/kg	0.5	Org-023	[NT]	11	<0.5	<0.5	0	[NT]	[NT]
Ethylbenzene	mg/kg	1	Org-023	[NT]	11	<1	<1	0	[NT]	[NT]
m+p-xylene	mg/kg	2	Org-023	[NT]	11	<2	<2	0	[NT]	[NT]
o-Xylene	mg/kg	1	Org-023	[NT]	11	<1	<1	0	[NT]	[NT]
naphthalene	mg/kg	1	Org-023	[NT]	11	<1	<1	0	[NT]	[NT]
Surrogate aaa-Trifluorotoluene	%		Org-023	[NT]	11	105	103	2	[NT]	[NT]

QUALITY CONTROL: svTRH (C10-C40) in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-17	261469-2
Date extracted	-			11/02/2021	1	11/02/2021	11/02/2021		11/02/2021	11/02/2021
Date analysed	-			12/02/2021	1	12/02/2021	12/02/2021		12/02/2021	12/02/2021
TRH C_{10} - C_{14}	mg/kg	50	Org-020	<50	1	<50	<50	0	125	115
TRH C_{15} - C_{28}	mg/kg	100	Org-020	<100	1	<100	<100	0	102	94
TRH C_{29} - C_{36}	mg/kg	100	Org-020	<100	1	<100	<100	0	77	77
TRH >C_{10} -C_{16}	mg/kg	50	Org-020	<50	1	<50	<50	0	125	115
TRH >C_{16} -C_{34}	mg/kg	100	Org-020	<100	1	<100	<100	0	102	94
TRH >C_{34} -C_{40}	mg/kg	100	Org-020	<100	1	<100	<100	0	77	77
Surrogate o-Terphenyl	%		Org-020	81	1	77	83	8	121	82

QUALITY CONTROL: svTRH (C10-C40) in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	11	11/02/2021	11/02/2021		[NT]	[NT]
Date analysed	-			[NT]	11	12/02/2021	12/02/2021		[NT]	[NT]
TRH C_{10} - C_{14}	mg/kg	50	Org-020	[NT]	11	<50	<50	0	[NT]	[NT]
TRH C_{15} - C_{28}	mg/kg	100	Org-020	[NT]	11	<100	<100	0	[NT]	[NT]
TRH C_{29} - C_{36}	mg/kg	100	Org-020	[NT]	11	<100	<100	0	[NT]	[NT]
TRH >C_{10} -C_{16}	mg/kg	50	Org-020	[NT]	11	<50	<50	0	[NT]	[NT]
TRH >C_{16} -C_{34}	mg/kg	100	Org-020	[NT]	11	<100	<100	0	[NT]	[NT]
TRH >C_{34} -C_{40}	mg/kg	100	Org-020	[NT]	11	<100	<100	0	[NT]	[NT]
Surrogate o-Terphenyl	%		Org-020	[NT]	11	76	77	1	[NT]	[NT]

QUALITY CONTROL: PAHs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-17	261469-2
Date extracted	-			11/02/2021	1	11/02/2021	11/02/2021		11/02/2021	11/02/2021
Date analysed	-			11/02/2021	1	11/02/2021	11/02/2021		11/02/2021	11/02/2021
Naphthalene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	101	101
Acenaphthylene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Acenaphthene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	109	109
Fluorene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	102	104
Phenanthrene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	105	105
Anthracene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Fluoranthene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	105	109
Pyrene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	104	109
Benzo(a)anthracene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Chrysene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	112	116
Benzo(b,j+k)fluoranthene	mg/kg	0.2	Org-022/025	<0.2	1	<0.2	<0.2	0	[NT]	[NT]
Benzo(a)pyrene	mg/kg	0.05	Org-022/025	<0.05	1	<0.05	<0.05	0	85	93
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-022/025	97	1	97	100	3	98	101

QUALITY CONTROL: PAHs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	11	11/02/2021	11/02/2021		[NT]	[NT]
Date analysed	-			[NT]	11	11/02/2021	11/02/2021		[NT]	[NT]
Naphthalene	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Acenaphthylene	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Acenaphthene	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Fluorene	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Phenanthrene	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Anthracene	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Fluoranthene	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Pyrene	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Benzo(a)anthracene	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Chrysene	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Benzo(b,j+k)fluoranthene	mg/kg	0.2	Org-022/025	[NT]	11	<0.2	<0.2	0	[NT]	[NT]
Benzo(a)pyrene	mg/kg	0.05	Org-022/025	[NT]	11	<0.05	<0.05	0	[NT]	[NT]
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-022/025	[NT]	11	99	101	2	[NT]	[NT]

QUALITY CONTROL: Organochlorine Pesticides in soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-17	261469-2
Date extracted	-			11/02/2021	1	11/02/2021	11/02/2021		11/02/2021	11/02/2021
Date analysed	-			11/02/2021	1	11/02/2021	11/02/2021		11/02/2021	11/02/2021
alpha-BHC	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	104	101
HCB	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
beta-BHC	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	98	96
gamma-BHC	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Heptachlor	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	107	81
delta-BHC	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aldrin	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	110	114
Heptachlor Epoxide	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	107	103
gamma-Chlordane	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
alpha-chlordane	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Endosulfan I	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
pp-DDE	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	106	109
Dieldrin	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	109	111
Endrin	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	100	105
Endosulfan II	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
pp-DDD	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	92	97
Endrin Aldehyde	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
pp-DDT	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Endosulfan Sulphate	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	107	114
Methoxychlor	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-022/025	104	1	102	105	3	105	106

QUALITY CONTROL: Organochlorine Pesticides in soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	11	11/02/2021	11/02/2021		[NT]	[NT]
Date analysed	-			[NT]	11	11/02/2021	11/02/2021		[NT]	[NT]
alpha-BHC	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
HCB	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
beta-BHC	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
gamma-BHC	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Heptachlor	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
delta-BHC	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Aldrin	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Heptachlor Epoxide	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
gamma-Chlordane	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
alpha-chlordane	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Endosulfan I	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
pp-DDE	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Dieldrin	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Endrin	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Endosulfan II	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
pp-DDD	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Endrin Aldehyde	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
pp-DDT	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Endosulfan Sulphate	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Methoxychlor	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-022/025	[NT]	11	102	107	5	[NT]	[NT]

QUALITY CONTROL: Organophosphorus Pesticides in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-17	261469-2
Date extracted	-			11/02/2021	1	11/02/2021	11/02/2021		11/02/2021	11/02/2021
Date analysed	-			11/02/2021	1	11/02/2021	11/02/2021		11/02/2021	11/02/2021
Dichlorvos	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	102	96
Dimethoate	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Diazinon	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Chlorpyriphos-methyl	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Ronnel	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	104	107
Fenitrothion	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	89	103
Malathion	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	124	129
Chlorpyriphos	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	109	115
Parathion	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	80	88
Bromophos-ethyl	mg/kg	0.1	Org-022	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Ethion	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	103	121
Azinphos-methyl (Guthion)	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-022/025	104	1	102	105	3	105	106

QUALITY CONTROL: Organophosphorus Pesticides in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	11	11/02/2021	11/02/2021		[NT]	[NT]
Date analysed	-			[NT]	11	11/02/2021	11/02/2021		[NT]	[NT]
Dichlorvos	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Dimethoate	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Diazinon	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Chlorpyriphos-methyl	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Ronnel	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Fenitrothion	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Malathion	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Chlorpyriphos	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Parathion	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Bromophos-ethyl	mg/kg	0.1	Org-022	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Ethion	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Azinphos-methyl (Guthion)	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-022/025	[NT]	11	102	107	5	[NT]	[NT]

