Douglas Partners
Geotechnics / Environment / Groundwater

Integrated Practical Solutions

Report on
Detailed Site (Contamination) Investigation

Glenwood High School Upgrade
Forman Avenue, Glenwood

Prepared for
NSW Department of Education

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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.

	Signature		Date
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1. Introduction

This detailed site (contamination) investigation report accompanies an Environmental Impact Statement (EIS) pursuant to Part 4 of the Environmental Planning and Assessment Act 1979 (EP&A Act) in support of a State Significant Development Application (SSD - 23512960).

The development is for upgrading works comprising alterations and additions to Glenwood High School at 85 Forman Avenue, Glenwood. The site is legally described as Lot 5227 DP 868693.

The site is roughly rectangular in shape, with a total area of 60,790m2 and street frontages to Forman Avenue to the south and Glenwood Drive to the east. Glenwood Reserve adjoins the northern and western boundaries of the school.

This report addresses the relevant Secretary's Environmental Assessment Requirements (SEARs), specifically:

- State Environmental Planning Policy No. 55 – Remediation of Land (1998);
- Blacktown Local Environment Plan 2015.

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); an
- NSW EPA *Guidelines for Consultants Reporting on Contaminated Land* (NSW EPA, 2020).
- Waste Classification Guidelines (EPA, 2014).
- Acid Sulphate Soil Manual (NSW Acid Sulfate Soil Management Advisory Committee 1998).
- Sampling Design Guidelines (EPA, 1995)
- Consultants Reporting on Contamination Land-Contaminated Land Guidelines (EPA, 2020).

The objective of the DSI was to assess the nature and extent of contamination at the site, assess the suitability of the site for the proposed land use and, provide recommendations (if required) for further investigations and/or development of a remediation action plan (RAP) to render the site suitable for the proposed land use. It is understood that the report will be used to support a State Significant Development Application (SSDA) for the proposed upgrade.

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

DP carried out a geotechnical investigation in conjunction with this DSI, the results of which are presented in a separate report (DP Report Reference 94626.02.R.001.Rev0).

2. Proposed Development

The proposed development seeks to upgrade Glenwood High School. The upgrade consists of the following alterations and additions:

- Construction of a new three-storey building at the north-eastern portion of the site facing Glenwood Park Drive which will accommodate approximately 54 learning spaces.
- Construction of one storey performance pavilion;
- Refurbishment of existing Building Block A (ground floor only) to provide one new support unit within the space of an existing general learning space;
- Refurbishment of Building Block D (ground floor only) to provide an additional office space and storeroom;
- Refurbishment of Building Block E to re-purpose it on the ground floor for computer learning spaces, staff and administration as well as upgrades to the library on the first floor;
- Refurbishment of Building Block J to re-purpose it from visual arts and performing arts to learning spaces and workshops for food tech and woods/metal unit; and
- Demolition of existing botany room and construction of a new single storey pavilion comprising of interview rooms and end-of trip facilities; and
- The proposed development will also involve ancillary works at the site associated with the proposed upgrades

This report relates to the three storey building outlined in the first dot point.

3. Scope of Works

The scope of work for the DSI comprised:

- A review of geological, soil, acid sulfate soil, salinity and hydrogeological published information to assess and document the site's environmental setting;
- A review of readily-available site history information, comprising:
  - Current and historical title deeds;
  - Historical aerial photographs;
  - Search of the NSW EPA Land Information public databases held under the Contaminated Land Management Act 1997 and the Protection of the Environment Operations Act 1997;
  - Records held by SafeWork NSW;
  - Council Section 10.7 Planning Certificate;
- Search for groundwater bores on or adjacent to the site registered with the NSW Department of Primary Industries (DPI) Water;
- A site walkover to identify conditions that may indicate Potential Areas of Environmental Concern (PAEC);
- Preparation of a conceptual site model (CSM);

- Completion of a Dial Before You Dig underground services records search and scan of underground services carried out by a Telstra accredited services locator;
- Drilling of twenty-one boreholes (Bores 101 to Bore 122 excludes Bore 104) across the site;
- Collection of soil samples from each borehole location. Samples were collected at regular depth intervals, change of strata or indicators of potential contamination based on field observation;
- Installation and development of groundwater wells at three borehole locations to allow for future measurement/sampling of groundwater/levels;
- Survey of borehole locations using a differential GPS;
- Laboratory analysis of selected soil and groundwater samples for a range of the following contaminants:
    - Metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel, zinc);
    - Polycyclic aromatic hydrocarbons (PAH);
    - Total recoverable hydrocarbons (TRH);
    - Benzene, toluene, ethylbenzene and xylene (BTEX);
    - Phenols;
    - Organochlorine pesticides (OCP) , organophosphorus pesticides (OPP);
    - polychlorinated biphenyls (PCB);
    - pH;
    - cation exchange capacity (CEC); and
    - Asbestos.
- Field sampling and laboratory analysis included a Quality Assurance/Quality Control (QA/QC) plan consisting of approximately 10% intra-laboratory replicates and appropriate Chain of Custody procedures and in-house laboratory QA/QC testing;
- Interpretation of laboratory results in accordance with current NSW EPA endorsed guidelines; and
- Preparation of this DSI report outlining the methodology and results of the investigation, an assessment of the site's suitability for the proposed development and recommendations for further works if considered necessary. A preliminary waste classification will also be included to assist project planning.

4. Site Information

The site identification is presented in Table 1 and the site location is shown in Figure 1 and Drawing 1 in Appendix B.

Table 1: Site Identification

Site Address	85 Forman Avenue, Glenwood
Legal Description	Lot 5227 Deposited Plan 868693
Area	Full school site 6.1 hectares (approximately) Development area 0.5 hectare (approximately)
Zoning	SP2 Educational Establishment
Local Council Area	Blacktown City Council (BCC)
Current Use	High School/Educational
Surrounding Uses	North – undeveloped land East – Glenwood Park Drive with residential properties beyond and an open drainage reserve at the northern end South – Forman Avenue with residential properties beyond West – Recreational playing fields (Glenwood Reserve)

Figure 1: Site Location Plan of Proposed New Building (Source: Nearmap)

5. Environmental Setting

5.1 Topography

The regional topography generally comprises undulating hills with elevations to 60 m and 70 m Australian Height Datum (AHD). Site surface levels generally fall towards the north-east with gradients estimated to be up to 3°. The overall difference in level is estimated to be about 10 m from the highest part of the site (approximately 70 m AHD in the south-west corner) to the lowest (approximately 59 m AHD in the north-east corner).

5.2 Site Geology

Reference to the Penrith 1: 100 000 scale Soil Landscape Series Sheet indicates that the site is located within the Blacktown soil landscape group. The Blacktown Group is characterised by moderately reactive, highly plastic subsoil with poor drainage characteristics.

Reference to the Penrith 1:100 000 scale Geological Series Sheet indicates that the site is underlain by Ashfield Shale of Triassic Age. Ashfield Shale typically comprises dark grey to black shale, siltstone and aminate which weathers to a residual clay profile of medium to high plasticity.

5.3 Acid Sulphate Soils

Review of published mapping indicates that the site is in an area of 'no known occurrence of acid sulfate soils'. The NSW Acid Sulfate Soils Manual 1998 published by the Acid Sulfate Soils Management Advisory Committee (ASSMAC) indicates that ASS (and Potential Acid Sulfate Soils – PASS) normally occur in alluvial or estuarine soils below RL 5 m AHD although occasionally are encountered up to RL 12 m AHD. Considering the ASS mapping and given that the site soils are at site elevations above RL 50 m AHD, it is considered unlikely that ASS is present on-site.

5.4 Salinity

The Department of Infrastructure, Planning and Natural Resources (DIPNR) "Map of Salinity Potential in Western Sydney 2002" suggests that the site is in an area of "moderate to high salinity potential" with a higher potential in the lower elevations areas in close proximity to the Caddies Creek system.

5.5 Surface Water and Groundwater

The closest surface water receptor to the site is Caddies Creek located about 240 m north-west of the site.

Based on the local topography, groundwater is anticipated to flow to the north-east towards the open stormwater channel associated with Caddies Creek.

A search of the NSW Department of Primary Industries Water (DPI Water) online map of registered groundwater works was undertaken as part of the investigation. The search carried out on 19 August 2020 identified no registered groundwater boreholes within 500 m of the site.''

6. Site History

6.1 Title Deeds

A historical title deeds search was used to obtain ownership and occupancy information including company names and the occupations of individuals. The title information can assist in the identification of previous land uses by the company names or the site owners and can, therefore, assist in establishing whether there were potentially contaminating activities occurring at the site. A summary of the title deeds and possible land uses (with reference to the aerial photographs and other historical searches) is presented in Appendix C.

Table 2: Historical Title Deeds

Date of Acquisition and Term Held	Registered Proprietor(s) & Occupations	Inferred Land Use
1901 – 1939	Arthur Brien (Farmer)	Agricultural
1939 – 1939	Edith May Brien (Widow) (Transmission application not investigated)	Rural residential
1939 – 1944	Robert George Brien (Poultry Farmer)	Agricultural
1944 – 1963	Percy Edward Dobson (Dairyman)	Agricultural
1963 – 1968	Muriel Irene Dobson (Widow) (Section 94 Application no investigated)	Rural residential
1968 – 1968	Lexa Atkinson (Married Woman) Joy Kennedy (Married Woman)	Rural residential
1968 – 1973	Mario Bottero (Company Director) Maria Luigia Bottero (Married Woman)	Rural residential
1973 – 1999	The Housing Commission of New South Wales now New South Wales Land and Housing Corporation	Residential
1999 to date	#Minister for Education and Training	Educational

# Denotes current registered proprietor

Easements:

- 23.05.1997 (D.P. 868693) Easement to Drain Water 2.5 m wide and variable
- 01.06.2005 (D.P. 1083112) Easement for Padmount Substation 2.75 m wide
- 01.06.2005 (D.P. 1083112) Easement for Underground Cables 1 m wide

Leases:

- 11.03.1966 to Associated Dairies Limited – cancelled 11.04.1974
- 16.01.2009 (AE 225734) – surrendered 07.09.2010, not investigated.
- 16.01.2009 (AE 225735) to Axiom Education Pty Limited (excluding premises in Lease AE 225734) – expires 31.12.2032

- 16.01.2009 (AE 225736) Sub Lease to Minster for Education and Training– expires 31.12.2032

- 07.09.2010 (AF 599543) Sub Lease to The Trust Company Limited, of ABC Glenwood South – expires 31.12.2032
  - 26.11.2010 (AF 886881) Sub Lease to Goodstart Early Learning Ltd – expires 30.12.2027, also 5 year option

6.2 Historical Aerial Photography

A review of historical aerial photographs was carried out to identify changes to the site and surrounding areas which may include potential land contaminating activities. Images from 1955, 1961, 1970, 1979, 1986, 1991, 2004 and 2005 were sourced from Spatial Services, NSW. The aerial photographs are included in Drawings 2 to 7 in Appendix D. A summary of key features observed for the site and surrounding land is presented in Table 3.

Table 3: Summary of Historical Aerial Photographs

Year	Site	Surrounding Land Use
1955	The site appears to be undeveloped and moderately vegetated.	The surrounding land in all directions appears to be undeveloped and vegetated. Small dams are located on the land to the west and north-west.
1961	The site appears to be largely unchanged from the 1955 photograph	The dams to the west and north-west appear to have increased in size. The remaining surrounding land appears to have remained largely unchanged from the 1955 photograph.
1970	The site appears to be largely unchanged from the 1961 photograph	The dam to the north-west appears to have reduced in size. A new dam has appeared to the north-west of the site.
1979	The site appears to be largely unchanged from the 1970 photograph	The land to the south appears to have been cleared and a large dam has been constructed.
1986	The site appears to be largely unchanged from the 1979 photograph	The surrounding land appears to have remained largely unchanged from the 1979 photograph.
August 1991	The site appears to be largely unchanged from the 1986 photograph	The surrounding land appears to have remained largely unchanged from the 1986 photograph.
September 1991	The site appears to be largely unchanged from the August 1991 photograph	The surrounding land appears to have remained largely unchanged from the August 1991 photograph.
2004	The site appears to have been largely cleared except for in the north-eastern	Residential developments appear to have been constructed to the north-west,

Year	Site	Surrounding Land Use
	corner. A few buildings have been constructed in the south-western corner of the site and concrete slabs appear to have been constructed in the south-western corner. Earthworks for playing fields and basketball courts appear to be underway in the north-western corner of the site.	west and south. Glenwood Lake appears to have been constructed to the north along with the construction of open drainage reserves. Playing fields and an associated building and parking areas appear to have been constructed to the west.
2005	Construction for all buildings over the site appears to have been completed along with associated parking areas. The playing fields and basketball courts appear to have been completed in the north-western corner of the site.	The surrounding land appears to have remained largely unchanged from the 2004 photograph.

A brief review of satellite images from Nearmap from 2010 and 2020 was also carried out. A summary of key features observed for the site and surrounding land is presented in Table 4.

Table 4: Summary of Nearmap and MetroMap Images

Year	Site	Surrounding Land Use
2010	The site appears to have remained largely unchanged from the 2005 photograph except for eight structures (portable buildings) that appear to have been constructed close to the centre of the site.	The surrounding land appears to have remained largely unchanged from the 2005 photograph except for the clearing of land and earthworks operations to the north-west
August 2020	Another eleven portable buildings appear to have been constructed in the north-eastern corner of the site. A shade structure appears to have been constructed over the southern half of the basketball courts and a structure has been constructed to the north of the baskets courts. The remaining areas of the site appear to be largely unchanged.	The construction of the playing fields to the north-west appears to be completed. Dense vegetation is evident to the north of the playing fields and along the drainage reserve associated with Glenwood Lake.
August 2021	The site appears unchanged from the 2020 photograph.	The surrounding land appears unchanged from the 2020 photograph.

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6.3 Public Registers and Planning Records

A search of the database held by SafeWork NSW was conducted for the site on 7 August 2020. The search did not locate any records pertaining to the storage of hazardous chemicals at the site. A copy of the response from SafeWork NSW is included in Appendix F.

EPA Notices	A search of the EPA public database on 19 August 2020 did not indicate any contaminated sites within the suburb of Glenwood.
EPA Contaminated Land Record	A search of the Contaminated Land Record on 19 August 2020 did not indicate any contaminated sites within the suburb of Glenwood.
Planning Certificate	A review of Section 10.7 certificates received from Blacktown Council on 10 December 2019 indicates that there are no contaminated land notices applicable to the site. A copy of the Section 10.7 Certificate is included in Appendix E.
SafeWork NSW	A Safework NSW records search of Information on Storage of Hazardous Chemicals for the subject site was received in a letter dated 6 August 2020. The results indicated that Safework NSW did not locate "any records pertaining to the above-mentioned premises". A copy of the Safework letter is included in Appendix F.
Council Records	A review of Blacktown City Council's Website did not indicate any records of contamination activities at the school.

DP notes that a review of the Schools Infrastructure NSW register could not locate the asbestos register for this high school. Notwithstanding the absence of this register it is noted that the asbestos register of schools of a similar age in the local area has predominantly indicated that refurbished demountable buildings may have asbestos present in remnant mastic in window frames.

6.4 Site History Integrity Assessment

The information used to establish the history of the site was sourced from reputable and reliable reference documents, many of which were official records held by Government departments/agencies. The databases maintained by various Government agencies potentially can contain high quality information, but some of these do not contain any data at all.

In particular, aerial photographs provide high quality information that is generally independent of memory or documentation. They are only available at intervals of several years, so some gaps exist in the information from this source. The observed site features are open to different interpretations and can be affected by the time of day and/or year at which they were taken, as well as specific events, such as flooding. Care has been taken to consider different possible interpretations of aerial photographs and to consider them in conjunction with other lines of evidence.

6.5 Summary of Site History

The site history information suggests that the site was vacant up until 1955 to 2004 where land was partially used for rural and residential purposes. Since then the site appears to have undergone major site changes, including construction of a number of buildings, outdoor recreational areas and parking areas, occurring predominantly between 2004 and 2020.

7. Site Walkover

A site walkover was undertaken by an environmental engineer (Mr Grant Russell) and geotechnical engineer (Mr Gavin Boyd) on 7 August 2020. The general site topography was consistent with that described in Section 5.1. The site layout appears to have remained unchanged from the 2020 aerial photograph. No evidence of staining was evident during DP's site visit. Building rubble was observed beneath demountable buildings in the north-east side of the school

Site photographs are included in Appendix G.

8. Potential Areas of Environmental Concern

From the site history review and the site inspection, it is considered that a potential for contamination exists at the Site. Three areas were identified as PAEC and are summarised in Table 5.

It should be noted that as only a site walkover was completed, the PAEC identified are considered to have a low potential for contamination but cannot be ruled out without intrusive investigation being completed.

Table 5: Summary of Identified Potential Areas of Environmental Concern

PAEC#	Identified from	Description
1	Site Inspection	Refurbished Demountable Structures may contain remnant asbestos
2	1947 – Present Aerials and Site History Review	Fill placed across the site for the formation of site levels and the backfilling of the creek in the north-east corner of the site
3	1947 – Present Aerials Site History Review	Previous Agricultural Activities

9. Preliminary 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 ie: it enables an assessment of the potential source – pathway – receptor linkages (complete pathways).

Potential Sources

Based on the current investigation, the following potential sources of contamination and associated contaminants of potential concern (COPC) have been identified:

- Potential Source S1 (S1): Hazardous Building Materials

  Refurbished Demountable Structures may contain remnant asbestos.

- Potential Source S2 (S2): Fill: Fill areas of the site were identified during the review of aerial photographs and site inspection. It is not known whether fill materials were sourced from within the site or imported from an off-site source. Filling may be associated with levelling, demolition of former buildings on the site and potential burying of waste

  There is potential for areas of the site to be impacted from fill and demolition waste related COPC including:

  - Heavy metals;
  - TRH;
  - BTEX;
  - PAHs;
  - PCBs;
  - OCPs and OPPs; and
  - Asbestos.

- S3: Previous Agricultural Activity (Potential Source S3)

  Historical aerial photographs indicate that the site and surrounding area have been used for grazing or other agricultural activities up to the development of the school in 2008.

  Agricultural activities are commonly associated with use of pesticides. There is potential for contamination of surface soils from agriculture related COPCs including:

  - OCPs; and
  - Heavy metals (Arsenic, Cadmium, Chromium, Copper, Lead, Mercury, Nickel and Zinc).

Receptors

The following potential human receptors have been identified:

- R1: Current and future users [Education Facility];
- R2: Construction and maintenance workers;

The following potential environmental receptors have been identified:

- R3: Surface water [Second Ponds Creek]
- R4: Groundwater; and
- R5: Terrestrial ecology.

Potential Pathways

The following potential pathways have been identified:

- P1: Ingestion and dermal contact;
- P2: Inhalation of dust and/or vapours;
- P3: Surface water run-off;
- P4: Lateral migration of groundwater providing base flow to water bodies;
- P5: Leaching of contaminants and vertical migration into groundwater; and
- P6: Contact with terrestrial ecology.

Summary of Potentially Complete Exposure Pathways

A 'source–pathway–receptor' approach has been used to assess the potential risks of harm being caused to human or environmental receptors from contamination sources on or in the vicinity of the site, via exposure pathways (potential complete pathways). The possible pathways between the above sources (S1 to S3) and receptors (R1 to R5) are provided in Table 5.

10. Fieldwork, Analytical Rationale and Method

10.1 Data Quality Objectives and Project Quality Procedures

The investigation has been devised broadly in accordance with the seven step data quality objective (DQO) process which is provided in NEPC (2013) *National Environment Protection (Assessment of Site Contamination) Measure* (as amended 2013). The DQO process is outlined as follows:

- Stating the Problem;
- Identifying the Decision;
- Identifying Inputs to the Decision;
- Defining the Boundary of the Assessment;
- Developing a Decision Rule;
- Specifying Acceptable Limits on Decision Errors; and
- Optimising the Design for Obtaining Data.

An evaluation of the DQO is presented in Appendix K.

10.2 Data Quality Indicators

The performance of the investigation in achieving the DQO was assessed through the application of Data Quality Indicators (DQI), defined as follows:

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

An evaluation of the DQI is presented in Appendix K.

10.3 Soil

10.3.1 Sampling Locations and Rationale

Table A of the NSW EPA (1995) *Sampling Design Guidelines* recommends a minimum of thirteen sampling points for a site of 0.5 ha for site characterisation based on the detection of circular hot spots using a systematic sampling pattern. This density has been adopted for the DSI on this site with additional surface samples targeting the PAEC issues. Twenty-one boreholes (Bore 101 to Bore 122) were positioned across accessible areas of the site (see Drawing 1 in Appendix B). Additional boreholes and samples carried out outside the development footprint were carried out for previous proposed developments. The results are included in this report as background information over the wider school site.

10.3.2 Sampling Methodology

The field work was undertaken on 8 August 2020, 27 August 2020 and 31 August 2020 and involved the following:

Disturbed samples were collected at regular depth intervals to assist with logging and for laboratory testing.

All sampling data was recorded on DP's borehole logs, provided in Appendix H. Environmental sampling was performed with reference to standard operating procedures outlined in the DP *Field Procedures Manual*. The general sampling procedure adopted for the collection of soil samples for was as follows:

- Collection of soil samples from auger returns using disposable sampling equipment;
- Transfer samples into laboratory-prepared glass jars, completely filled to minimise the headspace within the sample jar, and capping immediately to minimise loss of volatiles;
- Labelling of sample containers with individual and unique identification, including project number, sample location and sample depth;
- Placement of the glass jars with Teflon lined lids into a cooled, insulated and sealed container for transport to the laboratory;
- Use of chain of custody documentation so that sample tracking and custody could be cross-checked at any point in the transfer of samples from the field to the laboratory;
- Laboratory-prepared trip blanks and spikes were taken and subject to the same jar storage and transfer as the field samples; and
- Dispatching primary and replicate samples to Envirolab Services Pty Ltd (ELS) a National Association of Testing Authorities (NATA) accredited laboratory for the tests performed.

DP notes that blind replicate samples were collected from the same location and identical depth to the primary sample (at a minimum of one replicate (intra-sample per ten primary samples). Samples were split to prevent the loss of volatiles from the soil (i.e. not homogenised in a bowl). Blind replicate samples were labelled with a DP identification number, recorded on DP's borehole logs, so as to conceal their relationship to the primary sample from the primary analytical laboratory.

Three of the boreholes (Bores 102, 103 and 105) were converted to groundwater monitoring wells at the completion of drilling. The wells involved inserting Class 18 uPVC screen and casing to the required depths, backfilling the screened length with clean gravel, plugging the top of the gravel with bentonite pellets and backfilling the casing with drilling spoil. The casing was finished with a gatic cover installed flush with the ground surface. Following installation, the wells were purged of groundwater and measurement of the groundwater level and sampling occurred on 2 September 2020.

Groundwater sampling was conducted in accordance with standard operating procedures including:

- Preparing record of samples, including sample date, location, description, signs of concern, and any field results;
- Measurement of groundwater level and thickness of any light non-aqueous phase liquids (LNAPL) in the wells;
- Purging of each well prior to sampling until the field parameters of pH, electrical conductivity (EC), dissolved oxygen (DO), temperature and reduction potential have stabilised (three consecutive readings at ±0.1°C, ±0.3 mg/L for DO, ±3% for EC, ±0.1 pH units, ±10 mV for reduction potential);
- Sampling of the groundwater from each well using a low flow pump;
- Decontaminating all re-usable sampling equipment prior to collecting each sample using a 3% solution of phosphate free detergent (Decon 90) and distilled water;
- Immediate placement of sample in laboratory-prepared sample containers and capping;
- Labelling sample containers with individual and unique identification, including project number and sample number;
- Collection of a duplicate sample;

- to the laboratory; and
- Use of chain-of-custody documentation so that sample tracking and custody can be cross-checked at any point in the transfer of samples from the field to hand-over to the laboratory.

The ground surface levels (measured in 'metres above Australian Height Datum' -m AHD') together with the Eastings and Northings at the test pit, borehole and surface sample locations were determined by using a High Precision Differential GPS which is accurate to approximately 0.1 m. The sample locations are shown on Drawing 1 in Appendix B.

10.3.3 Analytical Rationale

A total of twenty six primary soil samples were selected for analysis with the majority from fill and eight from the natural soil, given that field observations suggested that contamination is more likely to be associated with the fill than natural soil. One intra-laboratory replicate sample, one laboratory prepared trip spike sample and one laboratory prepared trip blank sample were submitted to a NATA accredited laboratory, ELS. Soil samples were analysed for COPC selected based on the potential contaminations sources associated with former site uses and/or activities as identified during the site history information review and site walkover and discussed in the CSM as presented in Section 8.

Three groundwater samples obtained from the three installed groundwater wells, one intra-laboratory replicate sample, one laboratory prepared trip spike sample and one laboratory prepared trip blank sample were submitted to ELS. Groundwater samples were analysed for CoPC selected based on the potential contamination sources associated with former site uses and/or activities as identified during the site history information review and site walkover and discussed in the CSM as presented in Section 8.

11. Site Assessment Criteria

In order to establish the compatibility of the site for the proposed development, the concentrations of the CoPC reported in the soil and groundwater samples tested have been assessed against appropriate site assessment criteria (SAC).

11.1 Soil

11.1.1 Health Investigation and Screening Levels

Based on the proposed development as a high school, the generic Health Investigation Levels (HIL) and Health Screening Levels (HSL) for a high school with garden/accessible soil (HIL A) is considered to be appropriate for the assessment of contamination at the site. The adopted soil HIL and HSL for the CoPC are presented in Table 6.

Table 6: Commercial HIL and HSL in mg/kg unless otherwise indicated

Contaminants		HIL - A and HSL - A	HSL - A Vapour Intrusion[3]
Metals	Arsenic	100	-
	Cadmium	20	-
	Chromium (VI)	100	-
	Copper	6000	-
	Lead	300	-
	Mercury (inorganic)	40	-
	Nickel	400	-
	Zinc	7400	-
PAH	Benzo(a)pyrene TEQ[1]	3	-
	Naphthalene	-	4
	Total PAH	300	-
TRH	C6 – C10 (less BTEX) [F1]	-	40
	>C10-C16 (less Naphthalene) [F2]	-	230
	>C16-C34 [F3]	-	-
	>C34-C40 [F4]	-	-
BTEX	Benzene	-	0.6
	Toluene	-	390
	Ethylbenzene	-	NL
	Xylenes	-	95
Phenol	Pentachlorophenol (used as an initial screen)	100	-
OCP	Aldrin + Dieldrin	6	-
	Chlordane	50	-
	DDT+DDE+DDD	240	-
	Endosulfan	270	-
	Endrin	10	-
	Heptachlor	6	-
	HCB	10	-
	Methoxychlor	300	-
OPP	Chlorpyrifos	160	-
PCB[2]		1	-

Notes:
1. sum of carcinogenic PAH
2. non dioxin-like PCB only.
3. The vapour intrusion HSL have been calculated for a silty clay fill being the predominant soil type (Section 11.1 and an assumed depth to contamination 0 m to <1 m

11.1.2 Ecological Investigation Levels

Ecological Investigation Levels (EIL) and Added Contaminant Limits (ACL), where appropriate, have been derived in NEPC (2013) for a short list of contaminants comprising As, Cu, Cr (III), DDT, naphthalene, Ni, Pb and Zn.

The adopted EIL derived using the interactive (excel) calculation spreadsheet on the NEPM toolbox website are presented in Table 7.

Table 7: EIL in mg/kg

Analyte		EIL	Comments
Metals	Arsenic	100	Adopted parameters (through analysis) pH = 6.67; CEC =13 $cmol_c/kg$; assumed clay content = 70%; "Aged" (>2 years) source of contamination Low for traffic volumes in NSW and commercial land use.
	Copper	220	
	Nickel	200	
	Chromium III	770	
	Lead	1,100	
	Zinc	570	
PAH	Naphthalene	170	
OCP	DDT	180	

11.1.3 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 ESL adopted are shown in Table 8.

Table 8: ESL in mg/kg

Analyte		ESL	Comments
TPH	[F1]	180*	All ESLs are low reliability apart from those marked with * which are moderate reliability The ESLs have been calculated for a fine soil with Urban residential and public open space.
	[F2]	120*	
	[F3]	1,300	
	[F4]	5,600	
BTEX	Benzene	65	
	Toluene	105	
	Ethylbenzene	125	
	Xylenes	45	
PAH	Benzo(a)pyrene	0.7	

11.1.4 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; and
- Effects on buried infrastructure e.g. penetration of, or damage to, in-ground services.

The management limits adopted from Schedule B1 of NEPC (2013) are shown in Table 9.

Table 9: Management Limits in mg/kg

Analyte		Management Limit	
TRH	C_6– C_{10}	800	The management limits have been calculated for a fine soil and urban residential and public open space land use.
	>C_{10}-C_{16}	1000	
	>C_{16}-C_{34}	3500	
	>C_{34}-C_{40}	10 000	

Separate management limits for BTEX and naphthalene are not available hence these have not been subtracted from the relevant fractions to obtain F1 and F2

11.1.5 Asbestos in Soil

Based on the CSM 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. Therefore, 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.

11.2 Groundwater

11.2.1 Groundwater Investigation Levels

The groundwater investigation levels (GIL) adopted in NEPC (2013) which are based on ANZECC (2000) which has been recently replaced by ANZG (2018), NRMMC (2008) and NRMMC (2011). It is noted that drinking water guidelines were not applied to the site as they we're not deemed relevant as no ground water bores were observed within 500 m of the site and groundwater abstraction is not proposed as part of site development. An assessment of groundwater results to compare against the drinking water guidelines should be undertaken if onsite groundwater abstraction is proposed.

The adopted GIL for the contaminants included in the assessment (where applicable), and the corresponding source documents, are shown in Table 9.

Table 10: GIL (in µg/L unless otherwise stated)

Potential Contaminant		Fresh Waters*	Hardness Adjusted
Metals	Arsenic (V)	13	-
	Cadmium	0.2	3.2
	Chromium (VI)	1.0	12.0
	Copper	1.4	-
	Lead	3.4	178.0
	Mercury (total)	0.6	-
	Nickel	11	156.0
	Zinc	8	114.0
PAH	Naphthalene	16	-
	Benzo(a)pyrene	0.2	-
Phenols	Total	320	-
BTEX	Benzene	950	-
	Toluene	180	-
	Ethylbenzene	80	-
	Xylenes (Total)	550	-
	Total (DDT)	0.01	-
OPP	Total (Chlorpyrifos)	0.01	-
PCB	Total	2	-
Total Cyanide	Total	7	-
Ammonia	Total	900	-

Notes: * For 95% protection of species as adopted in NEPC 2013.
** Hardness adjusted guideline adopted on a conservative result of 680 obtained in the well BH105.

11.2.2 Health Screening Levels

The generic residential land use HSL (HSL A / B) are considered to be appropriate for the assessment of contamination at the site from the perspective of the potential for vapour intrusion. The adopted groundwater HSL for vapour intrusion, from Table 1A(4), Schedule B1 of NEPC (2013) are shown in the following Table 11.

Table 11: HSL (µg/L)

Analyte		HSL-AB	
TRH	[F1]	6000	The HSL have been calculated for a clay soil, based on the heterogeneous fill present across the site and an assumed depth to contamination of 2 m to <4 m based on encountered groundwater depth.
	[F2]	NL	
BTEX	Benzene	4000	
	Toluene	NL	
	Ethylbenzene	NL	
	Xylene	NL	
PAH	Naphthalene	NL	

Note: NL -The solubility limit is defined as the groundwater concentration at which the water cannot dissolve any more of an individual chemical based on a petroleum mixture. The soil vapour which is in equilibrium with the groundwater will be at its maximum. If the derived groundwater HSL exceeds the water solubility limit, a soil-vapour source concentration for a petroleum mixture could not exceed a level that would result in the maximum allowable vapour risk for a given scenario. For these scenarios no HSL is presented for these chemicals. These are denoted as not limiting 'NL'.

12. Results

12.1 Field Work Soil Results

The borehole logs from the investigation are provided in Appendix C. Notes defining classification methods and terms used to describe the soils and rocks are included in Appendix A. The subsurface conditions encountered underlying the site of the can be summarised as follows:

- Topsoil: - silty clay topsoil fill to depths of between 0.1 m and 0.2 m in all boreholes except Bore 122. Inclusions of gravel, rootlets and surficial vegetation were encountered within the topsoil;
- Fill: - silty clay or sandy silt fill in all boreholes except Bore 104 to depths ranging between 0.1 m and 0.9 m. Inclusions of sand, gravel, brick, PVC pipe and plastic were encountered within the fill;
- Natural Soil: - typically stiff silty clay with some firm layers in all boreholes except Bore 122 to depths ranging between 0.5 m and 4.6 m. Stiff or very stiff gravelly clay was encountered in Bore 101 below a depth of 3 m and from 2 m to 3 m depth in Bore 102. Inclusions of ironstone and siltstone gravel were encountered within the clay;
- Very Low and Low Strength Siltstone: - very low strength, moderately weathered siltstone was encountered below a depth of 1.3 m in Bore 105 increasing to very low to low strength, below a depth of 1.8 m. Low strength, moderately weathered siltstone was encountered below a depth of 4.6 m in Bore 101 and low strength, slightly weathered siltstone with very low strength bands was encountered below a depth of 4.4 m in Bore 102;
- Low and Medium Strength Siltstone - low to medium strength, moderately to highly weathered siltstone with very low strength bands and clay seams was encountered below a depth of 3.0 m in Bore 103. Medium strength, moderately or slightly weathered siltstone was encountered below depths of 4.9 m and 3.0 m in Bore 102 and Bore 105, respectively. Very low strength bands and clay seams were encountered within the siltstone in Bore 105;
- High Strength Siltstone - high strength, fresh, unbroken siltstone with 10 % sandstone laminations were encountered below depths of between 4.9 m and 5.1 m in Bores 102, 103 and 105.

12.2 Groundwater Results

Free groundwater was observed at depths of 3.0 m and 2.0 m in Bore 101 and Bore 102, respectively on completion of auger drilling. Groundwater was not observed during the drilling of the remaining boreholes. Backfilling of all boreholes (except where wells were installed in Bores 102, 103 and 105) at the completion of drilling precluded long term monitoring of the groundwater levels.

Groundwater levels were measured in the monitoring wells on two subsequent occasions. A summary of the groundwater levels measured to date are provided in Table 12 with associated groundwater parameters outlined in Table 13.

Table 12: Results of Groundwater Level Measurements

Borehole Location	Surface RL (m AHD)	Monitoring Well Measurements – Water Level			
		27 August 2020		2 September 2020	
		Depth (m)	RL (m AHD)	Depth (m)	RL (m AHD)
102	59.4	1.6	57.8	2.2	57.2
103	60.4	2.4	58.0	2.3	58.1
105	62.2	3.2	59.0	3..1	59.1

Note: RL = Reduced Levels relative to Australian Height Datum (AHD)

The groundwater levels suggest groundwater flow to the east in the direction of the stormwater channel to the north-east of the site.

Table 13: Groundwater Details and Water Levels

Well	Temp (ºC)	DO (mg/L)	EC (µS/cm)	pH	Redox (mV)
102	18.2	0.18	11295	6.03	39.6
103	17.7	0.32	5563	6.71	90.2
105	17.4	0.30	10791	5.98	120.4

All water in the wells was found to be pale brown or clear and odourless.

The dissolved oxygen ranged between 0.02 ppm to 0.08 ppm indicating anaerobic water. Conductivity ranged between 5563 µS/cm to 11295 µS/cm indicating saline water. The pH was neutral and redox indicated reducing conditions.

12.3 Laboratory Results

The results of the laboratory analysis undertaken are presented in the following tables in Appendix I.

Tables I1 and I2: Soil Results; and

Table I3: Groundwater Results;

The full NATA laboratory certificates of analysis together with the chain of custody and sample receipt advice are attached in Appendix J.

In order to confirm the quality of the assessment data, the seven-step data DQO process has been completed see Section 9.1.

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

The QA/QC assessment is also included in the DQA provided in Appendix K. The results of the QA/QC assessment indicate that there are no issues precluding the use of the analytical results in the assessment.

12.3.1 Asbestos

Reported concentrations of asbestos in the soils samples were below the laboratory limit of reporting of 0.1 g/kg.

12.3.2 Other COPC

Reported concentrations of metals, BTEX, TRH, OCP, OPP, PCB and phenols in the soil samples were below the laboratory limit of reporting or practical quantitation limit (PQL) and / or within SAC with the exception of a EIL/ESL exceedance in Test Bore 109 from 0.01- 0.1 m.

13. Discussion of Results

13.1 Site History

Based on site history, it appears that the site was undeveloped until 2004 and was possibly used for agricultural activities prior to 1963. Following clearing of the land the site appears to have had increased potential for uncontrolled imported fill for development purposes including asbestos containing materials.

The potential sources of historical contamination identified are from imported fill from the construction of the existing high school and past and current land uses.

13.2 Intrusive Investigation (soils)

The field investigation involved a site walkover inspection, drilling of boreholes, sampling and laboratory testing.

Thirty-four soil samples collected from test locations across the site were tested for a range of common contaminants. For the soil samples tested, all reported concentrations of contaminants were below the adopted SAC except for a minor EIL/ESL exceedance of the BH109/0.0-0.1 m. The EIL/ESL level of 390 mg/kg exceeded the EIL/ESL level of 300 mg/kg. This minor exceedance is not considered statistically significant. Furthermore, this material is likely to be removed as part of construction works on-site.

Detectable concentrations of metals, TRH and PAHs were recorded in some soil samples with the remaining analytes having concentrations below the laboratory PQL.

13.3 Groundwater Sampling

From the groundwater samples tested, all reported concentrations of contaminants were below the adopted SAC with the exception of the well in Bore 105 where a minor exceedance of zinc. In this sample, the zinc level (150 µg/L) is above the GIL (8 µg/L) and the calculated hardness modified GIL (114 µg/L)

The elevated zinc concentration in the well in Bore 105 is only minor and typical of groundwater encountered within urbanised areas of Sydney. The zinc concentration in the two wells closest to the nearest water receptor, the stormwater channel to the north-east of the school, were below the zinc concentrations.

No on site or off-site (hydraulically upgradient) sources of groundwater contamination in proximity to the site have been identified. Furthermore, the testing of soil and groundwater samples across the site has not reported concentrations of contaminants considered to present a risk of groundwater contamination.

14. Conclusions and Recommendations

The scope of the current Detailed Site Investigation included a desktop study and a site walkover which informed an updated CSM, data gaps assessment and a summary SAQP together with sampling and laboratory testing. The current investigation identified three potential areas of environmental concern (PAEC) that required investigation to characterise whether or not they pose an actual contamination risk to the proposed development. It is noted that these potential sources of contamination observed at the site are typical for the region and are considered by DP to unlikely pose a contamination constraint to the proposed development at this time.

Based on the findings of this investigation, DP concludes that the potential for contamination constraints at the site is considered to be relatively low. Given the absence of any indicators of significant soil contamination at the site at this time, groundwater investigations are not considered to be required at this time.

As with any site, there is always the potential that concealed structures and / or materials may be present at the site and this should be considered following removal of the demountable buildings and during bulk earthworks for the proposed development. In particular, it is recommended that an occupational hygienist inspect and test the ground following removal of the demountable buildings on-site. Furthermore, an Unexpected Finds Protocol will need to be established for use following removal of the demountable buildings and during earthworks during redevelopment, in order to ensure that due process is carried out in the event of a possible contaminated find.

15. References

Australian Collaborative Land Evaluation Program, Acid Sulfate Soils Risk Map [http://www.asris.csiro.au/arcgis/rest/services/ASRIS/Acid_Sulfate_Soils/MapServer]

Geological Survey of NSW Penrith, 1:100 000 Geology Sheet

NEPC (2013) National Environment Protection (Assessment of Site Contamination) Measure 1999 (as amended 2013)

NSW EPA (2017) Guidelines for the NSW Site Auditor Scheme (3rd Edition)

NSW EPA (2020) Consultants Reporting on Contaminated Land.

Soil Conservation Service of NSW, Penrith 1:100 000 Sheet

16. Limitations

Douglas Partners (DP) has prepared this report for this project at 85 Forman Avenue, Glenwood in accordance with DP's proposal NWS200105 dated 15 July 2020. The work was carried out under DP's Conditions of Engagement. This report is provided for the exclusive use of NSW Department of Education 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.

This report must be read in conjunction with all of the attached notes 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.

The contents of this report do not constitute formal design components such as are required, by the Health and Safety Legislation and Regulations, to be included in a Safety Report specifying the hazards likely to be encountered during construction and the controls required to mitigate risk. This design process requires risk assessment to be undertaken, with such assessment being dependent upon factors relating to likelihood of occurrence and consequences of damage to property and to life. This, in turn, requires project data and analysis presently beyond the knowledge and project role respectively of DP. DP may be able, however, to assist the client in carrying out a risk assessment of potential hazards contained in the Comments section of this report, as an extension to the current scope of works, if so requested, and provided that suitable additional information is made available to DP. Any such risk assessment would, however, be necessarily restricted to the environmental components set out in this report and to their application by the project designers to project design, construction, maintenance and demolition.

Douglas Partners Pty Ltd

Appendix A

About This Report

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.

DATA FOR DESCRIPTION AND CLASSIFICATION OF SOILS – Page 1

Major Divisions				Description		Field Identification			
				Group Symbol*	Typical Name	Grading		Nature of Fines	Dry Strength
COARSE-GRAINED SOILS	More than 65% by dry mass, (excluding that larger than 63 mm) is greater than 0.075 mm	GRAVEL	More than 50% of coarse grains are greater than 2.36 mm	GW	Well graded gravels and gravel-sand mixtures, little or no fines.	Good	Wide range in grain size	'Clean' materials (not enough fines to bind grains)	None
				GP	Poorly graded gravels and gravel-sand mixtures, little or no fines.	Poor	Predominantly one size or gap graded		
		GRAVELLY SOILS		GM	Silty gravels, gravel-sand-silt mixtures.	Good to Fair	'Dirty' materials with excess of fines	Fines are non-plastic	None to medium
				GC	Clay gravels, gravel-sand-clay mixtures.			Fines are plastic	Medium to high
		SAND	More than 50% of coarse grains are less than 2.36 mm	SW	Well graded sands and gravelly sands, little or no fines.	Good	Wide range in grain size	'Clean' materials (not enough fines to bind grains)	None
				SP	Poorly graded sands and gravelly sands, little or no fines.	Poor	Predominantly one size or gap graded		
		SANDY SOILS		SM	Silty sand, sand-silt mixtures.	Good to Fair	'Dirty' materials with excess of fines	Fines are non-plastic	None to medium
				SC	Clayey sands, sand-clay mixtures.			Fines are plastic	Medium to high
* For coarse grained soils where the fines content is between 5% and 12%, the soil shall be given a dual classification eg GP-GM.						Dry Strength		Dilatancy	Toughness
FINE-GRAINED SOILS	More than 35% by dry mass, (excluding that larger than 63 mm) is less than 0.075 mm	Liquid Limit less than 35%		ML	Inorganic silts, very fine sands, rock flour, silty or clayey fine sands.	None to low		Slow to rapid	Low
				CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays.	Medium to high		None to slow	Medium
				OL	Organic silts and organic silty clays of low plasticity	Low to medium		Slow	Low
		35% <LL< 50%		CI	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays.	Medium to high		None to slow	Medium
		Liquid Limit greater than 50%		MH	Inorganic silts, micaceous or diatomaceous fine sands or silts, elastic silts.	Low to medium		None to slow	Low to medium
				CH	Inorganic clays of high plasticity, fat clays.	High to very high		None	High
				OH	Organic clays of medium to high plasticity.	Medium to high		None to very slow	Low to medium
				Pt	Peat muck and other highly organic soils.	Readily identified by colour, odour, spongy feel and generally fibrous texture			

ORDER OF DESCRIPTION

In the soil description the terms should be given in the following order:

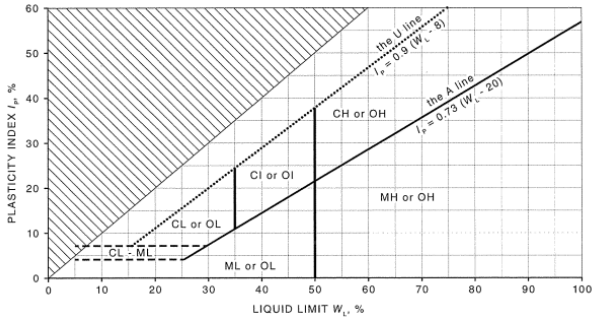
- SOIL NAME & UNIFIED CLASSIFICATION SYMBOL.
- Plasticity, behavioural or particle characteristics of the primary soil component
- Colour
- Secondary soil components' name(s), estimated proportion(s), plasticity, behavioural or particle characteristics, colour and where practical, its plasticity
- Moisture Condition (disturbed or undisturbed state)
- Consistency of fine-grained soils (undisturbed state only)
- Relative density of coarse-grained soils (determined by in situ tests)
- Structure of soil (in undisturbed state)
  - Zoning
  - Defects
  - Cementing
- Origin of soil
- Additional observations

EXAMPLES:

Silty SAND SM: fine to coarse grained, light brown, 15% non-plastic fines, with gravel, 20% angular particles, moist, apparently dense in place, alluvial.