QUALITY CONTROL: PCBs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-17	261469-2
Date extracted	-			11/02/2021	1	11/02/2021	11/02/2021		11/02/2021	11/02/2021
Date analysed	-			11/02/2021	1	11/02/2021	11/02/2021		11/02/2021	11/02/2021
Aroclor 1016	mg/kg	0.1	Org-021	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1221	mg/kg	0.1	Org-021	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1232	mg/kg	0.1	Org-021	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1242	mg/kg	0.1	Org-021	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1248	mg/kg	0.1	Org-021	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1254	mg/kg	0.1	Org-021	[NT]	1	<0.1	<0.1	0	90	100
Aroclor 1260	mg/kg	0.1	Org-021	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-021	104	1	102	105	3	105	106

QUALITY CONTROL: PCBs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	11	11/02/2021	11/02/2021		[NT]	[NT]
Date analysed	-			[NT]	11	11/02/2021	11/02/2021		[NT]	[NT]
Aroclor 1016	mg/kg	0.1	Org-021	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1221	mg/kg	0.1	Org-021	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1232	mg/kg	0.1	Org-021	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1242	mg/kg	0.1	Org-021	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1248	mg/kg	0.1	Org-021	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1254	mg/kg	0.1	Org-021	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1260	mg/kg	0.1	Org-021	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-021	[NT]	11	102	107	5	[NT]	[NT]

QUALITY CONTROL: Acid Extractable metals in soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-16	261469-2
Date prepared	-			12/02/2021	1	12/02/2021	12/02/2021		12/02/2021	12/02/2021
Date analysed	-			12/02/2021	1	12/02/2021	12/02/2021		12/02/2021	12/02/2021
Arsenic	mg/kg	4	Metals-020	<4	1	<4	<4	0	108	##
Cadmium	mg/kg	0.4	Metals-020	<0.4	1	<0.4	<0.4	0	111	78
Chromium	mg/kg	1	Metals-020	<1	1	150	140	7	106	#
Copper	mg/kg	1	Metals-020	<1	1	4	5	22	107	91
Lead	mg/kg	1	Metals-020	<1	1	28	27	4	104	76
Mercury	mg/kg	0.1	Metals-021	<0.1	1	<0.1	<0.1	0	109	113
Nickel	mg/kg	1	Metals-020	<1	1	12	13	8	109	82
Zinc	mg/kg	1	Metals-020	<1	1	26	30	14	112	81

QUALITY CONTROL: Acid Extractable metals in soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date prepared	-			[NT]	11	12/02/2021	12/02/2021		[NT]	[NT]
Date analysed	-			[NT]	11	12/02/2021	12/02/2021		[NT]	[NT]
Arsenic	mg/kg	4	Metals-020	[NT]	11	<4	<4	0	[NT]	[NT]
Cadmium	mg/kg	0.4	Metals-020	[NT]	11	<0.4	<0.4	0	[NT]	[NT]
Chromium	mg/kg	1	Metals-020	[NT]	11	400	450	12	[NT]	[NT]
Copper	mg/kg	1	Metals-020	[NT]	11	1	2	67	[NT]	[NT]
Lead	mg/kg	1	Metals-020	[NT]	11	7	8	13	[NT]	[NT]
Mercury	mg/kg	0.1	Metals-021	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Nickel	mg/kg	1	Metals-020	[NT]	11	12	13	8	[NT]	[NT]
Zinc	mg/kg	1	Metals-020	[NT]	11	3	3	0	[NT]	[NT]

QUALITY CONTROL: Misc Inorg - Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-17	[NT]
Date prepared	-			12/02/2021	4	12/02/2021	12/02/2021		12/02/2021	[NT]
Date analysed	-			12/02/2021	4	12/02/2021	12/02/2021		12/02/2021	[NT]
pH 1:5 soil:water	pH Units		Inorg-001	[NT]	4	6.1	6.0	2	100	[NT]
Electrical Conductivity 1:5 soil:water	µS/cm	1	Inorg-002	<1	4	35	36	3	98	[NT]

QUALITY CONTROL: Misc Inorg - Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date prepared	-			[NT]	12	12/02/2021	12/02/2021		[NT]	[NT]
Date analysed	-			[NT]	12	12/02/2021	12/02/2021		[NT]	[NT]
pH 1:5 soil:water	pH Units		Inorg-001	[NT]	12	5.5	5.5	0	[NT]	[NT]
Electrical Conductivity 1:5 soil:water	µS/cm	1	Inorg-002	[NT]	12	78	81	4	[NT]	[NT]

QUALITY CONTROL: ESP/CEC						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-17	261469-2
Date prepared	-			12/02/2021	1	12/02/2021	12/02/2021		12/02/2021	12/02/2021
Date analysed	-			12/02/2021	1	12/02/2021	12/02/2021		12/02/2021	12/02/2021
Exchangeable Ca	meq/100g	0.1	Metals-020	<0.1	1	2.6	2.6	0	91	96
Exchangeable K	meq/100g	0.1	Metals-020	<0.1	1	0.2	0.2	0	103	95
Exchangeable Mg	meq/100g	0.1	Metals-020	<0.1	1	2.8	2.7	4	95	96
Exchangeable Na	meq/100g	0.1	Metals-020	<0.1	1	<0.1	<0.1	0	118	103

QUALITY CONTROL: ESP/CEC						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date prepared	-			[NT]	11	12/02/2021	12/02/2021		[NT]	[NT]
Date analysed	-			[NT]	11	12/02/2021	12/02/2021		[NT]	[NT]
Exchangeable Ca	meq/100g	0.1	Metals-020	[NT]	11	4.8	5.2	8	[NT]	[NT]
Exchangeable K	meq/100g	0.1	Metals-020	[NT]	11	<0.1	0.1	0	[NT]	[NT]
Exchangeable Mg	meq/100g	0.1	Metals-020	[NT]	11	1.0	1.1	10	[NT]	[NT]
Exchangeable Na	meq/100g	0.1	Metals-020	[NT]	11	0.24	0.26	8	[NT]	[NT]
ESP	%	1	Metals-020	[NT]	11	4	4	0	[NT]	[NT]

QUALITY CONTROL: Misc Soil - Inorg						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-17	261469-2
Date prepared	-			12/02/2021	1	12/02/2021	12/02/2021		12/02/2021	12/02/2021
Date analysed	-			12/02/2021	1	12/02/2021	12/02/2021		12/02/2021	12/02/2021
Hexavalent Chromium, Cr^{6+}	mg/kg	1	Inorg-024	<1	1	<2	<2	0	106	#

QUALITY CONTROL: Misc Soil - Inorg						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date prepared	-			[NT]	11	12/02/2021	12/02/2021		[NT]	[NT]
Date analysed	-			[NT]	11	12/02/2021	12/02/2021		[NT]	[NT]
Hexavalent Chromium, Cr^{6+}	mg/kg	1	Inorg-024	[NT]	11	<2	<2	0	[NT]	[NT]

Result Definitions

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

Quality Control Definitions

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

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

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

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

Laboratory Acceptance Criteria

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

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

Spikes for Physical and Aggregate Tests are not applicable.

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

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

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

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

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

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

Measurement Uncertainty estimates are available for most tests upon request.

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

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

Report Comments

Asbestos: Excessive sample volumes were provided for asbestos analysis.
A portion of the supplied samples were sub-sampled according to Envirolab procedures.
We cannot guarantee that these sub-samples are indicative of the entire sample.
Envirolab recommends supplying 40-50g (50mL) of sample in its own container as per AS4964-2004.
Note: Samples 261469-1-8,10-13 were sub-sampled from bags provided by the client.

Asbestos: A portion of the supplied sample was sub-sampled for asbestos analysis according to Envirolab procedures.
We cannot guarantee that this sub-sample is indicative of the entire sample.
Envirolab recommends supplying 40-50g of sample in its own container.
Note: Sample 261469-9 was sub-sampled from a jar provided by the client.