SILT ML: low plasticity, brown, trace fine sand, w > PL, firm, estuarine.

PLASTICITY CHART (after AS 1726:2017)



The classification system excludes the boulder and cobble fractions of the soil and classifies only the materials less than 63 mm in size.

PARTICLE SIZES

Boulders	> 200 mm
Cobbles	63 mm to 200 mm
Gravel	2.36 mm to 63 mm
Sand	0.075 mm to 2.36 mm
Silt and Clay	< 0.075 mm

SAND			SILT
COARSE	MEDIUM	FINE	SILT
2.36-0.6 mm	0.6-0.2 mm	0.2-0.075 mm	0.075-0.002 mm
			

DATA FOR DESCRIPTION AND CLASSIFICATION OF SOILS – Page 2

GRAVEL

Density	Field Test
LOOSE	By inspection of voids and particle packing.
DENSE	

SAND

Density	Field Test	DPT Blows per 300 mm[1]		SPT N Blows	CPT q_c MPa	Relative Density %	Estimated Friction Angle
		Dry[2]	Wet[3]				
VERY LOOSE	Easily penetrated with 13 mm reinforcing rod pushed by hand.	< 1	0	0 – 4	0 – 2	0 – 15	25 - 30
LOOSE	Easily penetrated with 13 mm reinforcing rod pushed by hand. Can be excavated with a spade; 50 mm wooden peg can be easily driven.	1 - 3	< 1	4 – 10	2 – 5	15 – 35	27 - 32
MEDIUM DENSE	Penetrated 300 mm with 13 mm reinforcing rod driven by 2 kg hammer – hard shovelling.	3 - 8	1 - 6	10 – 30	5 – 15	35 – 65	30 - 35
DENSE	Penetrated 300 mm with 13 mm reinforcing rod driven with 2 kg hammer, requires pick for excavation; 50 mm wooden peg hard to drive	8 – 15	6 - 10	30 – 50	15 – 25	65 – 85	35 - 40
VERY DENSE	Penetrated only 25 – 50 mm with 13 mm reinforcing rod driven by 2 kg hammer.	> 15	> 10	> 50	> 25	85 – 100	38 - 43

[1]Valid for depths up to approx 1m bgl; [2]At a mc of approx. 3%-5%; [3]At a mc of approx. 15%.

SILT & CLAY

Consistency	Field Test		DCP Blows per 150 mm	SPT N Blows	Undrained Shear Strength C_u Shear Vane (kPa)	Unconfined Compressive Strength q_u PP* (kPa)	CPT q_c kPa
VERY SOFT	Easily penetrated > 40 mm by thumb. Exudes between thumb and fingers when squeezed in hand	Shear Vane Preferred	< 1	< 2	< 12	< 25	0 - 180
SOFT	Easily penetrated 10 mm by thumb. Moulded by light finger pressure.		1 – 1.5	2 – 4	12 – 25	25 – 50	180 - 375
FIRM	Impression by thumb with moderate effort. Moulded by strong finger pressure		1.5 – 3	4 – 8	25 – 50	50 – 100	375 - 750
STIFF	Slight impression by thumb cannot be moulded with finger		3 – 6	8 – 16	50 – 100	100 – 200	750 - 1500
VERY STIFF	Very tough. Readily indented by thumbnail.		6 – 12	16 – 32	100 – 200	200 – 400	1500 - 3000
HARD	Brittle. Indented with difficulty by thumbnail.		> 12	> 32	> 200	> 400	> 3000
FRIABLE	Easily crumbled or broken into small pieces by hand.						

* Pocket Penetrometer (**PP**) may overestimate q_u by a factor of 1.5 to 2.0.

Note: Visual-tactile assessment is indicative only. Use in-situ testing for logging

MOISTURE OF FINE GRAINED SOILS

Moist, dry of plastic limit	w < PL	Wet, near liquid limit	w ≈ LL
Moist, near plastic limit	w ≈ PL	Wet, wet of liquid limit	w > LL
Moist, wet of plastic limit	w > PL		

DEGREE OF SATURATION OF SANDS

Condition of Sand	Criteria	Degree of Saturation (%)
Dry	Non-cohesive and free-running	0 – 25%
Moist	Feels cool, darker colour, grains tend to adhere to one another	25 – 75%
Wet	Feels cold, makes hands wet, should be close to water table	75 – 99%

FIELD IDENTIFICATION PROCEDURE FOR FINE GRAINED SOILS OR FRACTIONS

These procedures are to be performed on the minus 0.4 mm sieve size particles. For field classification purposes, screening is not intended, simply remove by hand the coarse particles that interfere with the tests.

Dilatancy (Reaction to shaking):

After removing particles larger than 0.4 mm sieve size, prepare a pat of moist soil with a volume of about 8000 mm^3. Add enough water if necessary to make the soil soft but not sticky. Place the pat in the open palm of one hand and shake horizontally, striking vigorously against the other hand several times. A positive reaction consists of the appearance of water on the surface of the pat which changes to a livery consistency and becomes glossy. When the sample is squeezed between the fingers, the water and gloss disappear from the surface, the pat stiffens and finally it cracks or crumbles. The rapidity of appearance of water during shaking and of its disappearance during squeezing assist in identifying the character of the fines in a soil. Very fine clean sands give the quickest and most distinct reaction whereas a plastic clay has no reaction. Inorganic silts, such as a typical rock flour, show a moderately quick reaction.

Dry Strength (Crushing characteristics):

After removing particles larger than 0.4 mm sieve size, mould a pat of soil to the consistency of putty, adding water if necessary. Allow the pat to dry completely by oven sun or air drying, and then test its strength by breaking and crumbling between the fingers. This strength is a measure of the character and quantity of the colloidal fraction contained in the soil. The dry strength increases with increasing plasticity.

High dry strength is characteristic for clays of the CH group. A typical inorganic silt possesses only very slight dry strength. Silty fine sands and silts have about the same dry strength but can be distinguished by the feel when powdering the dried specimen. Fine sand feels gritty whereas a typical silt has the smooth feel of flour.

Toughness (Consistency near plastic limit):

After removing particles larger than the 0.4 mm sieve size, a specimen of soil about 12 mm cube in size, is moulded to the consistency of putty. If too dry, water must be added and if sticky, the specimen should be spread out in a thin layer and allowed to lose some moisture by evaporation. Then the specimen is rolled out by hand on a smooth surface or between the palms into a thread about 3 mm in diameter. The thread is then folded and re-rolled repeatedly. During this manipulation the moisture content is gradually reduced, and the specimen stiffens, finally loses its plasticity, and crumbles when the plastic limit is reached. After the thread crumbles, the pieces should be lumped together, and a slight kneading action continued until the lump crumbles.

The tougher the thread near the plastic limit and the stiffer the lump when it finally crumbles, the more potent is the colloidal clay fraction in the soil. Weakness of the thread at the plastic limit and quick loss of coherence of the lump below the plastic limit indicate either inorganic clay or low plasticity, or materials such as kaolin-type clays and organic clays which occur below the A-line.

Highly organic clays have a very weak and spongy feel at the plastic limit.

PROPORTION OF MINOR AND SECONDARY COMPONENTS

Term	Meaning	Approximate Proportion	
		Coarse Soils	Fine Soils
Trace	Just detectable by feel or eye. Soil properties of main component virtually unaffected.	< 5% fines < 15 % coarse fraction	< 15% sand / gravel
With	Easily detectable by feel or eye. Soil properties only slightly affected by minor components.	5% – 12% fines 15% – 30% coarse fraction	15% – 30% sand / gravel
Prefix	Easily detected by feel or eye. Soil properties significantly affected by secondary components.	> 12% fines > 30% coarse fraction	> 30% sand / gravel

PROPORTIONS OF SECONDARY COMPONENTS

5%	12%	35%
		

DATA FOR DESCRIPTION AND CLASSIFICATION OF ROCK

SEDIMENTARY ROCK TYPE DEFINITIONS

Rock Type	Definition
Conglomerate	More than 50% of the rock consists of gravel sized (greater than 2 mm) fragments.
Sandstone	More than 50% of the rock consists of sand sized (0.06 mm to 2 mm) grains.
Siltstone	More than 50% of the rock consists of silt-sized (less than 0.06 mm) granular particles and the rock is not laminated.
Claystone	More than 50% of the rock consists of clay or sericitic material and the rock is not laminated.
Shale	More than 50% of the rock consists of silt or clay sized particles and the rock is laminated.

Rocks possessing characteristics of two groups are described by their predominant particle size with reference also to the minor constituents, e.g. Clayey SANDSTONE, Sandy SHALE.

DEGREE OF WEATHERING

Term	Abbreviation	Definition
Residual soil	RS	Material is weathered to such an extent that it has soil properties. Mass structure, material texture and fabric of original rock are no longer visible, but the soil has not been significantly transported.
Extremely Weathered	XW	Material is weathered to such an extent that it has soil properties. Mass structure and material texture and fabric of original rock are still visible.
Highly Weathered	HW	The whole of the rock is discoloured, usually by iron staining or bleaching to the extent that the colour of the original rock is not recognisable. Rock strength is significantly changed by weathering. Some primary minerals have weathered to clay minerals. Porosity may be increased by leaching or may be decreased due to deposition of weathering products in pores.
Moderately Weathered	MW	The whole of the rock material is discoloured, usually by iron staining or bleaching to the extent that the colour of the original rock is not recognisable but shows little or no change of strength from fresh rock.
Slightly Weathered	SW	Rock is partially discoloured with staining or bleaching along joints but shows little or no change of strength from fresh rock.
Fresh	FR	Rock shows no sign of decomposition of individual minerals or colour changes.

DW*

*If highly and moderately weathered rock cannot be differentiated use the term, 'Distinctly Weathered (DW)'.

ORDER OF DESCRIPTION

In the rock description the terms should be given in the following order:
ROCK NAME
Grain size and type
Colour
Fabric and texture
Inclusions and minor components
Moisture content
Durability
Strength
Weathering and/or alteration
Defects – type, orientation, spacing, roughness
Stratigraphic unit
Geological structure

STRATIFICATION

Term	Separation of Stratification Planes
Thinly laminated	< 6 mm
Laminated	6 mm to 20 mm
Very thinly bedded	20 mm to 60 mm
Thinly bedded	60 mm to 0.2 m
Medium bedded	0.2 m to 0.6 m
Thickly bedded	0.6 m to 2 m
Very thickly bedded	> 2 m

DEGREE OF FRACTURING

This classification applies to diamond drill cores and refers to the spacing of all types of natural fractures along which the core discontinuous. These include bedding plane partings, joints and other rock defects, **but exclude artificial fractures such as drilling breaks.**

Term	Description
Fragmented	The core is comprised primarily of fragments of length less than 20 mm, and mostly of width less than the core diameter
Highly Fractured	Core lengths are generally less than 20 mm to 40 mm with occasional fragments
Fractured	Core lengths are mainly 30 mm to 100 mm with occasional shorter and longer sections
Slightly Fractured	Core lengths are generally 300 mm or longer with occasional sections of 100 mm to 300 mm
Unbroken	The core contains very few fractures

ROCK STRENGTH

Rock strength is classified using the unconfined compressive strength (UCS). Where adequate UCS data are not available then the classification may be based on the Point Load Strength ($I_{S(50)}$) and refers to the strength of the rock substance in the direction normal to the bedding.

Strength Term	UCS MPa	Field Guide	Approx $I_{S(50)}$ MPa
Material less than very low strength is to be described using soil properties			
Very Low	2	Material crumbles under firm blows with sharp end of pick; can be peeled with knife. Pieces up to 30 mm thick can be broken by finger pressure.	0.1
Low	6	Easily scored with a knife; indentations 1 mm to 3 mm show in the specimen with firm blows of the pick point; has dull sound under hammer. A piece of core 150 mm long by 50 mm diameter may be broken by hand. Sharp edges of core may be friable and break during handling.	0.3
Medium	20	Readily scored with a knife; a piece of core 150 mm long by 50 mm diameter can be broken by hand with difficulty.	1.0
High	60	A piece of core 150 mm long by 50 mm diameter cannot be broken by hand but can be broken by a pick with a single firm blow; rock rings under hammer.	3.0
Very High	200	Hand specimen breaks with pick after more than one blow; rock rings under hammer.	10.0
Extremely High		Specimen requires many blows with geological pick to break through intact material; rock rings under hammer.	

The approximate point load strength ($I_{S(50)}$) is based on an assumed ratio to UCS of 1:20. This ratio may vary widely and should be determined for each site and rock type.

DISCONTINUITIES / DEFECTS

The actual defect is described not the process which formed or may have formed it, e.g. 'sheared zone', not 'zone of shearing'; the latter suggests a currently active process.

Spacing*:

A measure of the spacing of discontinuities. Measure mean and range of spacings for each set where possible (do not use descriptive terms).

Thickness, openness:

Measured in millimetres normal to plane of the discontinuity.

Persistence*:

The areal extent of a discontinuity. Give trace lengths in metres.

Roughness and Shape*:

A measure of the inherent surface unevenness and waviness of the defect relative to its mean plane.

Coating or Infilling:

Clean: no visible coating or infilling.

Stained: no visible coating or infilling but surfaces are discoloured by mineral staining.

Veneer: a visible coating or infilling of soil or mineral substance but usually unable to be measured (less than 1 mm).

Patchy Veneer: if discontinuous over the plane.

Coating: a visible coating or infilling of soil or mineral substance, greater than 1 mm thick. Describe composition and thickness.

* Usually determined in field exposures

Roughness:

Very Rough
Rough
Smooth
Polished
Slickensided

Shape*:

Planar
Curved
Undulating
Stepped
Irregular

Discontinuity Spacing in Three Dimensions:

The spacing of discontinuities in exposures may be described with reference to the size and shape of rock bounded by the discontinuities.

Equidimensional	Same size in all directions
Tabular	Thickness much less than length or width
Columnar	Height much greater than cross section
Polyhedral	Irregular defects without obvious pattern

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.

Symbols & Abbreviations

Douglas Partners

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

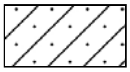
Soils


Topsoil

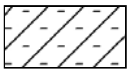

Peat


Clay

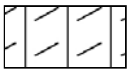

Silty clay

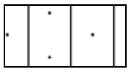

Sandy clay

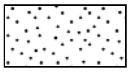

Gravelly clay

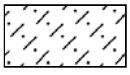

Shaly clay

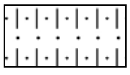

Silt


Clayey silt


Sandy silt

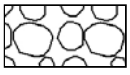

Sand

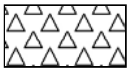

Clayey sand


Silty sand


Gravel


Sandy gravel


Cobbles, boulders

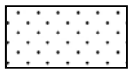

Talus

Sedimentary Rocks

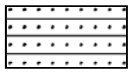

Boulder conglomerate

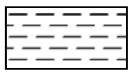

Conglomerate


Conglomeratic sandstone

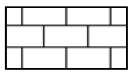

Sandstone


Siltstone


Laminite

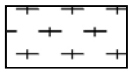

Mudstone, claystone, shale

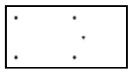

Coal


Limestone

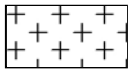
Metamorphic Rocks

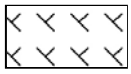

Slate, phyllite, schist

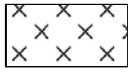

Gneiss

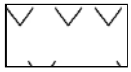

Quartzite

Igneous Rocks


Granite


Dolerite, basalt, andesite

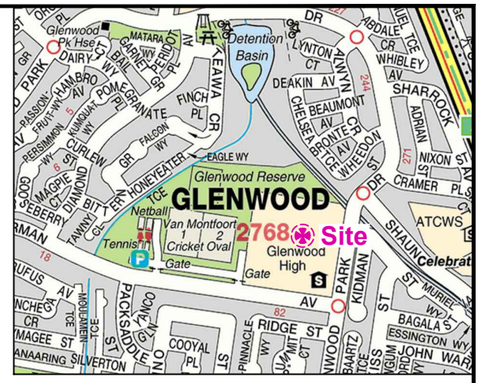

Dacite, epidote


Tuff, breccia

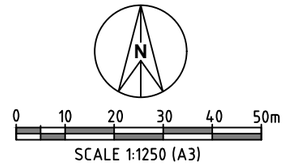

Porphyry

Appendix B

Drawing No. 1



Location Plan



LEGEND

- NEW-ADMINISTRATION UNIT
- NEW-CIRCULATION
- NEW-FOOD TECH - MATERIALS LEARNING UNIT
- NEW-GENERAL LEARNING UNIT
- NEW-SHARED LEARNING SPACE
- NEW-LIBRARY UNIT
- NEW-OUTDOOR COVERED LEARNING
- NEW-PERFORMING ARTS UNIT
- NEW-PERFORM ARTS WORKSHOP
- NEW-PERFORM ARTS STORE
- NEW-SCIENCE LEARNING UNIT
- NEW-SCIENCE LABORATORY
- NEW-SCIENCE STORE
- NEW-STAFF UNIT
- NEW-STORAGE UNIT / COMMS
- NEW-STUDENT AMENITIES
- NEW-STAFF AMENITIES
- NEW-SUPPORT LEARNING UNIT
- NEW-WOOD/METAL - MATERIALS LEARNING UNIT
- EXIST-ADMINISTRATION
- EXIST-CANTEEN UNIT
- EXIST-CIRCULATION
- EXIST-FITNESS LEARNING UNI
- EXIST-GENERAL LEARNING UNIT
- EXIST-MOVEMENT COMPLEX
- EXIST-STORAGE UNIT / COMMS
- EXIST-STUDENT AMENITIES
- EXIST-SUPPORT LEARNING UNIT
- EXIST-WOOD/METAL - MATERIALS LEARNING UNIT

LEGEND:-

- Borehole location and number
- Approx. site boundary

NOTE:-

1. Test locations are approximate only and are shown with reference to existing site features.
2. Image obtained from Near Map. Date of imagery 14-07-2020.

Douglas Partners
Geotechnics | Environment | Groundwater

CLIENT: NSW Department of Education		
OFFICE: North West Sydney	DRAWN BY: JST	
SCALE: As shown	DATE: 25 October 2021	

TITLE: **Site and Test Location Plan**
Glenwood High School Upgrade
Forman Avenue, Glenwood

PROJECT No:	94626.02
DRAWING No:	1
REVISION:	0

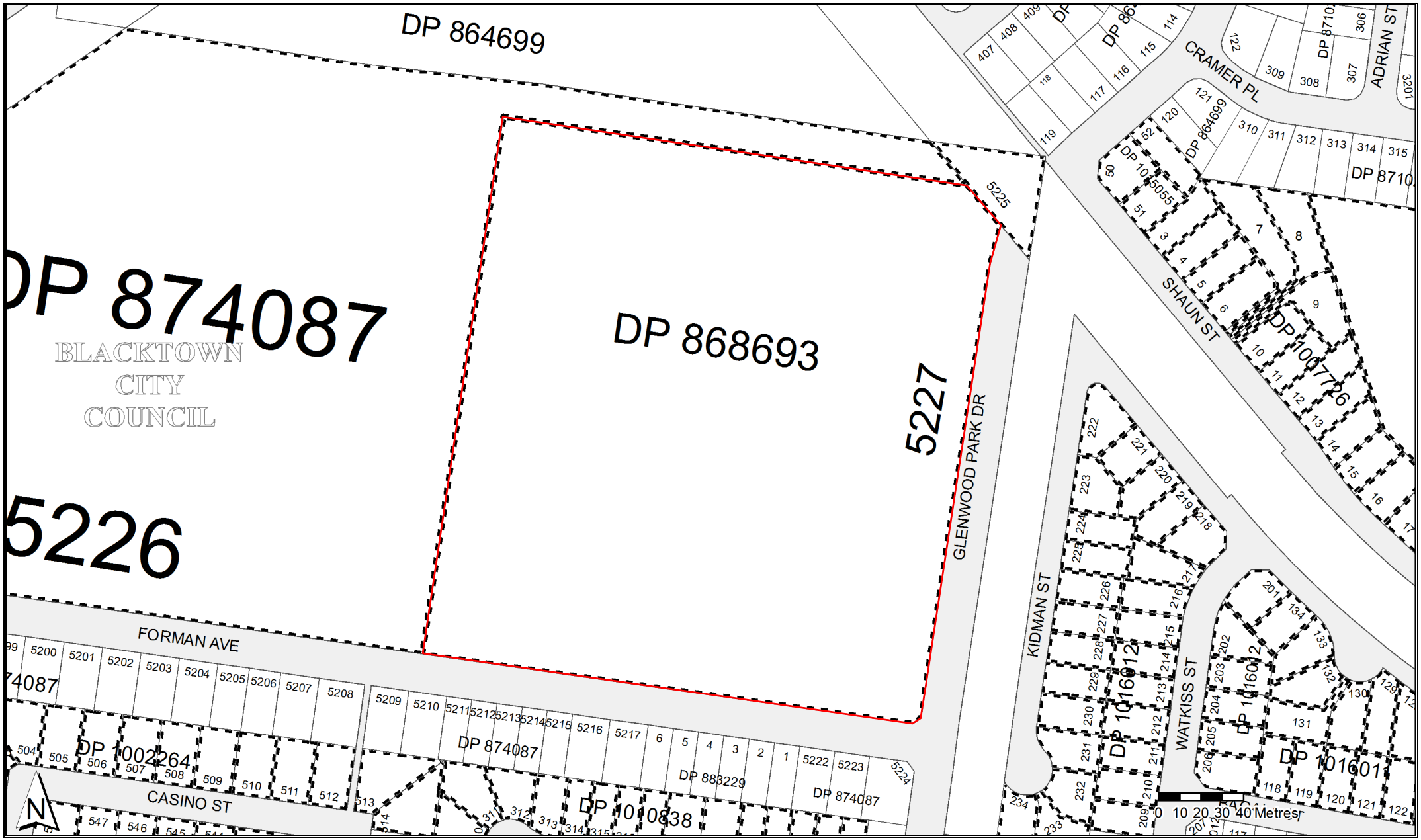
P:\NSW\94626.02\94626.00.D.002.Rev0.dwg

Appendix C

Historical Title Deeds

Cadastral Records Enquiry Report : Lot 5227 DP 868693

Locality : GLENWOOD
Parish : GIDLEY
LGA : BLACKTOWN
County : CUMBERLAND



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PLAN FORM 2

Plan Drawing only to appear in this space

*OFFICE USE ONLY

DP 868693 (F)

Registered: 23.5.1997

C.A.:

Title System: TORRENS

Purpose SUBDIVISION

Ref. Map: U 9160-II, 2#

Last Plan: DP 866497

PLAN OF SUBDIVISION OF LOT 101 D.P. 866497

Lengths are in metres. Reduction Ratio 1:5000

LGA: BLACKTOWN

Locality: GLENWOOD

Parish: GIDLEY

County: CUMBERLAND

This is sheet 1 of my plan in sheets
(Delete if inapplicable)

I JOHN GEORGE NELSON
of JOHN G. NELSON PTY. LTD.
P.O. BOX 1032 EPPING, 2121
PH. 9876-8055 FAX 9876-8474
a surveyor registered under the Surveyors Act, 1929, hereby certify that the survey represented in this plan is accurate, has been made in accordance with the Survey Practice Regulations, 1990 and was completed on 16/5/1997

(Signature) Surveyor registered under the Surveyors Act, 1929.

Datum Line or Orientation 'X'–'Y'

Plans used in preparation of survey/compilation.
D.P.856992
D.P.864699
D.P.866497

PANEL FOR USE ONLY for statements of intention to dedicate public roads or to create public reserves, drainage reserves, easements, restrictions on the use of land or positive covenants.

PURSUANT TO SEC. 88B OF THE CONVEYANCING ACT, 1919, IT IS INTENDED TO CREATE:
1. EASEMENT TO DRAIN WATER 2.5 WIDE & VARIABLE

SIGNATURE AND SEALS ONLY

SIGNED BY ME, MICHAEL ROBERT OWENS DELEGATE OF THE NEW SOUTH WALES LAND AND HOUSING CORPORATION AND I HEREBY DECLARE THAT I HAVE NO NOTICE OF THE REVOCATION OF THE DELEGATION.

M R Owens

SURVEY PRACTICE REGULATION 1990: CLAUSE 32 (2)

MARK	I.S.G. CO-ORDINATES EASTING	NORTHING	ZONE	ACC.
P.M.7677	292940.667	1265407.875	56/1	2
P.M.44703	293369.389	1265634.295	56/1	2
P.M.44704	293876.651	1265930.996	56/1	2

SOURCE: I.S.G. CO-ORDINATES ADOPTED FROM S.C.I.M.S. AT 30th AUGUST, 1996
COMBINED SEA LEVEL & SCALE FACTOR = 0.99993

SCHEDULE OF SHORT LINES

No.	BEARING	DIST	ARC	RADIUS
1	186°20'40"	19.135	22.145	12
2	219°25'50"	8.125	8.29	12
3	199°38'40"	1.06		
4	157°57'40"	5.975		
5	118°07'40"	3.425	3.425	115
6	208°59'	15.0		
7	205°11'	29.515		
8	227°06'30"	52.94		
9	217°41'20"	93.525		
10	224°23'30"	63.56		
11	235°49'40"	20.635		
12	242°10'	19.62		
13	226°54'	32.37		
14	204°08'10"	15.045		
15	195°10'50"	32.895		
16	185°13'	54.95		
17	184°05'	15.0		
18	274°05'	18.2		
19	184°05'	28.34		
20	267°43'10"	35.355		
21	177°43'10"	49.0		
22	267°43'10"	45.335		
23	222°43'	5.655		
24	177°43'10"	38.99		
25	183°18'10"	49.42	49.5	254
26	186°53'	1.0		
27	279°07'	9.0		

DIAGRAM 'A' not to scale

DIAGRAM 'B' not to scale

DIAGRAM 'C' not to scale

DIAGRAM 'D' not to scale

WHERE ANY LOT SHOWN HEREIN ABUTS A NON TIDAL STREAM OR ROAD, THE TITLE EXTENDS ONLY TO THE BOUNDARY OF THE STREAM OR ROAD AND NOT TO THE MIDDLE LINE THEREOF.

Crown Lands Office Approval

PLAN APPROVED ..... Authorised Officer

Land District .....

Paper No. .....

Film Book ..... pages .....

Council's Certificate

I hereby certify that –
(a) the requirements of the Local Government Act, 1919 (other than the requirements for the registration of plans), and
*(b) the requirements of † Part 3 Division 2 of the Water Board Act 1987, or † Part 5 Division 7 of the Hunter Water Board (Corporatisation) Act 1991,
have been complied with by the applicant in relation to the proposed (insert "new road", "subdivision" or "consolidated lot") set out herein.

Subdivision No. .....

Date .....

(Signature) ..... General Manager/Authorised Person

Council File No. .....

* This part of the certificate to be deleted where the application is only for a consolidated lot or the opening of a new road or where the land to be subdivided is wholly outside the areas of operations of the Water Board and the Hunter Water Corporation Ltd.

† Delete if inapplicable.

SURVEYOR'S REFERENCE: 05/5021–1 CHECKLIST

✱ PROPOSED ACQUISITION FOR DRAINAGE RESERVE VIDE D.P. 832280

CAD FILE: SU5021.DWG
THIS PLOT: 19/05/1997 13:58
REFERENCE: 5021.001

10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 Table of mm 210 220 230 240 250 260 270 280 290 300 310 320 330 340 350 360 370 380 390

WARNING: CREASING OR FOLDING WILL LEAD TO REJECTION

DP 868693

PLAN FORM 2 — Plan Drawing only to appear in this space

SIGNATURE AND SEALS ONLY.

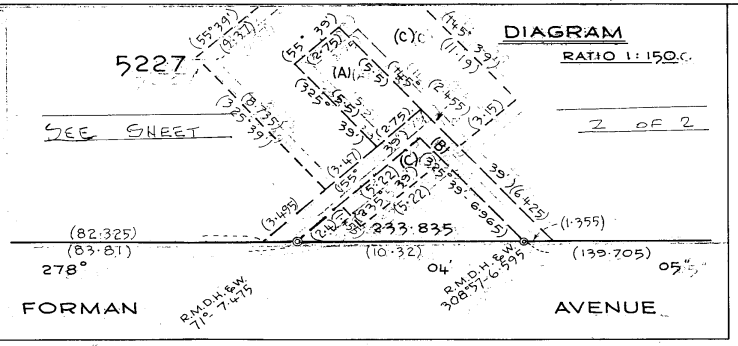
EXECUTED BY MINISTER FOR EDUCATION AND TRAINING

Signed by me as delegate of the Minister for Education and Training pursuant to Section 126 of the Education Act 1990 and I hereby certify that I have no notice of the revocation of such delegation.

DIAGRAM

RATIO 1:150 @ A3

2 OF 2

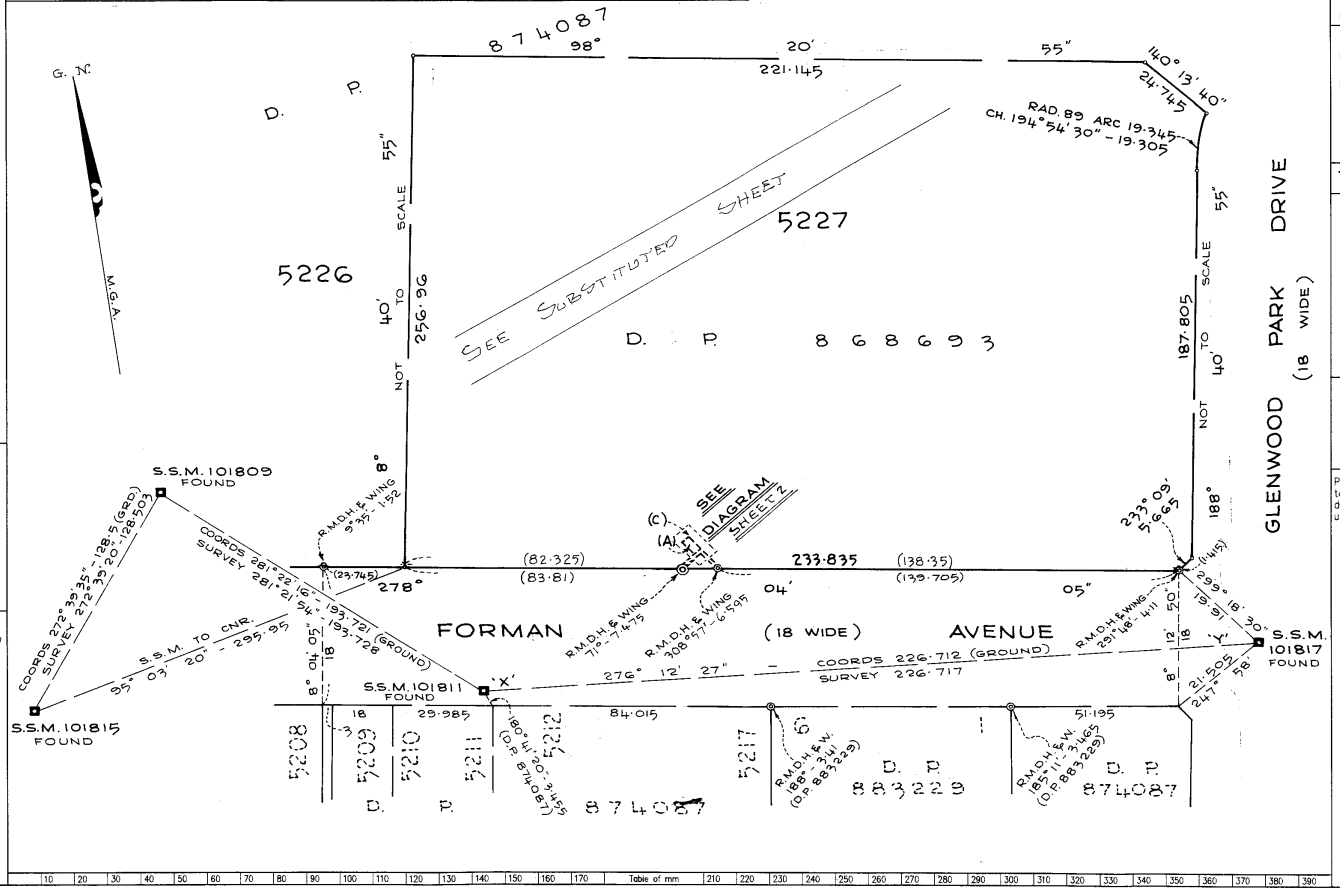


SURVEYING REGULATION 2001 : CLAUSE 32(2)				
MARK	M.G.A. COORDINATES ZONE 56 EASTING	NORTHING	CLASS	ORDER
S.S.M. 101809	308·557·879	6 265 539·478	C	4
S.S.M. 101811	308·747·805	6 265 501·282	C	4
S.S.M. 101815	308·425·515	6 265 545·441	C	4
S.S.M. 101817	308·873·197	6 265 476·767	C	3
COMBINED SEA LEVEL AND SCALE FACTOR 1·000039				
SOURCE: M.G.A. COORDINATES ADOPTED FROM S.C.I.MIS. ON 10-6-2004				

(A) - EASEMENT FOR PADMOUNT SUBSTATION 2·75 WIDE

(B) - EASEMENT FOR UNDERGROUND CABLES 1 WIDE

(C) - RESTRICTION ON USE 'ZONE'.



Department of Land and Water Conservation Approval

I ..... (Authorised Officer) ..... in approving this plan certify that all necessary approvals in regard to the allocation of the land shown hereon have been given.

Signature: .....

Date: .....

File No.: .....

Office: .....

Subdivision Certificate

hereby certify that the provisions of s.109J of the Environmental Planning and Assessment Act 1979 have been satisfied in relation to the proposed ..... set out herein

..... * (Insert "subdivision" or "new road")

..... * Authorised Person/General Manager/Accredited Certifier

Consent Authority: .....

Date of endorsement : .....

Accreditation no : .....

Subdivision Certificate no : .....

File no. .....

Note:
When the plan is to be lodged electronically in Land and Property Information, it should include a signature in an electronic or digital format approved by the Registrar-General.

* Delete whichever is inapplicable

SURVEYOR'S REFERENCE: 23174 R.H./FORMAN (CHECKLIST)

10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 Table of mm 210 220 230 240 250 260 270 280 290 300 310 320 330 340 350 360 370 380 390

WARNING: CREASING OR FOLDING WILL LEAD TO REJECTION

DP1083112

Registered 9.6.2005

Title System: TORRENS

Purpose: EASEMENT

Ref. Map: 9160-1 & 2

Last Plan: D.P. 868693

PLAN OF EASEMENTS OVER ~~LOT 5226 IN D.P. 874087 &~~ LOT 5227 IN D.P. 868693

Lengths are in metres. Reduction Ratio 1: 1000

L G A BLACKTOWN

Locality: GLENWOOD

Parish: GIDLEY

County: CUMBERLAND

SHEET 1 OF 2

~~This is sheet 1 of my plan in ... sheets.~~

(Delete if inapplicable)

Surveying Regulation 2001

I, ROBERT GORDON HARRISON of HARRISON FRIEDMANN & ASSOC. P/L P.O. BOX 99 JANNALI N.S.W. 2226 a surveyor registered under the Surveying Act, 2002, hereby certify that the survey represented in this plan is accurate, has been made in accordance with the Surveying Regulation, 2001 and was completed on 11-6-2004.

The survey relates to ~~...~~ THE EASEMENTS ONLY & ~~RESIDUE IS COMPILED~~ (here specify the land actually surveyed, or specify any land shown in the plan that is not the subject of the survey)

(Signature) ..... Dated 7-11-2004

Surveyor registered under the Surveying Act, 2002

Datum Line:

Type: Urban/~~Rural~~

Plans used in preparation of survey/~~compilation~~

D.P. 868693
D.P. 874087
D.P. 883229
D.P. 1002264
D.P. 1010838

PANEL FOR USE ONLY for statements of intention to dedicate public roads, to create public reserves, drainage reserves, easements, restrictions on the use of land or positive covenants.

PURSUANT TO SEC. 88B OF THE CONVEYANCING ACT, 1919 AND AS SET OUT IN THE ACCOMPANYING INSTRUMENT, IT IS INTENDED TO CREATE :-

1. EASEMENT FOR PADMOUNT SUBSTATION 2·75 WIDE
2. EASEMENT FOR UNDERGROUND CABLES 1 WIDE
3. RESTRICTION ON THE USE OF LAND.

*OFFICE USE ONLY

PLAN FORM 2 — Plan Drawing only to appear in this space

SIGNATURE AND SEALS ONLY.

SUBSTITUTED SHEET

SEE SHEET 1 OF 2 FOR SIGNATURES

epartment of Land and Water Conservation Approval

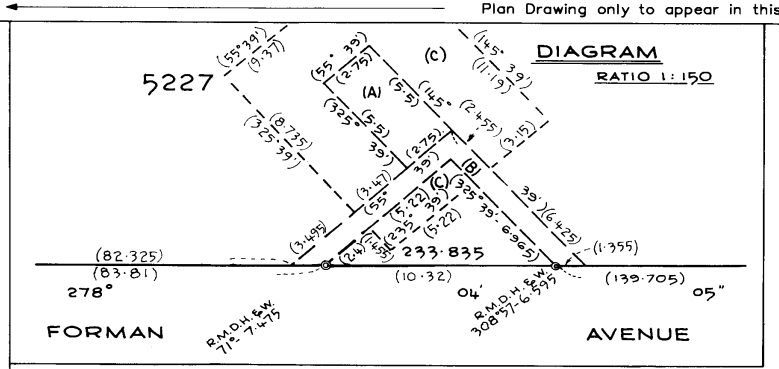
... in approving this plan certify
(Authorised Officer)
t all necessary approvals in regard to the allocation of the land
wn hereon have been given.
nature: ...
te: ...
No.: ...
ce: ...

Subdivision Certificate

reby certify that the provisions of s.109J of the Environmental Planning Assessment Act 1979 have been satisfied in relation to the osed ... set out herein
* (Insert "subdivision" or "new road")
* Authorised Person/General Manager/Accredited Certifier
nsent Authority: ...
te of endorsement: ...
creditation no: ...
bdivision Certificate no: ...
no. ...
te: ...
em the plan is to be lodged electronically in Land and Property ormation, it should include a signature in an electronic or digital rmat approved by the Registrar-General.
* Delete whichever is inapplicable

SURVEYOR'S REFERENCE: 23174 R.H./FORMAN (CHECKLIST)

DIAGRAM
RATIO 1:150



(A) - EASEMENT FOR PADMOUNT SUBSTATION 2.75 WIDE

(B) - EASEMENT FOR UNDERGROUND CABLES 1 WIDE

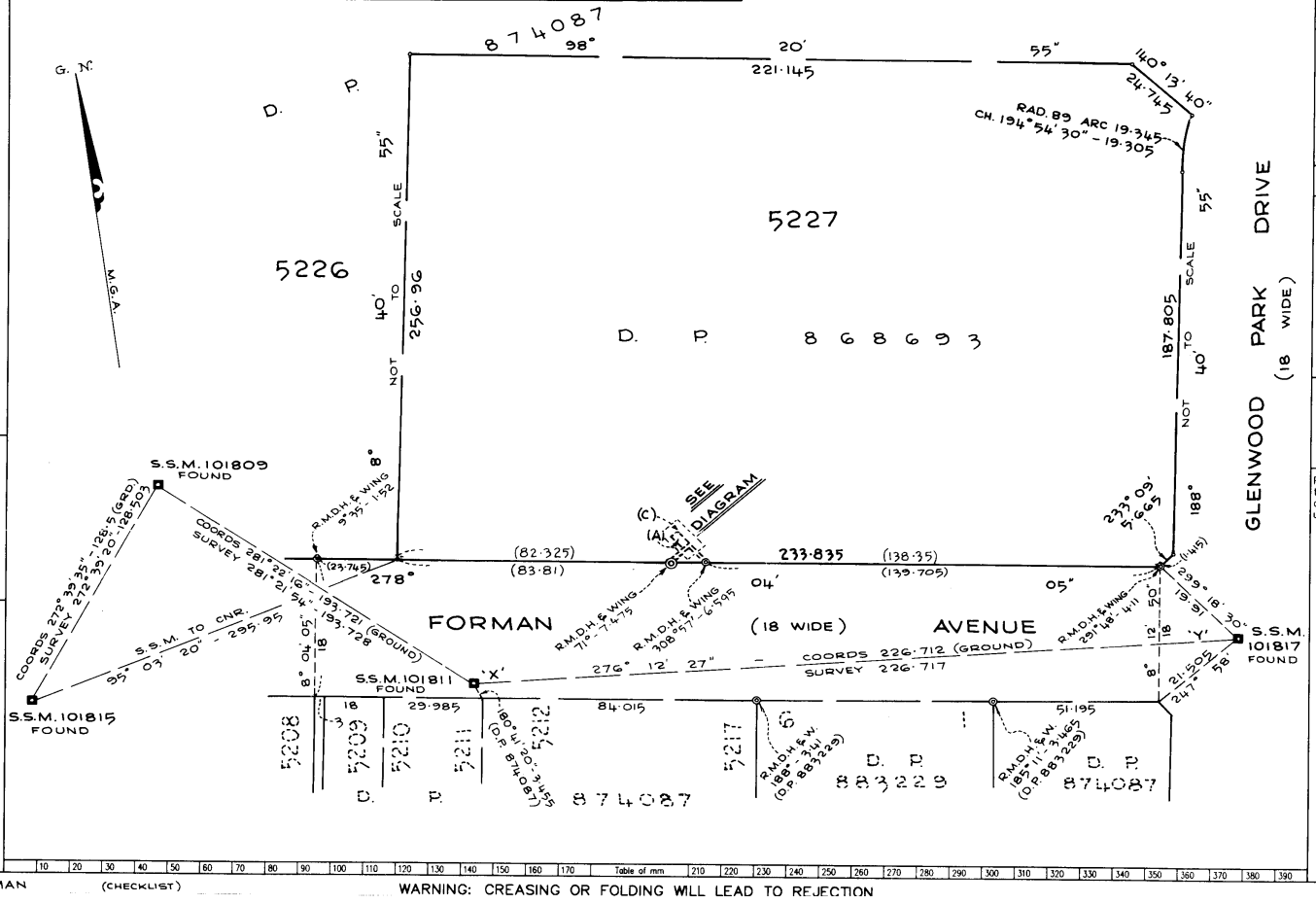
(C) - RESTRICTION ON USE ZONE.