8 metals in soil:
-# Percent recovery is not possible to report due to the high concentration of the element in the sample. However an acceptable recovery was obtained for the LCS.
-## Low spike recovery was obtained for this sample. Sample matrix interference is suspected. However, an acceptable recovery was obtained for the LCS

MISC_INORG_CRVI: Hexavalent Chromium PQL has been raised due to matrix interferences, samples were diluted and reanalysed however same results were achieved.

MISC_INORG_CRVI: # Percent recovery not reported due to matrix interferences. Samples were diluted and reanalysed and the poor recovery was confirmed. However an acceptable recovery was obtained for the LCS.

ESP: Where the exchangeable Sodium is less than the PQL and CEC is less than 10meq/100g, the ESP cannot be calculated.

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CERTIFICATE OF ANALYSIS 261469-A

Client Details

Client	Douglas Partners Pty Ltd (Port Macquarie)
Attention	Chris Bozinovski
Address	PO Box 5463, Port Macquarie, NSW, 2444

Sample Details

Your Reference	**89754.03, Port Macquarie**
Number of Samples	Additional Testing on 2 Soils
Date samples received	11/02/2021
Date completed instructions received	15/02/2021

Analysis Details

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

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

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

Report Details

Date results requested by	17/02/2021
Date of Issue	17/02/2021

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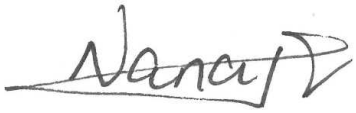
Asbestos Approved By
Analysed by Asbestos Approved Identifier: Panika Wongchanda
Authorised by Asbestos Approved Signatory: Matt Mansfield
Results Approved By
Ken Nguyen, Reporting Supervisor

Authorised By



Nancy Zhang, Laboratory Manager

Metals in TCLP USEPA1311			
Our Reference		261469-A-5	261469-A-6
Your Reference	UNITS	BH202	BH202
Depth		0.7-1.0	3.5-4.0
Date Sampled		8/02/2021	8/02/2021
Type of sample		SOIL	SOIL
Date extracted	-	17/02/2021	17/02/2021
Date analysed	-	17/02/2021	17/02/2021
pH of soil for fluid# determ.	pH units	7.1	7.0
pH of soil TCLP (after HCl)	pH units	1.7	1.7
Extraction fluid used	-	1	1
pH of final Leachate	pH units	4.9	4.9
Nickel in TCLP	mg/L	0.03	0.3

Method ID	Methodology Summary
EXTRACT.7	Toxicity Characteristic Leaching Procedure (TCLP) using Zero Headspace Extraction (zHE) using AS4439 and USEPA 1311.
Inorg-001	pH - Measured using pH meter and electrode in accordance with APHA latest edition, 4500-H+. Please note that the results for water analyses are indicative only, as analysis outside of the APHA storage times.
Inorg-004	Toxicity Characteristic Leaching Procedure (TCLP) using in house method INORG-004. Please note that the mass used may be scaled down from the default based on sample mass available.
Metals-020 ICP-AES	Determination of various metals by ICP-AES.

QUALITY CONTROL: Metals in TCLP USEPA1311						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date extracted	-			17/02/2021	[NT]	[NT]	[NT]	[NT]	17/02/2021	[NT]
Date analysed	-			17/02/2021	[NT]	[NT]	[NT]	[NT]	17/02/2021	[NT]
Nickel in TCLP	mg/L	0.02	Metals-020 ICP-AES	<0.02	[NT]	[NT]	[NT]	[NT]	84	[NT]

Result Definitions

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Douglas Partners
Geotechnics | Environment | Groundwater

89754.00.R.007.Rev0 - April 2020 - Table B1

Table B1: Summary of Laboratory Results – Metals, TRH, BTEX, PAH

			Metals									TRH						BTEX				PAH			
			Arsenic	Cadmium	Total Chromium	Hexavalent Chromium	Copper	Lead	Mercury (inorganic)	Nickel	Zinc	TRH C6 - C10	TRH >C10-C16	F1 ((C6-C10)- BTEX)	F2 (>C10-C16 less Naphthalene)	F3 (>C16-C34)	F4 (>C34-C40)	Benzene	Toluene	Ethylbenzene	Total Xylenes	Naphthalene [b]	Benzo(a)pyrene (BaP)	Benzo(a)pyrene TEQ	Total PAHs
		PQL	4	0.4	1	1	1	1	0.1	1	1	25	50	25	50	100	100	0.2	0.5	1	1	1	0.05	0.5	0.05
Sample ID[a]	Strata	Sample Date	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Bore 1/0.05 m	Fill (silty sand)	15/01/2020	<4	<0.4	120	NT	5	10	<0.1	8	18	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<0.05	<0.5	<0.05
			300 100	90 NC	300 190	300 190	17000 130	600 1100	80 NC	1200 60	30000 260	NC NC	NC NC	45 180	110 120	NC 300	NC 2800	0.5 50	160 85	55 70	40 105	3 170	NC 0.7	3 NC	300 NC
Bore 2/ 0.05 m	Fill (silty sand)	15/01/2020	<4	<0.4	170	NT	4	33	0.1	8	29	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
			300 100	90 NC	300 190	300 190	17000 130	600 1100	80 NC	1200 60	30000 260	NC NC	NC NC	45 180	110 120	NC 300	NC 2800	0.5 50	160 85	55 70	40 105	3 170	NC 0.7	3 NC	300 NC
Bore 2/ 0.5 m	Fill (silty sand)	15/01/2020	<4	<0.4	80	NT	2	10	<0.1	5	6	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<0.05	<0.5	<0.05
			300 100	90 NC	300 190	300 190	17000 130	600 1100	80 NC	1200 60	30000 260	NC NC	NC NC	45 180	110 120	NC 300	NC 2800	0.5 50	160 85	55 70	40 105	3 170	NC 0.7	3 NC	300 NC
Bore 2/1 - 1.45 m	Natural (clay)	15/01/2020	<4	<0.4	110	NT	1	10	<0.1	8	2	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<0.05	<0.5	<0.05
			300 100	90 NC	300 410	300 410	17000 130	600 1100	80 NC	1200 60	30000 260	NC NC	NC NC	40 180	230 120	NC 1300	NC 5600	0.6 65	390 105	NL 125	95 45	4 170	NC 0.7	3 NC	300 NC
Bore 3/ 0.05 m	Fill (silty sand)	16/01/2020	<4	<0.4	64	NT	9	32	<0.1	6	73	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<0.05	<0.5	<0.05
			300 100	90 NC	300 190	300 190	17000 130	600 1100	80 NC	1200 60	30000 260	NC NC	NC NC	45 180	110 120	NC 300	NC 2800	0.5 50	160 85	55 70	40 105	3 170	NC 0.7	3 NC	300 NC
Bore 3/ 0.5 m	Natural (silty clay)	16/01/2020	<4	0.4	74	NT	3	19	<0.1	5	23	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
			300 100	90 NC	300 410	300 410	17000 130	600 1100	80 NC	1200 60	30000 260	NC NC	NC NC	40 180	230 120	NC 1300	NC 5600	0.6 65	390 105	NL 125	95 45	4 170	NC 0.7	3 NC	300 NC
Bore 4/ 0.2 m	Fill (sand)	15/01/2020	<4	<0.4	460	<1	2	12	<0.1	24	6	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<0.05	<0.5	<0.05
			300 100	90 NC	300 190	300 190	17000 130	600 1100	80 NC	1200 60	30000 260	NC NC	NC NC	45 180	110 120	NC 300	NC 2800	0.5 50	160 85	55 70	40 105	3 170	NC 0.7	3 NC	300 NC
Bore 5/ 0.05 m	Fill (silty sand)	15/01/2020	<4	<0.4	310	<10	4	92	<0.1	11	21	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
			300 100	90 NC	300 190	300 190	17000 130	600 1100	80 NC	1200 60	30000 260	NC NC	NC NC	45 180	110 120	NC 300	NC 2800	0.5 50	160 85	55 70	40 105	3 170	NC 0.7	3 NC	300 NC
Bore 5/1 - 1.45 m	Natural (silty clay)	15/01/2020	<4	0.4	700	<1	2	11	<0.1	22	4	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<0.05	<0.5	<0.05
			300 100	90 NC	300 410	300 410	17000 130	600 1100	80 NC	1200 60	30000 260	NC NC	NC NC	40 180	230 120	NC 1300	NC 5600	0.6 65	390 105	NL 125	95 45	4 170	NC 0.7	3 NC	300 NC
QA1	Natural (silty clay)	15/01/2020	<4	0.4	710	NT	2	13	<0.1	22	4	NT	<50	NT	<50	<100	<100	NT	NT	NT	NT	NT	NT	NT	NT
			300 100	90 NC	300 410	300 410	17000 130	600 1100	80 NC	1200 60	30000 260	NC NC	NC NC	40 180	230 120	NC 1300	NC 5600	0.6 65	390 105	NL 125	95 45	4 170	NC 0.7	3 NC	300 NC
Bore 5/1 - 1.45 m (retest)	Natural (silty clay)	15/01/2020	NT	NT	600	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
			300 100	90 NC	300 410	300 410	17000 130	600 1100	80 NC	1200 60	30000 260	NC NC	NC NC	40 180	230 120	NC 1300	NC 5600	0.6 65	390 105	NL 125	95 45	4 170	NC 0.7	3 NC	300 NC