SURVEYING REGULATION 2001 : CLAUSE 32(2)

MARK	M.G.A. COORDINATES ZONE 56 EASTING	NORTHING	CLASS	ORDER
S.S.M.101809	308 557·879	6 265 539·478	C	4
S.S.M.101811	308 747·805	6 265 501·282	C	4
S.S.M.101815	308 429·515	6 265 545·441	C	4
S.S.M.101817	308 973·197	6 265 476·767	C	3

COMBINED SEA LEVEL AND SCALE FACTOR 1·000039

SOURCE: M.G.A. COORDINATES ADOPTED FROM S.C.I.M.S. ON 10-6-2004



WARNING: CREASING OR FOLDING WILL LEAD TO REJECTION

SUBSTITUTED SHEET
DP1083112

Registered: *
Title System:
Purpose: SEE SHEET 1
Ref. Map:
Last Plan:

PLAN OF EASEMENTS OVER ~~LOT 5226 IN D.P. 874087 &~~ LOT 5227 IN D.P. 868693

Lengths are in metres. Reduction Ratio 1: 1000

L.G.A. BLACKTOWN
Locality: GLENWOOD
Parish: GIDLEY
County: CUMBERLAND
SHEET 2 OF 2

~~This is sheet 1 of my plan in ... sheets~~
(Delete if inapplicable)

Surveying Regulation 2001

I, ROBERT GORDON HARRISON of HARRISON FRIEDMANN & ASSOC. P/L. P.O. BOX 99 JANNALI N.S.W. 2226
a surveyor registered under the Surveying Act, 2002, hereby certify that the survey represented in this plan is accurate, has been made in accordance with the Surveying Regulation, 2001 and was completed on 11-6-2004.
The survey relates to ~~...~~ THE EASEMENTS ONLY & RESIDUE IS COMPILED
(here specify the land actually surveyed, or specify any land shown in the plan that is not the subject of the survey)
(Signature) ... Dated: 2-U-2004
Surveyor registered under the Surveying Act, 2002
Datum Line:
Type: Urban/~~Rural~~

Plans used in preparation of survey/~~compilation~~
D.P. 868693
D.P. 874087
D.P. 883229
D.P. 1002264
D.P. 1010838

PANEL FOR USE ONLY for statements of intention to dedicate public roads, to create public reserves, drainage reserves, easements, restrictions on the use of land or positive covenants.

PURSUANT TO SEC. 88B OF THE CONVEYANCING ACT, 1919 AND AS SET OUT IN THE ACCOMPANYING INSTRUMENT, IT IS INTENDED TO CREATE:-

1. EASEMENT FOR PADMOUNT SUBSTATION 2.75 WIDE
2. EASEMENT FOR UNDERGROUND CABLES 1 WIDE
3. RESTRICTION ON THE USE OF LAND.

*OFFICE USE ONLY

Historical Title

NEW SOUTH WALES LAND REGISTRY SERVICES - HISTORICAL SEARCH

SEARCH DATE
10/8/2020 2:02PM

FOLIO: 3084/849826

First Title(s): OLD SYSTEM
Prior Title(s): 5002/847626

Recorded	Number	Type of Instrument	C.T. Issue
7/6/1995	DP849826	DEPOSITED PLAN	LOT RECORDED FOLIO NOT CREATED
1/8/1996	DP849826	DEPOSITED PLAN	FOLIO CREATED EDITION 1
5/8/1996	2352161	DEPARTMENTAL DEALING	EDITION 2
16/10/1996	DP862902	DEPOSITED PLAN	FOLIO CANCELLED RESIDUE REMAINS
12/11/2001	8103813	DEPARTMENTAL DEALING	

*** END OF SEARCH ***

Glenwood Forman PRINTED ON 10/8/2020

Received: 10/08/2020 14:02:03

Historical Title

NEW SOUTH WALES LAND REGISTRY SERVICES - HISTORICAL SEARCH

SEARCH DATE
10/8/2020 2:01PM

FOLIO: 3117/862902

First Title(s): OLD SYSTEM
Prior Title(s): 3084/849826

Recorded	Number	Type of Instrument	C.T. Issue
16/10/1996	DP862902	DEPOSITED PLAN	FOLIO CREATED EDITION 1
4/3/1997	DP866497	DEPOSITED PLAN	FOLIO CANCELLED
26/6/1997	3177675	DEPARTMENTAL DEALING	FOLIO CANCELLED
17/9/1997	3420884	DEPARTMENTAL DEALING	FOLIO CANCELLED

*** END OF SEARCH ***

Glenwood Forman PRINTED ON 10/8/2020

Received: 10/08/2020 14:01:51

Historical Title

NEW SOUTH WALES LAND REGISTRY SERVICES - HISTORICAL SEARCH

SEARCH DATE
10/8/2020 2:01PM

FOLIO: 101/866497

First Title(s): OLD SYSTEM
Prior Title(s): 3117/862902

Recorded	Number	Type of Instrument	C.T. Issue
4/3/1997	DP866497	DEPOSITED PLAN	FOLIO CREATED EDITION 1
23/5/1997	DP868693	DEPOSITED PLAN	FOLIO CANCELLED
17/9/1997	3420882	DEPARTMENTAL DEALING	FOLIO CANCELLED

*** END OF SEARCH ***

Glenwood Forman PRINTED ON 10/8/2020

Received: 10/08/2020 14:01:43

Historical Title

NEW SOUTH WALES LAND REGISTRY SERVICES - HISTORICAL SEARCH

SEARCH DATE
3/8/2020 6:21AM

FOLIO: 5227/868693

First Title(s): OLD SYSTEM
Prior Title(s): 101/866497

Recorded	Number	Type of Instrument	C.T. Issue
23/5/1997	DP868693	DEPOSITED PLAN	FOLIO CREATED EDITION 1
17/9/1997	3420882	DEPARTMENTAL DEALING	
7/9/1999	6167978	TRANSFER	EDITION 2
1/6/2005	DP1083112	DEPOSITED PLAN	EDITION 3
16/1/2009	AE225734	LEASE	
16/1/2009	AE225735	LEASE	
16/1/2009	AE225736	SUB-LEASE	EDITION 4
7/9/2010	AF599542	SURRENDER OF LEASE	
7/9/2010	AF599543	LEASE	EDITION 5
26/11/2010	AF886881	SUB-LEASE	
13/6/2012	AH8823	CAVEAT	
16/11/2012	AH362225	WITHDRAWAL OF CAVEAT	
16/11/2012	AH349283	MORTGAGE OF LEASE	
13/9/2018	AN699187	CHANGE OF NAME	
13/9/2018	AN699188	CHANGE OF NAME	
13/9/2018	AN699186	VARIATION OF LEASE	

*** END OF SEARCH ***

Glenwood Forman PRINTED ON 3/8/2020

Received: 03/08/2020 06:21:17

Form: 97-01T

Licence: LAW/0526/98

TRANSFER

New South Wales

Real Property Act 1900

6167978K

Office of State Revenue use only

Crown Instrument not liable to Stamp Duty
I. V. KNIGHT
Crown Solicitor
per

(A) **LAND TRANSFERRED**
If appropriate, specify the share or part transferred.

FOLIO IDENTIFIER 5227/868693

(B) **LODGED BY**

LTO Box	Name, Address or DX and Telephone
813E	**State Crown Solicitor's Office** 60-70 Elizabeth Street, Sydney DX 19 SYDNEY PH: 9224-5075 REFERENCE (optional): EDU 534.235PEC

(C) **TRANSFEROR** **NEW SOUTH WALES LAND AND HOUSING CORPORATION ("LANDCOM")**

(D) acknowledges receipt of the consideration of four million five hundred and seventy five thousand dollars ($4,575,000.00) and as regards the land specified above transfers to the transferee an estate in fee simple.

(E) Encumbrances (if applicable) 1. 2. 3.

(F) **TRANSFEREE**

T **TS** (s713 LGA) **TW** (Sheriff)	**MINISTER FOR EDUCATION AND TRAINING**

(G) **TENANCY:**

(H) We certify this dealing correct for the purposes of the Real Property Act 1900. **DATE** 25 August 1999

Signed in my presence by the transferor who is personally known to me.

.....
Signature of Witness

RACHEL PULLICINO
NEW SOUTH WALES
LAND AND HOUSING CORPORATION
PARRAMATTA

Name of Witness (BLOCK LETTERS)

.....
Address of Witness

Signed by me Frances Wilmore as delegate of the New South Wales Land and Housing Corporation, and I hereby certify that I have no notice of revocation of such delegation.

.....
Signature of Transferor

.....
Signature of Witness

.....
Name of Witness (BLOCK LETTERS)

.....
Address of Witness

Signed for IAN VICTOR KNIGHT, State Crown Solicitor's Office, Solicitor for the transferee, by PAUL CROLLINI, Senior Solicitor, State Crown Solicitor's Office

I. V. KNIGHT
Crown Solicitor
per

.....
Signature of Transferee

CHECKED BY (LTO use) .....

Title Search

NEW SOUTH WALES LAND REGISTRY SERVICES - TITLE SEARCH

FOLIO: 5227/868693

SEARCH DATE	TIME	EDITION NO	DATE
10/8/2020	2:17 PM	5	7/9/2010

LAND

LOT 5227 IN DEPOSITED PLAN 868693
AT GLENWOOD
LOCAL GOVERNMENT AREA BLACKTOWN
PARISH OF GIDLEY COUNTY OF CUMBERLAND
TITLE DIAGRAM DP868693

FIRST SCHEDULE

MINISTER FOR EDUCATION AND TRAINING (T 6167978)

SECOND SCHEDULE (8 NOTIFICATIONS)

1 315922 RIGHT OF WAY APPURTENANT TO THE PART(S) SHOWN SO BENEFITED IN THE TITLE DIAGRAM
2 DP862902 RESTRICTION(S) ON THE USE OF LAND
3 DP868693 EASEMENT TO DRAIN WATER 2.5 WIDE AND VARIABLE AFFECTING THE PART(S) SHOWN SO BURDENED IN THE TITLE DIAGRAM
4 DP1083112 EASEMENT FOR PADMOUNT SUBSTATION 2.75 METRE(S) WIDE AFFECTING THE PART(S) SHOWN SO BURDENED IN DP1083112
5 DP1083112 EASEMENT FOR UNDERGROUND CABLES 1 METRE(S) WIDE AFFECTING THE PART(S) SHOWN SO BURDENED IN DP1083112
6 DP1083112 RESTRICTION(S) ON THE USE OF LAND
7 AE225735 LEASE TO AXIOM EDUCATION PTY LIMITED EXCLUDING THE PREMISES IN LEASE AE225734. EXPIRES: 31/12/2032.
AE225736 LEASE OF LEASE AE225735 TO MINISTER FOR EDUCATION AND TRAINING EXPIRES: 30/11/2032.
* AH349283 MORTGAGE OF LEASE AE225735 TO AET STRUCTURED FINANCE SERVICES PTY LIMITED
* 8 AF599543 LEASE TO THE TRUST COMPANY LIMITED (SEE AN699187) OF PART BEING PREMISES KNOWN AS ABC GLENWOOD SOUTH AS SHOWN IN PLAN WITH AE225734. EXPIRES: 31/12/2032.
* AF886881 LEASE OF LEASE AF599543 TO GOODSTART EARLY LEARNING LTD (SEE AN699188). EXPIRES: 30/12/2022. OPTION OF RENEWAL: 5 YEARS AND ONE FURTHER OPTION OF 5 YEARS.
* AN699186 VARIATION OF LEASE AF886881 EXPIRY DATE NOW 30/12/2027. OPTION OF RENEWAL: 5 YEARS.

END OF PAGE 1 - CONTINUED OVER

FOLIO: 5227/868693 PAGE 2

NOTATIONS

UNREGISTERED DEALINGS: NIL

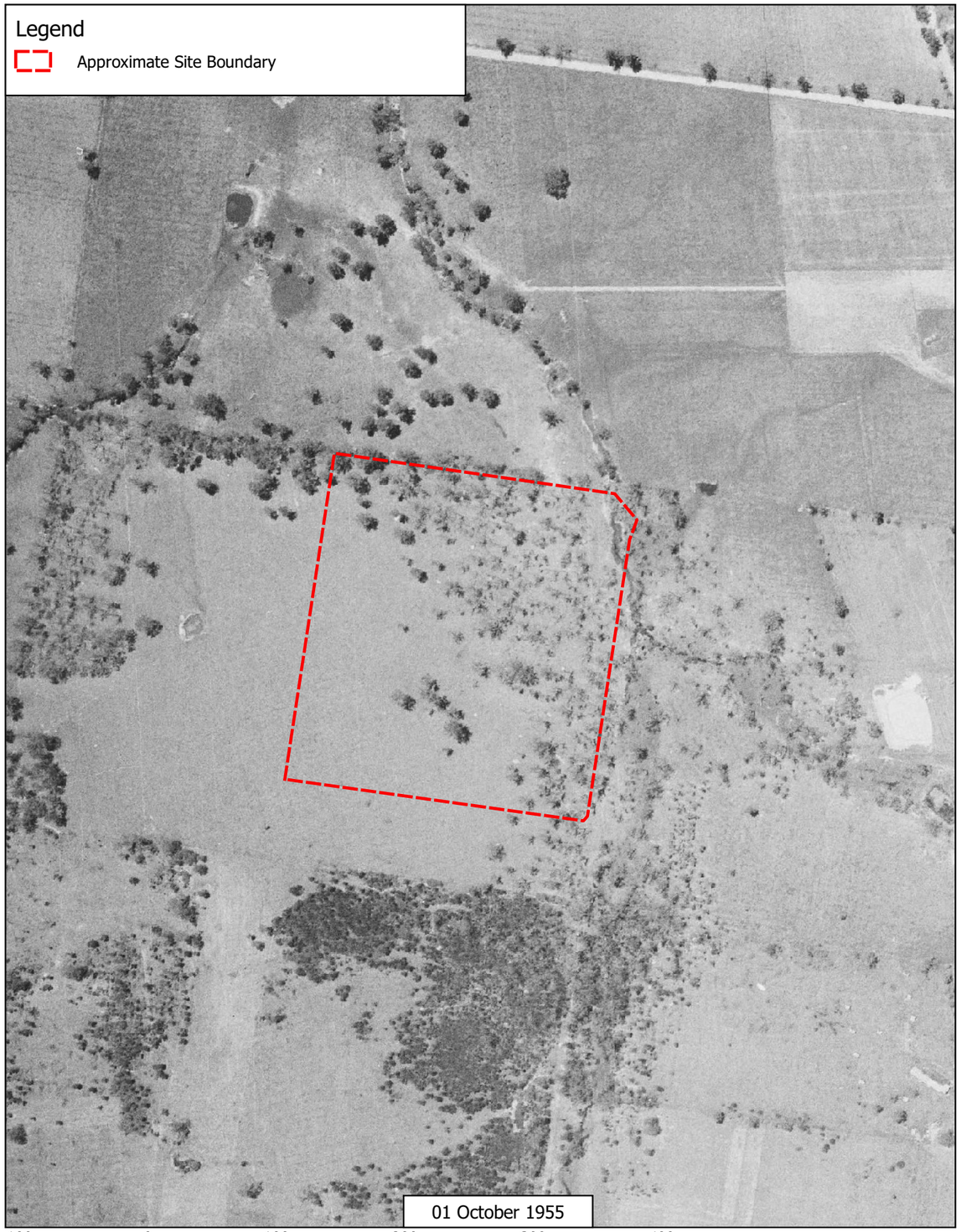
*** END OF SEARCH ***

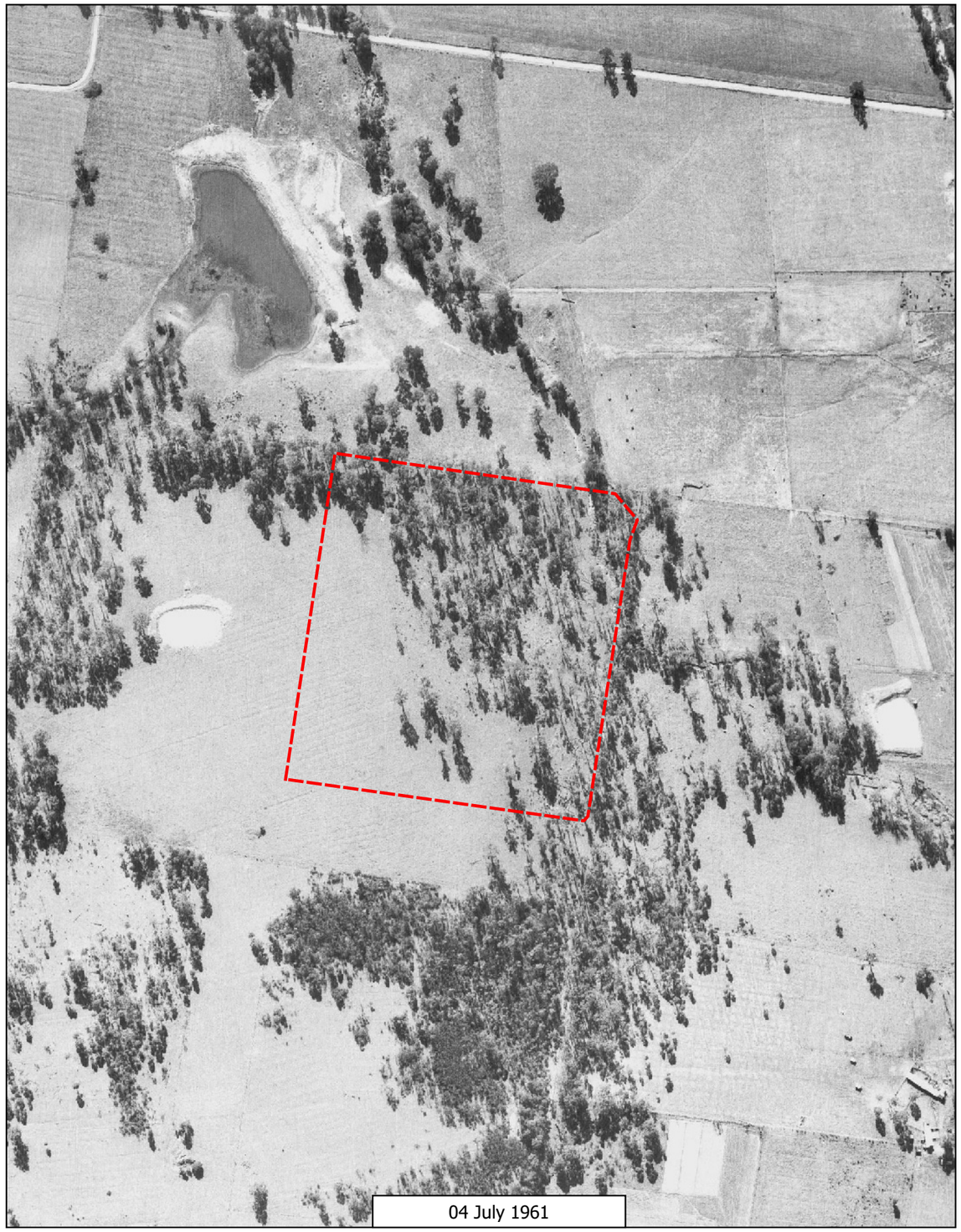
Appendix D

Historical Aerial Photographs Drawing Nos 2 to 7

Legend

Approximate Site Boundary





100 0 100 200 300 400 m

Douglas Partners
Geotechnics / Environment / Groundwater

CLIENT:	Woolacotts Consulting Engineers Pty Ltd		
OFFICE:	Central Coast	DRAWN BY:	JBR
SCALE:	1:4,000 @ A3	DATE:	21.08.2020

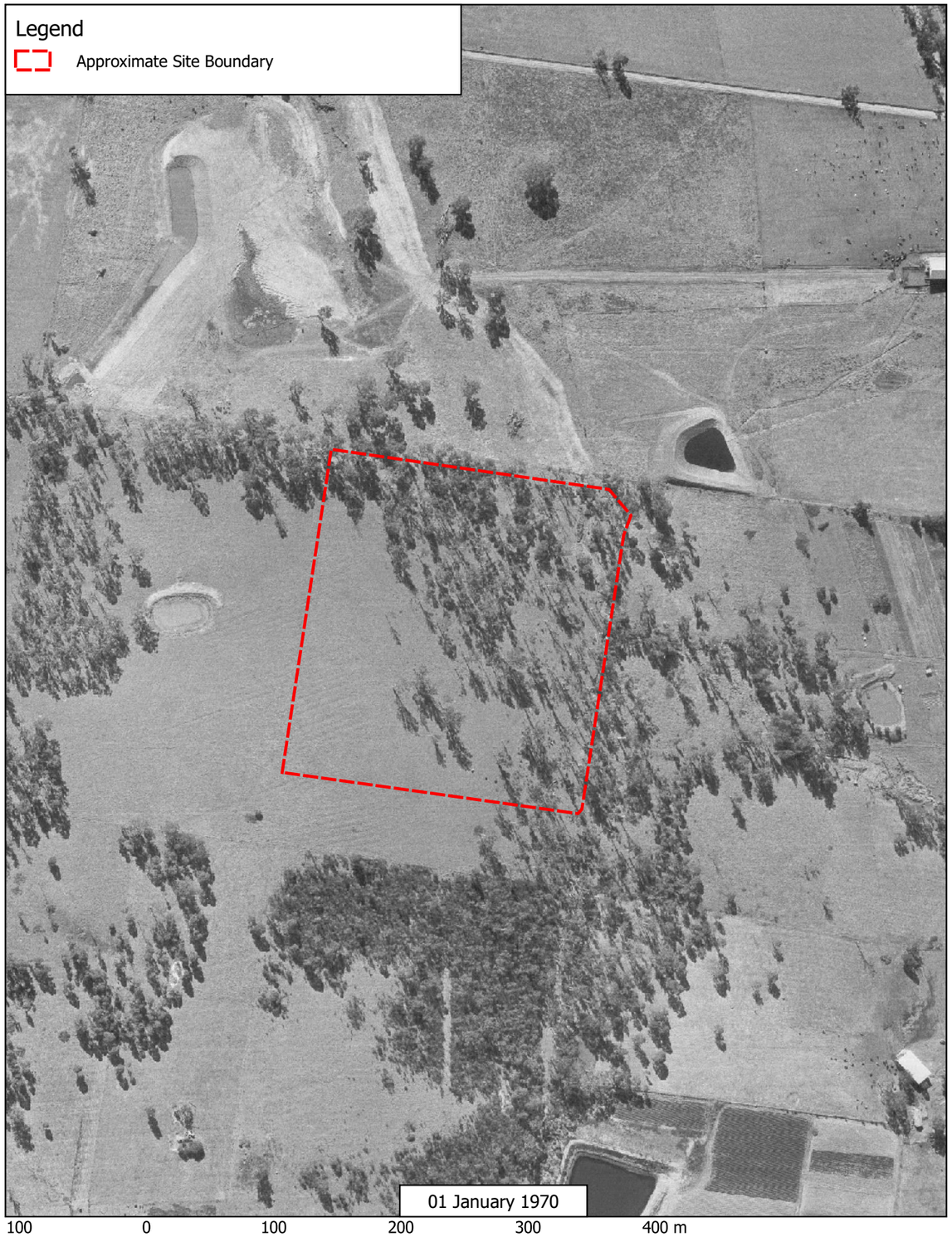
TITLE: **Historical Imagery**
Glenwood High School Upgrade
Forman Avenue, Glenwood

N

PROJECT No:	94626.00
DRAWING No:	2
REVISION:	0

Legend

Approximate Site Boundary



100 0 100 200 300 400 m

Douglas Partners
Geotechnics / Environment / Groundwater

CLIENT:	Woolacotts Consulting Engineers Pty Ltd		
OFFICE:	Central Coast	DRAWN BY:	JBR
SCALE:	1:4,000 @ A3	DATE:	21.08.2020

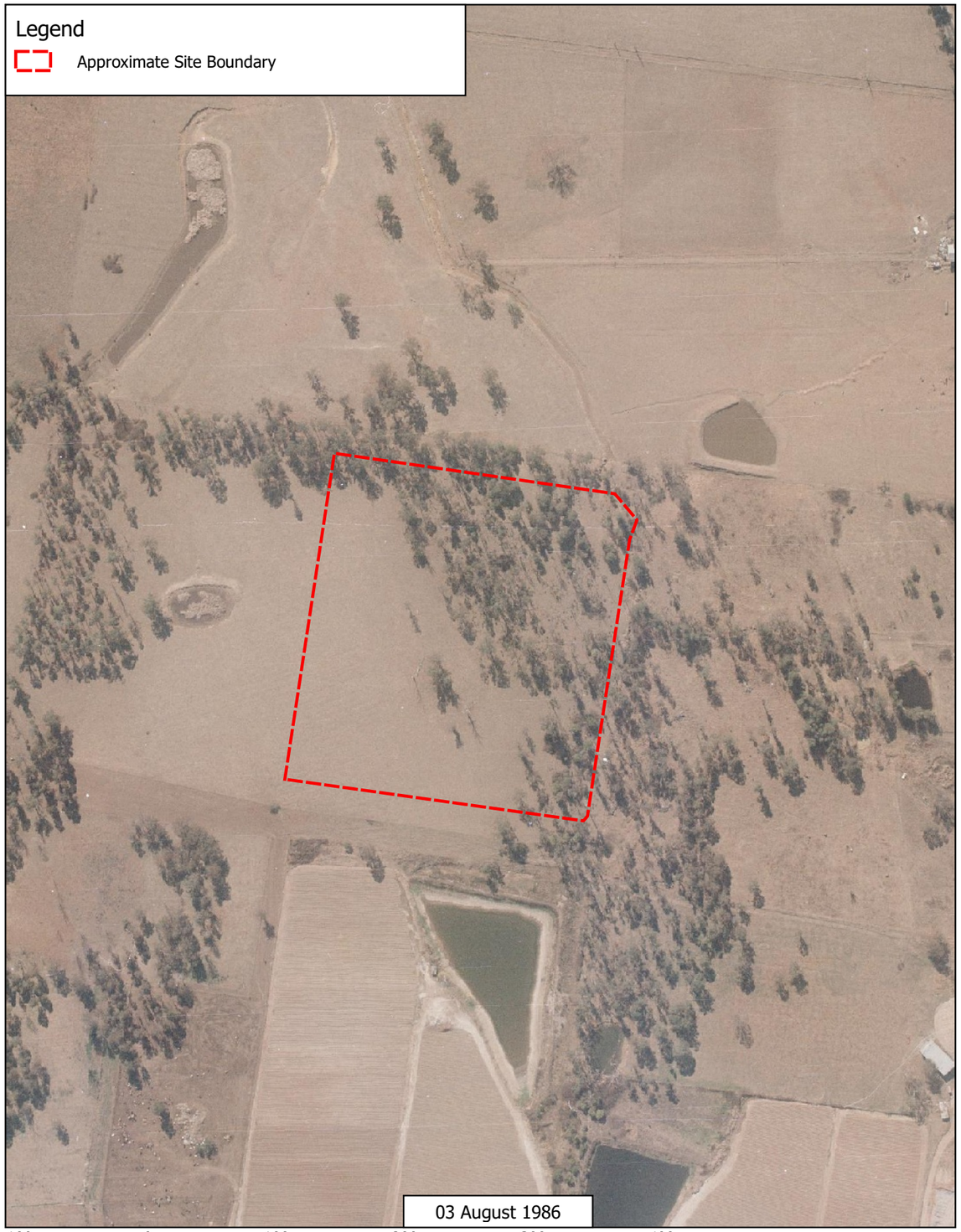
TITLE: **Historical Imagery**
Glenwood High School Upgrade
Forman Avenue, Glenwood

N

PROJECT No:	94626.00
DRAWING No:	3
REVISION:	0

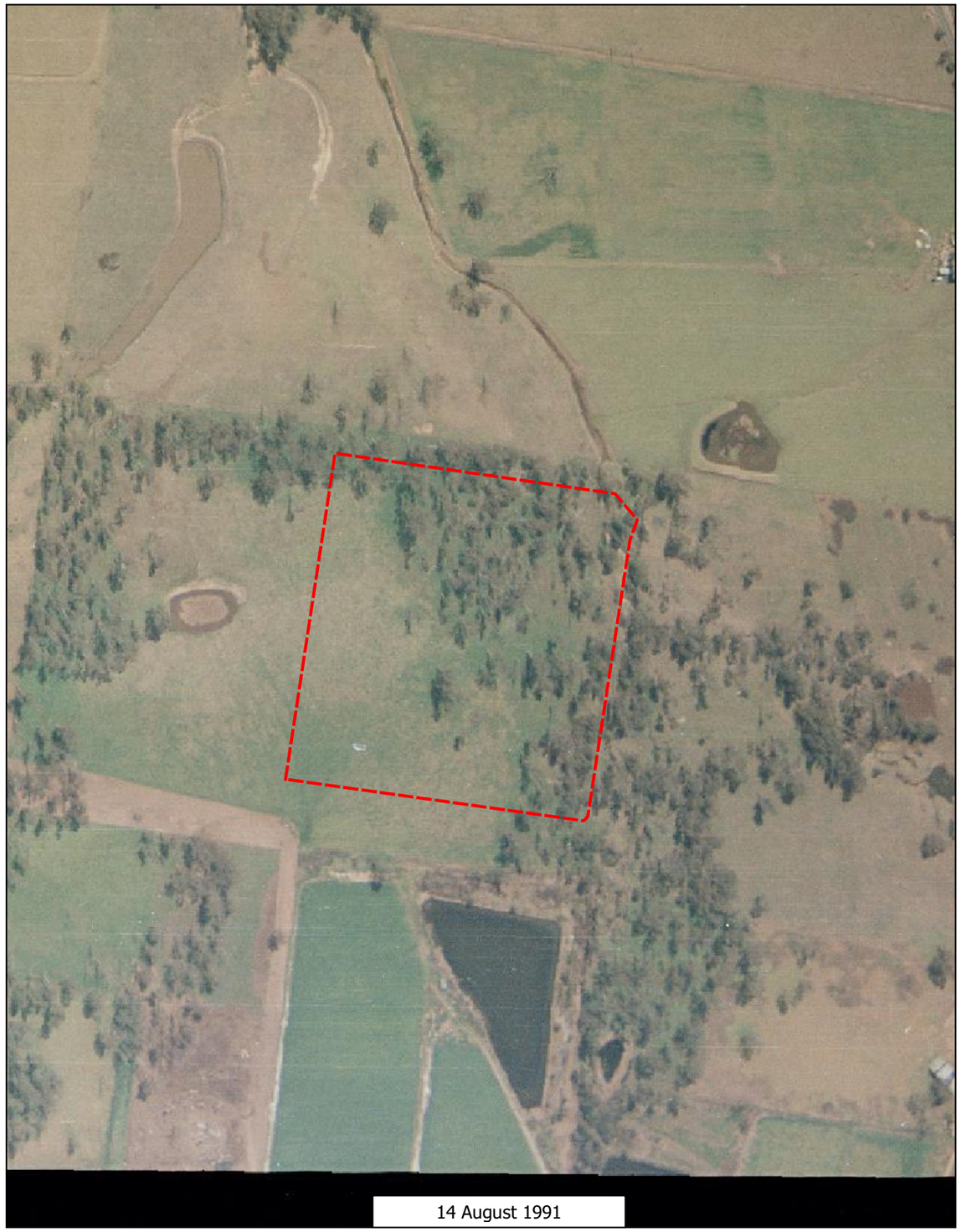
Legend

Approximate Site Boundary



03 August 1986

100 0 100 200 300 400 m



14 August 1991

Douglas Partners
Geotechnics / Environment / Groundwater

CLIENT:	Woolacotts Consulting Engineers Pty Ltd		
OFFICE:	Central Coast	DRAWN BY:	JBR
SCALE:	1:4,000 @ A3	DATE:	21.08.2020

TITLE: **Historical Imagery**
Glenwood High School Upgrade
Forman Avenue, Glenwood

N

PROJECT No:	94626.00
DRAWING No:	4
REVISION:	0

Legend

Approximate Site Boundary

20 September 1991

100 0 100 200 300 400 m

25 March 2004

Douglas Partners
Geotechnics / Environment / Groundwater

CLIENT:	Woolacotts Consulting Engineers Pty Ltd		
OFFICE:	Central Coast	DRAWN BY:	JBR
SCALE:	1:4,000 @ A3	DATE:	21.08.2020

TITLE: **Historical Imagery**
Glenwood High School Upgrade
Forman Avenue, Glenwood

N

PROJECT No:	94626.00
DRAWING No:	5
REVISION:	0

Legend

Approximate Site Boundary

10 December 2005

14 August 2010

100 0 100 200 300 400 m

Douglas Partners Geotechnics / Environment / Groundwater	CLIENT: Woolacotts Consulting Engineers Pty Ltd		TITLE: **Historical Imagery** **Glenwood High School Upgrade** **Forman Avenue, Glenwood**	N	PROJECT No: 94626.00
	OFFICE: Central Coast	DRAWN BY: JBR			DRAWING No: 6
	SCALE: 1:4,000 @ A3	DATE: 21.08.2020			REVISION: 0

Legend

Approximate Site Boundary

100 0 100 200 300 400 m

Douglas Partners Geotechnics / Environment / Groundwater	CLIENT: Woolacotts Consulting Engineers Pty Ltd	TITLE: **Historical Imagery** **Glenwood High School Upgrade** **Forman Avenue, Glenwood**	N	PROJECT No: 94626.00
	OFFICE: Central Coast DRAWN BY: JBR			DRAWING No: 7
	SCALE: 1:4,000 @ A3 DATE: 21.08.2020			REVISION: 0

Appendix E

Section 10.7 (2 & 5) Certificate

Applicant Details

Your reference 94626.00

DOUGLAS PARTNERS PTY LTD
43 HOBART STREET
RIVERSTONE NSW 2765

Certificate Details

Certificate no. PL2020/09869 **Fee: $133.00**

Date issued 03 August 2020 **Urgency fee: N/A**

Receipt no. ePay Ref 93223

Property information

Property ID 326021 **Land ID** 326021

Legal description LOT 5227 DP 868693

Address 85 FORMAN AVENUE GLENWOOD NSW 2768

County CUMBERLAND **Parish** GIDLEY

PLANNING CERTIFICATE (Section 10.7(2 & 5))

Blacktown City Council prepared this Planning Certificate under Section 10.7 of the *Environmental Planning and Assessment Act 1979*. The form and content of the Certificate is consistent with *Environmental Planning and Assessment Regulation 2000*.

Disclaimer

Blacktown City Council gives notice and points out to all users of the information supplied herein, that the information herein has been compiled by Council from sources outside of Council's control. While the information herein is provided with all due care and in good faith, it is provided on the basis that Council will not accept any responsibility for and will not be liable for its contents or for any consequence arising from its use, and every user of such information is advised to make all necessary enquiries from the appropriate organisations, institutions and the like. Blacktown City Council also gives notice to all users of the information supplied herein, wherever any particular enquiry herein remains unanswered or has not been elaborated upon, such silence should not be interpreted as meaning or inferring either a negative or a positive response as the case may be.

Section 10.7(2)

The following information is provided under Section 10.7(2) of the *Environmental Planning and Assessment Act 1979*. The information relates to the subject land at the date of this Certificate.

---

1. Names of relevant planning instruments and development control plans

1.1 Environmental Planning Instrument

Blacktown Local Environmental Plan 2015 applies to the subject land.

1.2 Proposed Local Environmental Plans

Not applicable.

1.3 Other Applicable State Environmental Planning Policies

Attachment 1 contains a list of State Environmental Planning Policies that may apply to the carrying out of development on the subject land.

1.4 Proposed State Environmental Planning Policies

Council is not aware of any proposed State Environmental Planning Policy that is or has been the subject of community consultation or on public exhibition under the Act, applying to the subject land.

1.5 Development control plans

Blacktown Development Control Plan 2015 applies to the subject land.

2. Zoning and land use under relevant environmental planning instruments

The following information will assist in determining how the subject land may be developed. It is recommended that you read this section in conjunction with a full copy of any relevant environmental planning instrument as there may be additional provisions that affect how the land may be developed.

2.1 Zoning

Under *Blacktown Local Environmental Plan 2015,* the land is zoned:

Zone SP2 Infrastructure

The following is an extract from Blacktown Local Environmental Plan 2015 outlining the types of development that may or may not be carried out in the above zone

1 Objectives of zone

- *To provide for infrastructure and related uses.*
- *To prevent development that is not compatible with or that may detract from the provision of infrastructure.*
- *To ensure that development does not have an adverse impact on the form and scale of the surrounding neighbourhood.*

2 Permitted without consent

Environmental protection works; Flood mitigation works

3 Permitted with consent

Aquaculture; Roads; Signage; The purpose shown on the Land Zoning Map, including any development that is ordinarily incidental or ancillary to development for that purpose

4 Prohibited

Any development not specified in item 2 or 3

The SP2 Infrastructure zone applicable to this site is for the purposes of:
SP2 - Infrastructure-Educational Establishment

2.2 Minimum land dimensions for the erection of a dwelling house

Not applicable

2.3 Critical habitat

The land does not include or comprise a critical habitat.

Note: Critical habitat registers are kept by the National Parks and Wildlife Service under the *Threatened Species Conservation Act 1995* and the Department of Fisheries under the *Fisheries Management Act 1994*.

2.4 Conservation areas

The land is not within a conservation area.

2.5 Environmental Heritage

The land does not contain an item of environmental heritage under the protection of Blacktown Local Environmental Plan 2015

3. Complying development

Complying development may or may not be carried out on the subject land under an Environmental Planning Policy. Council does not have sufficient information to determine the extent to which specific complying development may or may not be carried out.

4. Coastal protection

The subject land is not affected by the operation of Sections 38 or 39 of the *Coastal Protection Act, 1979*.

5. Mine subsidence

The subject land has not been proclaimed to be a mine subsidence district within the meaning of Section 15 of the *Mine Subsidence Compensation Act 1961*.

6. Road widening and road realignment

The subject land is not affected by road widening or road realignment under an environmental planning instrument.

7. Council and other public authority policies on hazard risk restrictions

7.1 Contaminated Lands Policy and Asbestos Policy Schedule 6

Council has adopted a Contaminated Lands Policy and an Asbestos Policy which may restrict development on the subject land.

The Land Contamination Policy applies when zoning or land use changes are proposed on land which has previously been used for certain purposes or has the potential to be affected by such purposes undertaken on nearby lands. The Asbestos Policy applies where land contains, or is likely to have contained in the past, buildings or structures that were erected prior to the banning of asbestos. Both policies should be considered in the context of relevant State legislation and guidelines.

Council's records may not be sufficient to determine all previous uses on the land, or determine activities that may have taken place on this land.

7.2 Other policies on hazard risk restrictions

Council has not adopted any other policies to restrict the development of the subject land by reason of the likelihood of landslip, bushfire, tidal inundation, subsidence or the occurrence of acid sulphate soils.

Note: Although Council has not adopted a specific policy to restrict development bushfire prone land, it is bound by state-wide bushfire legislation that may restrict development on the subject land. Additional information relating to bushfire prone land is provided at point 11 below.

7a. Flood related development controls information

There are currently no mainstream or backwater flood-related development controls adopted by Council that apply to the land subject to this Certificate

8. Land reserved for acquisition

Blacktown Local Environmental Plan 2015 makes provision for land included on the Land Reservation Acquisition Map to be acquired by a public authority.

9. Contributions plans

Council currently levies contributions under Section 7.11 of the *Environmental Planning & Assessment Act 1979* for facilities and services. The further development of the subject land may incur such contributions.

Contributions Plan No. 5 - Parklea Release Area applies to the subject land.

9a. Biodiversity certified land

The land is not biodiversity certified land as defined by Part 7AA of the *Threatened Species Conservation Act 1995*.

10. Biobanking agreements

The land is not subject to any biobanking agreement under Part 7A of the *Threatened Species Conservation Act 1995*.

11. Bushfire prone land

The Rural Fires and Environmental Assessment Legislation Amendment Act 2002, which came into force on 1 August 2002, introduced development provisions for bush fire prone land as shown on a Bush Fire Prone Land Map. "Bush fire prone land" is land that has been designated by the Commissioner of the NSW Rural Fire Service as being bush fire prone due to characteristics of vegetation and topography. The land the subject of this certificate has been identified on Council's Bush Fire Prone Land Map as being:

Clear of any bush fire prone land

On land that is bush fire prone, certain development may require further consideration under Section 4.14 or Section 4.46 of the *Environmental Planning & Assessment Act 1979* and under Section 100B of the *Rural Fires Act 1997*.

12. Property vegetation plans

The subject land is not affected by a property vegetation plan under the *Native Vegetation Act 2003*. The Blacktown local government area is excluded from the operation of the *Native Vegetation Act 2003* (refer Schedule 1 Part 3 of that Act).

13. Orders under *Trees (Disputes Between Neighbours) Act 2006*

No. Council has not been notified of any order made under the *Trees (Disputes Between Neighbours) Act 2006* in relation to the subject land.

14. Site compatibility certificates and conditions for seniors housing

Land to which this Certificate applies is not subject to the above.

15. Site compatibility certificates for infrastructure

Land to which this Certificate applies is not subject to the above.

16. Site compatibility certificates and conditions for affordable rental housing

Land to which this Certificate applies is not subject to the above.

17. Paper subdivision information

Not applicable

18. Site verification certificates

Council is not aware of any site verification certificate applying to the subject land.

Under the *Contaminated Land Management Act 1997* and *Contaminated Land Management Amendment Act 2008*

(a) The land to which this certificate relates has not been declared to be significantly contaminated land at the date when the certificate was issued

(b) The land to which the certificate relates is not subject to a management order at the date when the certificate was issued

(c) The land to which this certificate relates is not the subject of an approved voluntary management proposal at the date when the certificate was issued

(d) The land to which this certificate relates is not subject to an ongoing maintenance order as at the date when the certificate was issued

(e) The land to which this certificate relates is not the subject of a site audit statement provided to the Council.

19. Affected building notices and building product rectification orders

19.1 Affected building notices

Council is not aware of any affected building notice in force for the subject land.

19.2 Building product rectification orders

(a) Council is not aware of any building product rectification order in force for the subject land.

(b) Council is not aware of any notice of intention to make a building product rectification order being given for the subject land.

Section 10.7(5)

The following information is provided under Section 10.7(5) of the *Environmental Planning & Assessment Act 1979*. As per section 10.7(6) of the Act, Council shall not incur any liability in respect of any advice provided in good faith under section 10.7(5). The absence of any reference to any matter affecting the land shall not imply that the land is not affected by any matter not referred to in this Certificate.

Planning Instruments and Covenants

The provisions of any covenant, agreement or instrument applying to this land that restrict or prohibit certain development may be inconsistent with the provisions of an environmental planning instrument. In such cases, the provisions of any such covenant, agreement or instrument may be overridden.

Loose-filled Asbestos Insulation

Some residential homes located in the Blacktown Local Government Area may potentially contain loose-fill asbestos insulation, for example in the roof space. NSW Fair Trading maintains a Register of homes that are affected by loose-fill asbestos insulation.

You should make your own enquiries as to the age of the buildings on the land to which this certificate relates and, if it contains a building constructed prior to 1980, the council strongly recommends that any potential purchaser obtain advice from a licensed asbestos assessor to determine whether loose-fill asbestos is present in any building on the land and, if so, the health risks (if any) this may pose for the building's occupants.

Contact NSW Fair Trading for further information

Biodiversity and Threatened Species Conservation

The land is affected by a tree preservation control under Clause 5.9 of the Blacktown Local Environmental Plan 2015. A person shall not ringbark, cut down, lop, top, remove, injure or wilfully destroy any tree, or cause any tree to be ringbarked, cut down, topped, lopped, injured or wilfully destroyed, except with the consent of the Council.

The provisions of any covenant, agreement or instrument applying to this land purporting to restrict or prohibit certain development may be inconsistent with the provisions of a Regional Environmental Plan, State Environmental Planning Policy or Blacktown Local Environmental Plan 2015, in which case the provisions of any such covenant, agreement or instrument may be overridden.

The *Threatened Species Conservation Act 1995* provides for the conservation of threatened species, populations and ecological communities of animals and plants.

The *Threatened Species Conservation Act 1995* amended the *Environmental Planning and Assessment Act 1979* to require, amongst other things, that:

(a) A critical habitat (as defined in the *Threatened Species Conservation Act 1995*) be identified in environmental planning instruments, and

(b) Consent authorities and determining authorities must, when considering proposed development or an activity, assess whether it is likely to significantly affect threatened species, populations and ecological communities, or their habitats, and, if a significant effect is likely, to require the preparation of a species impact statement in accordance with the requirements of the *Threatened Species Conservation Act 1995*, and

(c) Consent authorities and determining authorities must, when considering proposed development or an activity, have regard to the relevant recovery plans and threat abatement plans.