Lab result
HIL/HSL value EIL/ESL value

HIL/HSL exceedance EIL/ESL exceedance HIL/HSL and EIL/ESL exceedance ML exceedance ML and HIL/HSL or EIL/ESL exceedance

Indicates that asbestos has been detected by the lab below the PQL, refer to the lab report **Blue** = DC exceedance

Bold = Lab detections NT = Not tested NL = Non limiting NC = No criteria NA = Not applicable NAD = No asbestos detected

Notes:

HIL/HSL	NEPC, Schedule B1 - HIL C (Public Open Space), HSL A/B (Low - High Density Residential)
EIL/ESL	NEPC, Schedule B1 - EIL UR/POS (urban residential/public open space), ESL UR/POS (urban residential/public open space)
ML	NEPC, Schedule B1 - ML R/P/POS (Residential, parkland and public open space)
a	QA/QC replicate of sample listed directly below the primary sample
b	reported naphthalene laboratory result obtained from BTEXN suite

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89754.00.R.007.Rev0 - April 2020 - Table B2

Table B2: Summary of Laboratory Results – OCP, PCB, Asbestos

			OCP								PCB	Asbestos	
			DDT+DDE+DDD [c]	Aldrin & Dieldrin	Total Chlordane	Total Endosulfan	Endrin	Heptachlor	Hexachlorobenzene	Methoxychlor	Total PCB	Asbestos ID in soil >0.1g/kg	Trace Analysis
		PQL	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1		
Sample ID[a]	Depth	Sample Date	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	-	-
Bore 1/0.05 m	Fill (silty sand)	15/01/2020	<0.1 400 180	<0.1 10 NC	<0.1 70 NC	<0.1 340 NC	<0.1 20 NC	<0.1 10 NC	<0.1 10 NC	<0.1 400 NC	<0.1 1 NC	NAD	NAD
Bore 2/ 0.05 m	Fill (silty sand)	15/01/2020	<0.1 400 180	<0.1 10 NC	<0.1 70 NC	<0.1 340 NC	<0.1 20 NC	<0.1 10 NC	<0.1 10 NC	<0.1 400 NC	NT 1 NC	NT	NT
Bore 2/ 0.5 m	Fill (silty sand)	15/01/2020	<0.1 400 180	<0.1 10 NC	<0.1 70 NC	<0.1 340 NC	<0.1 20 NC	<0.1 10 NC	<0.1 10 NC	<0.1 400 NC	<0.1 1 NC	NAD	NAD
Bore 2/1 - 1.45 m	Natural (clay)	15/01/2020	<0.1 400 180	<0.1 10 NC	<0.1 70 NC	<0.1 340 NC	<0.1 20 NC	<0.1 10 NC	<0.1 10 NC	<0.1 400 NC	<0.1 1 NC	NAD	NAD
Bore 3/ 0.05 m	Fill (silty sand)	16/01/2020	<0.1 400 180	<0.1 10 NC	<0.1 70 NC	<0.1 340 NC	<0.1 20 NC	<0.1 10 NC	<0.1 10 NC	<0.1 400 NC	<0.1 1 NC	NAD	NAD
Bore 3/ 0.5 m	Natural (silty clay)	16/01/2020	<0.1 400 180	<0.1 10 NC	<0.1 70 NC	<0.1 340 NC	<0.1 20 NC	<0.1 10 NC	<0.1 10 NC	<0.1 400 NC	NT 1 NC	NT	NT
Bore 4/ 0.2 m	Fill (sand)	15/01/2020	<0.1 400 180	<0.1 10 NC	<0.1 70 NC	<0.1 340 NC	<0.1 20 NC	<0.1 10 NC	<0.1 10 NC	<0.1 400 NC	<0.1 1 NC	NAD	NAD
Bore 5/ 0.05 m	Fill (silty sand)	15/01/2020	<0.1 400 180	<0.1 10 NC	<0.1 70 NC	<0.1 340 NC	<0.1 20 NC	<0.1 10 NC	<0.1 10 NC	<0.1 400 NC	NT 1 NC	NT	NT
Bore 5/1 - 1.45 m	Natural (silty clay)	15/01/2020	<0.1 400 180	<0.1 10 NC	<0.1 70 NC	<0.1 340 NC	<0.1 20 NC	<0.1 10 NC	<0.1 10 NC	<0.1 400 NC	<0.1 1 NC	NAD	NAD
QA1	Natural (silty clay)	15/01/2020	NT 400 180	NT 10 NC	NT 70 NC	NT 340 NC	NT 20 NC	NT 10 NC	NT 10 NC	NT 400 NC	NT 1 NC	NT	NT
Bore 5/1 - 1.45 m (retest)	Natural (silty clay)	15/01/2020	NT 400 180	NT 10 NC	NT 70 NC	NT 340 NC	NT 20 NC	NT 10 NC	NT 10 NC	NT 400 NC	NT 1 NC	NT	NT

Lab result
HIL/HSL value EIL/ESL value

HIL/HSL exceedance EIL/ESL exceedance HIL/HSL and EIL/ESL exceedance ML exceedance ML and HIL/HSL or EIL/ESL exceedance

Indicates that asbestos has been detected by the lab below the PQL, refer to the lab report **Blue** = DC exceedance

Bold = Lab detections NT = Not tested NL = Non limiting NC = No criteria NA = Not applicable NAD = No asbestos detected

Notes:

HIL/HSL	NEPC, Schedule B1 - HIL C (Public Open Space), HSL A/B (Low - High Density Residential)
EIL/ESL	NEPC, Schedule B1 - EIL UR/POS (urban residential/public open space), ESL UR/POS (urban residential/public open space)
ML	NEPC, Schedule B1 - ML R/P/POS (Residential, parkland and public open space)
a	QA/QC replicate of sample listed directly below the primary sample
c	criteria applies to DDT only

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Table B1: Summary of Laboratory Results – Metals (including chromium VI), TRH, BTEX