The *Environment Protection and Biodiversity Conservation Act 1999* provides protection for items of national significance. Items of national environmental significance include nationally threatened animal and plant species and ecological communities.

The Act requires a separate Commonwealth approval to be obtained where an action is likely to have significant impacts on items of national environmental significance.

For further information on this matter, please contact the Australian Government's Department of the Environment.

Attachment 1 – State Environmental Planning Policies

In addition to the principal environmental planning instrument identified in section 2.1 of this Certificate, the following State Environmental Planning Policies may also affect development on the subject land.

SEPP (Affordable Rental Housing) 2009

This policy aims to facilitate the increased supply and diversity of affordable rental and social housing in NSW and covers housing types including in-fill affordable housing, along with secondary dwellings (granny flats), boarding houses, group homes, social housing and supportive accommodation. Part 3 of the policy provides for the retention of existing affordable rental housing stock. Development applications to demolish, alter or add, change the use of, or strata subdivide existing low cost rental dwellings may require a contribution towards the provision of alternative affordable housing.

SEPP (Building Sustainability Index: BASIX) 2004

This policy aims to ensure consistency in the implementation of the BASIX scheme throughout the State by overriding provisions of other environmental planning instruments and development control plans that would otherwise add to, subtract from or modify any obligations arising under the BASIX scheme.

SEPP (Exempt and Complying Development Codes) 2008

This policy is also known as the Codes SEPP and includes a number of Codes that allow for certain types of development to be undertaken without the need for council approval as either Exempt Development or approved under a fast track system known as Complying Development, if the relevant standards are met.

SEPP (Sydney Region Growth Centres) 2006

This policy provides for the coordinated release of land for residential, employment and other urban development in the North West Growth Centre, the South West Growth Centre and the Wilton Growth Area. It provides development controls to enable the establishment of vibrant, sustainable and liveable neighbourhoods that provide for community well-being and high quality local amenity.

SEPP (Housing for Seniors or People with a Disability) 2004

This policy is also known as Seniors Housing SEPP and encourages the development of high quality and well-designed housing for older people and people with disabilities, while ensuring that it is in keeping with neighbourhood character. In October 2018, an amendment was made to change some

rules for site compatibility certificates and to make the relevant planning panel the determining authority for site compatibility certificates issued under the Seniors Housing SEPP.

SEPP (Infrastructure) 2007

This policy assists the NSW Government, private infrastructure providers, local councils and the communities they support by simplifying the process for providing infrastructure like hospitals, roads, railways, emergency services, water supply and electricity delivery, while ensuring appropriate levels of environmental assessment and consultation are undertaken. Recent changes introduce new provisions for correctional services, emergency and police services facilities and bushfire hazard reduction, ports and roads infrastructure, including facilities for electric vehicles, and other operational and housekeeping improvements.

SEPP (Miscellaneous Consent Provisions) 2007

This policy contains provisions for the erection of temporary structures, subdivision, the demolition of a building or work, certain change of use and fire alarm communication links.

SEPP (State Significant Precincts) 2005

The purpose of this Policy is to facilitate the development, redevelopment or protection of important urban, coastal and regional sites of economic, environmental or social significance to the State so as to facilitate the orderly use, development or conservation of those State significant precincts for the benefit of the State. It also aims to facilitate service delivery outcomes for a range of public services and to provide for the development of major sites for a public purpose or redevelopment of major sites no longer appropriate or suitable for public purposes.

SEPP (Mining, Petroleum Production and Extractive Industries) 2007

This policy is also known as the Mining SEPP and governs the way that mining, petroleum production and extractive material resource proposals are assessed and developed in NSW.

SEPP No 1 - Development Standards

This policy provides flexibility in the application of development standards and allows Council to approve a development that does not comply with a development standard where it can be shown that the development standard is unreasonable or unnecessary.

SEPP No 19 - Bushland in Urban Areas

This policy protects and preserves bushland within urban areas because of its natural heritage, its aesthetic value and its value for recreational, educational or scientific purposes. The policy aims to protect bushland areas in public open space zones and reservations and ensures that bushland

preservation is given priority when local environmental plans are prepared.

SEPP No 21 - Caravan Parks

This policy applies to development for the purpose of caravan parks and camping grounds. The policy ensures that development consent is required for new caravan parks and camping grounds and for additional long term sites in existing caravan parks. It also requires that development consent be obtained from Council for the subdivision of land for lease purposes under the Local Government Act.

SEPP No. 30 - Intensive Agriculture
Requires development consent for cattle feedlots having a capacity of 50 or more cattle or piggeries having a capacity of 200 or more pigs. The policy sets out information and public notification requirements to ensure there are effective planning control over this export-driven rural industry. The policy does not alter if, and where, such development is permitted, or the functions of the consent authority.

SEPP No. 32 - Urban Consolidation
States the Government's intention to ensure that urban consolidation objectives are met in all urban areas throughout the State. The policy focuses on the redevelopment of urban land that is no longer required for the purpose it is currently zoned or used, and encourages local councils to pursue their own urban consolidation strategies to help implement the aims and objectives of the policy. Councils will continue to be responsible for the majority of rezonings. The policy sets out guidelines for the Minister to follow when considering whether to initiate a regional environmental plan (REP) to make particular sites available for consolidated urban redevelopment. Where a site is rezoned by an REP, the Minister will be the consent authority.

SEPP No 33 - Hazardous and Offensive Development

This policy applies to development defined as ‘potentially hazardous industry’ or ‘potentially offensive industry’. The policy ensures that in determining whether a development is a hazardous or offensive industry, any measures proposed to be employed to reduce the impact of the development are taken into account.

SEPP No 55 - Remediation of Land

This policy promotes the remediation of contaminated land for the purpose of reducing risk of harm to human health. The policy includes considerations that are relevant in rezoning land and in determining development applications where remediation of land is required.

SEPP No. 62 - Sustainable Aquaculture
Encourages the sustainable expansion of the industry in NSW. The policy implements the regional strategies already developed by creating a simple approach to identity and categorise aquaculture development on the basis of its potential environmental impact. The SEPP also identifies aquaculture development as a designated development only where there are potential environmental risks.

SEPP No 64 - Advertising and Signage

This policy sets out planning controls for advertising and signage in NSW and requires signage to be compatible with the future character of an area, provide effective communication in suitable locations and be of high quality design and finish. The policy also bans advertisements on parked trailers on roads, road shoulders, footpaths and nature strips, excluding advertising associated with the primary use of the trailer.

SEPP No 65 - Design Quality of Residential Apartment Development

This policy aims to improve the design quality of residential apartment development through the application of 9 design quality principles. The policy also provides requirements for a constituted design review panel to provide independent expert advice to council on the merit of residential flat developments. A design review panel is not mandatory.

Sydney Regional Environmental Plan No 30 - St Marys

This plan provides the planning framework for the planning and development of land known as Australian Defence Industries (ADI) site at St Marys.

SEPP (Western Sydney Employment Area) 2009

This policy aims to protect and enhance land in the Western Sydney Employment Area for employment purposes and to promote economic development and the creations of employment opportunities in Western Sydney. The policy provides for a coordinated approach to the planning, development and rezoning of land within the Western Sydney Employment Area and includes controls to ensure that development occurs in a logical, environmentally sensitive and cost-effective manner.

SEPP (Western Sydney Parklands) 2009

This policy provides the framework to enable the Western Sydney Parklands Trust to develop the Western Parklands into a multi-use urban parkland to meet a range of community needs and interests, including those that promote health and well-being in the community for Western Sydney.

SEPP (Western Sydney Recreation Area)
This policy enables development to be carried out for recreational, sporting and cultural purposes within the Western Sydney Recreation Area, including the development of a recreation area of state significance.

Authorised by Blacktown City Council
Proforma ID: 824816

End of Certificate

Appendix F

Safework Letter

NSW GOVERNMENT | SafeWork NSW

Locked Bag 2906, Lisarow NSW 2252
Customer Experience 13 10 50
ABN 81 913 830 179 | www.safework.nsw.gov.au

Our Ref: D20/163135

7 August 2020

Mr Gavin Boyd
Douglas Partners Pty Ltd
PO Box 267
RIVERSTONE NSW 2765
Gavin.boyd@douglaspartners.com.au

Dear Mr Boyd

RE SITE: 85 Forman Ave Glenwood NSW 2768

I refer to your site search request received by SafeWork NSW on 31 July 2020 requesting information on Storage of Hazardous Chemicals for the above site.

A search of the records held by SafeWork NSW has not located any records pertaining to the above-mentioned premises.

For further information or if you have any questions, please call us on 13 10 50 or email licensing@safework.nsw.gov.auw

Yours sincerely

Customer Service Officer
Customer Experience - Operations
SafeWork NSW

Appendix G

Site Photographs

Photo 1 - Eastern Side of Proposed New Building

Photo 2 - Eastern Side of Proposed New Building

Douglas Partners Geotechnics / Environment / Groundwater	Site Photographs	PROJECT: 94626.00
	Glenwood High School Upgrade	PLATE No: 1
	85 Forman Avenue, Glenwood	REV: A
	CLIENT: Woolacotts Consulting Engineers Pty Ltd	DATE: Aug-20

Photo 3 - North-eastern Corner of Proposed New Building

Photo 4 - Northern Side of Proposed New Building

Douglas Partners Geotechnics / Environment / Groundwater	Site Photographs	PROJECT:	94626.00
	Glenwood High School Upgrade	PLATE No:	2
	85 Forman Avenue, Glenwood	REV:	A
	CLIENT: Woolacotts Consulting Engineers Pty Ltd	DATE:	Aug-20

Photo 5 - Northern Side of Proposed New Buildingh

Photo 6 - Demountable Buildings over the Footprint of the Proposed New Building

Douglas Partners Geotechnics / Environment / Groundwater	Site Photographs	PROJECT:	94626.00
	Glenwood High School Upgrade	PLATE No:	3
	85 Forman Avenue, Glenwood	REV:	A
	CLIENT: Woolacotts Consulting Engineers Pty Ltd	DATE:	Aug-20

Photo 7 - Building Rubble beneath Demountable Buildings

Photo 8 - Southern Side of Proposed New Building

Douglas Partners Geotechnics / Environment / Groundwater	Site Photographs	PROJECT:	94626.00
	Glenwood High School Upgrade	PLATE No:	4
	85 Forman Avenue, Glenwood	REV:	A
	CLIENT: Woolacotts Consulting Engineers Pty Ltd	DATE:	Aug-20

Photo 9 - Proposed Demountable Buildings under Footprint of Proposed New Building

Photo 10 - North of Admin Building

Douglas Partners Geotechnics / Environment / Groundwater	Site Photographs	PROJECT:	94626.00
	Glenwood High School Upgrade	PLATE No:	5
	85 Forman Avenue, Glenwood	REV:	A
	CLIENT: Woolacotts Consulting Engineers Pty Ltd	DATE:	Aug-20

Photo 11 - North-west Side of Proposed New Building

Photo 12 - South-east Corner of Admin Building

Douglas Partners Geotechnics / Environment / Groundwater	Site Photographs	PROJECT:	94626.00
	Glenwood High School Upgrade	PLATE No:	6
	85 Forman Avenue, Glenwood	REV:	A
	CLIENT: Woolacotts Consulting Engineers Pty Ltd	DATE:	Aug-20

Photo 13 - Northern Side of Block K

Photo 14 - Northern Side of Building K

Douglas Partners Geotechnics / Environment / Groundwater	Site Photographs	PROJECT:	94626.00
	Glenwood High School Upgrade	PLATE No:	7
	85 Forman Avenue, Glenwood	REV:	A
	CLIENT: Woolacotts Consulting Engineers Pty Ltd	DATE:	Aug-20

Appendix H

Results of Field Work

BOREHOLE LOG

CLIENT: Woolacotts Consulting Engineers Pty Ltd
PROJECT: Glenwood High School Upgrade
LOCATION: 85 Forman Avenue, Glenwood

SURFACE LEVEL: 59.2 mAHD
EASTING: 308936
NORTHING: 6265740.1
DIP/AZIMUTH: 90°/--

BORE No: 101
PROJECT No: 94626.00
DATE: 8/8/2020
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Degree of Weathering (EW HW MW SW FS FR)	Graphic Log	Rock Strength (Ex Low / Very Low / Low / Medium / High / Very High / Ex High)	Water	Fracture Spacing (m) (0.01 / 0.05 / 0.10 / 0.50 / 1.00)	Discontinuities (B - Bedding J - Joint S - Shear F - Fault)	Sampling & In Situ Testing: Type	Core Rec. %	RQD %	Test Results & Comments
59	0.1	FILL / TOPSOIL: Silty CLAY: grey-brown, trace rootlets, w < PL, surficial vegetation							D/E*			
		FILL /Silty CLAY CH: medium to high plasticity, grey-brown, trace gravel, w < PL							D/E			
	0.6	Silty CLAY CH: medium to high plasticity, grey and orange-brown, w < PL, stiff, alluvial							U50			
58	1								S			5,6,8 N = 14
		1.5m: becoming pale grey mottled orange										
	2.0	Silty CLAY CL: low to medium plasticity, pale grey mottled orange, w > PL, firm to stiff, alluvial							S			2,4,4 N = 8
57	3											
	3.0	Gravelly CLAY CL: low to medium plasticity, pale grey mottled orange, with silt, ironstone and siltstone gravel, w > PL, very stiff, alluvial							S			10,11,14 N = 25
56	4											
55	4.6								S			17,10/20B refusal
	4.67	SILTSTONE: grey-brown, low strength, moderately weathered, Ashfield Shale										
		Bore discontinued at 4.67m										

RIG: Hanjin D&B 8-D **DRILLER:** Rockwell **LOGGED:** JY **CASING:** Uncased

TYPE OF BORING: 110mm diameter hand auger

WATER OBSERVATIONS: Free groundwater observed at approximately 3.0m

REMARKS: *BD2/0200808 sampled at 0-0.1m

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: Woolacotts Consulting Engineers Pty Ltd
PROJECT: Glenwood High School Upgrade
LOCATION: 85 Forman Avenue, Glenwood

SURFACE LEVEL: 59.4 mAHD
EASTING: 308982
NORTHING: 6265717.8
DIP/AZIMUTH: 90°/--

BORE No: 102
PROJECT No: 94626.00
DATE: 9/8/2020
SHEET 1 OF 2

RL	Depth (m)	Description of Strata	Degree of Weathering (EW HW MW SW FS FR)	Graphic Log	Rock Strength (Ex Low / Very Low / Low / Medium / High / Very High / Ex High)	Water	Fracture Spacing (m) (0.01 / 0.05 / 0.10 / 0.50 / 1.00)	Discontinuities (B - Bedding J - Joint S - Shear F - Fault)	Sampling & In Situ Testing: Type	Core Rec. %	RQD %	Test Results & Comments
59	0.15	FILL / Topsoil: Silty Clay, brown, trace gravel, trace plastic, sand and rootlets, w > PL, surficial vegetation							D/E			
		FILL / Silty CLAY CH: medium to high plasticity, brown, trace sand and gravel, w < PL							D/E			
	0.6	Silty CLAY CH: medium to high plasticity, orange-brown and grey, trace ironstone gravel, w < PL, stiff, alluvial							D/E			
58	1								S			4,6,6 N = 12
	2.0	Gravelly CLAY CH: medium plasticity, pale grey mottled orange, gravel is ironstone, w > PL, stiff, alluvial							S			4,4,6 N = 10
57	2											
	3.0	Silty CLAY CH: medium plasticity, orange-brown and grey, trace ironstone gravel, w<PL, stiff, alluvial							S			4,6,7 N = 13
56	4							Note: Unless otherwise stated, defects are rough planar bedding dipping 0°- 10° some with fe stn				
		4.2m: becoming hard (extremely weathered siltstone)							S			7,15,30 N = 45
55	4.4	SILTSTONE: grey-brown, low strength, moderately weathered, Ashfield Shale						4.45 - 4.54: Cs(x3), 10 - 20 mm 4.48-4.87m: J(x3), 30-70°, he, pl, fe stn	C	100	20	PL(A) = 0.13
		4.94-5.07m: becoming medium strength, slightly weathered						4.78m: J80°, sm, pl, fe stn 4.84m: Fg, 20mm				

RIG: Hanjin D&B 8-D **DRILLER:** Rockwell **LOGGED:** JY / YB **CASING:** HQ to 4.5m

TYPE OF BORING: Solid flight auger (TC) bit to 4.4m then NMLC coring to 8.0m

WATER OBSERVATIONS: Free groundwater observed at approximately 2.0m

REMARKS: Blank 0-2.0m, Screen 2-5.0m. Backfill: 5mm gravel 0-1.0m, Bentonite 1-1.5m, 5mm gravel 1.5-7.0m

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: Woolacotts Consulting Engineers Pty Ltd
PROJECT: Glenwood High School Upgrade
LOCATION: 85 Forman Avenue, Glenwood

SURFACE LEVEL: 59.4 mAHD
EASTING: 308982
NORTHING: 6265717.8
DIP/AZIMUTH: 90°/--

BORE No: 102
PROJECT No: 94626.00
DATE: 9/8/2020
SHEET 2 OF 2

RL	Depth (m)	Description of Strata	Degree of Weathering (EW HW MW SW FS FR)	Graphic Log	Rock Strength (Ex Low, Very Low, Low, Medium, High, Very High, Ex High)	Water	Fracture Spacing (m) (0.01, 0.05, 0.10, 0.50, 1.00)	Discontinuities (B - Bedding J - Joint S - Shear F - Fault)	Sampling & In Situ Testing: Type	Core Rec. %	RQD %	Test Results & Comments
	5.07	SILTSTONE: dark grey and pale grey, with sandstone laminations, high strength, fresh, unbroken, Ashfield Shale						4.94m: Fg, 10mm				PL(A) = 0.55
54	6											PL(A) = 1.47 PL(A) = 1.28
53								6.29m: Ds, 20mm	C	100	99	
52	7											PL(A) = 1.35
	8											
	8.0	Bore discontinued at 8.0m										
51	9											
50												

RIG: Hanjin D&B 8-D **DRILLER:** Rockwell **LOGGED:** JY / YB **CASING:** HQ to 4.5m

TYPE OF BORING: Solid flight auger (TC) bit to 4.4m then NMLC coring to 8.0m

WATER OBSERVATIONS: Free groundwater observed at approximately 2.0m

REMARKS: Blank 0-2.0m, Screen 2-5.0m. Backfill: 5mm gravel 0-1.0m, Bentonite 1-1.5m, 5mm gravel 1.5-7.0m

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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BORE: BH102 PROJECT: 94626.00 August 2020

4.45m – 8.0m

BOREHOLE LOG

CLIENT: Woolacotts Consulting Engineers Pty Ltd
PROJECT: Glenwood High School Upgrade
LOCATION: 85 Forman Avenue, Glenwood

SURFACE LEVEL: 60.4 mAHD
EASTING: 308962.4
NORTHING: 6265650.8
DIP/AZIMUTH: 90°/--

BORE No: 103
PROJECT No: 94626.00
DATE: 8/8/2020
SHEET 1 OF 2

RL	Depth (m)	Description of Strata	Degree of Weathering (EW HW MW SW FS FR)	Graphic Log	Rock Strength (Ex Low / Very Low / Low / Medium / High / Very High / Ex High)	Water	Fracture Spacing (m) (0.01 / 0.05 / 0.10 / 0.50 / 1.00)	Discontinuities (B - Bedding J - Joint S - Shear F - Fault)	Type	Core Rec. %	RQD %	Test Results & Comments
60	0.1	FILL / Topsoil: Sandy silt, low plasticity, grey-brown, fine sand, with clay, rootlets, grass and igneous gravel, w < PL							A/E			
		FILL / Silty CLAY: low plasticity, grey-brown and orange-brown, with fine sand, trace of gravel, moist							A/E			
	0.6	Silty CLAY CI-CH: medium to high plasticity, orange-brown and red-brown, trace of charcoal and ironstone gravel, w < PL, appears soft to firm, residual							A/E			
59	1.0	Silty CLAY CI -CH:medium to high plasticity, pale grey mottled red-brown and orange brown, trace ironstone gravel, w < PL, stiff, residual							A/E			
									U50			pp ~ 150 kPa
									S			2,5,9 N = 14
58	2.5	Silty CLAY CL - CH: medium to high plasticity, pale grey mottled red-brown and orange-brown, with ironstone bands, w < PL, very stiff to hard, residual (extremely weathered siltstone)						Note: Unless otherwise stated, rock is fractured along rough planar bedding dipping 0° - 10 °	S			5,13,13 N = 26
57	3.26	SILTSTONE: dark orange-brown, low strength , moderately then slightly weathered, with extremely weathered bands, highly fractured fractured, Ashfield Shale						3.26m: J45°, he, pl, fe stn 3.31 -3.75 m: Cs (x8), 20 - 50 mm 3.68-5.65m: J(x3), 45-80°, he, pl, fe stn	C	100	43	PL(A) = 0.17 PL(A) = 0.2
56	4.4	SILTSTONE: dark grey, medium strength with very low strength bands, slightly weathered, fractured, Ashfield Shale						4.18-4.26m: J(x3), 10-80°, he, pl, fe stn, cly vn 4.28 - 4.29 m: Cs (x2); 40 - 50 mm 4.56-4.83m: J(x3), 45°, ro, pl, fe stn 4.68m: Cs, 10mm 4.74 - 4.88, J 50-60°, pl, sm, fe, stn				PL(A) = 0.77
	4.9											

RIG: Hanjin D&B 8-D **DRILLER:** Rockwell **LOGGED:** IT / YB **CASING:** HQ to 2.5m

TYPE OF BORING: Solid flight auger (TC) bit to 3.0m then NMLC coring to 7.0m

WATER OBSERVATIONS: No free groundwater observed whilst augering

REMARKS: Blank 0-2.0m, Screen 2-5.0m. Backfill: 5mm gravel 0-1.0m, Bentonite 1-1.5m, 5mm gravel 1.5-7.0m

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: Woolacotts Consulting Engineers Pty Ltd
PROJECT: Glenwood High School Upgrade
LOCATION: 85 Forman Avenue, Glenwood

SURFACE LEVEL: 60.4 mAHD
EASTING: 308962.4
NORTHING: 6265650.8
DIP/AZIMUTH: 90°/--

BORE No: 103
PROJECT No: 94626.00
DATE: 8/8/2020
SHEET 2 OF 2

RL	Depth (m)	Description of Strata	Degree of Weathering (EW HW MW SW FS FR)	Graphic Log	Rock Strength (Ex Low / Very Low / Low / Medium / High / Very High / Ex High)	Water	Fracture Spacing (m) (0.01 / 0.05 / 0.10 / 0.50 / 1.00)	Discontinuities (B - Bedding J - Joint S - Shear F - Fault)	Sampling & In Situ Testing: Type	Core Rec. %	RQD %	Test Results & Comments
55		SILTSTONE: dark grey and pale grey, with 10% sandstone laminations, high strength, fresh, unbroken, Ashfield Shale *(continued)*							C	100	43	
54	6								C	100	100	PL(A) = 2.23
53	7 7.0	Bore discontinued at 7.0m										PL(A) = 1.12
52	8											
51	9											

RIG: Hanjin D&B 8-D **DRILLER:** Rockwell **LOGGED:** IT / YB **CASING:** HQ to 2.5m

TYPE OF BORING: Solid flight auger (TC) bit to 3.0m then NMLC coring to 7.0m

WATER OBSERVATIONS: No free groundwater observed whilst augering

REMARKS: Blank 0-2.0m, Screen 2-5.0m. Backfill: 5mm gravel 0-1.0m, Bentonite 1-1.5m, 5mm gravel 1.5-7.0m

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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BORE: BH103 **PROJECT: 94626.00** **August 2020**

3.0m – 7.0m

BOREHOLE LOG

CLIENT: Woolacotts Consulting Engineers Pty Ltd
PROJECT: Glenwood High School Upgrade
LOCATION: 85 Forman Avenue, Glenwood

SURFACE LEVEL: 62.2 mAHD
EASTING: 308912.5
NORTHING: 6265630.1
DIP/AZIMUTH: 90°/--

BORE No: 105
PROJECT No: 94626.00
DATE: 9/8/2020
SHEET 1 OF 2

RL	Depth (m)	Description of Strata	Degree of Weathering	Graphic Log	Rock Strength	Water	Fracture Spacing (m)	Discontinuities	Sampling & In Situ Testing: Type	Core Rec. %	RQD %	Test Results & Comments
			EW HW MW SW FS FR		Ex Low Very Low Low Medium High Very High Ex High		0.01 0.05 0.10 0.50 1.00	B - Bedding J - Joint S - Shear F - Fault				
62	0.05	FILL/Topsoil							D/E			
		FILL / Silty CLAY CH: medium to high plasticity, brown, trace rootlets, w < PL										
	0.3	Silty CLAY CH: medium to high plasticity, orange-brown mottled grey, w < PL, very stiff to hard, residual							D/E			
									D			
61	1							Note: Unless otherwise stated, defects are rough planar bedding dipping 0°- 10° some with fe stn or cly vn	S			7,20,30 N = 50
	1.3	SILTSTONE: grey, very low strength, moderately weathered, Ashfield Shale										
								1.5m: CORE LOSS: 260mm				
	1.76	SILTSTONE: orange-brown and pale grey, very low and low strength, extremely weathered with moderately weathered bands, Ashfield Shale						1.76-2.08m: Cs, 320mm				
60	2							2.08m: Fg, 50mm	C	81	0	
								2.13-3.70m: J(x5), 45-60°, he, pl, fe stn				
								2.38 - 2.6, Cs(x4) 20 - 40 mm				
								2.42-2.48m: J80°, partially he, pl, cly vn				
								2.6m: Cs, 70mm				PL(A) = 0.14
								2.67m: J80°, ro, pl, cln				
								2.60 - 3.64 m; Cs (x5), 20 - 90 mm				
	3.0	SILTSTONE: dark orange-brown, medium strength with very low strength bands, moderately weathered with extremely weathered bands, highly fractured, Ashfield Shale						2.91m: CORE LOSS: 90mm	C	78	0	
59	3							3.15m: Ds, 30mm				
								3.18-3.5m: Cs (x 2) , 140-150mm				
								3.32m: Fg, 40mm				
								3.64m: Cs, 50mm				
								3.72m: J45°, ro, pl, fe stn				PL(A) = 0.31
	4							4.14m: Cs, 10mm	C	100	54	
58								4.54m: J50-80°, partially he, un, fe stn				
								4.54 - 4.6 m, J45-80° (x2), partially he, un, fe stn				PL(A) = 0.36
	4.88							4.74m: Cs, 20mm				

RIG: Hanjin D&B 8-D **DRILLER:** Rockwell **LOGGED:** JY / YB **CASING:** HQ to 1.5m

TYPE OF BORING: 150mm diameter SFA to 1.5m then NMLC coring to 6.7m

WATER OBSERVATIONS: No free groundwater observed whilst augering

REMARKS: Blank 0-2.0m, Screen 2-5.0m. Backfill: 5mm gravel 0-1.0m, Bentonite 1-1.5m, 5mm gravel 1.5-6.7m

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: Woolacotts Consulting Engineers Pty Ltd
PROJECT: Glenwood High School Upgrade
LOCATION: 85 Forman Avenue, Glenwood

SURFACE LEVEL: 62.2 mAHD
EASTING: 308912.5
NORTHING: 6265630.1
DIP/AZIMUTH: 90°/--

BORE No: 105
PROJECT No: 94626.00
DATE: 9/8/2020
SHEET 2 OF 2

RL	Depth (m)	Description of Strata	Degree of Weathering (EW HW MW SW FS FR)	Graphic Log	Rock Strength (Ex Low, Very Low, Low, Medium, High, Very High, Ex High)	Water	Fracture Spacing (m) (0.01, 0.05, 0.10, 0.50, 1.00)	Discontinuities (B - Bedding J - Joint S - Shear F - Fault)	Sampling & In Situ Testing: Type	Core Rec. %	RQD %	Test Results & Comments
57		SILTSTONE: dark grey and pale grey, with 10% sandstone laminations, high strength, fresh, unbroken, Ashfield Shale *(continued)*							C	100	54	
56	6							6.15m: J45°, ro, pl, cln	C	100	100	PL(A) = 1.24
	6.7	Bore discontinued at 6.7m										PL(A) = 1.31
55	7											
54	8											
53	9											

RIG: Hanjin D&B 8-D **DRILLER:** Rockwell **LOGGED:** JY / YB **CASING:** HQ to 1.5m

TYPE OF BORING: 150mm diameter SFA to 1.5m then NMLC coring to 6.7m

WATER OBSERVATIONS: No free groundwater observed whilst augering

REMARKS: Blank 0-2.0m, Screen 2-5.0m. Backfill: 5mm gravel 0-1.0m, Bentonite 1-1.5m, 5mm gravel 1.5-6.7m

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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BORE: BH105 PROJECT: 94626.00 August 2020

1.5m – 6.0m

BORE: BH105 PROJECT: 94626.00 August 2020

6.0m – 6.7m

BOREHOLE LOG

CLIENT: Woolacotts Consulting Engineers Pty Ltd
PROJECT: Glenwood High School Upgrade
LOCATION: 85 Forman Avenue, Glenwood

SURFACE LEVEL: 59.1 mAHD
EASTING: 308946.7
NORTHING: 6265731.4
DIP/AZIMUTH: 90°/--

BORE No: 106
PROJECT No: 94626.00
DATE: 9/8/2020
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Degree of Weathering (EW HW MW SW FS FR)	Graphic Log	Rock Strength (Ex Low, Very Low, Low, Medium, High, Very High, Ex High)	Water	Fracture Spacing (m) (0.01, 0.05, 0.10, 0.50, 1.00)	Discontinuities (B - Bedding, J - Joint, S - Shear, F - Fault)	Sampling & In Situ Testing: Type	Core Rec. %	RQD %	Test Results & Comments
59	0.1	FILL / TOPSOIL: Silty CLAY: grey-brown, trace rootlets, w < PL, surficial vegetation							D/E			
	0.3	FILL / Silty CLAY CH: medium to high plasticity, grey-brown, trace gravel							D/E			
	0.5	Silty CLAY CH:medium to high plasticity, grey mottled orange-brown, w < PL, firm										
		Bore discontinued at 0.5m										
58	1											
57	2											
56	3											
55	4											

RIG: Hand Tools **DRILLER:** JY **LOGGED:** JY **CASING:** Uncased

TYPE OF BORING: 110mm diameter hand auger

WATER OBSERVATIONS: No free groundwater observed whilst augering

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: Woolacotts Consulting Engineers Pty Ltd
PROJECT: Glenwood High School Upgrade
LOCATION: 85 Forman Avenue, Glenwood

SURFACE LEVEL: 59.6 mAHD
EASTING: 308955.5
NORTHING: 6265686.7
DIP/AZIMUTH: 90°/--

BORE No: 107
PROJECT No: 94626.00
DATE: 8/8/2020
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Degree of Weathering (EW HW MW SW FS FR)	Graphic Log	Rock Strength (Ex Low, Very Low, Low, Medium, High, Very High, Ex High)	Water	Fracture Spacing (m) (0.01, 0.05, 0.10, 0.50, 1.00)	Discontinuities (B - Bedding J - Joint S - Shear F - Fault)	Sampling & In Situ Testing: Type	Core Rec. %	RQD %	Test Results & Comments
59.4	0.2	FILL / Silty CLAY CH: medium to high plasticity, grey-brown, with sand, trace siltstone gravel, w > PL, surficial bark mulch layer							D/E			
59.1	0.5	Silty CLAY CH: medium to high plasticity, orange-brown, trace ironstone gravel, w < PL, stiff, residual							D/E			
		Bore discontinued at 0.5m										
59												
58	1											
57	2											
56	3											
55	4											

RIG: Hand Tools **DRILLER:** JY **LOGGED:** JY **CASING:** Uncased

TYPE OF BORING: 110mm diameter hand auger

WATER OBSERVATIONS: No free groundwater observed whilst augering

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: Woolacotts Consulting Engineers Pty Ltd
PROJECT: Glenwood High School Upgrade
LOCATION: 85 Forman Avenue, Glenwood

SURFACE LEVEL: 61.3 mAHD
EASTING: 308927.9
NORTHING: 6265643.5
DIP/AZIMUTH: 90°/--

BORE No: 108
PROJECT No: 94626.00
DATE: 8/8/2020
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Degree of Weathering (EW HW MW SW FS FR)	Graphic Log	Rock Strength (Ex Low, Very Low, Low, Medium, High, Very High, Ex High)	Water	Fracture Spacing (m) (0.01, 0.05, 0.10, 0.50, 1.00)	Discontinuities (B - Bedding J - Joint S - Shear F - Fault)	Sampling & In Situ Testing: Type	Core Rec. %	RQD %	Test Results & Comments
61	0.0	FILL / Silty CLAY CH: medium to high plasticity, grey-brown, trace siltstone gravel, w<PL, surficial bark mulch layer							D/E*			
		0.2m: 10mm brick fragment										
	0.4	Silty CLAY CH: medium to high plasticity, orange-brown, with ironstone gravel, w <PL, stiff, residual							D/E			
	0.6	Bore discontinued at 0.5m							D/E			
60	1											
59	2											
58	3											
57	4											

RIG: Hand Tools **DRILLER:** JY **LOGGED:** JY **CASING:** Uncased

TYPE OF BORING: 110mm diameter hand auger

WATER OBSERVATIONS: No free groundwater observed whilst augering

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: Woolacotts Consulting Engineers Pty Ltd
PROJECT: Glenwood High School Upgrade
LOCATION: 85 Forman Avenue, Glenwood

SURFACE LEVEL: 62.2 mAHD
EASTING: 308895.2
NORTHING: 6265641.4
DIP/AZIMUTH: 90°/--

BORE No: 109
PROJECT No: 94626.00
DATE: 8/8/2020
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Degree of Weathering (EW HW MW SW FS FR)	Graphic Log	Rock Strength (Ex Low, Very Low, Low, Medium, High, Very High, Ex High)	Water	Fracture Spacing (m) (0.01, 0.05, 0.10, 0.50, 1.00)	Discontinuities (B - Bedding, J - Joint, S - Shear, F - Fault)	Sampling & In Situ Testing: Type	Core Rec. %	RQD %	Test Results & Comments
62	0.0	FILL / Silty CLAY CH: medium to high plasticity, grey-brown, trace siltstone gravel, w<PL, surficial bark mulch layer							D/E			
		0.2m: 10mm brick fragment										
	0.4	Silty CLAY CH: medium to high plasticity, orange-brown, with ironstone gravel, w <PL, stiff, residual							D/E			
	0.6	Bore discontinued at 0.6m										
61	1											
60	2											
59	3											
58	4											

RIG: Hand Tools **DRILLER:** JY **LOGGED:** JY **CASING:** Uncased

TYPE OF BORING: 110mm diameter hand auger

WATER OBSERVATIONS: No free groundwater observed whilst augering

REMARKS: *BD1/20200808 sampled at 0.0.1m

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
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BOREHOLE LOG

CLIENT: Woolacotts Consulting Engineers Pty Ltd
PROJECT: Glenwood High School Upgrade
LOCATION: 85 Forman Avenue, Glenwood

SURFACE LEVEL: 59.6 mAHD
EASTING: 308979.9
NORTHING: 6265709.5
DIP/AZIMUTH: 90°/--

BORE No: 110
PROJECT No: 94626.00
DATE: 8/8/2020
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Degree of Weathering (EW HW MW SW FS FR)	Graphic Log	Rock Strength (Ex Low, Very Low, Low, Medium, High, Very High, Ex High)	Water	Fracture Spacing (m) (0.01, 0.05, 0.10, 0.50, 1.00)	Discontinuities (B - Bedding, J - Joint, S - Shear, F - Fault)	Sampling & In Situ Testing: Type	Core Rec. %	RQD %	Test Results & Comments
59	0.1	FILL / TOPSOIL: Silty CLAY: grey-brown, trace rootlets, w < PL, surficial vegetation										
		FILL / Silty CLAY CH: medium to high plasticity, grey-brown, trace gravel, w < PL										
	0.5	Silty CLAY CH: medium to high plasticity, orange-brown and grey, trace ironstone and siltstone gravel, w < PL, stiff residual										
	1											
	1.5	Bore discontinued at 1.5m										
58	2											
57	3											
56	4											
55												

RIG: Hanjin D&B 8-D **DRILLER:** Rockwell **LOGGED:** JY **CASING:** Uncased
TYPE OF BORING: Solid flight auger (TC) bit
WATER OBSERVATIONS: No free groundwater observed whilst augering
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)

Douglas Partners
Geotechnics / Environment / Groundwater

BOREHOLE LOG

CLIENT: Woolacotts Consulting Engineers Pty Ltd
PROJECT: Glenwood High School Upgrade
LOCATION: 85 Forman Avenue, Glenwood

SURFACE LEVEL: 59.5 mAHD
EASTING: 308982.1
NORTHING: 6265699.1
DIP/AZIMUTH: 90°/--

BORE No: 111
PROJECT No: 94626.00
DATE: 8/8/2020
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Degree of Weathering (EW HW MW SW FS FR)	Graphic Log	Rock Strength (Ex Low, Very Low, Low, Medium, High, Very High, Ex High)	Water	Fracture Spacing (m) (0.01, 0.05, 0.10, 0.50, 1.00)	Discontinuities (B - Bedding, J - Joint, S - Shear, F - Fault)	Sampling & In Situ Testing: Type	Core Rec. %	RQD %	Test Results & Comments
59	0.1	FILL / TOPSOIL: Silty CLAY: grey-brown, trace rootlets, w < PL, surficial vegetation							D/E			
		FILL / Silty CLAY CH: medium to high plasticity, grey-brown, trace gravel, w < PL										
	0.5	Silty CLAY CH: medium to high plasticity, orange-brown and grey, trace ironstone and siltstone gravel, w < PL, stiff residual							D/E			
58	1.0	Bore discontinued at 1.0m										
57	2											
56	3											
55	4											

RIG: Hanjin D&B 8-D **DRILLER:** Rockwell **LOGGED:** JY **CASING:** Uncased

TYPE OF BORING: Solid flight auger (TC) bit

WATER OBSERVATIONS: No free groundwater observed whilst augering

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)

Douglas Partners
Geotechnics / Environment / Groundwater

BOREHOLE LOG

CLIENT: Woolacotts Consulting Engineers Pty Ltd
PROJECT: Glenwood High School Upgrade
LOCATION: 85 Forman Avenue, Glenwood

SURFACE LEVEL: 59.9 mAHD
EASTING: 308974
NORTHING: 6265661.3
DIP/AZIMUTH: 90°/--

BORE No: 112
PROJECT No: 94626.00
DATE: 8/8/2020
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Degree of Weathering (EW HW MW SW FS FR)	Graphic Log	Rock Strength (Ex Low / Very Low / Low / Medium / High / Very High / Ex High)	Water	Fracture Spacing (m) (0.01 / 0.05 / 0.10 / 0.50 / 1.00)	Discontinuities (B - Bedding J - Joint S - Shear F - Fault)	Sampling & In Situ Testing: Type	Core Rec. %	RQD %	Test Results & Comments
59	0.1	FILL / TOPSOIL: Silty CLAY: grey-brown, trace rootlets, w < PL, surficial vegetation							D/E			
	0.3	FILL / Silty CLAY CH: medium to high plasticity, grey-brown, trace gravel, w < PL							D/E			
		Silty CLAY CH: medium to high plasticity, orange-brown, trace gravel, w < PL, stiff, residual							D/E			
	1											
									D			
58	2	2.0m: becoming grey							D			
									D			
57	3											
	3.7	Silty CLAY CH: medium to high plasticity, pale grey and orange-brown, trace siltstone gravel, w < PL, stiff, residual (extremely weathered siltstone)										
56	4	4.0 Bore discontinued at 4.0m							D			
55												

RIG: Hanjin D&B 8-D **DRILLER:** Rockwell **LOGGED:** JY **CASING:** Uncased

TYPE OF BORING: Solid flight auger (TC) bit

WATER OBSERVATIONS: No free groundwater observed whilst augering

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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Geotechnics / Environment / Groundwater

BOREHOLE LOG

CLIENT: Woolacotts Consulting Engineers Pty Ltd
PROJECT: Glenwood High School Upgrade
LOCATION: 85 Forman Avenue, Glenwood

SURFACE LEVEL: 59.5 mAHD
EASTING: 308979.9
NORTHING: 6265687.6
DIP/AZIMUTH: 90°/--

BORE No: 113
PROJECT No: 94626.00
DATE: 8/8/2020
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Degree of Weathering (EW HW MW SW FS FR)	Graphic Log	Rock Strength (Ex Low, Very Low, Low, Medium, High, Very High, Ex High)	Water	Fracture Spacing (m) (0.01, 0.05, 0.10, 0.50, 1.00)	Discontinuities (B - Bedding, J - Joint, S - Shear, F - Fault)	Sampling & In Situ Testing: Type	Core Rec. %	RQD %	Test Results & Comments
59	0.1	FILL / TOPSOIL: Silty CLAY: grey-brown, trace rootlets, w < PL, surficial vegetation							D/E			
		FILL / Silty CLAY CH: medium to high plasticity, grey-brown, trace gravel, w < PL							D/E			
	0.5	Silty CLAY CH: medium to high plasticity, orange-brown and grey, trace ironstone and siltstone gravel, w < PL, stiff residual							D/E			
	1								B			
58	1.5	Bore discontinued at 1.5m										
	2											
57												
	3											
56												
	4											
55												

RIG: Hanjin D&B 8-D **DRILLER:** Rockwell **LOGGED:** JY **CASING:** Uncased

TYPE OF BORING: Solid flight auger (TC) bit

WATER OBSERVATIONS: No free groundwater observed whilst augering

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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Geotechnics / Environment / Groundwater

BOREHOLE LOG

CLIENT: Woolacotts Consulting Engineers Pty Ltd
PROJECT: Glenwood High School Upgrade
LOCATION: 85 Forman Avenue, Glenwood

SURFACE LEVEL: 61.9 mAHD
EASTING: 308947.8
NORTHING: 6265620.4
DIP/AZIMUTH: 90°/--

BORE No: 114
PROJECT No: 94626.00
DATE: 8/8/2020
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Degree of Weathering (EW HW MW SW FS FR)	Graphic Log	Rock Strength (Ex Low, Very Low, Low, Medium, High, Very High, Ex High)	Water	Fracture Spacing (m) (0.01, 0.05, 0.10, 0.50, 1.00)	Discontinuities (B - Bedding, J - Joint, S - Shear, F - Fault)	Sampling & In Situ Testing: Type	Core Rec. %	RQD %	Test Results & Comments
61	0.1	FILL / TOPSOIL: Silty CLAY: grey-brown, trace rootlets, w < PL, surficial vegetation							D/E			
		FILL / Silty CLAY CH: medium to high plasticity, grey-brown, trace gravel, w < PL							D/E			
	0.7	Silty CLAY CH: medium to high plasticity, orange-brown, w < PL, stiff, residual							D/E			
	1	1.0m: becoming pale grey mottled orange, with ironstone gravel										
	1.5	Bore discontinued at 1.5m										
60	2											
59	3											
58	4											
57												

RIG: Hanjin D&B 8-D **DRILLER:** Rockwell **LOGGED:** JY **CASING:** Uncased

TYPE OF BORING: Solid flight auger (TC) bit

WATER OBSERVATIONS: No free groundwater observed whilst augering

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: Woolacotts Consulting Engineers Pty Ltd
PROJECT: Glenwood High School Upgrade
LOCATION: 85 Forman Avenue, Glenwood