89754.02.R.001.Rev0 - Dec 2020 - Table B1

			Metals									TRH						BTEX			
			Arsenic	Cadmium	Total Chromium	Chromium VI	Copper	Lead	Mercury (inorganic)	Nickel	Zinc	TRH C6 - C10	TRH >C10-C16	F1 ((C6-C10)-BTEX)	F2 (>C10-C16 less Naphthalene)	F3 (>C16-C34)	F4 (>C34-C40)	Benzene	Toluene	Ethylbenzene	Total Xylenes
		PQL	4	0.4	1	1	1	1	0.1	1	1	25	50	25	50	100	100	0.2	0.5	1	1
Sample ID	Depth	Sample Date	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
101 / 0.05	0 m	26/11/2020	<4	<0.4	**130**	**2**	**2**	**11**	<0.1	**5**	**9**	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1
			300 NC	90 NC	NC 190	300 NC	17000 140	600 NC	80 NC	1200 60	30000 260	NC NC	NC 120	NC 180	NC NC	NC 300	NC 2800	NC 50	NC 85	NC 70	NC 105
101 / 0.5	0 m	26/11/2020	<4	<0.4	**450**	**1**	**1**	**7**	<0.1	**10**	**2**	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1
			300 NC	90 NC	NC 690	300 NC	17000 140	600 NC	80 NC	1200 60	30000 260	NC NC	NC 120	NC 180	NC NC	NC 300	NC 2800	NC 50	NC 85	NC 70	NC 105
102 / 0.3	0 m	26/11/2020	<4	<0.4	**280**	**2**	**2**	**7**	<0.1	**11**	**3**	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1
			300 NC	90 NC	NC 690	300 NC	17000 140	600 NC	80 NC	1200 60	30000 260	NC NC	NC 120	NC 180	NC NC	NC 1300	NC 5600	NC 65	NC 105	NC 125	NC 45
102 / 0.55	0 m	26/11/2020	<4	<0.4	**350**	**7**	**7**	**6**	<0.1	**10**	**2**	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
			300 NC	90 NC	NC 690	300 NC	17000 140	600 NC	80 NC	1200 60	30000 260	NC NC	NC 120	NC 180	NC NC	NC 1300	NC 5600	NC 65	NC 105	NC 125	NC 45
103 / 0.05	0 m	26/11/2020	<4	<0.4	**110**	**2**	**2**	**6**	<0.1	**4**	**9**	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1
			300 NC	90 NC	NC 190	300 NC	17000 140	600 NC	80 NC	1200 60	30000 260	NC NC	NC 120	NC 180	NC NC	NC 300	NC 2800	NC 50	NC 85	NC 70	NC 105
103 / 0.3	0 m	26/11/2020	<4	<0.4	**250**	**2**	**2**	**6**	<0.1	**10**	**3**	<25	NT	<25	NT	NT	NT	<0.2	<0.5	<1	<1
			300 NC	90 NC	NC 690	300 NC	17000 140	600 NC	80 NC	1200 60	30000 260	NC NC	NC 120	NC 180	NC NC	NC 1300	NC 5600	NC 65	NC 105	NC 125	NC 45

Lab result

HIL/HSL value EIL/ESL value

HIL/HSL exceedance EIL/ESL exceedance HIL/HSL and EIL/ESL exceedance ML exceedance ML and HIL/HSL or EIL/ESL exceedance

Indicates that asbestos has been detected by the lab below the PQL, refer to the lab report **Blue** = DC exceedance

Bold = Lab detections NT = Not tested NL = Non limiting NC = No criteria NA = Not applicable NAD = No asbestos detected at the reporting limit

Notes:

HIL/HSL/DC	NEPC, Schedule B1 - HIL C (undefined), HSL A/B (undefined), DC HSL A (undefined)
EIL/ESL	NEPC, Schedule B1 - EIL UR/POS (undefined), ESL UR/POS (undefined)
ML	NEPC, Schedule B1 - ML R/P/POS (undefined)
a	QA/QC replicate of sample listed directly below the primary sample
b	Reported naphthalene laboratory result obtained from BTEXN suite
c	Criteria applies to DDT only

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89754.02.R.001.Rev0 - Dec 2020 - Table B1

Table B2: Summary of Laboratory Results – PAH, OCP, OPP, PCB and Asbestos

			PAH			OCP											OPP	PCB	Asbestos		
			Naphthalene [b]	Benzo(a)pyrene (BaP)	Benzo(a)pyrene TEQ	DDT+DDE+DDD [c]	DDD	DDE	DDT	Aldrin & Dieldrin	Total Chlordane	Total Endosulfan	Endrin	Heptachlor	Hexachlorobenzene	Methoxychlor	Chlorpyriphos	Total PCB	Asbestos ID in soil >0.1g/kg	Trace Analysis	Asbestos (50 g)
		PQL	1	0.05	0.5	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1			
Sample ID	Depth	Sample Date	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	-	-	-
101 / 0.05	0 m	26/11/2020	<1	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NAD	NAD	NAD
			NC 170	NC 0.7	3 NC	400 NC	NC NC	NC NC	NC 180	10 NC	70 NC	340 NC	20 NC	10 NC	10 NC	400 NC	250 NC	1 NC			
101 / 0.5	0 m	26/11/2020	<1	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NAD	NAD	NAD
			NC 170	NC 0.7	3 NC	400 NC	NC NC	NC NC	NC 180	10 NC	70 NC	340 NC	20 NC	10 NC	10 NC	400 NC	250 NC	1 NC			
102 / 0.3	0 m	26/11/2020	<1	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NAD	NAD	NAD
			NC 170	NC 0.7	3 NC	400 NC	NC NC	NC NC	NC 180	10 NC	70 NC	340 NC	20 NC	10 NC	10 NC	400 NC	250 NC	1 NC			
102 / 0.55	0 m	26/11/2020	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
			NC 170	NC 0.7	3 NC	400 NC	NC NC	NC NC	NC 180	10 NC	70 NC	340 NC	20 NC	10 NC	10 NC	400 NC	250 NC	1 NC			
103 / 0.05	0 m	26/11/2020	<1	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NAD	NAD	NAD
			NC 170	NC 0.7	3 NC	400 NC	NC NC	NC NC	NC 180	10 NC	70 NC	340 NC	20 NC	10 NC	10 NC	400 NC	250 NC	1 NC			
103 / 0.3	0 m	26/11/2020	<1	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NAD	NAD	NAD
			NC 170	NC 0.7	3 NC	400 NC	NC NC	NC NC	NC 180	10 NC	70 NC	340 NC	20 NC	10 NC	10 NC	400 NC	250 NC	1 NC			

Lab result
HIL/HSL value EIL/ESL value

HIL/HSL exceedance EIL/ESL exceedance HIL/HSL and EIL/ESL exceedance ML exceedance ML and HIL/HSL or EIL/ESL exceedance

Indicates that asbestos has been detected by the lab below the PQL, refer to the lab report **Blue** = DC exceedance

Bold = Lab detections NT = Not tested NL = Non limiting NC = No criteria NA = Not applicable NAD = No asbestos detected at the reporting limit

Notes:

HIL/HSL/DC	NEPC, Schedule B1 - HIL C (undefined), HSL A/B (undefined), DC HSL A (undefined)
EIL/ESL	NEPC, Schedule B1 - EIL UR/POS (undefined), ESL UR/POS (undefined)
ML	NEPC, Schedule B1 - ML R/P/POS (undefined)
a	QA/QC replicate of sample listed directly below the primary sample
b	Reported naphthalene laboratory result obtained from BTEXN suite
c	Criteria applies to DDT only

Appendix C

Quality Control Report
Chain of Custody Sheets (Despatch)
Laboratory Sample Receipt

Appendix C
Data Quality Report
16 Owens Street, Port Macquarie

C1.0 Field and Laboratory Data Quality Assurance and Quality Control

The field and laboratory data quality assurance and quality control (QA/QC) procedures and results are summarised in the following Table 1. Reference should be made to the field work methodology and the laboratory results / certificates of analysis for further details.