SURFACE LEVEL: 62.2 mAHD
EASTING: 308945.1
NORTHING: 6265612.4
DIP/AZIMUTH: 90°/--

BORE No: 115
PROJECT No: 94626.00
DATE: 8/8/2020
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Degree of Weathering (EW HW MW SW FS FR)	Graphic Log	Rock Strength (Ex Low, Very Low, Low, Medium, High, Very High, Ex High)	Water	Fracture Spacing (m) (0.01, 0.05, 0.10, 0.50, 1.00)	Discontinuities (B - Bedding, J - Joint, S - Shear, F - Fault)	Sampling & In Situ Testing: Type	Core Rec. %	RQD %	Test Results & Comments
62	0.1	FILL / TOPSOIL: Silty CLAY: grey-brown, trace gravel, w < PL, surficial vegetation							D/E			
		FILL / Silty CLAY CH: medium to high plasticity, grey-brown, trace gravel, w < PL							D/E			
									B			
	0.9											
61	1	Silty CLAY CH: medium to high plasticity, orange-brown mottled pale grey, trace ironstone gravel, w < PL, stiff, residual							D			
	1.5	Bore discontinued at 1.5m										
60	2											
59	3											
58	4											

RIG: Hanjin D&B 8-D **DRILLER:** Rockwell **LOGGED:** JY **CASING:** Uncased

TYPE OF BORING: Solid flight auger (TC) bit

WATER OBSERVATIONS: No free groundwater observed whilst augering

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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Geotechnics / Environment / Groundwater

BOREHOLE LOG

CLIENT: Woolacotts Consulting Engineers Pty Ltd
PROJECT: Glenwood High School Upgrade
LOCATION: 85 Forman Avenue, Glenwood

SURFACE LEVEL: 62.8 mAHD
EASTING: 308786.7
NORTHING: 6265678.8
DIP/AZIMUTH: 90°/--

BORE No: 116
PROJECT No: 94626.00
DATE: 31/8/2020
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Degree of Weathering (EW HW MW SW FS FR)	Graphic Log	Rock Strength (Ex Low, Very Low, Low, Medium, High, Very High, Ex High)	Water	Fracture Spacing (m) (0.01, 0.05, 0.10, 0.50, 1.00)	Discontinuities (B - Bedding J - Joint S - Shear F - Fault)	Sampling & In Situ Testing: Type	Core Rec. %	RQD %	Test Results & Comments
62.7	0.1	FILL / TOPSOIL: Silty CLAY: grey-brown, trace rootlets, w < PL, surficial vegetation										
62.6	0.2	FILL / Silty CLAY CH: medium to high plasticity, grey-brown, trace gravel										
		Silty CLAY CH:medium to high plasticity, grey mottled orange-brown, w < PL, very stiff										
62	0.8	SILTSTONE: grey, very low strength, Ashfield Shale										
	1								S			10/50 refusal
61.7	1.1	Bore discontinued at 1.1m										
61	2											
60	3											
59	4											
58												

RIG: Multi-Drill **DRILLER:** GRB **LOGGED:** GRB **CASING:** Uncased

TYPE OF BORING: Solid flight auger (TC) bit

WATER OBSERVATIONS: No free groundwater observed whilst augering

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)

Douglas Partners
Geotechnics / Environment / Groundwater

BOREHOLE LOG

CLIENT: Woolacotts Consulting Engineers Pty Ltd
PROJECT: Glenwood High School Upgrade
LOCATION: 85 Forman Avenue, Glenwood

SURFACE LEVEL: 62.6 mAHD
EASTING: 308803.9
NORTHING: 6265676.3
DIP/AZIMUTH: 90°/--

BORE No: 117
PROJECT No: 94626.00
DATE: 31/8/2020
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Degree of Weathering (EW HW MW SW FS FR)	Graphic Log	Rock Strength (Ex Low, Very Low, Low, Medium, High, Very High, Ex High)	Water	Fracture Spacing (m) (0.01, 0.05, 0.10, 0.50, 1.00)	Discontinuities (B - Bedding J - Joint S - Shear F - Fault)	Sampling & In Situ Testing: Type	Core Rec. %	RQD %	Test Results & Comments
62	0.15	FILL / TOPSOIL: Silty CLAY: grey-brown, trace rootlets, w < PL, surficial vegetation										
		Silty CLAY CH: medium to high plasticity, grey mottled orange-brown, w < PL, very stiff, residual							S			10,20/50 refusal
	0.7	SILTSTONE: grey, very low strength to low, Ashfield Shale										
61	1.6	Bore discontinued at 1.6m										
60												
59												
58												

RIG: MultiDrill **DRILLER:** GRB **LOGGED:** GRB **CASING:** Uncased

TYPE OF BORING: Solid flight auger (TC) bit

WATER OBSERVATIONS: No free groundwater observed whilst augering

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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Geotechnics / Environment / Groundwater

BOREHOLE LOG

CLIENT: Woolacotts Consulting Engineers Pty Ltd
PROJECT: Glenwood High School Upgrade
LOCATION: 85 Forman Avenue, Glenwood

SURFACE LEVEL: 63.5 mAHD
EASTING: 308836.9
NORTHING: 6265662.9
DIP/AZIMUTH: 90°/--

BORE No: 118
PROJECT No: 94626.00
DATE: 31/8/2020
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Degree of Weathering (EW HW MW SW FS FR)	Graphic Log	Rock Strength (Ex Low, Very Low, Low, Medium, High, Very High, Ex High)	Water	Fracture Spacing (m) (0.01, 0.05, 0.10, 0.50, 1.00)	Discontinuities (B - Bedding J - Joint S - Shear F - Fault)	Sampling & In Situ Testing: Type	Core Rec. %	RQD %	Test Results & Comments
63	0.1	FILL / TOPSOIL: Silty CLAY: grey-brown, trace rootlets and brick fragments (10mm), w < PL, surficial vegetation										
		Silty CLAY CH: medium to high plasticity, orange-brown, trace ironstone gravel, w<PL, stiff, residual										
62	1.0	Bore discontinued at 1.0m										
61												
60												
59												

RIG: Hand Tools **DRILLER:** GRB **LOGGED:** GRB **CASING:** Uncased

TYPE OF BORING: 110mm diameter hand auger

WATER OBSERVATIONS: No free groundwater observed whilst augering

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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Geotechnics / Environment / Groundwater

BOREHOLE LOG

CLIENT: Woolacotts Consulting Engineers Pty Ltd
PROJECT: Glenwood High School Upgrade
LOCATION: 85 Forman Avenue, Glenwood

SURFACE LEVEL: 64.2 mAHD
EASTING: 308912.9
NORTHING: 6265536.2
DIP/AZIMUTH: 90°/--

BORE No: 119
PROJECT No: 94626.00
DATE: 31/8/2020
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Degree of Weathering (EW HW MW SW FS FR)	Graphic Log	Rock Strength (Ex Low, Very Low, Low, Medium, High, Very High, Ex High)	Water	Fracture Spacing (m) (0.01, 0.05, 0.10, 0.50, 1.00)	Discontinuities (B - Bedding J - Joint S - Shear F - Fault)	Sampling & In Situ Testing: Type	Core Rec. %	RQD %	Test Results & Comments
64	0.2	FILL / TOPSOIL: Silty CLAY: brown, with sand, trace gravel, trace rootlets, w < PL, surficial vegetation							D/E			
		Silty CLAY CH: medium to high plasticity, pale grey mottled orange, trace ironstone gravel, w < PL, stiff, residual							D/E			
	0.5	Bore discontinued at 0.5m							D/E			
63	1											
62	2											
61	3											
60	4											

RIG: Hand Tools **DRILLER:** GRB **LOGGED:** GRB **CASING:** Uncased

TYPE OF BORING: 110mm diameter hand auger

WATER OBSERVATIONS: No free groundwater observed whilst augering

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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Geotechnics / Environment / Groundwater

BOREHOLE LOG

CLIENT: Woolacotts Consulting Engineers Pty Ltd
PROJECT: Glenwood High School Upgrade
LOCATION: 85 Forman Avenue, Glenwood

SURFACE LEVEL: 64.2 mAHD
EASTING: 308928.9
NORTHING: 6265515
DIP/AZIMUTH: 90°/--

BORE No: 120
PROJECT No: 94626.00
DATE: 31/8/2020
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Degree of Weathering (EW HW MW SW FS FR)	Graphic Log	Rock Strength (Ex Low, Very Low, Low, Medium, High, Very High, Ex High)	Water	Fracture Spacing (m) (0.01, 0.05, 0.10, 0.50, 1.00)	Discontinuities (B - Bedding J - Joint S - Shear F - Fault)	Sampling & In Situ Testing: Type	Core Rec. %	RQD %	Test Results & Comments
64	0.2	FILL / TOPSOIL: Silty CLAY: brown, with sand, trace gravel, brick and plastic fragment observed, trace rootlets, w < PL							D/E			
	0.4	FILL / Silty CLAY CH: medium to high plasticity, grey and brown, trace gravel and rootlets, w < PL							D/E			
	0.5	Silty CLAY CH: medium to high plasticity, pale grey mottled orange, trace ironstone gravel, w < PL, stiff, residual							D/E			
		Bore discontinued at 0.5m										
63	1											
62	2											
61	3											
60	4											

RIG: Hand Tools **DRILLER:** GRB **LOGGED:** GRB **CASING:** Uncased

TYPE OF BORING: 110mm diameter hand auger

WATER OBSERVATIONS: No free groundwater observed whilst augering

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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Geotechnics / Environment / Groundwater

BOREHOLE LOG

CLIENT: Woolacotts Consulting Engineers Pty Ltd
PROJECT: Glenwood High School Upgrade
LOCATION: 85 Forman Avenue, Glenwood

SURFACE LEVEL: 59.2 mAHD
EASTING: 308970.1
NORTHING: 6265735.3
DIP/AZIMUTH: 90°/--

BORE No: 121
PROJECT No: 94626.00
DATE: 8/8/2020
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Degree of Weathering (EW HW MW SW FS FR)	Graphic Log	Rock Strength (Ex Low / Very Low / Low / Medium / High / Very High / Ex High)	Water	Fracture Spacing (m) (0.01 / 0.05 / 0.10 / 0.50 / 1.00)	Discontinuities (B - Bedding J - Joint S - Shear F - Fault)	Sampling & In Situ Testing: Type	Core Rec. %	RQD %	Test Results & Comments
59	0.1	FILL / TOPSOIL: Silty CLAY: grey-brown, trace rootlets and brick fragments (10mm), w < PL, surficial vegetation							D/E			
	0.5	FILL / Silty CLAY CH: medium to high plasticity, grey-brown, trace gravel 0.45m: PVC pipe fragment							D/E			
58	1	Silty CLAY CH: medium to high plasticity, orange-brown, trace ironstone gravel, w ~= PL, stiff, residual							D/E			
	1.5	Bore discontinued at 1.5m										
57	2											
56	3											
55	4											

RIG: Hanjin D&B 8-D **DRILLER:** Rockwell **LOGGED:** JY **CASING:** Uncased

TYPE OF BORING: Solid flight auger (TC) bit

WATER OBSERVATIONS: No free groundwater observed whilst augering

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)

Douglas Partners
Geotechnics / Environment / Groundwater

BOREHOLE LOG

CLIENT: Woolacotts Consulting Engineers Pty Ltd
PROJECT: Glenwood High School Upgrade
LOCATION: 85 Forman Avenue, Glenwood

SURFACE LEVEL: 60.1 mAHD
EASTING: 308958.8
NORTHING: 6265662.7
DIP/AZIMUTH: 90°/--

BORE No: 122
PROJECT No: 94626.00
DATE: 8/8/2020
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Degree of Weathering (EW HW MW SW FS FR)	Graphic Log	Rock Strength (Ex Low, Very Low, Low, Medium, High, Very High, Ex High)	Water	Fracture Spacing (m) (0.01, 0.05, 0.10, 0.50, 1.00)	Discontinuities (B - Bedding J - Joint S - Shear F - Fault)	Sampling & In Situ Testing: Type	Core Rec. %	RQD %	Test Results & Comments
60	0.1	FILL / Silty CLAY CH: medium to high plasticity, grey-brown, with sand, trace siltstone gravel, w > PL, surficial bark mulch layer							D/E			
		Bore discontinued at 0.1m										
59	1											
58	2											
57	3											
56	4											

RIG: Hand Tools **DRILLER:** JY **LOGGED:** JY **CASING:** Uncased

TYPE OF BORING: 110mm diameter hand auger

WATER OBSERVATIONS: No free groundwater observed whilst augering

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 I

Laboratory Results Summary Tables

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Table I1: Summary of Laboratory Results – Metals, TRH, BTEX, PAH

			Metals								TRH						BTEX				PAH		
			Arsenic	Cadmium	Total 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
		PQL	4	0.4	1	1	1	0.1	1	1	25	50	25	50	100	100	0.2	0.5	1	1	1	0.05	0.5
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
BH101	0.0 - 0.1m	8/08/2020	8	<0.4	20	9	18	<0.1	5	20	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<0.05	<0.5
			100 NC	20 NC	100 670	6000 75	300 NC	40 NC	400 60	7400 190	NC NC	NC 120	NC 180	NC NC	NC 300	NC 2800	NC 50	NC 85	NC 70	NC 105	NC NC	NC 0.7	3 NC
BH102	0.0 - 0.1m	9/08/2020	6	<0.4	21	14	19	<0.1	12	32	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<0.05	<0.5
			100 NC	20 NC	100 670	6000 75	300 NC	40 NC	400 60	7400 190	NC NC	NC 120	NC 180	NC NC	NC 300	NC 2800	NC 50	NC 85	NC 70	NC 105	NC NC	NC 0.7	3 NC
BH103	0.0 - 0.1m	8/08/2020	7	<0.4	18	11	17	<0.1	6	27	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	0.1	<0.5
			100 NC	20 NC	100 670	6000 75	300 NC	40 NC	400 60	7400 190	NC NC	NC 120	NC 180	NC NC	NC 300	NC 2800	NC 50	NC 85	NC 70	NC 105	NC NC	NC 0.7	3 NC
BH105	0.0 - 0.1m	9/08/2020	7	<0.4	18	10	15	<0.1	5	23	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<0.05	<0.5
			100 NC	20 NC	100 670	6000 75	300 NC	40 NC	400 60	7400 190	NC NC	NC 120	NC 180	NC NC	NC 300	NC 2800	NC 50	NC 85	NC 70	NC 105	NC NC	NC 0.7	3 NC
BH107	0.0 - 0.1m	8/08/2020	5	<0.4	10	10	14	<0.1	5	29	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<0.05	<0.5
			100 NC	20 NC	100 670	6000 75	300 NC	40 NC	400 60	7400 190	NC NC	NC 120	NC 180	NC NC	NC 300	NC 2800	NC 50	NC 85	NC 70	NC 105	NC NC	NC 0.7	3 NC
BH108	0.0 - 0.1m	8/08/2020	6	<0.4	17	11	14	<0.1	5	29	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<0.05	<0.5
			100 NC	20 NC	100 670	6000 75	300 NC	40 NC	400 60	7400 190	NC NC	NC 120	NC 180	NC NC	NC 300	NC 2800	NC 50	NC 85	NC 70	NC 105	NC NC	NC 0.7	3 NC
BH109	0.0 - 0.1m	8/08/2020	6	<0.4	16	10	13	<0.1	5	30	<25	<50	<25	<50	390	200	<0.2	<0.5	<1	<1	<1	<0.05	<0.5
			100 NC	20 NC	100 670	6000 75	300 NC	40 NC	400 60	7400 190	NC NC	NC 120	NC 180	NC NC	NC 300	NC 2800	NC 50	NC 85	NC 70	NC 105	NC NC	NC 0.7	3 NC
BH110	0.0 - 0.1m	8/08/2020	9	<0.4	15	16	20	<0.1	8	35	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<0.05	<0.5
			100 NC	20 NC	100 670	6000 75	300 NC	40 NC	400 60	7400 190	NC NC	NC 120	NC 180	NC NC	NC 300	NC 2800	NC 50	NC 85	NC 70	NC 105	NC NC	NC 0.7	3 NC
BH111	0.0 - 0.1m	8/08/2020	6	<0.4	12	9	14	<0.1	6	22	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<0.05	<0.5
			100 NC	20 NC	100 670	6000 75	300 NC	40 NC	400 60	7400 190	NC NC	NC 120	NC 180	NC NC	NC 300	NC 2800	NC 50	NC 85	NC 70	NC 105	NC NC	NC 0.7	3 NC
BH112	0.0 - 0.1m	8/08/2020	8	<0.4	19	10	17	<0.1	6	23	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<0.05	<0.5
			100 NC	20 NC	100 670	6000 75	300 NC	40 NC	400 60	7400 190	NC NC	NC 120	NC 180	NC NC	NC 300	NC 2800	NC 50	NC 85	NC 70	NC 105	NC NC	NC 0.7	3 NC
BH113	0.0 - 0.1m	8/08/2020	7	<0.4	17	10	18	<0.1	5	19	<25	<50	<25	<50	<100	120	<0.2	<0.5	<1	<1	<1	<0.05	<0.5
			100 NC	20 NC	100 670	6000 75	300 NC	40 NC	400 60	7400 190	NC NC	NC 120	NC 180	NC NC	NC 300	NC 2800	NC 50	NC 85	NC 70	NC 105	NC NC	NC 0.7	3 NC
BH114	0.0 - 0.1m	8/08/2020	6	<0.4	16	10	16	<0.1	4	20	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<0.05	<0.5
			100 NC	20 NC	100 670	6000 75	300 NC	40 NC	400 60	7400 190	NC NC	NC 120	NC 180	NC NC	NC 300	NC 2800	NC 50	NC 85	NC 70	NC 105	NC NC	NC 0.7	3 NC
BH121	0.0 - 0.1m	8/08/2020	8	<0.4	15	14	18	<0.1	6	40	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<0.05	<0.5
			100 NC	20 NC	100 670	6000 75	300 NC	40 NC	400 60	7400 190	NC NC	NC 120	NC 180	NC NC	NC 300	NC 2800	NC 50	NC 85	NC 70	NC 105	NC NC	NC 0.7	3 NC
BH122	0.0 - 0.1m	9/08/2020	6	<0.4	13	10	12	<0.1	7	28	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<0.05	<0.5
			100 NC	20 NC	100 670	6000 75	300 NC	40 NC	400 60	7400 190	NC NC	NC 120	NC 180	NC NC	NC 300	NC 2800	NC 50	NC 85	NC 70	NC 105	NC NC	NC 0.7	3 NC
BH102	0.6 m	9/08/2020	9	<0.4	13	14	16	<0.1	8	31	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<0.05	<0.5
			100 NC	20 NC	100 670	6000 75	300 NC	40 NC	400 60	7400 190	NC NC	NC 120	NC 180	NC NC	NC 300	NC 2800	NC 50	NC 85	NC 70	NC 105	NC NC	NC 0.7	3 NC
BH107	0.2 m	8/08/2020	4	<0.4	10	9	13	<0.1	5	21	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<0.05	<0.5
			100 NC	20 NC	100 670	6000 75	300 NC	40 NC	400 60	7400 190	NC NC	NC 120	NC 180	NC NC	NC 300	NC 2800	NC 50	NC 85	NC 70	NC 105	NC NC	NC 0.7	3 NC
BH109	0.4 m	8/08/2020	7	<0.4	17	13	9	<0.1	6	29	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<0.05	<0.5
			100 NC	20 NC	100 670	6000 75	300 NC	40 NC	400 60	7400 190	NC NC	NC 120	NC 180	NC NC	NC 300	NC 2800	NC 50	NC 85	NC 70	NC 105	NC NC	NC 0.7	3 NC
BH113	0.5 m	8/08/2020	6	<0.4	11	11	13	<0.1	5	20	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<0.05	<0.5
			100 NC	20 NC	100 670	6000 75	300 NC	40 NC	400 60	7400 190	NC NC	NC 120	NC 180	NC NC	NC 300	NC 2800	NC 50	NC 85	NC 70	NC 105	NC NC	NC 0.7	3 NC
BH114	0.7 m	8/08/2020	7	<0.4	20	19	13	<0.1	7	36	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<0.05	<0.5
			100 NC	20 NC	100 670	6000 75	300 NC	40 NC	400 60	7400 190	NC NC	NC 120	NC 180	NC NC	NC 300	NC 2800	NC 50	NC 85	NC 70	NC 105	NC NC	NC 0.7	3 NC
BH121	0.5 m	8/08/2020	8	<0.4	13	14	17	<0.1	7	31	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<0.05	<0.5
			100 NC	20 NC	100 670	6000 75	300 NC	40 NC	400 60	7400 190	NC NC	NC 120	NC 180	NC NC	NC 300	NC 2800	NC 50	NC 85	NC 70	NC 105	NC NC	NC 0.7	3 NC
BH101	0.2 m	8/08/2020	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
			100 NC	20 NC	100 670	6000 75	300 NC	40 NC	400 60	7400 190	NC NC	NC 120	NC 180	NC NC	NC 300	NC 2800	NC 50	NC 85	NC 70	NC 105	NC NC	NC 0.7	3 NC
BH102	0.2 m	9/08/2020	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
			100 NC	20 NC	100 670	6000 75	300 NC	40 NC	400 60	7400 190	NC NC	NC 120	NC 180	NC NC	NC 300	NC 2800	NC 50	NC 85	NC 70	NC 105	NC NC	NC 0.7	3 NC
BH103	0.2 m	8/08/2020	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
			100 NC	20 NC	100 670	6000 75	300 NC	40 NC	400 60	7400 190	NC NC	NC 120	NC 180	NC NC	NC 300	NC 2800	NC 50	NC 85	NC 70	NC 105	NC NC	NC 0.7	3 NC

BH109	0.2 m	8/08/2020	NT 100 NC	NT 20 NC	NT 100 670	NT 6000 75	NT 300 NC	NT 40 NC	NT 400 60	NT 7400 190	NT NC NC	NT NC 120	NT NC 180	NT NC NC	NT NC 300	NT NC 2800	NT NC 50	NT NC 85	NT NC 70	NT NC 105	NT NC NC	NT NC 0.7	NT 3 NC
BH112	0.2 m	8/08/2020	NT 100 NC	NT 20 NC	NT 100 670	NT 6000 75	NT 300 NC	NT 40 NC	NT 400 60	NT 7400 190	NT NC NC	NT NC 120	NT NC 180	NT NC NC	NT NC 300	NT NC 2800	NT NC 50	NT NC 85	NT NC 70	NT NC 105	NT NC NC	NT NC 0.7	NT 3 NC
BH115	0.2 m	8/08/2020	NT 100 NC	NT 20 NC	NT 100 670	NT 6000 75	NT 300 NC	NT 40 NC	NT 400 60	NT 7400 190	NT NC NC	NT NC 120	NT NC 180	NT NC NC	NT NC 300	NT NC 2800	NT NC 50	NT NC 85	NT NC 70	NT NC 105	NT NC NC	NT NC 0.7	NT 3 NC
BD1/20200808	0 m	8/08/2020	6 100 NC	<0.4 20 NC	16 100 670	10 6000 75	14 300 NC	<0.1 40 NC	6 400 60	31 7400 190	<25 NC NC	<50 NC 120	<25 NC 180	<50 NC NC	<100 NC 300	<100 NC 2800	<0.2 NC 50	<0.5 NC 85	<1 NC 70	<1 NC 105	<1 NC NC	<0.05 NC 0.7	<0.5 3 NC
BD2/20200808	0 m	8/08/2020	8 100 NC	<0.4 20 NC	20 100 670	10 6000 75	17 300 NC	<0.1 40 NC	5 400 60	21 7400 190	<25 NC NC	<50 NC 120	<25 NC 180	<50 NC NC	<100 NC 300	<100 NC 2800	<0.2 NC 50	<0.5 NC 85	<1 NC 70	<1 NC 105	<1 NC NC	<0.05 NC 0.7	<0.5 3 NC
117a/0.0-0.2	0.0-0.2m	31/08/2020	6 100 NC	<0.4 20 NC	17 100 670	12 6000 75	11 300 NC	<0.1 40 NC	3 400 60	15 7400 190	<25 NC NC	<50 NC 120	<25 NC 180	<50 NC NC	<100 NC 300	<100 NC 2800	<0.2 NC 50	<0.5 NC 85	<1 NC 70	<1 NC 105	<1 NC NC	<0.05 NC 0.7	<0.5 3 NC
116/0.0-0.4	0.0-0.4m	31/08/2020	8 100 NC	<0.4 20 NC	22 100 670	12 6000 75	20 300 NC	<0.1 40 NC	6 400 60	44 7400 190	<25 NC NC	<50 NC 120	<25 NC 180	<50 NC NC	<100 NC 300	<100 NC 2800	<0.2 NC 50	<0.5 NC 85	<1 NC 70	<1 NC 105	<1 NC NC	<0.05 NC 0.7	<0.5 3 NC
120/0.4-0.5	0.4-0.5m	31/08/2020	6 100 NC	<0.4 20 NC	9 100 670	13 6000 75	12 300 NC	<0.1 40 NC	2 400 60	14 7400 190	<25 NC NC	<50 NC 120	<25 NC 180	<50 NC NC	<100 NC 300	<100 NC 2800	<0.2 NC 50	<0.5 NC 85	<1 NC 70	<1 NC 105	<1 NC NC	<0.05 NC 0.7	<0.5 3 NC
120/0.2-0.3	0.2-0.3m	31/08/2020	6 100 NC	<0.4 20 NC	16 100 670	21 6000 75	15 300 NC	<0.1 40 NC	4 400 60	41 7400 190	<25 NC NC	<50 NC 120	<25 NC 180	<50 NC NC	<100 NC 300	<100 NC 2800	<0.2 NC 50	<0.5 NC 85	<1 NC 70	<1 NC 105	<1 NC NC	<0.05 NC 0.7	<0.5 3 NC
119/0.0-0.1	0.0-0.1m	31/08/2020	4 100 NC	<0.4 20 NC	12 100 670	36 6000 75	14 300 NC	<0.1 40 NC	9 400 60	84 7400 190	<25 NC NC	<50 NC 120	<25 NC 180	<50 NC NC	<100 NC 300	<100 NC 2800	<0.2 NC 50	<0.5 NC 85	<1 NC 70	<1 NC 105	<1 NC NC	<0.05 NC 0.7	<0.5 3 NC
121a/0.2-0.3	0 m	31/08/2020	6 100 NC	<0.4 20 NC	11 100 670	14 6000 75	14 300 NC	<0.1 40 NC	7 400 60	34 7400 190	<25 NC NC	<50 NC 120	<25 NC 180	<50 NC NC	<100 NC 300	<100 NC 2800	<0.2 NC 50	<0.5 NC 85	<1 NC 70	<1 NC 105	<1 NC NC	<0.05 NC 0.7	<0.5 3 NC
119/0.2-0.3	0.2-0.3m	31/08/2020	7 100 NC	<0.4 20 NC	12 100 670	17 6000 75	13 300 NC	<0.1 40 NC	4 400 60	21 7400 190	<25 NC NC	<50 NC 120	<25 NC 180	<50 NC NC	<100 NC 300	<100 NC 2800	<0.2 NC 50	<0.5 NC 85	<1 NC 70	<1 NC 105	<1 NC NC	<0.05 NC 0.7	<0.5 3 NC
120/0.1-0.3	0.1-0.3m	31/08/2020	7 100 NC	<0.4 20 NC	17 100 670	23 6000 75	18 300 NC	<0.1 40 NC	6 400 60	41 7400 190	<25 NC NC	<50 NC 120	<25 NC 180	<50 NC NC	<100 NC 300	<100 NC 2800	<0.2 NC 50	<0.5 NC 85	<1 NC 70	<1 NC 105	<1 NC NC	<0.05 NC 0.7	<0.5 3 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 A (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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Table I2: Summary of Laboratory Results – Phenol, OCP, OPP, PCB, Asbestos

			Phenol	OCP												OPP	PCB	Asbestos		
			Phenol	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	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	-	-	-
BH101	0.0 - 0.1m	8/08/2020	<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
			100 NC	240 NC	NC NC	NC NC	NC NC	6 NC	50 NC	270 NC	10 NC	6 NC	10 NC	300 NC		160 NC	1 NC			
BH102	0.0 - 0.1m	9/08/2020	<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
			100 NC	240 NC	NC NC	NC NC	NC NC	6 NC	50 NC	270 NC	10 NC	6 NC	10 NC	300 NC		160 NC	1 NC			
BH103	0.0 - 0.1m	8/08/2020	<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
			100 NC	240 NC	NC NC	NC NC	NC NC	6 NC	50 NC	270 NC	10 NC	6 NC	10 NC	300 NC		160 NC	1 NC			
BH105	0.0 - 0.1m	9/08/2020	<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
			100 NC	240 NC	NC NC	NC NC	NC NC	6 NC	50 NC	270 NC	10 NC	6 NC	10 NC	300 NC		160 NC	1 NC			
BH107	0.0 - 0.1m	8/08/2020	<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
			100 NC	240 NC	NC NC	NC NC	NC NC	6 NC	50 NC	270 NC	10 NC	6 NC	10 NC	300 NC		160 NC	1 NC			
BH108	0.0 - 0.1m	8/08/2020	<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
			100 NC	240 NC	NC NC	NC NC	NC NC	6 NC	50 NC	270 NC	10 NC	6 NC	10 NC	300 NC		160 NC	1 NC			
BH109	0.0 - 0.1m	8/08/2020	<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
			100 NC	240 NC	NC NC	NC NC	NC NC	6 NC	50 NC	270 NC	10 NC	6 NC	10 NC	300 NC		160 NC	1 NC			
BH110	0.0 - 0.1m	8/08/2020	<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
			100 NC	240 NC	NC NC	NC NC	NC NC	6 NC	50 NC	270 NC	10 NC	6 NC	10 NC	300 NC		160 NC	1 NC			
BH111	0.0 - 0.1m	8/08/2020	<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
			100 NC	240 NC	NC NC	NC NC	NC NC	6 NC	50 NC	270 NC	10 NC	6 NC	10 NC	300 NC		160 NC	1 NC			
BH112	0.0 - 0.1m	8/08/2020	<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
			100 NC	240 NC	NC NC	NC NC	NC NC	6 NC	50 NC	270 NC	10 NC	6 NC	10 NC	300 NC		160 NC	1 NC			
BH113	0.0 - 0.1m	8/08/2020	<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
			100 NC	240 NC	NC NC	NC NC	NC NC	6 NC	50 NC	270 NC	10 NC	6 NC	10 NC	300 NC		160 NC	1 NC			
BH114	0.0 - 0.1m	8/08/2020	<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
			100 NC	240 NC	NC NC	NC NC	NC NC	6 NC	50 NC	270 NC	10 NC	6 NC	10 NC	300 NC		160 NC	1 NC			
BH121	0.0 - 0.1m	8/08/2020	<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
			100 NC	240 NC	NC NC	NC NC	NC NC	6 NC	50 NC	270 NC	10 NC	6 NC	10 NC	300 NC		160 NC	1 NC			
BH122	0.0 - 0.1m	9/08/2020	<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
			100 NC	240 NC	NC NC	NC NC	NC NC	6 NC	50 NC	270 NC	10 NC	6 NC	10 NC	300 NC		160 NC	1 NC			
BH102	0.6 m	9/08/2020	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT		NT	NT	NT	NT	NT
			100 NC	240 NC	NC NC	NC NC	NC NC	6 NC	50 NC	270 NC	10 NC	6 NC	10 NC	300 NC		160 NC	1 NC			
BH107	0.2 m	8/08/2020	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT		NT	NT	NT	NT	NT
			100 NC	240 NC	NC NC	NC NC	NC NC	6 NC	50 NC	270 NC	10 NC	6 NC	10 NC	300 NC		160 NC	1 NC			
BH109	0.4 m	8/08/2020	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT		NT	NT	NT	NT	NT
			100 NC	240 NC	NC NC	NC NC	NC NC	6 NC	50 NC	270 NC	10 NC	6 NC	10 NC	300 NC		160 NC	1 NC			
BH113	0.5 m	8/08/2020	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT		NT	NT	NT	NT	NT
			100 NC	240 NC	NC NC	NC NC	NC NC	6 NC	50 NC	270 NC	10 NC	6 NC	10 NC	300 NC		160 NC	1 NC			
BH114	0.7 m	8/08/2020	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT		NT	NT	NT	NT	NT
			100 NC	240 NC	NC NC	NC NC	NC NC	6 NC	50 NC	270 NC	10 NC	6 NC	10 NC	300 NC		160 NC	1 NC			
BH121	0.5 m	8/08/2020	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT		NT	NT	NT	NT	NT
			100 NC	240 NC	NC NC	NC NC	NC NC	6 NC	50 NC	270 NC	10 NC	6 NC	10 NC	300 NC		160 NC	1 NC			
BH101	0.2 m	8/08/2020	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT		NT	NT	NAD	NAD	NAD
			100 NC	240 NC	NC NC	NC NC	NC NC	6 NC	50 NC	270 NC	10 NC	6 NC	10 NC	300 NC		160 NC	1 NC			
BH102	0.2 m	9/08/2020	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT		NT	NT	NAD	NAD	NAD
			100 NC	240 NC	NC NC	NC NC	NC NC	6 NC	50 NC	270 NC	10 NC	6 NC	10 NC	300 NC		160 NC	1 NC			
BH103	0.2 m	8/08/2020	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT		NT	NT	NAD	NAD	NAD
			100 NC	240 NC	NC NC	NC NC	NC NC	6 NC	50 NC	270 NC	10 NC	6 NC	10 NC	300 NC		160 NC	1 NC			

BH109	0.2 m	8/08/2020	NT 100 NC	NT 240 NC	NT NC NC	NT NC NC	NT NC NC	NT 6 NC	NT 50 NC	NT 270 NC	NT 10 NC	NT 6 NC	NT 10 NC	NT 300 NC	NT 160 NC	NT 1 NC	NAD	NAD	NAD
BH112	0.2 m	8/08/2020	NT 100 NC	NT 240 NC	NT NC NC	NT NC NC	NT NC NC	NT 6 NC	NT 50 NC	NT 270 NC	NT 10 NC	NT 6 NC	NT 10 NC	NT 300 NC	NT 160 NC	NT 1 NC	NAD	NAD	NAD
BH115	0.2 m	8/08/2020	NT 100 NC	NT 240 NC	NT NC NC	NT NC NC	NT NC NC	NT 6 NC	NT 50 NC	NT 270 NC	NT 10 NC	NT 6 NC	NT 10 NC	NT 300 NC	NT 160 NC	NT 1 NC	NAD	NAD	NAD
BD1/20200808		8/08/2020	NT 100 NC	NT 240 NC	NT NC NC	NT NC NC	NT NC NC	NT 6 NC	NT 50 NC	NT 270 NC	NT 10 NC	NT 6 NC	NT 10 NC	NT 300 NC	NT 160 NC	NT 1 NC	NT	NT	NT
BD2/20200808		8/08/2020	NT 100 NC	NT 240 NC	NT NC NC	NT NC NC	NT NC NC	NT 6 NC	NT 50 NC	NT 270 NC	NT 10 NC	NT 6 NC	NT 10 NC	NT 300 NC	NT 160 NC	NT 1 NC	NT	NT	NT
117a/0.0-0.2	0.0-0.2m	31/08/2020	<5 100 NC	<0.1 240 NC	<0.1 NC NC	<0.1 NC NC	<0.1 NC NC	<0.1 6 NC	<0.1 50 NC	<0.1 270 NC	<0.1 10 NC	<0.1 6 NC	<0.1 10 NC	<0.1 300 NC	<0.1 160 NC	<0.1 1 NC	NAD	NAD	NAD
116/0.0-0.4	0.0-0.4m	31/08/2020	<5 100 NC	<0.1 240 NC	<0.1 NC NC	<0.1 NC NC	<0.1 NC NC	<0.1 6 NC	<0.1 50 NC	<0.1 270 NC	<0.1 10 NC	<0.1 6 NC	<0.1 10 NC	<0.1 300 NC	<0.1 160 NC	<0.1 1 NC	NAD	NAD	NAD
120/0.4-0.5	0.4-0.5m	31/08/2020	NT 100 NC	NT 240 NC	NT NC NC	NT NC NC	NT NC NC	NT 6 NC	NT 50 NC	NT 270 NC	NT 10 NC	NT 6 NC	NT 10 NC	NT 300 NC	NT 160 NC	NT 1 NC	NT	NT	NT
120/0.2-0.3	0.2-0.3m	31/08/2020	<5 100 NC	<0.1 240 NC	<0.1 NC NC	<0.1 NC NC	<0.1 NC NC	<0.1 6 NC	<0.1 50 NC	<0.1 270 NC	<0.1 10 NC	<0.1 6 NC	<0.1 10 NC	<0.1 300 NC	<0.1 160 NC	<0.1 1 NC	NAD	NAD	NAD
119/0.0-0.1	0.0-0.1m	31/08/2020	<5 100 NC	<0.1 240 NC	<0.1 NC NC	<0.1 NC NC	<0.1 NC NC	<0.1 6 NC	<0.1 50 NC	<0.1 270 NC	<0.1 10 NC	<0.1 6 NC	<0.1 10 NC	<0.1 300 NC	<0.1 160 NC	<0.1 1 NC	NAD	NAD	NAD
121a/0.2-0.3	0 m	31/08/2020	<5 100 NC	<0.1 240 NC	<0.1 NC NC	<0.1 NC NC	<0.1 NC NC	<0.1 6 NC	<0.1 50 NC	<0.1 270 NC	<0.1 10 NC	<0.1 6 NC	<0.1 10 NC	<0.1 300 NC	<0.1 160 NC	<0.1 1 NC	NAD	NAD	NAD
119/0.2-0.3	0.2-0.3m	31/08/2020	NT 100 NC	NT 240 NC	NT NC NC	NT NC NC	NT NC NC	NT 6 NC	NT 50 NC	NT 270 NC	NT 10 NC	NT 6 NC	NT 10 NC	NT 300 NC	NT 160 NC	NT 1 NC	NT	NT	NT
120/0.1-0.3	0.1-0.3m	31/08/2020	<5 100 NC	<0.1 240 NC	<0.1 NC NC	<0.1 NC NC	<0.1 NC NC	<0.1 6 NC	<0.1 50 NC	<0.1 270 NC	<0.1 10 NC	<0.1 6 NC	<0.1 10 NC	<0.1 300 NC	<0.1 160 NC	<0.1 1 NC	NAD	NAD	NAD

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 A (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

Table I3: Laboratory Results Summary for Groundwater (All results in µg/L unless otherwise stated)

Sample ID	Heavy Metals								TRH/BTEX								PAHs				Phenols	Total +ve OCP	Total +ve OPP	Total +ve PCB
	As	Cd	Cr	Cu	Pb	Hg	Ni	Zn	F1	F2	F3	F4	Benzene	Toluene	Ethylbenzene	Xylene	Total PAH	B(a)P TEQ	B(a)P	Naphthalene				
PQL	1	0.1	1	1	1	0.05	1	1	10	50	100	100	1	1	1	1	0.1	0.5	0.1	0.2	0.05	0.2	0.2	0.07
102	<1	<0.1	<1	2	<1	<0.05	10	19	<10	<50	<100	<100	<1	<1	<1	<3	NIL (+)VE	<5	<1	<1	<0.05	<0.2	<0.2	<0.07
103	<1	<0.1	<1	1	<1	<0.05	5	8	<10	<50	<100	<100	<1	<1	<1	<2	NIL (+)VE	<5	<1	<1	-			
105	<1	0.2	<1	1	<1	<0.05	100	150	<10	230	<100	<100	<1	<1	<1	<2	NIL (+)VE	<5	<1	<1	-			
BD1/20200902	<1	0.2	<1	<1	<1	<0.05	95	140	<10	320	<100	<100	<1	<1	<1	<2	NIL (+)VE	<5	<1	<1	-			
Site Assessment Criteria																								
95% Fresh DGV	13	0.2	1	1.4	3.4	0.6	11	8.0	-	-	-	-	950	180	80	550	-	-	0.2	16	320	0.2	0.2	2
Hardness Adjusted*	-	3.2	12.0	19.7	178.0	-	156.0	114.0	-	-	-	-	-	-										
HSL-AB	-	-	-	-	-	-	-	-	1000	1000	-	-	900	NL	NL	NL	-	-	-	-	-	-	-	-

Notes

Bold	Detection
	Exceedance of SAC
-	Not tested/not available
*	Hardness adjusted results. Hardness ranged from 540 to 1400 in Groundwater Wells. A value of 680 for Hardness in Well 105 has been adopted as the most applicable result.
PQL	Practical quantification limit
F1	Calculated as being TRH C_6-C_{10} minus BTEX
F2	Calculated as being TRH >C_{10}-C_{16} minus Naphthalene
F3	TRH >C16-C34
F4	TRH >C34-C40
BD	Replicate samples of sample listed directly above
95% Marine DGV	Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZAST, August 2018) - Default Guideline Values for Marine water with 95% level of species protection
HSL-A	NEPC, *National Environment Protection (Assessment of Site Contamination) Measure 1999* (Amended 2013), Schedule B1, Table 1A (4) Groundwater HSWIs for vapour intrusion - HSL A & HSL B Low-high density residential for sand soils at depths of 2m to <4m.
95% UCL	statistical analysis of the 95% upper confidence limit

Appendix J

Laboratory Certificates of Analysis, Sample Receipt Advice and Chain of Custody Documentation

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

CERTIFICATE OF ANALYSIS 249157

Client Details

Client	Douglas Partners Pty Ltd (Riverstone)
Attention	Gavin Boyd
Address	43 Hobart St, Riverstone, NSW, 2765

Sample Details

Your Reference	**94626.00, Glenwood High School**
Number of Samples	40 soil
Date samples received	17/08/2020
Date completed instructions received	17/08/2020

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	24/08/2020
Date of Issue	24/08/2020

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Asbestos Approved By
Analysed by Asbestos Approved Identifier: Panika Wongchanda
Authorised by Asbestos Approved Signatory: Lucy Zhu

Results Approved By
Diego Bigolin, Team Leader, Inorganics
Dragana Tomas, Senior Chemist
Hannah Nguyen, Senior Chemist
Lucy Zhu, Asbestos Supervisor
Nancy Zhang, Laboratory Manager, Sydney
Priya Samarawickrama, Senior Chemist

Authorised By

Nancy Zhang, Laboratory Manager

vTRH(C6-C10)/BTEXN in Soil						
Our Reference		249157-1	249157-2	249157-3	249157-4	249157-5
Your Reference	UNITS	BH101	BH102	BH103	BH105	BH107
Depth		0-0.1m	0-0.1m	0-0.1m	0-0.1m	0-0.1m
Date Sampled		8/08/2020	9/08/2020	8/08/2020	9/08/2020	8/08/2020
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	19/08/2020	19/08/2020	19/08/2020	19/08/2020	19/08/2020
Date analysed	-	20/08/2020	20/08/2020	20/08/2020	20/08/2020	20/08/2020
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	%	95	108	110	108	113

vTRH(C6-C10)/BTEXN in Soil						
Our Reference		249157-6	249157-7	249157-8	249157-9	249157-10
Your Reference	UNITS	BH108	BH109	BH110	BH111	BH112
Depth		0-0.1m	0-0.1m	0-0.1m	0-0.1m	0-0.1m
Date Sampled		8/08/2020	8/08/2020	8/08/2020	8/08/2020	8/08/2020
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	19/08/2020	19/08/2020	19/08/2020	19/08/2020	19/08/2020
Date analysed	-	20/08/2020	20/08/2020	20/08/2020	20/08/2020	20/08/2020
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	%	121	114	110	108	112

vTRH(C6-C10)/BTEXN in Soil						
Our Reference		249157-11	249157-12	249157-13	249157-14	249157-15
Your Reference	UNITS	BH113	BH114	BH121	BH122	BH102
Depth		0-0.1m	0-0.1m	0-0.1m	0-0.1m	0.6-0.7m
Date Sampled		8/08/2020	8/08/2020	8/08/2020	9/08/2020	9/08/2020
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	19/08/2020	19/08/2020	19/08/2020	19/08/2020	19/08/2020
Date analysed	-	20/08/2020	20/08/2020	20/08/2020	20/08/2020	20/08/2020
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	%	118	126	115	111	112

vTRH(C6-C10)/BTEXN in Soil						
Our Reference		249157-16	249157-17	249157-18	249157-19	249157-20
Your Reference	UNITS	BH107	BH109	BH113	BH114	BH121
Depth		0.2-0.3m	0.4-0.5m	0.5-0.6m	0.7-0.8m	0.5-0.6m
Date Sampled		8/08/2020	8/08/2020	8/08/2020	8/08/2020	8/08/2020
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	19/08/2020	19/08/2020	19/08/2020	19/08/2020	19/08/2020
Date analysed	-	20/08/2020	20/08/2020	20/08/2020	20/08/2020	20/08/2020
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	%	101	93	110	84	98

vTRH(C6-C10)/BTEXN in Soil					
Our Reference		249157-27	249157-28	249157-29	249157-30
Your Reference	UNITS	BD1/20200808	BD2/20200808	Trip Spike	Trip Blank
Depth		-	-	-	-
Date Sampled		8/08/2020	8/08/2020	5/08/2020	5/08/2020
Type of sample		soil	soil	soil	soil
Date extracted	-	19/08/2020	19/08/2020	19/08/2020	19/08/2020
Date analysed	-	20/08/2020	20/08/2020	20/08/2020	20/08/2020
TRH C_6 - C_9	mg/kg	<25	<25	<25	[NA]
TRH C_6 - C_{10}	mg/kg	<25	<25	<25	[NA]
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	<25	<25	<25	[NA]
Benzene	mg/kg	<0.2	<0.2	108%	<0.2
Toluene	mg/kg	<0.5	<0.5	102%	<0.5
Ethylbenzene	mg/kg	<1	<1	104%	<1
m+p-xylene	mg/kg	<2	<2	103%	<2
o-Xylene	mg/kg	<1	<1	102%	<1
naphthalene	mg/kg	<1	<1	[NA]	[NA]
Total +ve Xylenes	mg/kg	<3	<3	[NA]	[NA]
Surrogate aaa-Trifluorotoluene	%	96	95	93	87

svTRH (C10-C40) in Soil						
Our Reference		249157-1	249157-2	249157-3	249157-4	249157-5
Your Reference	UNITS	BH101	BH102	BH103	BH105	BH107
Depth		0-0.1m	0-0.1m	0-0.1m	0-0.1m	0-0.1m
Date Sampled		8/08/2020	9/08/2020	8/08/2020	9/08/2020	8/08/2020
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	19/08/2020	19/08/2020	19/08/2020	19/08/2020	19/08/2020
Date analysed	-	19/08/2020	19/08/2020	19/08/2020	19/08/2020	19/08/2020
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	%	85	80	86	83	74

svTRH (C10-C40) in Soil						
Our Reference		249157-6	249157-7	249157-8	249157-9	249157-10
Your Reference	UNITS	BH108	BH109	BH110	BH111	BH112
Depth		0-0.1m	0-0.1m	0-0.1m	0-0.1m	0-0.1m
Date Sampled		8/08/2020	8/08/2020	8/08/2020	8/08/2020	8/08/2020
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	19/08/2020	19/08/2020	19/08/2020	19/08/2020	19/08/2020
Date analysed	-	19/08/2020	19/08/2020	19/08/2020	19/08/2020	19/08/2020
TRH C_{10} - C_{14}	mg/kg	<50	<50	<50	<50	<50
TRH C_{15} - C_{28}	mg/kg	<100	210	<100	<100	<100
TRH C_{29} - C_{36}	mg/kg	<100	260	<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	390	<100	<100	<100
TRH >C_{34} -C_{40}	mg/kg	<100	200	<100	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	<50	600	<50	<50	<50
Surrogate o-Terphenyl	%	72	87	78	75	73

svTRH (C10-C40) in Soil						
Our Reference		249157-11	249157-12	249157-13	249157-14	249157-15
Your Reference	UNITS	BH113	BH114	BH121	BH122	BH102
Depth		0-0.1m	0-0.1m	0-0.1m	0-0.1m	0.6-0.7m
Date Sampled		8/08/2020	8/08/2020	8/08/2020	9/08/2020	9/08/2020
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	19/08/2020	19/08/2020	19/08/2020	19/08/2020	19/08/2020
Date analysed	-	19/08/2020	19/08/2020	19/08/2020	19/08/2020	19/08/2020
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	120	<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	120	<100	<100	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	120	<50	<50	<50	<50
Surrogate o-Terphenyl	%	80	77	74	73	78

svTRH (C10-C40) in Soil						
Our Reference		249157-16	249157-17	249157-18	249157-19	249157-20
Your Reference	UNITS	BH107	BH109	BH113	BH114	BH121
Depth		0.2-0.3m	0.4-0.5m	0.5-0.6m	0.7-0.8m	0.5-0.6m
Date Sampled		8/08/2020	8/08/2020	8/08/2020	8/08/2020	8/08/2020
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	19/08/2020	19/08/2020	19/08/2020	19/08/2020	19/08/2020
Date analysed	-	20/08/2020	20/08/2020	20/08/2020	20/08/2020	20/08/2020
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	78	75	77	73

svTRH (C10-C40) in Soil			
Our Reference		249157-27	249157-28
Your Reference	UNITS	BD1/20200808	BD2/20200808
Depth		-	-
Date Sampled		8/08/2020	8/08/2020
Type of sample		soil	soil
Date extracted	-	19/08/2020	19/08/2020
Date analysed	-	20/08/2020	20/08/2020
TRH C_{10} - C_{14}	mg/kg	<50	<50
TRH C_{15} - C_{28}	mg/kg	<100	<100
TRH C_{29} - C_{36}	mg/kg	<100	<100
TRH >C_{10} -C_{16}	mg/kg	<50	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	mg/kg	<50	<50
TRH >C_{16} -C_{34}	mg/kg	<100	<100
TRH >C_{34} -C_{40}	mg/kg	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	<50	<50
Surrogate o-Terphenyl	%	77	77

PAHs in Soil						
Our Reference		249157-1	249157-2	249157-3	249157-4	249157-5
Your Reference	UNITS	BH101	BH102	BH103	BH105	BH107
Depth		0-0.1m	0-0.1m	0-0.1m	0-0.1m	0-0.1m
Date Sampled		8/08/2020	9/08/2020	8/08/2020	9/08/2020	8/08/2020
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	19/08/2020	19/08/2020	19/08/2020	19/08/2020	19/08/2020
Date analysed	-	21/08/2020	21/08/2020	21/08/2020	21/08/2020	21/08/2020
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	0.2	<0.1	<0.1
Pyrene	mg/kg	<0.1	<0.1	0.2	<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	0.1	<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	0.2	<0.1	<0.1
Total +ve PAH's	mg/kg	<0.05	<0.05	1.2	<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	%	123	135	123	121	128

PAHs in Soil						
Our Reference		249157-6	249157-7	249157-8	249157-9	249157-10
Your Reference	UNITS	BH108	BH109	BH110	BH111	BH112
Depth		0-0.1m	0-0.1m	0-0.1m	0-0.1m	0-0.1m
Date Sampled		8/08/2020	8/08/2020	8/08/2020	8/08/2020	8/08/2020
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	19/08/2020	19/08/2020	19/08/2020	19/08/2020	19/08/2020
Date analysed	-	21/08/2020	21/08/2020	21/08/2020	21/08/2020	21/08/2020
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	%	123	124	128	120	124

PAHs in Soil						
Our Reference		249157-11	249157-12	249157-13	249157-14	249157-15
Your Reference	UNITS	BH113	BH114	BH121	BH122	BH102
Depth		0-0.1m	0-0.1m	0-0.1m	0-0.1m	0.6-0.7m
Date Sampled		8/08/2020	8/08/2020	8/08/2020	9/08/2020	9/08/2020
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	19/08/2020	19/08/2020	19/08/2020	19/08/2020	19/08/2020
Date analysed	-	21/08/2020	21/08/2020	21/08/2020	21/08/2020	21/08/2020
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	%	123	123	125	125	119

PAHs in Soil						
Our Reference		249157-16	249157-17	249157-18	249157-19	249157-20
Your Reference	UNITS	BH107	BH109	BH113	BH114	BH121
Depth		0.2-0.3m	0.4-0.5m	0.5-0.6m	0.7-0.8m	0.5-0.6m
Date Sampled		8/08/2020	8/08/2020	8/08/2020	8/08/2020	8/08/2020
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	19/08/2020	19/08/2020	19/08/2020	19/08/2020	19/08/2020
Date analysed	-	21/08/2020	21/08/2020	21/08/2020	21/08/2020	21/08/2020
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	%	124	126	126	130	124

PAHs in Soil			
Our Reference		249157-27	249157-28
Your Reference	UNITS	BD1/20200808	BD2/20200808
Depth		-	-
Date Sampled		8/08/2020	8/08/2020
Type of sample		soil	soil
Date extracted	-	19/08/2020	19/08/2020
Date analysed	-	21/08/2020	21/08/2020
Naphthalene	mg/kg	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1
Phenanthrene	mg/kg	<0.1	<0.1
Anthracene	mg/kg	<0.1	<0.1
Fluoranthene	mg/kg	<0.1	<0.1
Pyrene	mg/kg	<0.1	<0.1
Benzo(a)anthracene	mg/kg	<0.1	<0.1
Chrysene	mg/kg	<0.1	<0.1
Benzo(b,j+k)fluoranthene	mg/kg	<0.2	<0.2
Benzo(a)pyrene	mg/kg	<0.05	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	<0.1
Total +ve PAH's	mg/kg	<0.05	<0.05
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5	<0.5
Surrogate p-Terphenyl-d14	%	127	127

Organochlorine Pesticides in soil						
Our Reference		249157-1	249157-2	249157-3	249157-4	249157-5
Your Reference	UNITS	BH101	BH102	BH103	BH105	BH107
Depth		0-0.1m	0-0.1m	0-0.1m	0-0.1m	0-0.1m
Date Sampled		8/08/2020	9/08/2020	8/08/2020	9/08/2020	8/08/2020
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	19/08/2020	19/08/2020	19/08/2020	19/08/2020	19/08/2020
Date analysed	-	21/08/2020	21/08/2020	21/08/2020	21/08/2020	21/08/2020
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	%	116	120	116	115	115

Organochlorine Pesticides in soil						
Our Reference		249157-6	249157-7	249157-8	249157-9	249157-10
Your Reference	UNITS	BH108	BH109	BH110	BH111	BH112
Depth		0-0.1m	0-0.1m	0-0.1m	0-0.1m	0-0.1m
Date Sampled		8/08/2020	8/08/2020	8/08/2020	8/08/2020	8/08/2020
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	19/08/2020	19/08/2020	19/08/2020	19/08/2020	19/08/2020
Date analysed	-	21/08/2020	21/08/2020	21/08/2020	21/08/2020	21/08/2020
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	%	127	121	115	109	111

Organochlorine Pesticides in soil					
Our Reference		249157-11	249157-12	249157-13	249157-14
Your Reference	UNITS	BH113	BH114	BH121	BH122
Depth		0-0.1m	0-0.1m	0-0.1m	0-0.1m
Date Sampled		8/08/2020	8/08/2020	8/08/2020	9/08/2020
Type of sample		soil	soil	soil	soil
Date extracted	-	19/08/2020	19/08/2020	19/08/2020	19/08/2020
Date analysed	-	21/08/2020	21/08/2020	21/08/2020	21/08/2020
alpha-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1
HCB	mg/kg	<0.1	<0.1	<0.1	<0.1
beta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1
gamma-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1
Heptachlor	mg/kg	<0.1	<0.1	<0.1	<0.1
delta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1
Aldrin	mg/kg	<0.1	<0.1	<0.1	<0.1
Heptachlor Epoxide	mg/kg	<0.1	<0.1	<0.1	<0.1
gamma-Chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1
alpha-chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1
Endosulfan I	mg/kg	<0.1	<0.1	<0.1	<0.1
pp-DDE	mg/kg	<0.1	<0.1	<0.1	<0.1
Dieldrin	mg/kg	<0.1	<0.1	<0.1	<0.1
Endrin	mg/kg	<0.1	<0.1	<0.1	<0.1
Endosulfan II	mg/kg	<0.1	<0.1	<0.1	<0.1
pp-DDD	mg/kg	<0.1	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	<0.1	<0.1	<0.1	<0.1
pp-DDT	mg/kg	<0.1	<0.1	<0.1	<0.1
Endosulfan Sulphate	mg/kg	<0.1	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	<0.1	<0.1	<0.1	<0.1
Total +ve DDT+DDD+DDE	mg/kg	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	110	109	110	111

Organophosphorus Pesticides in Soil						
Our Reference		249157-1	249157-2	249157-3	249157-4	249157-5
Your Reference	UNITS	BH101	BH102	BH103	BH105	BH107
Depth		0-0.1m	0-0.1m	0-0.1m	0-0.1m	0-0.1m
Date Sampled		8/08/2020	9/08/2020	8/08/2020	9/08/2020	8/08/2020
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	19/08/2020	19/08/2020	19/08/2020	19/08/2020	19/08/2020
Date analysed	-	21/08/2020	21/08/2020	21/08/2020	21/08/2020	21/08/2020
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	%	116	120	116	115	115

Organophosphorus Pesticides in Soil						
Our Reference		249157-6	249157-7	249157-8	249157-9	249157-10
Your Reference	UNITS	BH108	BH109	BH110	BH111	BH112
Depth		0-0.1m	0-0.1m	0-0.1m	0-0.1m	0-0.1m
Date Sampled		8/08/2020	8/08/2020	8/08/2020	8/08/2020	8/08/2020
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	19/08/2020	19/08/2020	19/08/2020	19/08/2020	19/08/2020
Date analysed	-	21/08/2020	21/08/2020	21/08/2020	21/08/2020	21/08/2020
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	%	127	121	115	109	111

Organophosphorus Pesticides in Soil					
Our Reference		249157-11	249157-12	249157-13	249157-14
Your Reference	UNITS	BH113	BH114	BH121	BH122
Depth		0-0.1m	0-0.1m	0-0.1m	0-0.1m
Date Sampled		8/08/2020	8/08/2020	8/08/2020	9/08/2020
Type of sample		soil	soil	soil	soil
Date extracted	-	19/08/2020	19/08/2020	19/08/2020	19/08/2020
Date analysed	-	21/08/2020	21/08/2020	21/08/2020	21/08/2020
Dichlorvos	mg/kg	<0.1	<0.1	<0.1	<0.1
Dimethoate	mg/kg	<0.1	<0.1	<0.1	<0.1
Diazinon	mg/kg	<0.1	<0.1	<0.1	<0.1
Chlorpyriphos-methyl	mg/kg	<0.1	<0.1	<0.1	<0.1
Ronnel	mg/kg	<0.1	<0.1	<0.1	<0.1
Fenitrothion	mg/kg	<0.1	<0.1	<0.1	<0.1
Malathion	mg/kg	<0.1	<0.1	<0.1	<0.1
Chlorpyriphos	mg/kg	<0.1	<0.1	<0.1	<0.1
Parathion	mg/kg	<0.1	<0.1	<0.1	<0.1
Bromophos-ethyl	mg/kg	<0.1	<0.1	<0.1	<0.1
Ethion	mg/kg	<0.1	<0.1	<0.1	<0.1
Azinphos-methyl (Guthion)	mg/kg	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	110	109	110	111

PCBs in Soil						
Our Reference		249157-1	249157-2	249157-3	249157-4	249157-5
Your Reference	UNITS	BH101	BH102	BH103	BH105	BH107
Depth		0-0.1m	0-0.1m	0-0.1m	0-0.1m	0-0.1m
Date Sampled		8/08/2020	9/08/2020	8/08/2020	9/08/2020	8/08/2020
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	19/08/2020	19/08/2020	19/08/2020	19/08/2020	19/08/2020
Date analysed	-	21/08/2020	21/08/2020	21/08/2020	21/08/2020	21/08/2020
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	%	116	120	116	115	115

PCBs in Soil						
Our Reference		249157-6	249157-7	249157-8	249157-9	249157-10
Your Reference	UNITS	BH108	BH109	BH110	BH111	BH112
Depth		0-0.1m	0-0.1m	0-0.1m	0-0.1m	0-0.1m
Date Sampled		8/08/2020	8/08/2020	8/08/2020	8/08/2020	8/08/2020
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	19/08/2020	19/08/2020	19/08/2020	19/08/2020	19/08/2020
Date analysed	-	21/08/2020	21/08/2020	21/08/2020	21/08/2020	21/08/2020
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	%	127	121	115	109	111

PCBs in Soil					
Our Reference		249157-11	249157-12	249157-13	249157-14
Your Reference	UNITS	BH113	BH114	BH121	BH122
Depth		0-0.1m	0-0.1m	0-0.1m	0-0.1m
Date Sampled		8/08/2020	8/08/2020	8/08/2020	9/08/2020
Type of sample		soil	soil	soil	soil
Date extracted	-	19/08/2020	19/08/2020	19/08/2020	19/08/2020
Date analysed	-	21/08/2020	21/08/2020	21/08/2020	21/08/2020
Aroclor 1016	mg/kg	<0.1	<0.1	<0.1	<0.1
Aroclor 1221	mg/kg	<0.1	<0.1	<0.1	<0.1
Aroclor 1232	mg/kg	<0.1	<0.1	<0.1	<0.1
Aroclor 1242	mg/kg	<0.1	<0.1	<0.1	<0.1
Aroclor 1248	mg/kg	<0.1	<0.1	<0.1	<0.1
Aroclor 1254	mg/kg	<0.1	<0.1	<0.1	<0.1
Aroclor 1260	mg/kg	<0.1	<0.1	<0.1	<0.1
Total +ve PCBs (1016-1260)	mg/kg	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	110	109	110	111

Acid Extractable metals in soil						
Our Reference		249157-1	249157-2	249157-3	249157-4	249157-5
Your Reference	UNITS	BH101	BH102	BH103	BH105	BH107
Depth		0-0.1m	0-0.1m	0-0.1m	0-0.1m	0-0.1m
Date Sampled		8/08/2020	9/08/2020	8/08/2020	9/08/2020	8/08/2020
Type of sample		soil	soil	soil	soil	soil
Date prepared	-	19/08/2020	19/08/2020	19/08/2020	19/08/2020	19/08/2020
Date analysed	-	19/08/2020	19/08/2020	19/08/2020	19/08/2020	19/08/2020
Arsenic	mg/kg	8	6	7	7	5
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	20	21	18	18	10
Copper	mg/kg	9	14	11	10	10
Lead	mg/kg	18	19	17	15	14
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	5	12	6	5	5
Zinc	mg/kg	20	32	27	23	29

Acid Extractable metals in soil						
Our Reference		249157-6	249157-7	249157-8	249157-9	249157-10
Your Reference	UNITS	BH108	BH109	BH110	BH111	BH112
Depth		0-0.1m	0-0.1m	0-0.1m	0-0.1m	0-0.1m
Date Sampled		8/08/2020	8/08/2020	8/08/2020	8/08/2020	8/08/2020
Type of sample		soil	soil	soil	soil	soil
Date prepared	-	19/08/2020	19/08/2020	19/08/2020	19/08/2020	19/08/2020
Date analysed	-	19/08/2020	19/08/2020	19/08/2020	19/08/2020	19/08/2020
Arsenic	mg/kg	6	6	9	6	8
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	17	16	15	12	19
Copper	mg/kg	11	10	16	9	10
Lead	mg/kg	14	13	20	14	17
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	5	5	8	6	6
Zinc	mg/kg	29	30	35	22	23

Acid Extractable metals in soil						
Our Reference		249157-11	249157-12	249157-13	249157-14	249157-15
Your Reference	UNITS	BH113	BH114	BH121	BH122	BH102
Depth		0-0.1m	0-0.1m	0-0.1m	0-0.1m	0.6-0.7m
Date Sampled		8/08/2020	8/08/2020	8/08/2020	9/08/2020	9/08/2020
Type of sample		soil	soil	soil	soil	soil
Date prepared	-	19/08/2020	19/08/2020	19/08/2020	19/08/2020	19/08/2020
Date analysed	-	19/08/2020	19/08/2020	19/08/2020	19/08/2020	19/08/2020
Arsenic	mg/kg	7	6	8	6	9
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	17	16	15	13	13
Copper	mg/kg	10	10	14	10	14
Lead	mg/kg	18	16	18	12	16
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	5	4	6	7	8
Zinc	mg/kg	19	20	40	28	31

Acid Extractable metals in soil						
Our Reference		249157-16	249157-17	249157-18	249157-19	249157-20
Your Reference	UNITS	BH107	BH109	BH113	BH114	BH121
Depth		0.2-0.3m	0.4-0.5m	0.5-0.6m	0.7-0.8m	0.5-0.6m
Date Sampled		8/08/2020	8/08/2020	8/08/2020	8/08/2020	8/08/2020
Type of sample		soil	soil	soil	soil	soil
Date prepared	-	19/08/2020	19/08/2020	19/08/2020	19/08/2020	19/08/2020
Date analysed	-	19/08/2020	19/08/2020	19/08/2020	19/08/2020	19/08/2020
Arsenic	mg/kg	4	7	6	7	8
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	10	17	11	20	13
Copper	mg/kg	9	13	11	19	14
Lead	mg/kg	13	9	13	13	17
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	5	6	5	7	7
Zinc	mg/kg	21	29	20	36	31

Acid Extractable metals in soil				
Our Reference		249157-27	249157-28	249157-41
Your Reference	UNITS	BD1/20200808	BD2/20200808	BH101 - [TRIPLICATE]
Depth		-	-	0-0.1m
Date Sampled		8/08/2020	8/08/2020	8/08/2020
Type of sample		soil	soil	soil
Date prepared	-	19/08/2020	19/08/2020	19/08/2020
Date analysed	-	19/08/2020	19/08/2020	19/08/2020
Arsenic	mg/kg	6	8	9
Cadmium	mg/kg	<0.4	<0.4	<0.4
Chromium	mg/kg	16	20	18
Copper	mg/kg	10	10	11
Lead	mg/kg	14	17	17
Mercury	mg/kg	<0.1	<0.1	<0.1
Nickel	mg/kg	6	5	5
Zinc	mg/kg	31	21	24

Misc Soil - Inorg						
Our Reference		249157-1	249157-2	249157-3	249157-4	249157-5
Your Reference	UNITS	BH101	BH102	BH103	BH105	BH107
Depth		0-0.1m	0-0.1m	0-0.1m	0-0.1m	0-0.1m
Date Sampled		8/08/2020	9/08/2020	8/08/2020	9/08/2020	8/08/2020
Type of sample		soil	soil	soil	soil	soil
Date prepared	-	19/08/2020	19/08/2020	19/08/2020	19/08/2020	19/08/2020
Date analysed	-	19/08/2020	19/08/2020	19/08/2020	19/08/2020	19/08/2020
Total Phenolics (as Phenol)	mg/kg	<5	<5	<5	<5	<5

Misc Soil - Inorg						
Our Reference		249157-6	249157-7	249157-8	249157-9	249157-10
Your Reference	UNITS	BH108	BH109	BH110	BH111	BH112
Depth		0-0.1m	0-0.1m	0-0.1m	0-0.1m	0-0.1m
Date Sampled		8/08/2020	8/08/2020	8/08/2020	8/08/2020	8/08/2020
Type of sample		soil	soil	soil	soil	soil
Date prepared	-	19/08/2020	19/08/2020	19/08/2020	19/08/2020	19/08/2020
Date analysed	-	19/08/2020	19/08/2020	19/08/2020	19/08/2020	19/08/2020
Total Phenolics (as Phenol)	mg/kg	<5	<5	<5	<5	<5

Misc Soil - Inorg					
Our Reference		249157-11	249157-12	249157-13	249157-14
Your Reference	UNITS	BH113	BH114	BH121	BH122
Depth		0-0.1m	0-0.1m	0-0.1m	0-0.1m
Date Sampled		8/08/2020	8/08/2020	8/08/2020	9/08/2020
Type of sample		soil	soil	soil	soil
Date prepared	-	19/08/2020	19/08/2020	19/08/2020	19/08/2020
Date analysed	-	19/08/2020	19/08/2020	19/08/2020	19/08/2020
Total Phenolics (as Phenol)	mg/kg	<5	<5	<5	<5

Moisture						
Our Reference		249157-1	249157-2	249157-3	249157-4	249157-5
Your Reference	UNITS	BH101	BH102	BH103	BH105	BH107
Depth		0-0.1m	0-0.1m	0-0.1m	0-0.1m	0-0.1m
Date Sampled		8/08/2020	9/08/2020	8/08/2020	9/08/2020	8/08/2020
Type of sample		soil	soil	soil	soil	soil
Date prepared	-	19/08/2020	19/08/2020	19/08/2020	19/08/2020	19/08/2020
Date analysed	-	20/08/2020	20/08/2020	20/08/2020	20/08/2020	20/08/2020
Moisture	%	21	17	21	18	16

Moisture						
Our Reference		249157-6	249157-7	249157-8	249157-9	249157-10
Your Reference	UNITS	BH108	BH109	BH110	BH111	BH112
Depth		0-0.1m	0-0.1m	0-0.1m	0-0.1m	0-0.1m
Date Sampled		8/08/2020	8/08/2020	8/08/2020	8/08/2020	8/08/2020
Type of sample		soil	soil	soil	soil	soil
Date prepared	-	19/08/2020	19/08/2020	19/08/2020	19/08/2020	19/08/2020
Date analysed	-	20/08/2020	20/08/2020	20/08/2020	20/08/2020	20/08/2020
Moisture	%	17	19	17	16	14

Moisture						
Our Reference		249157-11	249157-12	249157-13	249157-14	249157-15
Your Reference	UNITS	BH113	BH114	BH121	BH122	BH102
Depth		0-0.1m	0-0.1m	0-0.1m	0-0.1m	0.6-0.7m
Date Sampled		8/08/2020	8/08/2020	8/08/2020	9/08/2020	9/08/2020
Type of sample		soil	soil	soil	soil	soil
Date prepared	-	19/08/2020	19/08/2020	19/08/2020	19/08/2020	19/08/2020
Date analysed	-	20/08/2020	20/08/2020	20/08/2020	20/08/2020	20/08/2020
Moisture	%	18	19	19	19	12

Moisture						
Our Reference		249157-16	249157-17	249157-18	249157-19	249157-20
Your Reference	UNITS	BH107	BH109	BH113	BH114	BH121
Depth		0.2-0.3m	0.4-0.5m	0.5-0.6m	0.7-0.8m	0.5-0.6m
Date Sampled		8/08/2020	8/08/2020	8/08/2020	8/08/2020	8/08/2020
Type of sample		soil	soil	soil	soil	soil
Date prepared	-	19/08/2020	19/08/2020	19/08/2020	19/08/2020	19/08/2020
Date analysed	-	20/08/2020	20/08/2020	20/08/2020	20/08/2020	20/08/2020
Moisture	%	18	18	12	18	15

Asbestos ID - soils						
Our Reference		249157-1	249157-2	249157-3	249157-4	249157-5
Your Reference	UNITS	BH101	BH102	BH103	BH105	BH107
Depth		0-0.1m	0-0.1m	0-0.1m	0-0.1m	0-0.1m
Date Sampled		8/08/2020	9/08/2020	8/08/2020	9/08/2020	8/08/2020
Type of sample		soil	soil	soil	soil	soil
Date analysed	-	20/08/2020	20/08/2020	20/08/2020	20/08/2020	20/08/2020
Sample mass tested	g	Approx. 55g	Approx. 45g	Approx. 35g	Approx. 45g	Approx. 35g
Sample Description	-	Brown coarse-grained soil & rocks	Brown coarse-grained 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		249157-6	249157-7	249157-8	249157-9	249157-10
Your Reference	UNITS	BH108	BH109	BH110	BH111	BH112
Depth		0-0.1m	0-0.1m	0-0.1m	0-0.1m	0-0.1m
Date Sampled		8/08/2020	8/08/2020	8/08/2020	8/08/2020	8/08/2020
Type of sample		soil	soil	soil	soil	soil
Date analysed	-	20/08/2020	20/08/2020	20/08/2020	20/08/2020	20/08/2020
Sample mass tested	g	Approx. 40g	Approx. 40g	Approx. 50g	Approx. 60g	Approx. 75g
Sample Description	-	Brown coarse-grained soil & rocks	Brown coarse-grained 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		249157-11	249157-12	249157-13	249157-14	249157-21
Your Reference	UNITS	BH113	BH114	BH121	BH122	BH101
Depth		0-0.1m	0-0.1m	0-0.1m	0-0.1m	0.2-0.3m
Date Sampled		8/08/2020	8/08/2020	8/08/2020	9/08/2020	8/08/2020
Type of sample		soil	soil	soil	soil	soil
Date analysed	-	20/08/2020	20/08/2020	20/08/2020	20/08/2020	20/08/2020
Sample mass tested	g	Approx. 50g	Approx. 50g	Approx. 55g	Approx. 70g	Approx. 50g
Sample Description	-	Brown coarse-grained soil & rocks	Brown coarse-grained 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		249157-22	249157-23	249157-24	249157-25	249157-26
Your Reference	UNITS	BH102	BH103	BH109	BH112	BH115
Depth		0.2-0.3m	0.2-0.3m	0.2-0.3m	0.2-0.3m	0.2-0.3m
Date Sampled		9/08/2020	8/08/2020	8/08/2020	8/08/2020	8/08/2020
Type of sample		soil	soil	soil	soil	soil
Date analysed	-	20/08/2020	20/08/2020	20/08/2020	20/08/2020	20/08/2020
Sample mass tested	g	Approx. 55g	Approx. 40g	Approx. 55g	Approx. 60g	Approx. 40g
Sample Description	-	Brown coarse-grained soil & rocks	Brown coarse-grained 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

Misc Inorg - Soil						
Our Reference		249157-15	249157-31	249157-32	249157-36	249157-38
Your Reference	UNITS	BH102	BH109	BH102	BH103	BH112
Depth		0.6-0.7m	0.4-0.5m	1-1.45m	0.9-1.0m	0.3-0.4m
Date Sampled		9/08/2020	8/08/2020	9/08/2020	8/08/2020	8/08/2020
Type of sample		soil	soil	soil	soil	soil
Date prepared	-	19/08/2020	19/08/2020	19/08/2020	19/08/2020	19/08/2020
Date analysed	-	19/08/2020	19/08/2020	19/08/2020	19/08/2020	19/08/2020
pH 1:5 soil:water	pH Units	[NA]	[NA]	8.3	7.2	7.1
Chloride, Cl 1:5 soil:water	mg/kg	630	<10	[NA]	[NA]	[NA]
Sulphate, SO4 1:5 soil:water	mg/kg	230	40	[NA]	[NA]	[NA]

Texture and Salinity*						
Our Reference		249157-15	249157-33	249157-34	249157-35	249157-36
Your Reference	UNITS	BH102	BH102	BH102	BH103	BH103
Depth		0.6-0.7m	2-2.45m	4-4.45m	0.4-0.5m	0.9-1.0m
Date Sampled		9/08/2020	9/08/2020	9/08/2020	8/08/2020	8/08/2020
Type of sample		soil	soil	soil	soil	soil
Date prepared	-	19/08/2020	21/08/2020	21/08/2020	21/08/2020	19/08/2020
Date analysed	-	19/08/2020	21/08/2020	21/08/2020	21/08/2020	19/08/2020
Electrical Conductivity 1:5 soil:water	µS/cm	760	500	300	180	54
Texture Value	-	9.0	9.0	7.0	9.0	8.0
Texture	-	CLAY LOAM	CLAY LOAM	MEDIUM CLAY	CLAY LOAM	LIGHT MEDIUM CLAY
ECe	dS/m	6.8	4.5	2.1	<2	<2
Class	-	MODERATELY SALINE	MODERATELY SALINE	SLIGHTLY SALINE	NON SALINE	NON SALINE

Texture and Salinity*					
Our Reference		249157-37	249157-38	249157-39	249157-40
Your Reference	UNITS	BH103	BH112	BH112	BH112
Depth		2.5-2.95m	0.3-0.4m	1.4-1.5m	2.4-2.5m
Date Sampled		8/08/2020	8/08/2020	8/08/2020	8/08/2020
Type of sample		soil	soil	soil	soil
Date prepared	-	21/08/2020	19/08/2020	21/08/2020	21/08/2020
Date analysed	-	21/08/2020	19/08/2020	21/08/2020	21/08/2020
Electrical Conductivity 1:5 soil:water	µS/cm	260	180	540	460
Texture Value	-	8.0	7.0	7.0	7.0
Texture	-	LIGHT MEDIUM CLAY	MEDIUM CLAY	MEDIUM CLAY	MEDIUM CLAY
ECe	dS/m	2.1	<2	3.8	3.2
Class	-	SLIGHTLY SALINE	NON SALINE	SLIGHTLY SALINE	SLIGHTLY SALINE

ESP/CEC						
Our Reference		249157-15	249157-31	249157-32	249157-36	249157-38
Your Reference	UNITS	BH102	BH109	BH102	BH103	BH112
Depth		0.6-0.7m	0.4-0.5m	1-1.45m	0.9-1.0m	0.3-0.4m
Date Sampled		9/08/2020	8/08/2020	9/08/2020	8/08/2020	8/08/2020
Type of sample		soil	soil	soil	soil	soil
Date prepared	-	21/08/2020	21/08/2020	21/08/2020	21/08/2020	21/08/2020
Date analysed	-	21/08/2020	21/08/2020	21/08/2020	21/08/2020	21/08/2020
Exchangeable Ca	meq/100g	1.5	4.5	0.6	3.5	2.6
Exchangeable K	meq/100g	0.1	0.5	<0.1	<0.1	0.1
Exchangeable Mg	meq/100g	4.9	5.2	2.6	3.1	5.3
Exchangeable Na	meq/100g	1.6	0.12	1.4	0.15	1.8
Cation Exchange Capacity	meq/100g	8.2	10	4.7	6.8	9.8
ESP	%	20	1	29	2	18

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-031	Total Phenolics by segmented flow analyser (in line distillation with colourimetric finish). Solids are extracted in a caustic media prior to analysis.
Inorg-081	Anions - a range of Anions are determined by Ion Chromatography, in accordance with APHA latest edition, 4110-B. Waters samples are filtered on receipt prior to analysis. Alternatively determined by colourimetry/turbidity using Discrete Analyser.
INORG-123	Determined using a "Texture by Feel" method.
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.

Method ID	Methodology Summary
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.
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-2	249157-2
Date extracted	-			19/08/2020	1	19/08/2020	19/08/2020		19/08/2020	19/08/2020
Date analysed	-			20/08/2020	1	20/08/2020	20/08/2020		20/08/2020	20/08/2020
TRH C_6 - C_9	mg/kg	25	Org-023	<25	1	<25	<25	0	82	85
TRH C_6 - C_{10}	mg/kg	25	Org-023	<25	1	<25	<25	0	82	85
Benzene	mg/kg	0.2	Org-023	<0.2	1	<0.2	<0.2	0	72	73
Toluene	mg/kg	0.5	Org-023	<0.5	1	<0.5	<0.5	0	84	90
Ethylbenzene	mg/kg	1	Org-023	<1	1	<1	<1	0	88	91
m+p-xylene	mg/kg	2	Org-023	<2	1	<2	<2	0	84	86
o-Xylene	mg/kg	1	Org-023	<1	1	<1	<1	0	84	86
naphthalene	mg/kg	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
Surrogate aaa-Trifluorotoluene	%		Org-023	106	1	95	102	7	105	102

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-3	249157-20
Date extracted	-			[NT]	14	19/08/2020	19/08/2020		19/08/2020	19/08/2020
Date analysed	-			[NT]	14	20/08/2020	20/08/2020		20/08/2020	20/08/2020
TRH C_6 - C_9	mg/kg	25	Org-023	[NT]	14	<25	<25	0	81	82
TRH C_6 - C_{10}	mg/kg	25	Org-023	[NT]	14	<25	<25	0	81	82
Benzene	mg/kg	0.2	Org-023	[NT]	14	<0.2	<0.2	0	72	70
Toluene	mg/kg	0.5	Org-023	[NT]	14	<0.5	<0.5	0	82	89
Ethylbenzene	mg/kg	1	Org-023	[NT]	14	<1	<1	0	87	88
m+p-xylene	mg/kg	2	Org-023	[NT]	14	<2	<2	0	82	82
o-Xylene	mg/kg	1	Org-023	[NT]	14	<1	<1	0	81	81
naphthalene	mg/kg	1	Org-023	[NT]	14	<1	<1	0	[NT]	[NT]
Surrogate aaa-Trifluorotoluene	%		Org-023	[NT]	14	111	105	6	93	96

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]	19	19/08/2020	19/08/2020		[NT]	[NT]
Date analysed	-			[NT]	19	20/08/2020	20/08/2020		[NT]	[NT]
TRH C_6 - C_9	mg/kg	25	Org-023	[NT]	19	<25	<25	0	[NT]	[NT]
TRH C_6 - C_{10}	mg/kg	25	Org-023	[NT]	19	<25	<25	0	[NT]	[NT]
Benzene	mg/kg	0.2	Org-023	[NT]	19	<0.2	<0.2	0	[NT]	[NT]
Toluene	mg/kg	0.5	Org-023	[NT]	19	<0.5	<0.5	0	[NT]	[NT]
Ethylbenzene	mg/kg	1	Org-023	[NT]	19	<1	<1	0	[NT]	[NT]
m+p-xylene	mg/kg	2	Org-023	[NT]	19	<2	<2	0	[NT]	[NT]
o-Xylene	mg/kg	1	Org-023	[NT]	19	<1	<1	0	[NT]	[NT]
naphthalene	mg/kg	1	Org-023	[NT]	19	<1	<1	0	[NT]	[NT]
Surrogate aaa-Trifluorotoluene	%		Org-023	[NT]	19	84	93	10	[NT]	[NT]

QUALITY CONTROL: svTRH (C10-C40) in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-2	249157-2
Date extracted	-			19/08/2020	1	19/08/2020	19/08/2020		19/08/2020	19/08/2020
Date analysed	-			19/08/2020	1	19/08/2020	19/08/2020		19/08/2020	19/08/2020
TRH C_{10} - C_{14}	mg/kg	50	Org-020	<50	1	<50	<50	0	124	122
TRH C_{15} - C_{28}	mg/kg	100	Org-020	<100	1	<100	<100	0	101	97
TRH C_{29} - C_{36}	mg/kg	100	Org-020	<100	1	<100	<100	0	108	78
TRH >C_{10} -C_{16}	mg/kg	50	Org-020	<50	1	<50	<50	0	124	122
TRH >C_{16} -C_{34}	mg/kg	100	Org-020	<100	1	<100	<100	0	101	97
TRH >C_{34} -C_{40}	mg/kg	100	Org-020	<100	1	<100	<100	0	108	78
Surrogate o-Terphenyl	%		Org-020	80	1	85	84	1	130	80

QUALITY CONTROL: svTRH (C10-C40) in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-3	249157-20
Date extracted	-			[NT]	14	19/08/2020	19/08/2020		19/08/2020	19/08/2020
Date analysed	-			[NT]	14	19/08/2020	19/08/2020		19/08/2020	20/08/2020
TRH C_{10} - C_{14}	mg/kg	50	Org-020	[NT]	14	<50	<50	0	106	110
TRH C_{15} - C_{28}	mg/kg	100	Org-020	[NT]	14	<100	<100	0	86	88
TRH C_{29} - C_{36}	mg/kg	100	Org-020	[NT]	14	<100	<100	0	88	89
TRH >C_{10} -C_{16}	mg/kg	50	Org-020	[NT]	14	<50	<50	0	106	110
TRH >C_{16} -C_{34}	mg/kg	100	Org-020	[NT]	14	<100	<100	0	86	88
TRH >C_{34} -C_{40}	mg/kg	100	Org-020	[NT]	14	<100	<100	0	88	89
Surrogate o-Terphenyl	%		Org-020	[NT]	14	73	77	5	120	120

QUALITY CONTROL: svTRH (C10-C40) in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	19	19/08/2020	19/08/2020		[NT]	[NT]
Date analysed	-			[NT]	19	20/08/2020	20/08/2020		[NT]	[NT]
TRH C_{10} - C_{14}	mg/kg	50	Org-020	[NT]	19	<50	<50	0	[NT]	[NT]
TRH C_{15} - C_{28}	mg/kg	100	Org-020	[NT]	19	<100	<100	0	[NT]	[NT]
TRH C_{29} - C_{36}	mg/kg	100	Org-020	[NT]	19	<100	<100	0	[NT]	[NT]
TRH >C_{10} -C_{16}	mg/kg	50	Org-020	[NT]	19	<50	<50	0	[NT]	[NT]
TRH >C_{16} -C_{34}	mg/kg	100	Org-020	[NT]	19	<100	<100	0	[NT]	[NT]
TRH >C_{34} -C_{40}	mg/kg	100	Org-020	[NT]	19	<100	<100	0	[NT]	[NT]
Surrogate o-Terphenyl	%		Org-020	[NT]	19	77	79	3	[NT]	[NT]

QUALITY CONTROL: PAHs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-2	249157-2
Date extracted	-			19/08/2020	1	19/08/2020	19/08/2020		19/08/2020	19/08/2020
Date analysed	-			21/08/2020	1	21/08/2020	21/08/2020		21/08/2020	21/08/2020
Naphthalene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	112	114
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	113	118
Fluorene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	105	121
Phenanthrene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	115	125
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	116	112
Pyrene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	113	113
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	127	133
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	110	131
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	127	1	123	120	2	135	120

QUALITY CONTROL: PAHs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-3	249157-20
Date extracted	-			[NT]	14	19/08/2020	19/08/2020		19/08/2020	19/08/2020
Date analysed	-			[NT]	14	21/08/2020	21/08/2020		21/08/2020	21/08/2020
Naphthalene	mg/kg	0.1	Org-022/025	[NT]	14	<0.1	<0.1	0	112	126
Acenaphthylene	mg/kg	0.1	Org-022/025	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
Acenaphthene	mg/kg	0.1	Org-022/025	[NT]	14	<0.1	<0.1	0	113	124
Fluorene	mg/kg	0.1	Org-022/025	[NT]	14	<0.1	<0.1	0	118	110
Phenanthrene	mg/kg	0.1	Org-022/025	[NT]	14	<0.1	<0.1	0	123	110
Anthracene	mg/kg	0.1	Org-022/025	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
Fluoranthene	mg/kg	0.1	Org-022/025	[NT]	14	<0.1	<0.1	0	121	124
Pyrene	mg/kg	0.1	Org-022/025	[NT]	14	<0.1	<0.1	0	118	124
Benzo(a)anthracene	mg/kg	0.1	Org-022/025	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
Chrysene	mg/kg	0.1	Org-022/025	[NT]	14	<0.1	<0.1	0	129	112
Benzo(b,j+k)fluoranthene	mg/kg	0.2	Org-022/025	[NT]	14	<0.2	<0.2	0	[NT]	[NT]
Benzo(a)pyrene	mg/kg	0.05	Org-022/025	[NT]	14	<0.05	<0.05	0	127	138
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-022/025	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-022/025	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-022/025	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-022/025	[NT]	14	125	122	2	125	117

QUALITY CONTROL: PAHs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	19	19/08/2020	19/08/2020		[NT]	[NT]
Date analysed	-			[NT]	19	21/08/2020	21/08/2020		[NT]	[NT]
Naphthalene	mg/kg	0.1	Org-022/025	[NT]	19	<0.1	<0.1	0	[NT]	[NT]
Acenaphthylene	mg/kg	0.1	Org-022/025	[NT]	19	<0.1	<0.1	0	[NT]	[NT]
Acenaphthene	mg/kg	0.1	Org-022/025	[NT]	19	<0.1	<0.1	0	[NT]	[NT]
Fluorene	mg/kg	0.1	Org-022/025	[NT]	19	<0.1	<0.1	0	[NT]	[NT]
Phenanthrene	mg/kg	0.1	Org-022/025	[NT]	19	<0.1	<0.1	0	[NT]	[NT]
Anthracene	mg/kg	0.1	Org-022/025	[NT]	19	<0.1	<0.1	0	[NT]	[NT]
Fluoranthene	mg/kg	0.1	Org-022/025	[NT]	19	<0.1	<0.1	0	[NT]	[NT]
Pyrene	mg/kg	0.1	Org-022/025	[NT]	19	<0.1	<0.1	0	[NT]	[NT]
Benzo(a)anthracene	mg/kg	0.1	Org-022/025	[NT]	19	<0.1	<0.1	0	[NT]	[NT]
Chrysene	mg/kg	0.1	Org-022/025	[NT]	19	<0.1	<0.1	0	[NT]	[NT]
Benzo(b,j+k)fluoranthene	mg/kg	0.2	Org-022/025	[NT]	19	<0.2	<0.2	0	[NT]	[NT]
Benzo(a)pyrene	mg/kg	0.05	Org-022/025	[NT]	19	<0.05	<0.05	0	[NT]	[NT]
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-022/025	[NT]	19	<0.1	<0.1	0	[NT]	[NT]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-022/025	[NT]	19	<0.1	<0.1	0	[NT]	[NT]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-022/025	[NT]	19	<0.1	<0.1	0	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-022/025	[NT]	19	130	123	6	[NT]	[NT]