Table 1: Field and Laboratory Quality Control

Item	Evaluation / Acceptance Criteria	Compliance
Analytical laboratories used	NATA accreditation	C
Holding times	Various based on type of analysis	C
Laboratory / Reagent Blanks	1 per batch; <PQL	C
Matrix Spikes	1 per lab batch; 70-130% recovery (inorganics); 60-140% recovery (organics)	C
Surrogate Spikes	All organics analysis; 70-130% recovery (inorganics); 60-140% recovery (organics)	C
Control Samples	1 per lab batch; 70-130% recovery (inorganics); 60-140% recovery (organics)	C
Standard Operating Procedures (SOP)	Adopting SOP for all aspects of the sampling field work	C

Notes:
C = compliance; PC = partial compliance; NC = non-compliance

The RPD results for laboratory duplicates were all within the acceptable range.

In summary, the QC data is determined to be of sufficient quality to be considered acceptable for the assessment.

C2.0 Data Quality Indicators

The reliability of field procedures and analytical results was assessed against the following data quality indicators (DQIs) as outlined in NEPC *National Environment Protection (Assessment of Site Contamination) Measure 1999 (as amended 2013) [NEPM]* (NEPC, 2013):

- Completeness: a measure of the amount of usable data from a data collection activity;

- Comparability: the confidence (qualitative) that data may be considered to be equivalent for each sampling and analytical event;
- Representativeness: the confidence (qualitative) of data representativeness of media present on-site;
- Precision: a measure of variability or reproducibility of data; and
- Accuracy: a measure of closeness of the data to the 'true' value.

Table 2: Data Quality Indicators

Data Quality Indicator	Method(s) of Achievement
Completeness	Specified target locations sampled.
	Preparation of borehole logs, sample location plan and chain of custody records.
	Laboratory sample receipt information received confirming receipt of samples intact and appropriateness of the chain of custody.
	Samples analysed for contaminants of potential concern (COPC) identified in the Conceptual Site Model (CSM).
	Completion of chain of custody (COC) documentation.
	NATA accredited laboratory results certificates provided by the laboratory.
	Satisfactory frequency and results for field and laboratory quality control (QC) samples as discussed in Section 1.
Comparability	Using appropriate techniques for sample recovery, storage and transportation, which were the same for the duration of the project.
	Experienced sampler(s) used.
	Use of NATA registered laboratories, with test methods the same or similar between laboratories.
	Satisfactory results for field and laboratory QC samples.
Representativeness	Target media sampled.
	Sample numbers recovered and analysed are considered to be representative of the target media and complying with DQOs.
	Samples were extracted and analysed within holding times.
	Samples were analysed in accordance with the COC.
Precision	Field staff followed standard operating procedures.
	Satisfactory results for all other field and laboratory QC samples.
Accuracy	Field staff followed standard operating procedures.
	Satisfactory results for all field and laboratory QC samples.

Based on the above, it is considered that the DQIs have been generally complied with.

C3.0 Conclusion

Based on the results of the field QA and field and laboratory QC, and evaluation against the DQIs it is concluded that the field and laboratory test data obtained are reliable and useable for this assessment.

C4.0 References

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

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CHAIN OF CUSTODY DESPATCH SHEET

Project No:	89754.03	**Suburb:**	Port Macquarie	**To:**	Envirolab Services Pty Ltd
Project Name:	Proposed School Upgrade	**Order Number**			12 Ashley Street, CHATSWOOD NSW 2067
Project Manager:	Cowan, Joel	**Sampler:**	Cudmore, James	**Attn:**	Jacinta Hurst
Emails:	Chris.Bozinovski@douglaspartners.com.au, james.cudmore@douglaspartners.com.au			**Phone:**	(02) 9910 6200
Date Required:	Same day ☐ 24 hours ☐ 48 hours ☐ 72 hours ☐ Standard ☐			**Email:**	
Prior Storage:	☐ Esky ☐ Fridge ☐ Shelved	Do samples contain 'potential' HBM?	Yes ☐ No ☐	(If YES, then handle, transport and store in accordance with FPM HAZID)	

Sample ID	Lab ID	Date Sampled	Sample Type (S - soil, W - water)	Container Type (G - glass, P - plastic)	Analytes: pH, EC, CEC	Combo 6a	Cr VI	Asbestos	ESP					Notes/preservation
BH201/0.05	1	08/02/21	S	G	●	●	●							24hr turnaround testing
BH201/0.5	2	08/02/21	S	G + P	●	●	●	●						for all
BH201/1.5-1.95	3	08/02/21	S	G	●	●	●		●					
BH202/0.05	4	08/02/21	S	G + P	●	●	●	●						
BH202/0.7-1.0	5	08/02/21	S	G + P	●	●	●	●						
BH202/3.5-4.0	6	08/02/21	S	G + P	●	●	●	●						
BH203/0.5	7	09/02/21	S	G +P	●	●	●	●						
BH203/1.0	8	09/02/21	S	G	●	●	●							
BH203/2.5-2.95	9	09/02/21	S	G	●	●	●							
BH204/0.3	10	09/02/21	S	G +P	●	●	●	●						
BH205/0.1	11	09/02/21	S	G +P	●	●	●	●						
BH205/0.5	12	09/02/21	S	G	●	●	●							
BH205/1.0-1.45	13	09/02/21	S	G	●	●	●		●					
BH203	14	2,	S	P	Extra									
PQL (S) mg/kg														**ANZECC PQLs req'd for all water analytes** ☐

PQL = practical quantitation limit. If none given, default to Laboratory Method Detection Limit

Metals to Analyse: 8HM unless specified here:

Lab Report/Reference No: 261469

Total number of samples in container: 15 **Relinquished by:** **Transported to laboratory by:**

Send Results to: Chris, James **Address:** **Phone:** **Fax:**

Signed: **Received by:** R Chagoen **Date & Time:** 11/02/21 11:00

Envirolab Services
12 Ashley St
Chatswood NSW 2067
Ph: (02) 9910 6200

Job No: 261469
Date Received: 11/02/21
Time Received: 11:00
Received By: CL
Temp: Cool/Ambient
Cooling: Ice/Icepack
Security: Intact/Broken/None

Aileen Hie

From: Chris Bozinovski <Chris.Bozinovski@douglaspartners.com.au>
Sent: Monday, 15 February 2021 12:07 PM
To: Ken Nguyen; Jacinta Hurst
Cc: Joel Cowan; James Cudmore; SydneyMailbox; Patrick Heads
Subject: RE: Results for Registration 261469 89754.03, Port Macquarie - TCLP Testing

Importance: High

Hi Ken/Jacinta

Can you please proceed with additional TCLP testing for Ni on the following samples from Report 261469:

- 261469-5
- 261469-6

Fast turnaround testing is required – Results by COB this Wednesday (17 Feb 2021) please. If this is not possible please let me know.

Please call if you have any questions.

Envirolab Ref: 261469 A
Due: 17/2/21
2day TAT.