QUALITY CONTROL: Organochlorine Pesticides in soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-2	249157-2
Date extracted	-			19/08/2020	1	19/08/2020	19/08/2020		19/08/2020	19/08/2020
Date analysed	-			21/08/2020	1	21/08/2020	21/08/2020		21/08/2020	21/08/2020
alpha-BHC	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	97	125
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	96	111
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	87	113
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	114	123
Heptachlor Epoxide	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	110	116
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	111	116
Dieldrin	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	109	107
Endrin	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	95	114
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	103	114
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	78	124
Methoxychlor	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-022/025	114	1	116	113	3	133	124

QUALITY CONTROL: Organochlorine Pesticides in soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-3	[NT]
Date extracted	-			[NT]	14	19/08/2020	19/08/2020		19/08/2020	[NT]
Date analysed	-			[NT]	14	21/08/2020	21/08/2020		21/08/2020	[NT]
alpha-BHC	mg/kg	0.1	Org-022/025	[NT]	14	<0.1	<0.1	0	113	[NT]
HCB	mg/kg	0.1	Org-022/025	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
beta-BHC	mg/kg	0.1	Org-022/025	[NT]	14	<0.1	<0.1	0	109	[NT]
gamma-BHC	mg/kg	0.1	Org-022/025	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
Heptachlor	mg/kg	0.1	Org-022/025	[NT]	14	<0.1	<0.1	0	103	[NT]
delta-BHC	mg/kg	0.1	Org-022/025	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
Aldrin	mg/kg	0.1	Org-022/025	[NT]	14	<0.1	<0.1	0	121	[NT]
Heptachlor Epoxide	mg/kg	0.1	Org-022/025	[NT]	14	<0.1	<0.1	0	118	[NT]
gamma-Chlordane	mg/kg	0.1	Org-022/025	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
alpha-chlordane	mg/kg	0.1	Org-022/025	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
Endosulfan I	mg/kg	0.1	Org-022/025	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
pp-DDE	mg/kg	0.1	Org-022/025	[NT]	14	<0.1	<0.1	0	116	[NT]
Dieldrin	mg/kg	0.1	Org-022/025	[NT]	14	<0.1	<0.1	0	121	[NT]
Endrin	mg/kg	0.1	Org-022/025	[NT]	14	<0.1	<0.1	0	118	[NT]
Endosulfan II	mg/kg	0.1	Org-022/025	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
pp-DDD	mg/kg	0.1	Org-022/025	[NT]	14	<0.1	<0.1	0	117	[NT]
Endrin Aldehyde	mg/kg	0.1	Org-022/025	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
pp-DDT	mg/kg	0.1	Org-022/025	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
Endosulfan Sulphate	mg/kg	0.1	Org-022/025	[NT]	14	<0.1	<0.1	0	88	[NT]
Methoxychlor	mg/kg	0.1	Org-022/025	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-022/025	[NT]	14	111	110	1	113	[NT]

QUALITY CONTROL: Organophosphorus Pesticides in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-2	249157-2
Date extracted	-			19/08/2020	1	19/08/2020	19/08/2020		19/08/2020	19/08/2020
Date analysed	-			21/08/2020	1	21/08/2020	21/08/2020		21/08/2020	21/08/2020
Dichlorvos	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	92	114
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	98	116
Fenitrothion	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	72	85
Malathion	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	82	135
Chlorpyriphos	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	101	107
Parathion	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	71	84
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	95	115
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	114	1	116	113	3	133	124

QUALITY CONTROL: Organophosphorus Pesticides in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-3	[NT]
Date extracted	-			[NT]	14	19/08/2020	19/08/2020		19/08/2020	[NT]
Date analysed	-			[NT]	14	21/08/2020	21/08/2020		21/08/2020	[NT]
Dichlorvos	mg/kg	0.1	Org-022/025	[NT]	14	<0.1	<0.1	0	114	[NT]
Dimethoate	mg/kg	0.1	Org-022/025	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
Diazinon	mg/kg	0.1	Org-022/025	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
Chlorpyriphos-methyl	mg/kg	0.1	Org-022/025	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
Ronnel	mg/kg	0.1	Org-022/025	[NT]	14	<0.1	<0.1	0	114	[NT]
Fenitrothion	mg/kg	0.1	Org-022/025	[NT]	14	<0.1	<0.1	0	85	[NT]
Malathion	mg/kg	0.1	Org-022/025	[NT]	14	<0.1	<0.1	0	120	[NT]
Chlorpyriphos	mg/kg	0.1	Org-022/025	[NT]	14	<0.1	<0.1	0	117	[NT]
Parathion	mg/kg	0.1	Org-022/025	[NT]	14	<0.1	<0.1	0	84	[NT]
Bromophos-ethyl	mg/kg	0.1	Org-022	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
Ethion	mg/kg	0.1	Org-022/025	[NT]	14	<0.1	<0.1	0	115	[NT]
Azinphos-methyl (Guthion)	mg/kg	0.1	Org-022/025	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-022/025	[NT]	14	111	110	1	113	[NT]

QUALITY CONTROL: PCBs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-2	249157-2
Date extracted	-			19/08/2020	1	19/08/2020	19/08/2020		19/08/2020	19/08/2020
Date analysed	-			21/08/2020	1	21/08/2020	21/08/2020		21/08/2020	21/08/2020
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	<0.1	1	<0.1	<0.1	0	120	124
Aroclor 1260	mg/kg	0.1	Org-021	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-021	114	1	116	113	3	133	124

QUALITY CONTROL: PCBs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-3	[NT]
Date extracted	-			[NT]	14	19/08/2020	19/08/2020		19/08/2020	[NT]
Date analysed	-			[NT]	14	21/08/2020	21/08/2020		21/08/2020	[NT]
Aroclor 1016	mg/kg	0.1	Org-021	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1221	mg/kg	0.1	Org-021	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1232	mg/kg	0.1	Org-021	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1242	mg/kg	0.1	Org-021	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1248	mg/kg	0.1	Org-021	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1254	mg/kg	0.1	Org-021	[NT]	14	<0.1	<0.1	0	126	[NT]
Aroclor 1260	mg/kg	0.1	Org-021	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-021	[NT]	14	111	110	1	113	[NT]

QUALITY CONTROL: Acid Extractable metals in soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-2	249157-2
Date prepared	-			19/08/2020	1	19/08/2020	19/08/2020		19/08/2020	19/08/2020
Date analysed	-			19/08/2020	1	19/08/2020	19/08/2020		19/08/2020	19/08/2020
Arsenic	mg/kg	4	Metals-020	<4	1	8	10	22	96	75
Cadmium	mg/kg	0.4	Metals-020	<0.4	1	<0.4	<0.4	0	96	75
Chromium	mg/kg	1	Metals-020	<1	1	20	21	5	95	77
Copper	mg/kg	1	Metals-020	<1	1	9	13	36	93	90
Lead	mg/kg	1	Metals-020	<1	1	18	17	6	93	#
Mercury	mg/kg	0.1	Metals-021	<0.1	1	<0.1	<0.1	0	103	86
Nickel	mg/kg	1	Metals-020	<1	1	5	8	46	96	81
Zinc	mg/kg	1	Metals-020	<1	1	20	34	52	97	#

QUALITY CONTROL: Acid Extractable metals in soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-3	249157-20
Date prepared	-			[NT]	14	19/08/2020	19/08/2020		19/08/2020	19/08/2020
Date analysed	-			[NT]	14	19/08/2020	19/08/2020		19/08/2020	19/08/2020
Arsenic	mg/kg	4	Metals-020	[NT]	14	6	8	29	94	77
Cadmium	mg/kg	0.4	Metals-020	[NT]	14	<0.4	<0.4	0	93	77
Chromium	mg/kg	1	Metals-020	[NT]	14	13	14	7	93	80
Copper	mg/kg	1	Metals-020	[NT]	14	10	12	18	92	88
Lead	mg/kg	1	Metals-020	[NT]	14	12	15	22	92	73
Mercury	mg/kg	0.1	Metals-021	[NT]	14	<0.1	<0.1	0	93	84
Nickel	mg/kg	1	Metals-020	[NT]	14	7	6	15	95	76
Zinc	mg/kg	1	Metals-020	[NT]	14	28	37	28	94	82

QUALITY CONTROL: Acid Extractable metals in soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date prepared	-			[NT]	19	19/08/2020	19/08/2020		[NT]	[NT]
Date analysed	-			[NT]	19	19/08/2020	19/08/2020		[NT]	[NT]
Arsenic	mg/kg	4	Metals-020	[NT]	19	7	9	25	[NT]	[NT]
Cadmium	mg/kg	0.4	Metals-020	[NT]	19	<0.4	<0.4	0	[NT]	[NT]
Chromium	mg/kg	1	Metals-020	[NT]	19	20	19	5	[NT]	[NT]
Copper	mg/kg	1	Metals-020	[NT]	19	19	18	5	[NT]	[NT]
Lead	mg/kg	1	Metals-020	[NT]	19	13	13	0	[NT]	[NT]
Mercury	mg/kg	0.1	Metals-021	[NT]	19	<0.1	<0.1	0	[NT]	[NT]
Nickel	mg/kg	1	Metals-020	[NT]	19	7	6	15	[NT]	[NT]
Zinc	mg/kg	1	Metals-020	[NT]	19	36	32	12	[NT]	[NT]

QUALITY CONTROL: Misc Soil - Inorg						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	249157-2
Date prepared	-			19/08/2020	1	19/08/2020	19/08/2020		19/08/2020	19/08/2020
Date analysed	-			19/08/2020	1	19/08/2020	19/08/2020		19/08/2020	19/08/2020
Total Phenolics (as Phenol)	mg/kg	5	Inorg-031	<5	1	<5	<5	0	101	99

QUALITY CONTROL: Misc Soil - Inorg						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date prepared	-			[NT]	14	19/08/2020	19/08/2020		[NT]	[NT]
Date analysed	-			[NT]	14	19/08/2020	19/08/2020		[NT]	[NT]
Total Phenolics (as Phenol)	mg/kg	5	Inorg-031	[NT]	14	<5	<5	0	[NT]	[NT]

QUALITY CONTROL: Misc Inorg - Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date prepared	-			19/08/2020	38	19/08/2020	19/08/2020		19/08/2020	[NT]
Date analysed	-			19/08/2020	38	19/08/2020	19/08/2020		19/08/2020	[NT]
pH 1:5 soil:water	pH Units		Inorg-001	[NT]	38	7.1	7.0	1	101	[NT]
Chloride, Cl 1:5 soil:water	mg/kg	10	Inorg-081	<10	[NT]	[NT]	[NT]	[NT]	90	[NT]
Sulphate, SO4 1:5 soil:water	mg/kg	10	Inorg-081	<10	[NT]	[NT]	[NT]	[NT]	94	[NT]

QUALITY CONTROL: Texture and Salinity*					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date prepared	-			19/08/2020	38	19/08/2020	19/08/2020		19/08/2020	[NT]
Date analysed	-			19/08/2020	38	19/08/2020	19/08/2020		19/08/2020	[NT]
Electrical Conductivity 1:5 soil:water	µS/cm	1	Inorg-002	<1	38	180	170	6	101	[NT]
Texture Value	-		INORG-123	[NT]	38	7.0	7.0	0	[NT]	[NT]

QUALITY CONTROL: ESP/CEC						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date prepared	-			21/08/2020	[NT]	[NT]	[NT]	[NT]	21/08/2020	[NT]
Date analysed	-			21/08/2020	[NT]	[NT]	[NT]	[NT]	21/08/2020	[NT]
Exchangeable Ca	meq/100g	0.1	Metals-020	<0.1	[NT]	[NT]	[NT]	[NT]	93	[NT]
Exchangeable K	meq/100g	0.1	Metals-020	<0.1	[NT]	[NT]	[NT]	[NT]	100	[NT]
Exchangeable Mg	meq/100g	0.1	Metals-020	<0.1	[NT]	[NT]	[NT]	[NT]	92	[NT]
Exchangeable Na	meq/100g	0.1	Metals-020	<0.1	[NT]	[NT]	[NT]	[NT]	102	[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

pH / EC
Samples were out of the recommended holding time for this analysis.

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 requested for asbestos testing were sub-sampled from bags provided by the client.

Acid Extractable Metals in Soil:
-The laboratory RPD acceptance criteria has been exceeded for 249157-1 for Zn. Therefore a triplicate result has been issued as laboratory sample number 249157-41.
-# Percent recovery is not possible to report due to the inhomogeneous nature of the element/s in the sample/s. However an acceptable recovery was obtained for the LCS.

Douglas Partners
Geotechnics | Environment | Groundwater

CHAIN OF CUSTODY DESPATCH SHEET

Project No:	94626.00	**Suburb:**	Glenwood	**To:**	Envirolab Services
Project Name:	Glenwood High School	**Order Number**			12 Ashley St Chatswood 2067
Project Manager:	Gavin Boyd	**Sampler:**	Jeremie Young		
Emails:	gavin.boyd@douglaspartners.com.au	petrina.fielding@douglaspartners.com.au			kristine.nicodemus@douglaspartners.com.au
Date Required:	Same day ☐ 24 hours ☐ 48 hours ☐ 72 hours ☐ Standard ☑				
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: Combo 8a	Combo 3	Asbestos	Textural Classification / ECE	CEC	pH	Chloride/ Sulphate/ Sodicity	HM, TRH, BTEX, PAH	TRH / BTEX	Notes/preservation
BH101/0-0.1m	1	8.8.20	S	G/P	●									
BH102/0-0.1m	2	9.8.20	S	G/P	●									
BH103/0-0.1m	3	8.8.20	S	G/P	●									
BH105/0-0.1m	4	9.8.20	S	G/P	●									
BH107/0-0.1m	5	8.8.20	S	G/P	●									
BH108/0-0.1m	6	8.8.20	S	G/P	●									
BH109/0-0.1m	7	8.8.20	S	G/P	●									
BH110/0-0.1m	8	8.8.20	S	G/P	●									
BH111/0-0.1m	9	8.8.20	S	G/P	●									
BH112/0-0.1m	10	8.8.20	S	G/P	●									
BH113/0-0.1m	11	8.8.20	S	G/P	●									
BH114/0-0.1m	12	8.8.20	S	G/P	●									
BH121/0-0.1m	13	8.8.20	S	G/P	●									
BH122/0-0.1m	14	9.8.20	S	G/P	●									
PQL (S) mg/kg														**ANZECC PQLs req'd for all water analytes** ☐

ENVIROLAB

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

Job No: 249157
Date Received: 17/8/20
Time Received: 15:43
Received By: Helen
Temp: Cool/Ambient
Cooling: Ice/Icepack
Security: Intact/Broken/None

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

Metals to Analyse: 8HM unless specified here:

Lab Report/Reference No:

Total number of samples in container:	**Relinquished by:** JY	**Transported to laboratory by:**
Send Results to: Douglas Partners Pty Ltd	**Address:** 43 Hobart St Riverstone NSW 2765	**Phone:** **Fax:**
Signed:	**Received by:** Helen	**Date & Time:** 15:43 17/8/20

249157

Douglas Partners
Geotechnics | Environment | Groundwater

CHAIN OF CUSTODY DESPATCH SHEET

Project No:	94626.00	**Suburb:**	Glenwood	**To:**	Envirolab Services
Project Name:	Glenwood High School	**Order Number**			12 Ashley St Chatswood 2067
Project Manager:	Gavin Boyd	**Sampler:**	Jeremie Young		
Emails:	gavin.boyd@douglaspartners.com.au	petrina.fielding@douglaspartners.com.au		kristine.nicodemus@douglaspartners.com.au	
Date Required:	Same day ☐ 24 hours ☐ 48 hours ☐ 72 hours ☐ Standard ☑				
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	Sampling Date	Sample Type: S - soil, W - water	Container Type: G - glass, P - plastic	Analytes: Combo 8a	Combo 3	Asbestos	Textural Classification / ECE	CEC	pH	Chloride/ Sulphate/ Sodicity	HM, TRH, BTEX, PAH	TRH / BTEX	Notes/preservation
BH102/0.6-0.7m	15	9.8.20	S	G/P		●		●			●			
BH107/0.2-0.3m	16	8.8.20	S	G		●								
BH109/0.4-0.5m	17	8.8.20	S	G		●								
BH113/0.5-0.6m	18	8.8.20	S	G		●								
BH114/0.7-0.8m	19	8.8.20	S	G		●								
BH121/0.5-0.6m	20	8.8.20	S	G		●								
BH101/0.2-0.3m	21	8.8.20	S	G/P			●							
BH102/0.2-0.3m	22	9.8.20	S	G/P			●							
BH103/0.2-0.3m	23	8.8.20	S	G/P			●							
BH109/0.2-0.3m	24	8.8.20	S	G/P			●							
BH112/0.2-0.3m	25	8.8.20	S	G/P			●							
BH115/0.2-0.3m	26	8.8.20	S	G/P			●							
BD1/20200808	27	8.8.20	S	G								●		
BH2/20200808	28	8.8.20	S	G								●		
Trip spike/blank	29 30	5.8.20	S	G									●	
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:

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

Send Results to: Douglas Partners Pty Ltd **Address** 43 Hobart St Riverstone NSW 2765 **Phone:** **Fax:**

Signed: **Received by:** **Date & Time:** 15 43 17/8/20

249157

Douglas Partners
Geotechnics | Environment | Groundwater

CHAIN OF CUSTODY DESPATCH SHEET

Project No:	94626.00	**Suburb:**	Glenwood	**To:**	Envirolab Services
Project Name:	Glenwood High School	**Order Number**			12 Ashley St Chatswood 2067
Project Manager:	Gavin Boyd	**Sampler:**	Jeremie Young		
Emails:	gavin.boyd@douglaspartners.com.au	petrina.fielding@douglaspartners.com.au		kristine.nicodemus@douglaspartners.com.au	
Date Required:	Same day ☐ 24 hours ☐ 48 hours ☐ 72 hours ☐ Standard ☑				
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	Sampling Date	Sample Type (S - soil, W - water)	Container Type (G - glass, P - plastic)	Analytes: Combo 8a	Combo 3	Asbestos	Textural Classification / ECE	CEC	pH	Chloride/ Sulphate/ Sodicity	HM, TRH, BTEX, PAH	TRH / BTEX	Notes/preservation
BH109/0.4-0.5m	31										●			
BH102/1-1.45m	32								●	●				
BH102/2-2.45m	33							●						
BH102/4-4.45m	34							●						
BH103/0.4-0.5m	35							●						
BH103/0.9-1.0m	36							●	●	●				
BH103/2.5-2.95m	37							●						
BH112/0.3-0.4m	38							●	●	●				
BH112/1/4-1.5m	39							●						
BH112/2.4-2.5m	40							●						
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:

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

Send Results to: Douglas Partners Pty Ltd **Address** 43 Hobart St Riverstone NSW 2765 **Phone:** **Fax:**

Signed: **Received by:** **Date & Time:** 1543 17/8/20

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 (Riverstone)
Attention	Gavin Boyd

Sample Login Details

Your reference	94626.00, Glenwood High School
Envirolab Reference	249157
Date Sample Received	17/08/2020
Date Instructions Received	17/08/2020
Date Results Expected to be Reported	24/08/2020

Sample Condition

Samples received in appropriate condition for analysis	Yes
No. of Samples Provided	40 soil
Turnaround Time Requested	Standard
Temperature on Receipt (°C)	21.9
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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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	Misc Soil - Inorg	Asbestos ID - soils	Misc Inorg - Soil	Texture and Salinity*	ESP/CEC
BH101-0-0.1m	✓	✓	✓	✓	✓	✓	✓	✓	✓			
BH102-0-0.1m	✓	✓	✓	✓	✓	✓	✓	✓	✓			
BH103-0-0.1m	✓	✓	✓	✓	✓	✓	✓	✓	✓			
BH105-0-0.1m	✓	✓	✓	✓	✓	✓	✓	✓	✓			
BH107-0-0.1m	✓	✓	✓	✓	✓	✓	✓	✓	✓			
BH108-0-0.1m	✓	✓	✓	✓	✓	✓	✓	✓	✓			
BH109-0-0.1m	✓	✓	✓	✓	✓	✓	✓	✓	✓			
BH110-0-0.1m	✓	✓	✓	✓	✓	✓	✓	✓	✓			
BH111-0-0.1m	✓	✓	✓	✓	✓	✓	✓	✓	✓			
BH112-0-0.1m	✓	✓	✓	✓	✓	✓	✓	✓	✓			
BH113-0-0.1m	✓	✓	✓	✓	✓	✓	✓	✓	✓			
BH114-0-0.1m	✓	✓	✓	✓	✓	✓	✓	✓	✓			
BH121-0-0.1m	✓	✓	✓	✓	✓	✓	✓	✓	✓			
BH122-0-0.1m	✓	✓	✓	✓	✓	✓	✓	✓	✓			
BH102-0.6-0.7m	✓	✓	✓				✓			✓	✓	✓
BH107-0.2-0.3m	✓	✓	✓				✓					
BH109-0.4-0.5m	✓	✓	✓				✓					
BH113-0.5-0.6m	✓	✓	✓				✓					
BH114-0.7-0.8m	✓	✓	✓				✓					
BH121-0.5-0.6m	✓	✓	✓				✓					
BH101-0.2-0.3m									✓			
BH102-0.2-0.3m									✓			
BH103-0.2-0.3m									✓			
BH109-0.2-0.3m									✓			
BH112-0.2-0.3m									✓			
BH115-0.2-0.3m									✓			
BD1/20200808	✓	✓	✓				✓					
BD2/20200808	✓	✓	✓				✓					
Trip Spike	✓											
Trip Blank	✓											
BH109-0.4-0.5m										✓		✓
BH102-1-1.45m										✓		✓

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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	Misc Soil - Inorg	Asbestos ID - soils	Misc Inorg - Soil	Texture and Salinity*	ESP/CEC
BH102-2-2.45m											✓	
BH102-4-4.45m											✓	
BH103-0.4-0.5m											✓	
BH103-0.9-1.0m										✓	✓	✓
BH103-2.5-2.95m											✓	
BH112-0.3-0.4m										✓	✓	✓
BH112-1.4-1.5m											✓	
BH112-2.4-2.5m											✓	

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.

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www.envirolab.com.au

CERTIFICATE OF ANALYSIS 251036

Client Details

Client	Douglas Partners Pty Ltd (Riverstone)
Attention	Gavin Boyd
Address	43 Hobart St, Riverstone, NSW, 2765

Sample Details

Your Reference	**94626.00, Glenwood**
Number of Samples	4 WATER, 2 SOIL
Date samples received	11/09/2020
Date completed instructions received	11/09/2020

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	14/09/2020
Date of Issue	14/09/2020

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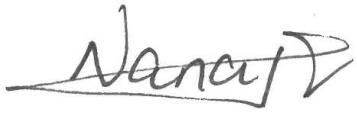
Accredited for compliance with ISO/IEC 17025 - Testing. **Tests not covered by NATA are denoted with ***

Results Approved By
Diego Bigolin, Team Leader, Inorganics
Dragana Tomas, Senior Chemist
Jaimie Loa-Kum-Cheung, Metals Supervisor
Loren Bardwell, Senior Chemist

Authorised By



Nancy Zhang, Laboratory Manager

vTRH(C6-C10)/BTEXN in Water					
Our Reference		251036-1	251036-2	251036-3	251036-4
Your Reference	UNITS	BH012	BH103	BH105	BD1/20200902
Date Sampled		02/09/2020	02/09/2020	02/09/2020	02/09/2020
Type of sample		WATER	WATER	WATER	WATER
Date extracted	-	11/09/2020	11/09/2020	11/09/2020	11/09/2020
Date analysed	-	14/09/2020	14/09/2020	14/09/2020	14/09/2020
TRH C_6 - C_9	µg/L	<10	<10	<10	<10
TRH C_6 - C_{10}	µg/L	<10	<10	<10	<10
TRH C_6 - C_{10} less BTEX (F1)	µg/L	<10	<10	<10	<10
Benzene	µg/L	<1	<1	<1	<1
Toluene	µg/L	<1	<1	<1	<1
Ethylbenzene	µg/L	<1	<1	<1	<1
m+p-xylene	µg/L	<2	<2	<2	<2
o-xylene	µg/L	<1	<1	<1	<1
Naphthalene	µg/L	<1	<1	<1	<1
Surrogate Dibromofluoromethane	%	96	100	77	102
Surrogate toluene-d8	%	100	100	100	99
Surrogate 4-BFB	%	104	100	102	102

svTRH (C10-C40) in Water					
Our Reference		251036-1	251036-2	251036-3	251036-4
Your Reference	UNITS	BH012	BH103	BH105	BD1/20200902
Date Sampled		02/09/2020	02/09/2020	02/09/2020	02/09/2020
Type of sample		WATER	WATER	WATER	WATER
Date extracted	-	14/09/2020	14/09/2020	14/09/2020	14/09/2020
Date analysed	-	14/09/2020	14/09/2020	14/09/2020	14/09/2020
TRH C_{10} - C_{14}	µg/L	<50	<50	200	300
TRH C_{15} - C_{28}	µg/L	<100	<100	<100	<100
TRH C_{29} - C_{36}	µg/L	<100	<100	<100	<100
TRH >C_{10} - C_{16}	µg/L	<50	<50	230	320
TRH >C_{10} - C_{16} less Naphthalene (F2)	µg/L	<50	<50	230	320
TRH >C_{16} - C_{34}	µg/L	<100	<100	<100	<100
TRH >C_{34} - C_{40}	µg/L	<100	<100	<100	<100
Surrogate o-Terphenyl	%	117	80	102	92

PAHs in Water					
Our Reference		251036-1	251036-2	251036-3	251036-4
Your Reference	UNITS	BH012	BH103	BH105	BD1/20200902
Date Sampled		02/09/2020	02/09/2020	02/09/2020	02/09/2020
Type of sample		WATER	WATER	WATER	WATER
Date extracted	-	14/09/2020	14/09/2020	14/09/2020	14/09/2020
Date analysed	-	14/09/2020	14/09/2020	14/09/2020	14/09/2020
Naphthalene	µg/L	<1	<1	<1	<1
Acenaphthylene	µg/L	<1	<1	<1	<1
Acenaphthene	µg/L	<1	<1	<1	<1
Fluorene	µg/L	<1	<1	<1	<1
Phenanthrene	µg/L	<1	<1	<1	<1
Anthracene	µg/L	<1	<1	<1	<1
Fluoranthene	µg/L	<1	<1	<1	<1
Pyrene	µg/L	<1	<1	<1	<1
Benzo(a)anthracene	µg/L	<1	<1	<1	<1
Chrysene	µg/L	<1	<1	<1	<1
Benzo(b,j+k)fluoranthene	µg/L	<2	<2	<2	<2
Benzo(a)pyrene	µg/L	<1	<1	<1	<1
Indeno(1,2,3-c,d)pyrene	µg/L	<1	<1	<1	<1
Dibenzo(a,h)anthracene	µg/L	<1	<1	<1	<1
Benzo(g,h,i)perylene	µg/L	<1	<1	<1	<1
Benzo(a)pyrene TEQ	µg/L	<5	<5	<5	<5
Total +ve PAH's	µg/L	NIL (+)VE	NIL (+)VE	NIL (+)VE	NIL (+)VE
Surrogate p-Terphenyl-d14	%	93	83	91	85

Organochlorine Pesticides in Water		
Our Reference		251036-2
Your Reference	UNITS	BH103
Date Sampled		02/09/2020
Type of sample		WATER
Date extracted	-	14/09/2020
Date analysed	-	14/09/2020
alpha-BHC	µg/L	<0.2
HCB	µg/L	<0.2
beta-BHC	µg/L	<0.2
gamma-BHC	µg/L	<0.2
Heptachlor	µg/L	<0.2
delta-BHC	µg/L	<0.2
Aldrin	µg/L	<0.2
Heptachlor Epoxide	µg/L	<0.2
gamma-Chlordane	µg/L	<0.2
alpha-Chlordane	µg/L	<0.2
Endosulfan I	µg/L	<0.2
pp-DDE	µg/L	<0.2
Dieldrin	µg/L	<0.2
Endrin	µg/L	<0.2
Endosulfan II	µg/L	<0.2
pp-DDD	µg/L	<0.2
Endrin Aldehyde	µg/L	<0.2
pp-DDT	µg/L	<0.2
Endosulfan Sulphate	µg/L	<0.2
Methoxychlor	µg/L	<0.2
Surrogate TCMX	%	79

OP Pesticides in Water		
Our Reference	UNITS	251036-2
Your Reference		BH103
Date Sampled		02/09/2020
Type of sample		WATER
Date extracted	-	14/09/2020
Date analysed	-	14/09/2020
Dichlorvos	µg/L	<0.2
Dimethoate	µg/L	<0.2
Diazinon	µg/L	<0.2
Chlorpyriphos-methyl	µg/L	<0.2
Ronnel	µg/L	<0.2
Fenitrothion	µg/L	<0.2
Malathion	µg/L	<0.2
Chlorpyriphos	µg/L	<0.2
Parathion	µg/L	<0.2
Bromophos ethyl	µg/L	<0.2
Ethion	µg/L	<0.2
Azinphos-methyl (Guthion)	µg/L	<0.2
Surrogate TCMX	%	79

PCBs in Water		
Our Reference		251036-2
Your Reference	UNITS	BH103
Date Sampled		02/09/2020
Type of sample		WATER
Date extracted	-	14/09/2020
Date analysed	-	14/09/2020
Aroclor 1016	µg/L	<2
Aroclor 1221	µg/L	<2
Aroclor 1232	µg/L	<2
Aroclor 1242	µg/L	<2
Aroclor 1248	µg/L	<2
Aroclor 1254	µg/L	<2
Aroclor 1260	µg/L	<2
Surrogate TCMX	%	79

Total Phenolics in Water		
Our Reference		251036-2
Your Reference	UNITS	BH103
Date Sampled		02/09/2020
Type of sample		WATER
Date extracted	-	14/09/2020
Date analysed	-	14/09/2020
Total Phenolics (as Phenol)	mg/L	<0.05

HM in water - dissolved					
Our Reference	UNITS	251036-1	251036-2	251036-3	251036-4
Your Reference		BH012	BH103	BH105	BD1/20200902
Date Sampled		02/09/2020	02/09/2020	02/09/2020	02/09/2020
Type of sample		WATER	WATER	WATER	WATER
Date prepared	-	14/09/2020	14/09/2020	14/09/2020	14/09/2020
Date analysed	-	14/09/2020	14/09/2020	14/09/2020	14/09/2020
Arsenic-Dissolved	µg/L	<1	<1	<1	<1
Cadmium-Dissolved	µg/L	<0.1	<0.1	0.2	0.2
Chromium-Dissolved	µg/L	<1	<1	<1	<1
Copper-Dissolved	µg/L	2	1	1	<1
Lead-Dissolved	µg/L	<1	<1	<1	<1
Mercury-Dissolved	µg/L	<0.05	<0.05	<0.05	<0.05
Nickel-Dissolved	µg/L	10	5	100	95
Zinc-Dissolved	µg/L	19	8	150	140

Cations in water Dissolved				
Our Reference		251036-1	251036-2	251036-3
Your Reference	UNITS	BH012	BH103	BH105
Date Sampled		02/09/2020	02/09/2020	02/09/2020
Type of sample		WATER	WATER	WATER
Date digested	-	14/09/2020	14/09/2020	14/09/2020
Date analysed	-	14/09/2020	14/09/2020	14/09/2020
Calcium - Dissolved	mg/L	71	34	26
Magnesium - Dissolved	mg/L	290	110	150
Hardness	mgCaCO 3 /L	1,400	540	680

Method ID	Methodology Summary
Inorg-031	Total Phenolics by segmented flow analyser (in line distillation with colourimetric finish). Solids are extracted in a caustic media prior to analysis.
Metals-020	Determination of various metals by ICP-AES.
Metals-021	Determination of Mercury by Cold Vapour AAS.
Metals-022	Determination of various metals by ICP-MS.
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-021	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-ECD.
Org-022/025	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS/GC-MSMS.
Org-022/025	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS/GC-MSMS. Benzo(a)pyrene TEQ as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater - 2013.
Org-023	Water samples are analysed directly 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.

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Water						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date extracted	-			11/09/2020	[NT]	[NT]	[NT]	[NT]	11/09/2020	[NT]
Date analysed	-			14/09/2020	[NT]	[NT]	[NT]	[NT]	14/09/2020	[NT]
TRH C_6 - C_9	µg/L	10	Org-023	<10	[NT]	[NT]	[NT]	[NT]	94	[NT]
TRH C_6 - C_{10}	µg/L	10	Org-023	<10	[NT]	[NT]	[NT]	[NT]	94	[NT]
Benzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	91	[NT]
Toluene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	91	[NT]
Ethylbenzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	95	[NT]
m+p-xylene	µg/L	2	Org-023	<2	[NT]	[NT]	[NT]	[NT]	96	[NT]
o-xylene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	93	[NT]
Naphthalene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate Dibromofluoromethane	%		Org-023	102	[NT]	[NT]	[NT]	[NT]	98	[NT]
Surrogate toluene-d8	%		Org-023	100	[NT]	[NT]	[NT]	[NT]	100	[NT]
Surrogate 4-BFB	%		Org-023	100	[NT]	[NT]	[NT]	[NT]	99	[NT]

QUALITY CONTROL: svTRH (C10-C40) in Water						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date extracted	-			14/09/2020	[NT]	[NT]	[NT]	[NT]	14/09/2020	[NT]
Date analysed	-			14/09/2020	[NT]	[NT]	[NT]	[NT]	14/09/2020	[NT]
TRH C_{10} - C_{14}	µg/L	50	Org-020	<50	[NT]	[NT]	[NT]	[NT]	119	[NT]
TRH C_{15} - C_{28}	µg/L	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	108	[NT]
TRH C_{29} - C_{36}	µg/L	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	92	[NT]
TRH >C_{10} - C_{16}	µg/L	50	Org-020	<50	[NT]	[NT]	[NT]	[NT]	119	[NT]
TRH >C_{16} - C_{34}	µg/L	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	108	[NT]
TRH >C_{34} - C_{40}	µg/L	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	92	[NT]
Surrogate o-Terphenyl	%		Org-020	93	[NT]	[NT]	[NT]	[NT]	69	[NT]

QUALITY CONTROL: PAHs in Water						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date extracted	-			14/09/2020	[NT]	[NT]	[NT]	[NT]	14/09/2020	[NT]
Date analysed	-			14/09/2020	[NT]	[NT]	[NT]	[NT]	14/09/2020	[NT]
Naphthalene	µg/L	1	Org-022/025	<1	[NT]	[NT]	[NT]	[NT]	80	[NT]
Acenaphthylene	µg/L	1	Org-022/025	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Acenaphthene	µg/L	1	Org-022/025	<1	[NT]	[NT]	[NT]	[NT]	83	[NT]
Fluorene	µg/L	1	Org-022/025	<1	[NT]	[NT]	[NT]	[NT]	86	[NT]
Phenanthrene	µg/L	1	Org-022/025	<1	[NT]	[NT]	[NT]	[NT]	88	[NT]
Anthracene	µg/L	1	Org-022/025	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Fluoranthene	µg/L	1	Org-022/025	<1	[NT]	[NT]	[NT]	[NT]	78	[NT]
Pyrene	µg/L	1	Org-022/025	<1	[NT]	[NT]	[NT]	[NT]	80	[NT]
Benzo(a)anthracene	µg/L	1	Org-022/025	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Chrysene	µg/L	1	Org-022/025	<1	[NT]	[NT]	[NT]	[NT]	88	[NT]
Benzo(b,j+k)fluoranthene	µg/L	2	Org-022/025	<2	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Benzo(a)pyrene	µg/L	1	Org-022/025	<1	[NT]	[NT]	[NT]	[NT]	75	[NT]
Indeno(1,2,3-c,d)pyrene	µg/L	1	Org-022/025	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Dibenzo(a,h)anthracene	µg/L	1	Org-022/025	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Benzo(g,h,i)perylene	µg/L	1	Org-022/025	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-022/025	104	[NT]	[NT]	[NT]	[NT]	83	[NT]

QUALITY CONTROL: Organochlorine Pesticides in Water						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date extracted	-			14/09/2020	[NT]	[NT]	[NT]	[NT]	14/09/2020	[NT]
Date analysed	-			14/09/2020	[NT]	[NT]	[NT]	[NT]	14/09/2020	[NT]
alpha-BHC	µg/L	0.2	Org-022/025	<0.2	[NT]	[NT]	[NT]	[NT]	83	[NT]
HCB	µg/L	0.2	Org-022/025	<0.2	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
beta-BHC	µg/L	0.2	Org-022/025	<0.2	[NT]	[NT]	[NT]	[NT]	78	[NT]
gamma-BHC	µg/L	0.2	Org-022/025	<0.2	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Heptachlor	µg/L	0.2	Org-022/025	<0.2	[NT]	[NT]	[NT]	[NT]	100	[NT]
delta-BHC	µg/L	0.2	Org-022/025	<0.2	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Aldrin	µg/L	0.2	Org-022/025	<0.2	[NT]	[NT]	[NT]	[NT]	77	[NT]
Heptachlor Epoxide	µg/L	0.2	Org-022/025	<0.2	[NT]	[NT]	[NT]	[NT]	81	[NT]
gamma-Chlordane	µg/L	0.2	Org-022/025	<0.2	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
alpha-Chlordane	µg/L	0.2	Org-022/025	<0.2	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Endosulfan I	µg/L	0.2	Org-022/025	<0.2	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
pp-DDE	µg/L	0.2	Org-022/025	<0.2	[NT]	[NT]	[NT]	[NT]	78	[NT]
Dieldrin	µg/L	0.2	Org-022/025	<0.2	[NT]	[NT]	[NT]	[NT]	80	[NT]
Endrin	µg/L	0.2	Org-022/025	<0.2	[NT]	[NT]	[NT]	[NT]	89	[NT]
Endosulfan II	µg/L	0.2	Org-022/025	<0.2	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
pp-DDD	µg/L	0.2	Org-022/025	<0.2	[NT]	[NT]	[NT]	[NT]	73	[NT]
Endrin Aldehyde	µg/L	0.2	Org-022/025	<0.2	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
pp-DDT	µg/L	0.2	Org-022/025	<0.2	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Endosulfan Sulphate	µg/L	0.2	Org-022/025	<0.2	[NT]	[NT]	[NT]	[NT]	110	[NT]
Methoxychlor	µg/L	0.2	Org-022/025	<0.2	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate TCMX	%		Org-022/025	97	[NT]	[NT]	[NT]	[NT]	82	[NT]

QUALITY CONTROL: OP Pesticides in Water						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date extracted	-			14/09/2020	[NT]	[NT]	[NT]	[NT]	14/09/2020	[NT]
Date analysed	-			14/09/2020	[NT]	[NT]	[NT]	[NT]	14/09/2020	[NT]
Dichlorvos	µg/L	0.2	Org-022/025	<0.2	[NT]	[NT]	[NT]	[NT]	122	[NT]
Dimethoate	µg/L	0.2	Org-022/025	<0.2	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Diazinon	µg/L	0.2	Org-022/025	<0.2	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Chlorpyriphos-methyl	µg/L	0.2	Org-022/025	<0.2	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Ronnel	µg/L	0.2	Org-022/025	<0.2	[NT]	[NT]	[NT]	[NT]	88	[NT]
Fenitrothion	µg/L	0.2	Org-022/025	<0.2	[NT]	[NT]	[NT]	[NT]	98	[NT]
Malathion	µg/L	0.2	Org-022/025	<0.2	[NT]	[NT]	[NT]	[NT]	95	[NT]
Chlorpyriphos	µg/L	0.2	Org-022/025	<0.2	[NT]	[NT]	[NT]	[NT]	117	[NT]
Parathion	µg/L	0.2	Org-022/025	<0.2	[NT]	[NT]	[NT]	[NT]	94	[NT]
Bromophos ethyl	µg/L	0.2	Org-022/025	<0.2	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Ethion	µg/L	0.2	Org-022/025	<0.2	[NT]	[NT]	[NT]	[NT]	126	[NT]
Azinphos-methyl (Guthion)	µg/L	0.2	Org-022/025	<0.2	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate TCMX	%		Org-022/025	97	[NT]	[NT]	[NT]	[NT]	82	[NT]

QUALITY CONTROL: PCBs in Water						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date extracted	-			14/09/2020	[NT]	[NT]	[NT]	[NT]	14/09/2020	[NT]
Date analysed	-			14/09/2020	[NT]	[NT]	[NT]	[NT]	14/09/2020	[NT]
Aroclor 1016	µg/L	2	Org-021	<2	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Aroclor 1221	µg/L	2	Org-021	<2	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Aroclor 1232	µg/L	2	Org-021	<2	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Aroclor 1242	µg/L	2	Org-021	<2	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Aroclor 1248	µg/L	2	Org-021	<2	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Aroclor 1254	µg/L	2	Org-021	<2	[NT]	[NT]	[NT]	[NT]	90	[NT]
Aroclor 1260	µg/L	2	Org-021	<2	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate TCMX	%		Org-021	97	[NT]	[NT]	[NT]	[NT]	82	[NT]

QUALITY CONTROL: Total Phenolics in Water						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date extracted	-			14/09/2020	[NT]	[NT]	[NT]	[NT]	14/09/2020	[NT]
Date analysed	-			14/09/2020	[NT]	[NT]	[NT]	[NT]	14/09/2020	[NT]
Total Phenolics (as Phenol)	mg/L	0.05	Inorg-031	<0.05	[NT]	[NT]	[NT]	[NT]	101	[NT]

QUALITY CONTROL: HM in water - dissolved						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date prepared	-			14/09/2020	[NT]	[NT]	[NT]	[NT]	14/09/2020	[NT]
Date analysed	-			14/09/2020	[NT]	[NT]	[NT]	[NT]	14/09/2020	[NT]
Arsenic-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	94	[NT]
Cadmium-Dissolved	µg/L	0.1	Metals-022	<0.1	[NT]	[NT]	[NT]	[NT]	99	[NT]
Chromium-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	95	[NT]
Copper-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	92	[NT]
Lead-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	83	[NT]
Mercury-Dissolved	µg/L	0.05	Metals-021	<0.05	[NT]	[NT]	[NT]	[NT]	113	[NT]
Nickel-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	91	[NT]
Zinc-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	94	[NT]

QUALITY CONTROL: Cations in water Dissolved						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date digested	-			14/09/2020	[NT]	[NT]	[NT]	[NT]	14/09/2020	[NT]
Date analysed	-			14/09/2020	[NT]	[NT]	[NT]	[NT]	14/09/2020	[NT]
Calcium - Dissolved	mg/L	0.5	Metals-020	<0.5	[NT]	[NT]	[NT]	[NT]	117	[NT]
Magnesium - Dissolved	mg/L	0.5	Metals-020	<0.5	[NT]	[NT]	[NT]	[NT]	115	[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

Samples received in good order: Holding time exceedance

Douglas Partners
Geotechnics / Environment / Groundwater

CHAIN OF CUSTODY DESPATCH SHEET

Project No:	94626.00	**Suburb:**	Glenwood	**To:**	Envirolab Services
Project Name:	Glenwood High School	**Order Number**			12 Ashley St Chatswood 2067
Project Manager:	Gavin Boyd	**Sampler:**	Jeremie Young		
Emails:	gavin.boyd@douglaspartners.com.au	petrina.fielding@douglaspartners.com.au			kristine.nicodemus@douglaspartners.com.au
Date Required:	Same day ☐ 24 hours ☑ 48 hours ☐ 72 hours ☐ Standard ☐				
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: Combo 8	Combo 3	Hardness	Combo 1M						Notes/preservation
BH102	1	2.9.2020	W	G/P		●	●							
BH103	2	2.9.2020	W	G/P	●		●							
BH105	3	2.9.2020	W	G/P		●	●							
BD1/20200902	4	2.9.2020	W	G/P		●								
TS/TB	5-6		S	G										
PQL (S) mg/kg														**ANZECC PQLs req'd for all water analytes** ☐

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

Job No: 251036
Date Received: 11/09/2020.
Time Received: 15.27
Received By: RL
Temp: ~~Cool/Ambient~~ 14.°C
Cooling: ~~Ice/Icepack~~
Security: Intact/Broken/None

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

Metals to Analyse: 8HM unless specified here:

Lab Report/Reference No:

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

Send Results to: Douglas Partners Pty Ltd **Address:** 43 Hobart St Riverstone NSW 2765 **Phone:** **Fax:**

Signed: **Received by:** RLhazeen ELS Sydney **Date & Time:** 11/09/2020 15.27

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 (Riverstone)
Attention	Gavin Boyd

Sample Login Details

Your reference	94626.00, Glenwood
Envirolab Reference	251036
Date Sample Received	11/09/2020
Date Instructions Received	11/09/2020
Date Results Expected to be Reported	14/09/2020

Sample Condition

Samples received in appropriate condition for analysis	Holding time exceedance
No. of Samples Provided	4 WATER, 2 SOIL
Turnaround Time Requested	1 day
Temperature on Receipt (°C)	14.0
Cooling Method	Ice Pack
Sampling Date Provided	YES

Comments

Please contact the laboratory within 24 hours if you wish to cancel the aformentioned testing. Otherwise testing will proceed as per the COC and hence invoice accordingly.