Regards

Chris Bozinovski | Principal
Douglas Partners Pty Ltd | ABN 75 053 980 117 | www.douglaspartners.com.au
15 Callistemon Close Warabrook NSW 2304 | Box 324 Hunter Region Mail Centre NSW 2310
P: 02 4960 9600 | M: 0412 496 093 | E: Chris.Bozinovski@douglaspartners.com.au

From: Ken Nguyen <KNguyen@envirolab.com.au>
Sent: Friday, 12 February 2021 7:08 PM
To: Douglas Partners Port Macquarie <PortMacquarie@douglaspartners.com.au>; Chris Bozinovski <Chris.Bozinovski@douglaspartners.com.au>; Joel Cowan <Joel.Cowan@douglaspartners.com.au>; James Cudmore <James.Cudmore@douglaspartners.com.au>
Subject: Results for Registration 261469 89754.03, Port Macquarie

Please refer to attached for:
a copy of the Certificate of Analysis
a copy of the COC/paperwork received from you
ESDAT Extracts
an Excel or .csv file containing the results

Envirolab Services Pty Ltd
ABN 37 112 535 645
12 Ashley St Chatswood NSW 2067
ph 02 9910 6200 fax 02 9910 6201
customerservice@envirolab.com.au
www.envirolab.com.au

SAMPLE RECEIPT ADVICE

Client Details

Client	Douglas Partners Pty Ltd (Port Macquarie)
Attention	Chris Bozinovski, James Cudmore

Sample Login Details

Your reference	89754.03, Port Macquarie
Envirolab Reference	261469
Date Sample Received	11/02/2021
Date Instructions Received	11/02/2021
Date Results Expected to be Reported	12/02/2021

Sample Condition

Samples received in appropriate condition for analysis	Yes
No. of Samples Provided	14 SOIL
Turnaround Time Requested	1 day
Temperature on Receipt (°C)	22
Cooling Method	Ice
Sampling Date Provided	YES

Comments

Nil

Please direct any queries to:

Aileen Hie	Jacinta Hurst
Phone: 02 9910 6200	**Phone: 02 9910 6200**
Fax: 02 9910 6201	**Fax: 02 9910 6201**
Email: ahie@envirolab.com.au	**Email: jhurst@envirolab.com.au**

Analysis Underway, details on the following page:

Envirolab Services Pty Ltd
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12 Ashley St Chatswood NSW 2067
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customerservice@envirolab.com.au
www.envirolab.com.au

Sample ID	vTRH(C6-C10)/BTEXN in Soil	svTRH (C10-C40) in Soil	PAHs in Soil	Organochlorine Pesticides in soil	Organophosphorus Pesticides in Soil	PCBsin Soil	Acid Extractable metalsin soil	Asbestos ID - soils	Misc Inorg - Soil	ESP/CEC	Misc Soil - Inorg	On Hold
BH201-0.05	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
BH201-0.5	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
BH201-1.5-1.95	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
BH202-0.05	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
BH202-0.7-1.0	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
BH202-3.5-4.0	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
BH203-0.5	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
BH203-1.0	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
BH203-2.5-2.95	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
BH204-0.3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
BH205-0.1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
BH205-0.5	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
BH205-1.0-1.45	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
BH203												✓

The '✓' indicates the testing you have requested. **THIS IS NOT A REPORT OF THE RESULTS.**

Additional Info

Sample storage - Waters are routinely disposed of approximately 1 month and soils approximately 2 months from receipt.
Requests for longer term sample storage must be received in writing.
Please contact the laboratory immediately if observed settled sediment present in water samples is to be included in the extraction and/or analysis (exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, Total Recoverable metals and PFAS analysis where solids are included by default.
TAT for Micro is dependent on incubation. This varies from 3 to 6 days.

Envirolab Services Pty Ltd
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12 Ashley St Chatswood NSW 2067
ph 02 9910 6200 fax 02 9910 6201
customerservice@envirolab.com.au
www.envirolab.com.au

SAMPLE RECEIPT ADVICE

Client Details

Client	Douglas Partners Pty Ltd (Port Macquarie)
Attention	Chris Bozinovski

Sample Login Details

Your reference	89754.03, Port Macquarie
Envirolab Reference	261469-A
Date Sample Received	11/02/2021
Date Instructions Received	15/02/2021
Date Results Expected to be Reported	17/02/2021

Sample Condition

Samples received in appropriate condition for analysis	Yes
No. of Samples Provided	Additional Testing on 2 Soils
Turnaround Time Requested	2 days
Temperature on Receipt (°C)	22
Cooling Method	Ice
Sampling Date Provided	YES

Comments

Nil

Please direct any queries to:

Aileen Hie	Jacinta Hurst
Phone: 02 9910 6200	**Phone: 02 9910 6200**
Fax: 02 9910 6201	**Fax: 02 9910 6201**
Email: ahie@envirolab.com.au	**Email: jhurst@envirolab.com.au**

Analysis Underway, details on the following page:

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ABN 37 112 535 645
12 Ashley St Chatswood NSW 2067
ph 02 9910 6200 fax 02 9910 6201
customerservice@envirolab.com.au
www.envirolab.com.au

Sample ID	Metals in TCLP USEPA1311	On Hold
BH201-0.05		✓
BH201-0.5		✓
BH201-1.5-1.95		✓
BH202-0.05		✓
BH202-0.7-1.0	✓	
BH202-3.5-4.0	✓	
BH203-0.5		✓
BH203-1.0		✓
BH203-2.5-2.95		✓
BH204-0.3		✓
BH205-0.1		✓
BH205-0.5		✓
BH205-1.0-1.45		✓
BH203		✓

The '✓' indicates the testing you have requested. **THIS IS NOT A REPORT OF THE RESULTS.**

Additional Info

Sample storage - Waters are routinely disposed of approximately 1 month and soils approximately 2 months from receipt.
Requests for longer term sample storage must be received in writing.
Please contact the laboratory immediately if observed settled sediment present in water samples is to be included in the extraction and/or analysis (exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, Total Recoverable metals and PFAS analysis where solids are included by default.
TAT for Micro is dependent on incubation. This varies from 3 to 6 days.

Appendix D

Groundwater Bore Works Summary (GW303216, GW065478)

WaterNSW
Work Summary

GW065478

Licence: 30WA313995
Licence Status: CURRENT

Authorised Purpose(s): RECREATION (GROUNDWATER)
Intended Purpose(s): RECREATION (GROU

Work Type: Bore
Work Status:
Construct.Method: Rotary Air
Owner Type: Private

Commenced Date:
Completion Date: 03/12/1991
Final Depth: 39.60 m
Drilled Depth: 39.60 m

Contractor Name: Watermin Drillers Pty Ltd
Driller: Kevin Harold Norrie
Assistant Driller:

Property: PT MACQ BOWLING CLUB Owen St PORT MACQUARIE 2444 NSW
GWMA: -
GW Zone: -
Standing Water Level (m): 3.000
Salinity Description: Very Good
Yield (L/s): 8.850

Site Details

Site Chosen By:

	County	Parish	Cadastre
Form A:	MACQUARIE	MACQUARIE	LOT 1 DP851324
Licensed:	MACQUARIE	MACQUARIE	Whole Lot 1//1141185

Region: 30 - North Coast
River Basin: 207 - HASTINGS RIVER
Area/District:
CMA Map: 9435-2S
Grid Zone:
Scale:

Elevation: 0.00 m (A.H.D.)
Elevation Source: Unknown
Northing: 6522577.000
Easting: 492502.000
Latitude: 31°25'53.3"S
Longitude: 152°55'16.0"E

GS Map: -
MGA Zone: 56
Coordinate Source: Unknown

Construction

Negative depths indicate Above Ground Level; C-Cemented; SL-Slot Length; A-Aperture; GS-Grain Size; Q-Quantity; PL-Placement of Gravel Pack; PC-Pressure Cemented; S-Sump; CE-Centralisers

Hole	Pipe	Component	Type	From (m)	To (m)	Outside Diameter (mm)	Inside Diameter (mm)	Interval	Details
1		Hole	Hole	0.00	18.30	190			Rotary Air
1		Hole	Hole	18.30	39.60	165			Percussion
1	1	Casing	Steel	-0.30	20.70	165			Driven into Hole
1	1	Opening	Slots - Vertical	18.30	20.70	165		1	Oxy-Acetylene Slotted, Steel, SL: 457.0mm, A: 2.00mm

Water Bearing Zones

From (m)	To (m)	Thickness (m)	WBZ Type	S.W.L. (m)	D.D.L. (m)	Yield (L/s)	Hole Depth (m)	Duration (hr)	Salinity (mg/L)
18.30	36.60	18.30	Fractured	3.00		8.85	36.60		

Drillers Log

From (m)	To (m)	Thickness (m)	Drillers Description	Geological Material	Comments
0.00	0.30	0.30	TOPSOIL	Unknown	
0.30	9.10	8.80	CKAY	Unknown	

9.10	15.20	6.10	SHALE	Unknown	
15.20	18.30	3.10	WEATHERED BLACK SHALE	Unknown	
18.30	39.60	21.30	BASALT WITH SEAMS OF QUARTZ	Unknown	

***** End of GW065478 *****

/

WaterNSW
Work Summary

GW303216

Licence: | **Licence Status:**

Authorised Purpose(s):
Intended Purpose(s): DOMESTIC

Work Type: Excavation
Work Status:
Construct.Method:
Owner Type: Private

Commenced Date: | **Final Depth:**
Completion Date: | **Drilled Depth:**

Contractor Name: (None)
Driller:
Assistant Driller:

Property: | **Standing Water Level (m):**
GWMA: | **Salinity Description:**
GW Zone: | **Yield (L/s):**

Site Details

Site Chosen By:

	County	Parish	Cadastre
Form A:	MACQUARIE	MACQUARIE	LT 7 DP 19842
Licensed:			

Region: 30 - North Coast | **CMA Map:**
River Basin: - Unknown | **Grid Zone:** | **Scale:**
Area/District:

Elevation: 0.00 m (A.H.D.) | **Northing:** 6522412.000 | **Latitude:** 31°25'58.6"S
Elevation Source: Unknown | **Easting:** 492253.000 | **Longitude:** 152°55'06.5"E

GS Map: - | **MGA Zone:** 56 | **Coordinate Source:** Unknown

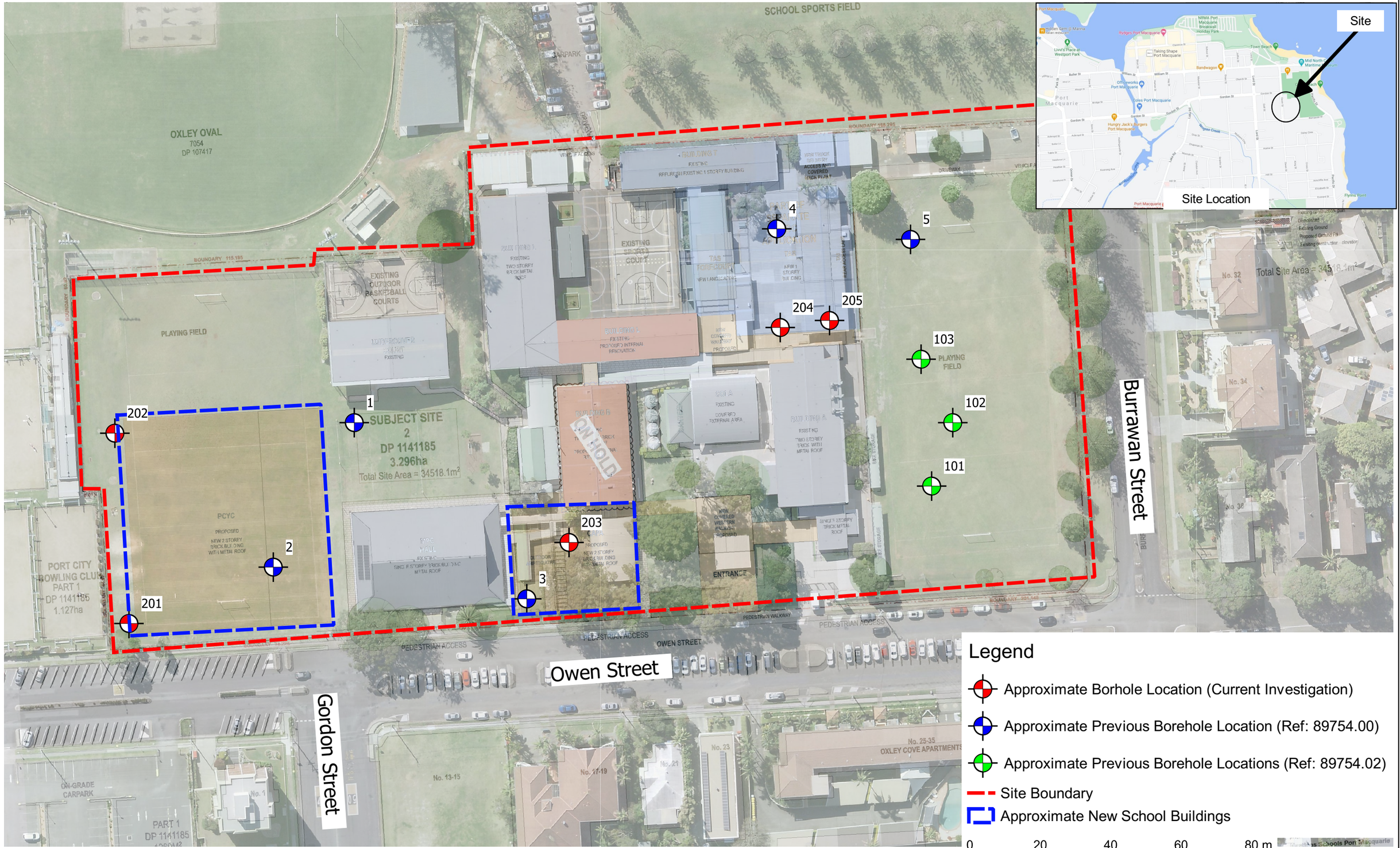
Remarks

17/06/2002: Form A Remarks:
Excavation of collapsed well
03/12/2009: Reviewed data - nothing to update.

***** End of GW303216 *****

Appendix E

Drawing 1 – Test Location Plan
Fjmt Site Plan – Proposed (SSDA-120010 Rev 05)



Drawing adapted from aerial imagery from Metro Map dated 17 September 2020 and Client supplied drawing titled "Site Plan - Proposed" Drawing SSDA-120010, dated 12 February 2021, Rev01, by fjmt Studio

Test locations are approximate only and were located using Handheld GPS and Measured off site features

Douglas Partners Geotechnics / Environment / Groundwater	CLIENT: Schools Infrastructure NSW	TITLE: **Test Location Plan** **Proposed Hastings Secondary College Upgrade** **16 Owen Street, Port Macquarie**		Project: 89754.03
	OFFICE: Port Macquarie DRAWN BY: JRC			DRAWING No: 1
	SCALE: 1:1000 @A3 DATE: 05.March.2021			REVISION: 1

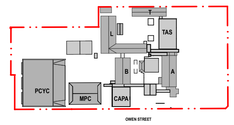
DP.QGIS.A3LandscapeDrawingLayout.DftA

0 5 10 20m

GENERAL NOTES

- ALL DIMENSIONS AND EXISTING CONDITIONS SHALL BE CHECKED AND VERIFIED BY THE CONTRACTOR BEFORE PROCEEDING WITH THE WORK.
- ALL LEVELS RELATIVE TO 'AUSTRALIAN HEIGHT DATUM'.
- DO NOT SCALE DRAWINGS. USE FIGURED DIMENSIONS ONLY.

keyplan



legend

- BOUNDARY LINE
- AREA UNDER ALTERNATIVE PLANNING PATHWAY
- PROPOSED REFURBISHMENT
- NEW CONSTRUCTION
- EXISTING TREES
- PROPOSED TREES

rev	date	name	by	chk
05	14/4/21	SSDA	MJ	
04	26/3/21	SSDA	KT	
03	19/3/21	SSDA - Consultant Background Issue	AD	
02	23/2/21	Draft SSDA 02	KT	
01	12/2/21	Draft SSDA	MJ	

fjmt studio architecture interiors landscape urban community
sydney melbourne uk
Level 5, 70 King Street t +61 2 9251 7077 w fjmtstudio.com

project
Hastings Schools Port Macquarie
Hastings Secondary College
Port Macquarie NSW 2444

title
Site
Site Plan - Proposed

scale	1:500 @ A1	first issued	12/2/21
project code		sheet no.	revision
HSPM		SSDA-120010	05