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
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	vTRH(C6-C10)/BTEXN in Water	svTRH (C10-C40) in Water	PAHsin Water	Organochlorine Pesticides in Water	OP Pesticides in Water	PCBs in Water	Total Phenolicsin Water	HM in water - dissolved	Cations in water Dissolved	On Hold
BH012	✓	✓	✓					✓	✓	
BH103	✓	✓	✓	✓	✓	✓	✓	✓	✓	
BH105	✓	✓	✓					✓	✓	
BD1/20200902	✓	✓	✓					✓		
TS										✓
TB										✓

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.

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CERTIFICATE OF ANALYSIS 251040

Client Details

Client	Douglas Partners Pty Ltd (Riverstone)
Attention	Gavin Boyd
Address	43 Hobart St, Riverstone, NSW, 2765

Sample Details

Your Reference	**94626.00, Glenwood High School**
Number of Samples	10 soil
Date samples received	11/09/2020
Date completed instructions received	11/09/2020

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	15/09/2020
Date of Issue	15/09/2020

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Accredited for compliance with ISO/IEC 17025 - Testing. **Tests not covered by NATA are denoted with ***

Asbestos Approved By
Analysed by Asbestos Approved Identifier: Lucy Zhu
Authorised by Asbestos Approved Signatory: Lucy Zhu

Results Approved By
Diego Bigolin, Team Leader, Inorganics
Dragana Tomas, Senior Chemist
Jaimie Loa-Kum-Cheung, Metals Supervisor
Josh Williams, Senior Chemist
Lucy Zhu, Asbestos Supervisor
Manju Dewendrage, Chemist

Authorised By

Nancy Zhang, Laboratory Manager

vTRH(C6-C10)/BTEXN in Soil						
Our Reference		251040-1	251040-3	251040-4	251040-5	251040-6
Your Reference	UNITS	117a/0.0-0.2	116/0.0-0.4	120/0.4-0.5	120/0.2-0.3	119/0.0-0.1
Date Sampled		31/08/2020	31/08/2020	31/08/2020	31/08/2020	31/08/2020
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	14/09/2020	14/09/2020	14/09/2020	14/09/2020	14/09/2020
Date analysed	-	14/09/2020	14/09/2020	14/09/2020	14/09/2020	14/09/2020
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	%	87	91	91	72	75

vTRH(C6-C10)/BTEXN in Soil				
Our Reference		251040-7	251040-8	251040-9
Your Reference	UNITS	121a/0.2-0.3	119/0.2-0.3	120/0.1-0.3
Date Sampled		31/08/2020	31/08/2020	31/08/2020
Type of sample		soil	soil	soil
Date extracted	-	14/09/2020	14/09/2020	14/09/2020
Date analysed	-	14/09/2020	14/09/2020	14/09/2020
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	%	97	77	103

svTRH (C10-C40) in Soil						
Our Reference		251040-1	251040-3	251040-4	251040-5	251040-6
Your Reference	UNITS	117a/0.0-0.2	116/0.0-0.4	120/0.4-0.5	120/0.2-0.3	119/0.0-0.1
Date Sampled		31/08/2020	31/08/2020	31/08/2020	31/08/2020	31/08/2020
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	14/09/2020	14/09/2020	14/09/2020	14/09/2020	14/09/2020
Date analysed	-	14/09/2020	14/09/2020	14/09/2020	15/09/2020	15/09/2020
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	%	88	82	90	78	83

svTRH (C10-C40) in Soil				
Our Reference		251040-7	251040-8	251040-9
Your Reference	UNITS	121a/0.2-0.3	119/0.2-0.3	120/0.1-0.3
Date Sampled		31/08/2020	31/08/2020	31/08/2020
Type of sample		soil	soil	soil
Date extracted	-	14/09/2020	14/09/2020	14/09/2020
Date analysed	-	15/09/2020	15/09/2020	15/09/2020
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	%	88	77	80

PAHs in Soil						
Our Reference		251040-1	251040-3	251040-4	251040-5	251040-6
Your Reference	UNITS	117a/0.0-0.2	116/0.0-0.4	120/0.4-0.5	120/0.2-0.3	119/0.0-0.1
Date Sampled		31/08/2020	31/08/2020	31/08/2020	31/08/2020	31/08/2020
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	14/09/2020	14/09/2020	14/09/2020	14/09/2020	14/09/2020
Date analysed	-	14/09/2020	14/09/2020	14/09/2020	14/09/2020	14/09/2020
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	%	100	104	104	103	106

PAHs in Soil				
Our Reference		251040-7	251040-8	251040-9
Your Reference	UNITS	121a/0.2-0.3	119/0.2-0.3	120/0.1-0.3
Date Sampled		31/08/2020	31/08/2020	31/08/2020
Type of sample		soil	soil	soil
Date extracted	-	14/09/2020	14/09/2020	14/09/2020
Date analysed	-	14/09/2020	14/09/2020	14/09/2020
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	%	100	100	103

Organochlorine Pesticides in soil						
Our Reference		251040-1	251040-3	251040-5	251040-6	251040-7
Your Reference	UNITS	117a/0.0-0.2	116/0.0-0.4	120/0.2-0.3	119/0.0-0.1	121a/0.2-0.3
Date Sampled		31/08/2020	31/08/2020	31/08/2020	31/08/2020	31/08/2020
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	14/09/2020	14/09/2020	14/09/2020	14/09/2020	14/09/2020
Date analysed	-	14/09/2020	14/09/2020	14/09/2020	14/09/2020	14/09/2020
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	%	107	112	109	111	105

Organochlorine Pesticides in soil		
Our Reference		251040-9
Your Reference	UNITS	120/0.1-0.3
Date Sampled		31/08/2020
Type of sample		soil
Date extracted	-	14/09/2020
Date analysed	-	14/09/2020
alpha-BHC	mg/kg	<0.1
HCB	mg/kg	<0.1
beta-BHC	mg/kg	<0.1
gamma-BHC	mg/kg	<0.1
Heptachlor	mg/kg	<0.1
delta-BHC	mg/kg	<0.1
Aldrin	mg/kg	<0.1
Heptachlor Epoxide	mg/kg	<0.1
gamma-Chlordane	mg/kg	<0.1
alpha-chlordane	mg/kg	<0.1
Endosulfan I	mg/kg	<0.1
pp-DDE	mg/kg	<0.1
Dieldrin	mg/kg	<0.1
Endrin	mg/kg	<0.1
Endosulfan II	mg/kg	<0.1
pp-DDD	mg/kg	<0.1
Endrin Aldehyde	mg/kg	<0.1
pp-DDT	mg/kg	<0.1
Endosulfan Sulphate	mg/kg	<0.1
Methoxychlor	mg/kg	<0.1
Total +ve DDT+DDD+DDE	mg/kg	<0.1
Surrogate TCMX	%	107

Organophosphorus Pesticides in Soil						
Our Reference		251040-1	251040-3	251040-5	251040-6	251040-7
Your Reference	UNITS	117a/0.0-0.2	116/0.0-0.4	120/0.2-0.3	119/0.0-0.1	121a/0.2-0.3
Date Sampled		31/08/2020	31/08/2020	31/08/2020	31/08/2020	31/08/2020
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	14/09/2020	14/09/2020	14/09/2020	14/09/2020	14/09/2020
Date analysed	-	14/09/2020	14/09/2020	14/09/2020	14/09/2020	14/09/2020
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	%	107	112	109	111	105

Organophosphorus Pesticides in Soil		
Our Reference		251040-9
Your Reference	UNITS	120/0.1-0.3
Date Sampled		31/08/2020
Type of sample		soil
Date extracted	-	14/09/2020
Date analysed	-	14/09/2020
Dichlorvos	mg/kg	<0.1
Dimethoate	mg/kg	<0.1
Diazinon	mg/kg	<0.1
Chlorpyriphos-methyl	mg/kg	<0.1
Ronnel	mg/kg	<0.1
Fenitrothion	mg/kg	<0.1
Malathion	mg/kg	<0.1
Chlorpyriphos	mg/kg	<0.1
Parathion	mg/kg	<0.1
Bromophos-ethyl	mg/kg	<0.1
Ethion	mg/kg	<0.1
Azinphos-methyl (Guthion)	mg/kg	<0.1
Surrogate TCMX	%	107

PCBs in Soil						
Our Reference		251040-1	251040-3	251040-5	251040-6	251040-7
Your Reference	UNITS	117a/0.0-0.2	116/0.0-0.4	120/0.2-0.3	119/0.0-0.1	121a/0.2-0.3
Date Sampled		31/08/2020	31/08/2020	31/08/2020	31/08/2020	31/08/2020
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	14/09/2020	14/09/2020	14/09/2020	14/09/2020	14/09/2020
Date analysed	-	14/09/2020	14/09/2020	14/09/2020	14/09/2020	14/09/2020
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	%	107	112	109	111	105

PCBs in Soil		
Our Reference		251040-9
Your Reference	UNITS	120/0.1-0.3
Date Sampled		31/08/2020
Type of sample		soil
Date extracted	-	14/09/2020
Date analysed	-	14/09/2020
Aroclor 1016	mg/kg	<0.1
Aroclor 1221	mg/kg	<0.1
Aroclor 1232	mg/kg	<0.1
Aroclor 1242	mg/kg	<0.1
Aroclor 1248	mg/kg	<0.1
Aroclor 1254	mg/kg	<0.1
Aroclor 1260	mg/kg	<0.1
Total +ve PCBs (1016-1260)	mg/kg	<0.1
Surrogate TCMX	%	107

Acid Extractable metals in soil						
Our Reference		251040-1	251040-3	251040-4	251040-5	251040-6
Your Reference	UNITS	117a/0.0-0.2	116/0.0-0.4	120/0.4-0.5	120/0.2-0.3	119/0.0-0.1
Date Sampled		31/08/2020	31/08/2020	31/08/2020	31/08/2020	31/08/2020
Type of sample		soil	soil	soil	soil	soil
Date prepared	-	15/09/2020	15/09/2020	15/09/2020	15/09/2020	15/09/2020
Date analysed	-	15/09/2020	15/09/2020	15/09/2020	15/09/2020	15/09/2020
Arsenic	mg/kg	6	8	6	6	4
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	17	22	9	16	12
Copper	mg/kg	12	12	13	21	36
Lead	mg/kg	11	20	12	15	14
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	3	6	2	4	9
Zinc	mg/kg	15	44	14	41	84

Acid Extractable metals in soil				
Our Reference		251040-7	251040-8	251040-9
Your Reference	UNITS	121a/0.2-0.3	119/0.2-0.3	120/0.1-0.3
Date Sampled		31/08/2020	31/08/2020	31/08/2020
Type of sample		soil	soil	soil
Date prepared	-	15/09/2020	15/09/2020	15/09/2020
Date analysed	-	15/09/2020	15/09/2020	15/09/2020
Arsenic	mg/kg	6	7	7
Cadmium	mg/kg	<0.4	<0.4	<0.4
Chromium	mg/kg	11	12	17
Copper	mg/kg	14	17	23
Lead	mg/kg	14	13	18
Mercury	mg/kg	<0.1	<0.1	<0.1
Nickel	mg/kg	7	4	6
Zinc	mg/kg	34	21	41

Misc Soil - Inorg						
Our Reference		251040-1	251040-3	251040-5	251040-6	251040-7
Your Reference	UNITS	117a/0.0-0.2	116/0.0-0.4	120/0.2-0.3	119/0.0-0.1	121a/0.2-0.3
Date Sampled		31/08/2020	31/08/2020	31/08/2020	31/08/2020	31/08/2020
Type of sample		soil	soil	soil	soil	soil
Date prepared	-	15/09/2020	15/09/2020	15/09/2020	15/09/2020	15/09/2020
Date analysed	-	15/09/2020	15/09/2020	15/09/2020	15/09/2020	15/09/2020
Total Phenolics (as Phenol)	mg/kg	<5	<5	<5	<5	<5

Misc Soil - Inorg		
Our Reference		251040-9
Your Reference	UNITS	120/0.1-0.3
Date Sampled		31/08/2020
Type of sample		soil
Date prepared	-	15/09/2020
Date analysed	-	15/09/2020
Total Phenolics (as Phenol)	mg/kg	<5

Moisture						
Our Reference		251040-1	251040-3	251040-4	251040-5	251040-6
Your Reference	UNITS	117a/0.0-0.2	116/0.0-0.4	120/0.4-0.5	120/0.2-0.3	119/0.0-0.1
Date Sampled		31/08/2020	31/08/2020	31/08/2020	31/08/2020	31/08/2020
Type of sample		soil	soil	soil	soil	soil
Date prepared	-	14/09/2020	14/09/2020	14/09/2020	14/09/2020	14/09/2020
Date analysed	-	15/09/2020	15/09/2020	15/09/2020	15/09/2020	15/09/2020
Moisture	%	15	8.4	18	17	29

Moisture				
Our Reference		251040-7	251040-8	251040-9
Your Reference	UNITS	121a/0.2-0.3	119/0.2-0.3	120/0.1-0.3
Date Sampled		31/08/2020	31/08/2020	31/08/2020
Type of sample		soil	soil	soil
Date prepared	-	14/09/2020	14/09/2020	14/09/2020
Date analysed	-	15/09/2020	15/09/2020	15/09/2020
Moisture	%	15	19	14

Asbestos ID - soils						
Our Reference		251040-1	251040-3	251040-5	251040-6	251040-7
Your Reference	UNITS	117a/0.0-0.2	116/0.0-0.4	120/0.2-0.3	119/0.0-0.1	121a/0.2-0.3
Date Sampled		31/08/2020	31/08/2020	31/08/2020	31/08/2020	31/08/2020
Type of sample		soil	soil	soil	soil	soil
Date analysed	-	15/09/2020	15/09/2020	15/09/2020	15/09/2020	15/09/2020
Sample mass tested	g	Approx. 50g	Approx. 45g	Approx. 35g	Approx. 30g	Approx. 25g
Sample Description	-	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks	Red 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		251040-9
Your Reference	UNITS	120/0.1-0.3
Date Sampled		31/08/2020
Type of sample		soil
Date analysed	-	15/09/2020
Sample mass tested	g	Approx. 30g
Sample Description	-	Brown coarse-grained soil & rocks
Asbestos ID in soil	-	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected
Trace Analysis	-	No asbestos detected

Misc Inorg - Soil						
Our Reference		251040-1	251040-2	251040-4	251040-6	251040-8
Your Reference	UNITS	117a/0.0-0.2	117/0.5-0.8	120/0.4-0.5	119/0.0-0.1	119/0.2-0.3
Date Sampled		31/08/2020	31/08/2020	31/08/2020	31/08/2020	31/08/2020
Type of sample		soil	soil	soil	soil	soil
Date prepared	-	15/09/2020	15/09/2020	15/09/2020	15/09/2020	15/09/2020
Date analysed	-	15/09/2020	15/09/2020	15/09/2020	15/09/2020	15/09/2020
pH 1:5 soil:water	pH Units	5.2	5.6	4.6	7.6	6.8
Chloride, Cl 1:5 soil:water	mg/kg	95	<10	140	<10	<10
Sulphate, SO4 1:5 soil:water	mg/kg	150	68	85	47	28

Misc Inorg - Soil		
Our Reference		251040-9
Your Reference	UNITS	120/0.1-0.3
Date Sampled		31/08/2020
Type of sample		soil
Date prepared	-	15/09/2020
Date analysed	-	15/09/2020
pH 1:5 soil:water	pH Units	8.1
Chloride, Cl 1:5 soil:water	mg/kg	26
Sulphate, SO4 1:5 soil:water	mg/kg	54

Texture and Salinity*						
Our Reference		251040-1	251040-2	251040-4	251040-6	251040-8
Your Reference	UNITS	117a/0.0-0.2	117/0.5-0.8	120/0.4-0.5	119/0.0-0.1	119/0.2-0.3
Date Sampled		31/08/2020	31/08/2020	31/08/2020	31/08/2020	31/08/2020
Type of sample		soil	soil	soil	soil	soil
Date prepared	-	15/09/2020	15/09/2020	15/09/2020	15/09/2020	15/09/2020
Date analysed	-	15/09/2020	15/09/2020	15/09/2020	15/09/2020	15/09/2020
Electrical Conductivity 1:5 soil:water	µS/cm	190	160	170	230	52
Texture Value	-	7.0	9.0	8.0	9.0	8.0
Texture	-	MEDIUM CLAY	CLAY LOAM	LIGHT MEDIUM CLAY	CLAY LOAM	LIGHT MEDIUM CLAY
ECe	dS/m	<2	<2	<2	2.1	<2
Class	-	NON SALINE	NON SALINE	NON SALINE	SLIGHTLY SALINE	NON SALINE

Texture and Salinity*		
Our Reference		251040-9
Your Reference	UNITS	120/0.1-0.3
Date Sampled		31/08/2020
Type of sample		soil
Date prepared	-	15/09/2020
Date analysed	-	15/09/2020
Electrical Conductivity 1:5 soil:water	µS/cm	220
Texture Value	-	9.0
Texture	-	CLAY LOAM
ECe	dS/m	<2
Class	-	NON SALINE

ESP/CEC						
Our Reference		251040-1	251040-2	251040-4	251040-6	251040-8
Your Reference	UNITS	117a/0.0-0.2	117/0.5-0.8	120/0.4-0.5	119/0.0-0.1	119/0.2-0.3
Date Sampled		31/08/2020	31/08/2020	31/08/2020	31/08/2020	31/08/2020
Type of sample		soil	soil	soil	soil	soil
Date prepared	-	15/09/2020	15/09/2020	15/09/2020	15/09/2020	15/09/2020
Date analysed	-	15/09/2020	15/09/2020	15/09/2020	15/09/2020	15/09/2020
Exchangeable Ca	meq/100g	3.6	5.1	1.6	34	12
Exchangeable K	meq/100g	0.4	0.6	0.3	0.3	0.2
Exchangeable Mg	meq/100g	2.8	2.2	5.3	1.2	3.6
Exchangeable Na	meq/100g	0.43	<0.1	1.1	<0.1	0.25
Cation Exchange Capacity	meq/100g	7.2	7.9	8.3	36	16
ESP	%	6	[NT]	13	<1	2

ESP/CEC		
Our Reference		251040-9
Your Reference	UNITS	120/0.1-0.3
Date Sampled		31/08/2020
Type of sample		soil
Date prepared	-	15/09/2020
Date analysed	-	15/09/2020
Exchangeable Ca	meq/100g	34
Exchangeable K	meq/100g	0.6
Exchangeable Mg	meq/100g	1.8
Exchangeable Na	meq/100g	0.17
Cation Exchange Capacity	meq/100g	36
ESP	%	<1

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-031	Total Phenolics by segmented flow analyser (in line distillation with colourimetric finish). Solids are extracted in a caustic media prior to analysis.
Inorg-081	Anions - a range of Anions are determined by Ion Chromatography, in accordance with APHA latest edition, 4110-B. Waters samples are filtered on receipt prior to analysis. Alternatively determined by colourimetry/turbidity using Discrete Analyser.
INORG-123	Determined using a "Texture by Feel" method.
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.

Method ID	Methodology Summary
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.
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-10	251040-3
Date extracted	-			14/09/2020	1	14/09/2020	14/09/2020		14/09/2020	14/09/2020
Date analysed	-			14/09/2020	1	14/09/2020	14/09/2020		14/09/2020	14/09/2020
TRH C_6 - C_9	mg/kg	25	Org-023	<25	1	<25	<25	0	114	101
TRH C_6 - C_{10}	mg/kg	25	Org-023	<25	1	<25	<25	0	114	101
Benzene	mg/kg	0.2	Org-023	<0.2	1	<0.2	<0.2	0	115	103
Toluene	mg/kg	0.5	Org-023	<0.5	1	<0.5	<0.5	0	114	102
Ethylbenzene	mg/kg	1	Org-023	<1	1	<1	<1	0	110	97
m+p-xylene	mg/kg	2	Org-023	<2	1	<2	<2	0	115	102
o-Xylene	mg/kg	1	Org-023	<1	1	<1	<1	0	119	105
naphthalene	mg/kg	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
Surrogate aaa-Trifluorotoluene	%		Org-023	96	1	87	92	6	103	94

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]	9	14/09/2020	14/09/2020		[NT]	[NT]
Date analysed	-			[NT]	9	14/09/2020	14/09/2020		[NT]	[NT]
TRH C_6 - C_9	mg/kg	25	Org-023	[NT]	9	<25	<25	0	[NT]	[NT]
TRH C_6 - C_{10}	mg/kg	25	Org-023	[NT]	9	<25	<25	0	[NT]	[NT]
Benzene	mg/kg	0.2	Org-023	[NT]	9	<0.2	<0.2	0	[NT]	[NT]
Toluene	mg/kg	0.5	Org-023	[NT]	9	<0.5	<0.5	0	[NT]	[NT]
Ethylbenzene	mg/kg	1	Org-023	[NT]	9	<1	<1	0	[NT]	[NT]
m+p-xylene	mg/kg	2	Org-023	[NT]	9	<2	<2	0	[NT]	[NT]
o-Xylene	mg/kg	1	Org-023	[NT]	9	<1	<1	0	[NT]	[NT]
naphthalene	mg/kg	1	Org-023	[NT]	9	<1	<1	0	[NT]	[NT]
Surrogate aaa-Trifluorotoluene	%		Org-023	[NT]	9	103	91	12	[NT]	[NT]

QUALITY CONTROL: svTRH (C10-C40) in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-10	251040-3
Date extracted	-			14/09/2020	1	14/09/2020	14/09/2020		14/09/2020	14/09/2020
Date analysed	-			14/09/2020	1	14/09/2020	14/09/2020		14/09/2020	14/09/2020
TRH C_{10} - C_{14}	mg/kg	50	Org-020	<50	1	<50	<50	0	120	104
TRH C_{15} - C_{28}	mg/kg	100	Org-020	<100	1	<100	<100	0	104	91
TRH C_{29} - C_{36}	mg/kg	100	Org-020	<100	1	<100	<100	0	81	98
TRH >C_{10} -C_{16}	mg/kg	50	Org-020	<50	1	<50	<50	0	120	104
TRH >C_{16} -C_{34}	mg/kg	100	Org-020	<100	1	<100	<100	0	104	91
TRH >C_{34} -C_{40}	mg/kg	100	Org-020	<100	1	<100	<100	0	81	98
Surrogate o-Terphenyl	%		Org-020	88	1	88	115	27	104	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]	9	14/09/2020	14/09/2020		[NT]	[NT]
Date analysed	-			[NT]	9	15/09/2020	15/09/2020		[NT]	[NT]
TRH C_{10} - C_{14}	mg/kg	50	Org-020	[NT]	9	<50	<50	0	[NT]	[NT]
TRH C_{15} - C_{28}	mg/kg	100	Org-020	[NT]	9	<100	<100	0	[NT]	[NT]
TRH C_{29} - C_{36}	mg/kg	100	Org-020	[NT]	9	<100	<100	0	[NT]	[NT]
TRH >C_{10} -C_{16}	mg/kg	50	Org-020	[NT]	9	<50	<50	0	[NT]	[NT]
TRH >C_{16} -C_{34}	mg/kg	100	Org-020	[NT]	9	<100	<100	0	[NT]	[NT]
TRH >C_{34} -C_{40}	mg/kg	100	Org-020	[NT]	9	<100	<100	0	[NT]	[NT]
Surrogate o-Terphenyl	%		Org-020	[NT]	9	80	78	3	[NT]	[NT]

QUALITY CONTROL: PAHs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-10	251040-3
Date extracted	-			14/09/2020	1	14/09/2020	14/09/2020		14/09/2020	14/09/2020
Date analysed	-			14/09/2020	1	14/09/2020	14/09/2020		14/09/2020	14/09/2020
Naphthalene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	99	92
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	106	94
Fluorene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	100	91
Phenanthrene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	109	99
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	107	96
Pyrene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	109	98
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	106	94
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	105	97
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	105	1	100	101	1	104	102

QUALITY CONTROL: PAHs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	9	14/09/2020	14/09/2020		[NT]	[NT]
Date analysed	-			[NT]	9	14/09/2020	14/09/2020		[NT]	[NT]
Naphthalene	mg/kg	0.1	Org-022/025	[NT]	9	<0.1	<0.1	0	[NT]	[NT]
Acenaphthylene	mg/kg	0.1	Org-022/025	[NT]	9	<0.1	<0.1	0	[NT]	[NT]
Acenaphthene	mg/kg	0.1	Org-022/025	[NT]	9	<0.1	<0.1	0	[NT]	[NT]
Fluorene	mg/kg	0.1	Org-022/025	[NT]	9	<0.1	<0.1	0	[NT]	[NT]
Phenanthrene	mg/kg	0.1	Org-022/025	[NT]	9	<0.1	<0.1	0	[NT]	[NT]
Anthracene	mg/kg	0.1	Org-022/025	[NT]	9	<0.1	<0.1	0	[NT]	[NT]
Fluoranthene	mg/kg	0.1	Org-022/025	[NT]	9	<0.1	<0.1	0	[NT]	[NT]
Pyrene	mg/kg	0.1	Org-022/025	[NT]	9	<0.1	<0.1	0	[NT]	[NT]
Benzo(a)anthracene	mg/kg	0.1	Org-022/025	[NT]	9	<0.1	<0.1	0	[NT]	[NT]
Chrysene	mg/kg	0.1	Org-022/025	[NT]	9	<0.1	<0.1	0	[NT]	[NT]
Benzo(b,j+k)fluoranthene	mg/kg	0.2	Org-022/025	[NT]	9	<0.2	<0.2	0	[NT]	[NT]
Benzo(a)pyrene	mg/kg	0.05	Org-022/025	[NT]	9	<0.05	<0.05	0	[NT]	[NT]
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-022/025	[NT]	9	<0.1	<0.1	0	[NT]	[NT]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-022/025	[NT]	9	<0.1	<0.1	0	[NT]	[NT]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-022/025	[NT]	9	<0.1	<0.1	0	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-022/025	[NT]	9	103	104	1	[NT]	[NT]

QUALITY CONTROL: Organochlorine Pesticides in soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-10	251040-3
Date extracted	-			14/09/2020	1	14/09/2020	14/09/2020		14/09/2020	14/09/2020
Date analysed	-			14/09/2020	1	14/09/2020	14/09/2020		14/09/2020	14/09/2020
alpha-BHC	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	96	92
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	92	89
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	93	97
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	108	101
Heptachlor Epoxide	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	107	99
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	108	101
Dieldrin	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	105	99
Endrin	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	100	102
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	95	94
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	69	91
Methoxychlor	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-022/025	107	1	107	106	1	107	109

QUALITY CONTROL: Organochlorine Pesticides in soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	9	14/09/2020	14/09/2020		[NT]	[NT]
Date analysed	-			[NT]	9	14/09/2020	14/09/2020		[NT]	[NT]
alpha-BHC	mg/kg	0.1	Org-022/025	[NT]	9	<0.1	<0.1	0	[NT]	[NT]
HCB	mg/kg	0.1	Org-022/025	[NT]	9	<0.1	<0.1	0	[NT]	[NT]
beta-BHC	mg/kg	0.1	Org-022/025	[NT]	9	<0.1	<0.1	0	[NT]	[NT]
gamma-BHC	mg/kg	0.1	Org-022/025	[NT]	9	<0.1	<0.1	0	[NT]	[NT]
Heptachlor	mg/kg	0.1	Org-022/025	[NT]	9	<0.1	<0.1	0	[NT]	[NT]
delta-BHC	mg/kg	0.1	Org-022/025	[NT]	9	<0.1	<0.1	0	[NT]	[NT]
Aldrin	mg/kg	0.1	Org-022/025	[NT]	9	<0.1	<0.1	0	[NT]	[NT]
Heptachlor Epoxide	mg/kg	0.1	Org-022/025	[NT]	9	<0.1	<0.1	0	[NT]	[NT]
gamma-Chlordane	mg/kg	0.1	Org-022/025	[NT]	9	<0.1	<0.1	0	[NT]	[NT]
alpha-chlordane	mg/kg	0.1	Org-022/025	[NT]	9	<0.1	<0.1	0	[NT]	[NT]
Endosulfan I	mg/kg	0.1	Org-022/025	[NT]	9	<0.1	<0.1	0	[NT]	[NT]
pp-DDE	mg/kg	0.1	Org-022/025	[NT]	9	<0.1	<0.1	0	[NT]	[NT]
Dieldrin	mg/kg	0.1	Org-022/025	[NT]	9	<0.1	<0.1	0	[NT]	[NT]
Endrin	mg/kg	0.1	Org-022/025	[NT]	9	<0.1	<0.1	0	[NT]	[NT]
Endosulfan II	mg/kg	0.1	Org-022/025	[NT]	9	<0.1	<0.1	0	[NT]	[NT]
pp-DDD	mg/kg	0.1	Org-022/025	[NT]	9	<0.1	<0.1	0	[NT]	[NT]
Endrin Aldehyde	mg/kg	0.1	Org-022/025	[NT]	9	<0.1	<0.1	0	[NT]	[NT]
pp-DDT	mg/kg	0.1	Org-022/025	[NT]	9	<0.1	<0.1	0	[NT]	[NT]
Endosulfan Sulphate	mg/kg	0.1	Org-022/025	[NT]	9	<0.1	<0.1	0	[NT]	[NT]
Methoxychlor	mg/kg	0.1	Org-022/025	[NT]	9	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-022/025	[NT]	9	107	109	2	[NT]	[NT]

QUALITY CONTROL: Organophosphorus Pesticides in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-10	251040-3
Date extracted	-			14/09/2020	1	14/09/2020	14/09/2020		14/09/2020	14/09/2020
Date analysed	-			14/09/2020	1	14/09/2020	14/09/2020		14/09/2020	14/09/2020
Dichlorvos	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	78	80
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	102	96
Fenitrothion	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	93	97
Malathion	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	96	112
Chlorpyriphos	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	107	103
Parathion	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	98	102
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	119	113
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	107	1	107	106	1	107	109

QUALITY CONTROL: Organophosphorus Pesticides in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	9	14/09/2020	14/09/2020		[NT]	[NT]
Date analysed	-			[NT]	9	14/09/2020	14/09/2020		[NT]	[NT]
Dichlorvos	mg/kg	0.1	Org-022/025	[NT]	9	<0.1	<0.1	0	[NT]	[NT]
Dimethoate	mg/kg	0.1	Org-022/025	[NT]	9	<0.1	<0.1	0	[NT]	[NT]
Diazinon	mg/kg	0.1	Org-022/025	[NT]	9	<0.1	<0.1	0	[NT]	[NT]
Chlorpyriphos-methyl	mg/kg	0.1	Org-022/025	[NT]	9	<0.1	<0.1	0	[NT]	[NT]
Ronnel	mg/kg	0.1	Org-022/025	[NT]	9	<0.1	<0.1	0	[NT]	[NT]
Fenitrothion	mg/kg	0.1	Org-022/025	[NT]	9	<0.1	<0.1	0	[NT]	[NT]
Malathion	mg/kg	0.1	Org-022/025	[NT]	9	<0.1	<0.1	0	[NT]	[NT]
Chlorpyriphos	mg/kg	0.1	Org-022/025	[NT]	9	<0.1	<0.1	0	[NT]	[NT]
Parathion	mg/kg	0.1	Org-022/025	[NT]	9	<0.1	<0.1	0	[NT]	[NT]
Bromophos-ethyl	mg/kg	0.1	Org-022	[NT]	9	<0.1	<0.1	0	[NT]	[NT]
Ethion	mg/kg	0.1	Org-022/025	[NT]	9	<0.1	<0.1	0	[NT]	[NT]
Azinphos-methyl (Guthion)	mg/kg	0.1	Org-022/025	[NT]	9	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-022/025	[NT]	9	107	109	2	[NT]	[NT]

QUALITY CONTROL: PCBs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-10	251040-3
Date extracted	-			14/09/2020	1	14/09/2020	14/09/2020		14/09/2020	14/09/2020
Date analysed	-			14/09/2020	1	14/09/2020	14/09/2020		14/09/2020	14/09/2020
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	<0.1	1	<0.1	<0.1	0	80	80
Aroclor 1260	mg/kg	0.1	Org-021	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-021	107	1	107	106	1	107	109

QUALITY CONTROL: PCBs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	9	14/09/2020	14/09/2020		[NT]	[NT]
Date analysed	-			[NT]	9	14/09/2020	14/09/2020		[NT]	[NT]
Aroclor 1016	mg/kg	0.1	Org-021	[NT]	9	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1221	mg/kg	0.1	Org-021	[NT]	9	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1232	mg/kg	0.1	Org-021	[NT]	9	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1242	mg/kg	0.1	Org-021	[NT]	9	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1248	mg/kg	0.1	Org-021	[NT]	9	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1254	mg/kg	0.1	Org-021	[NT]	9	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1260	mg/kg	0.1	Org-021	[NT]	9	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-021	[NT]	9	107	109	2	[NT]	[NT]

QUALITY CONTROL: Acid Extractable metals in soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-10	251040-3
Date prepared	-			15/09/2020	1	15/09/2020	15/09/2020		15/09/2020	15/09/2020
Date analysed	-			15/09/2020	1	15/09/2020	15/09/2020		15/09/2020	15/09/2020
Arsenic	mg/kg	4	Metals-020	<4	1	6	6	0	104	87
Cadmium	mg/kg	0.4	Metals-020	<0.4	1	<0.4	<0.4	0	101	80
Chromium	mg/kg	1	Metals-020	<1	1	17	15	12	90	85
Copper	mg/kg	1	Metals-020	<1	1	12	11	9	90	91
Lead	mg/kg	1	Metals-020	<1	1	11	15	31	88	79
Mercury	mg/kg	0.1	Metals-021	<0.1	1	<0.1	<0.1	0	96	100
Nickel	mg/kg	1	Metals-020	<1	1	3	3	0	93	84
Zinc	mg/kg	1	Metals-020	<1	1	15	16	6	93	85

QUALITY CONTROL: Acid Extractable metals in soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date prepared	-			[NT]	9	15/09/2020	15/09/2020		[NT]	[NT]
Date analysed	-			[NT]	9	15/09/2020	15/09/2020		[NT]	[NT]
Arsenic	mg/kg	4	Metals-020	[NT]	9	7	8	13	[NT]	[NT]
Cadmium	mg/kg	0.4	Metals-020	[NT]	9	<0.4	<0.4	0	[NT]	[NT]
Chromium	mg/kg	1	Metals-020	[NT]	9	17	19	11	[NT]	[NT]
Copper	mg/kg	1	Metals-020	[NT]	9	23	29	23	[NT]	[NT]
Lead	mg/kg	1	Metals-020	[NT]	9	18	18	0	[NT]	[NT]
Mercury	mg/kg	0.1	Metals-021	[NT]	9	<0.1	<0.1	0	[NT]	[NT]
Nickel	mg/kg	1	Metals-020	[NT]	9	6	6	0	[NT]	[NT]
Zinc	mg/kg	1	Metals-020	[NT]	9	41	40	2	[NT]	[NT]

QUALITY CONTROL: Misc Soil - Inorg						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-10	251040-3
Date prepared	-			15/09/2020	1	15/09/2020	15/09/2020		15/09/2020	15/09/2020
Date analysed	-			15/09/2020	1	15/09/2020	15/09/2020		15/09/2020	15/09/2020
Total Phenolics (as Phenol)	mg/kg	5	Inorg-031	<5	1	<5	<5	0	99	114

QUALITY CONTROL: Misc Inorg - Soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-10	[NT]
Date prepared	-			15/09/2020	[NT]	[NT]	[NT]	[NT]	15/09/2020	[NT]
Date analysed	-			15/09/2020	[NT]	[NT]	[NT]	[NT]	15/09/2020	[NT]
pH 1:5 soil:water	pH Units		Inorg-001	[NT]	[NT]	[NT]	[NT]	[NT]	101	[NT]
Chloride, Cl 1:5 soil:water	mg/kg	10	Inorg-081	<10	[NT]	[NT]	[NT]	[NT]	101	[NT]
Sulphate, SO4 1:5 soil:water	mg/kg	10	Inorg-081	<10	[NT]	[NT]	[NT]	[NT]	103	[NT]

QUALITY CONTROL: Texture and Salinity*					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-10	[NT]
Date prepared	-			15/09/2020	[NT]	[NT]	[NT]	[NT]	15/09/2020	[NT]
Date analysed	-			15/09/2020	[NT]	[NT]	[NT]	[NT]	15/09/2020	[NT]
Electrical Conductivity 1:5 soil:water	µS/cm	1	Inorg-002	<1	[NT]	[NT]	[NT]	[NT]	103	[NT]

QUALITY CONTROL: ESP/CEC						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-10	[NT]
Date prepared	-			15/09/2020	1	15/09/2020	15/09/2020		15/09/2020	[NT]
Date analysed	-			15/09/2020	1	15/09/2020	15/09/2020		15/09/2020	[NT]
Exchangeable Ca	meq/100g	0.1	Metals-020	<0.1	1	3.6	3.2	12	105	[NT]
Exchangeable K	meq/100g	0.1	Metals-020	<0.1	1	0.4	0.3	29	105	[NT]
Exchangeable Mg	meq/100g	0.1	Metals-020	<0.1	1	2.8	2.7	4	102	[NT]
Exchangeable Na	meq/100g	0.1	Metals-020	<0.1	1	0.43	0.42	2	105	[NT]
ESP	%	1	Metals-020	[NT]	1	6	6	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 251040-1,3 were sub-sampled from bags provided by the client.

Asbestos: A portion of the supplied samples were sub-sampled for asbestos analysis according to Envirolab procedures.
We cannot guarantee that these sub-samples are indicative of the entire sample.
Envirolab recommends supplying 40-50g of sample in its own container.
Note: Samples 251040-5,6,7,9 were sub-sampled from jars provided by the client.

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

Douglas Partners
Geotechnics / Environment / Groundwater

CHAIN OF CUSTODY DESPATCH SHEET

Project No:	94626.00	**Suburb:**	Glenwood	**To:**	Envirolab Services
Project Name:	Glenwood High School	**Order Number**			12 Ashley St Chatswood 2067
Project Manager:	Gavin Boyd	**Sampler:**	Jeremie Young		
Emails:	gavin.boyd@douglaspartners.com.au	petrina.fielding@douglaspartners.com.au			kristine.nicodemus@douglaspartners.com.au
Date Required:	Same day ☐ 24 hours ☐ 48 hours ☐ 72 hours ☐ Standard ☐				
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: Combo 8a	Combo 3	Asbestos	Textural Classification / ECE	CEC	pH	Chloride/ Sulphate/ Sodicity	HM, TRH, BTEX, PAH	TRH / BTEX	Notes/preservation
117a/0.0-0.2	1	31/08/20	Soil	G	•			•		•	•			
117/0.5-0.8	2	31/08/20	Soil	G				•		•	•			
116/0.0-0.4	3	31/08/20	Soil	G	•									
120/0.4-0.5	4	31/08/20	Soil	G		•		•		•	•			
120/0.2-0.3	5	31/08/20	Soil	G	•									
119/0.0-0.1	6	31/08/20	Soil	G	•			•		•	•			
121a/0.2-0.3	7	31/08/20	Soil	G	•									
119/0.2-0.3	8	31/08/20	Soil	G		•		•		•	•			
120/0.1-0.3	9	31/08/20	Soil	G	•			•		•	•			
extra TP114(0.0-0.3)	10													
PQL (S) mg/kg														**ANZECC PQLs req'd for all water analytes** ☐

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

Job No: 258104O
Date Received: 11/09/2020
Time Received: 15.27
Received By: RL
Temp: Cool/Ambient
Cooling: Ice/Icepack
Security: Intact/Broken/None

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

Lab Report/Reference No:

Metals to Analyse: 8HM unless specified here:

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

Send Results to: Douglas Partners Pty Ltd **Address:** 43 Hobart St Riverstone NSW 2765 **Phone:** **Fax:**

Signed: **Received by:** R. Chazeen **Date & Time:** 11/09/2020 15.27

		Date	Sample Type	Container Type	Analytes

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 (Riverstone)
Attention	Gavin Boyd

Sample Login Details

Your reference	94626.00, Glenwood High School
Envirolab Reference	251040
Date Sample Received	11/09/2020
Date Instructions Received	11/09/2020
Date Results Expected to be Reported	18/09/2020

Sample Condition

Samples received in appropriate condition for analysis	Yes
No. of Samples Provided	10 soil
Turnaround Time Requested	Standard
Temperature on Receipt (°C)	14
Cooling Method	Ice Pack
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
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	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	Misc Soil - Inorg	Asbestos ID - soils	Misc Inorg - Soil	Texture and Salinity*	ESP/CEC	On Hold
117a/0.0-0.2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
117/0.5-0.8										✓	✓	✓	
116/0.0-0.4	✓	✓	✓	✓	✓	✓	✓	✓	✓				
120/0.4-0.5	✓	✓	✓				✓			✓	✓	✓	
120/0.2-0.3	✓	✓	✓	✓	✓	✓	✓	✓	✓				
119/0.0-0.1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
121a/0.2-0.3	✓	✓	✓	✓	✓	✓	✓	✓	✓				
119/0.2-0.3	✓	✓	✓				✓			✓	✓	✓	
120/0.1-0.3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
TP114 (0.0-0.3)													✓

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 K

Data Quality Assessment

Appendix K - 1 Data Quality Objectives

The DSI has been devised broadly in accordance with the seven step data quality objective (DQO) process which is provided in Appendix B, Schedule B2 of the *National Environment Protection (Assessment of Site Contamination) Measure* 1999 as amended 2013 (NEPC, 2013). The DQO process is outlined as follows:

K1.1 State the Problem

The Site is proposed to be redeveloped for residential land use with accessible soils. The "problem" to be addressed is the extent and nature of potential contamination at the Site which is unknown, and as such, it is unclear whether the Site is suitable for the proposed development.

The objectives of the investigation are as follows:

- Undertake intrusive investigations of the Site to assess and describe the nature and extent of contamination;
- Determine the suitability of the Site for the proposed residential (with accessible soils) land use; and
- Recommend further investigation where the investigation found the Site to be unsuitable for the proposed land use.

K1.2 Identify the Decision/Goal of the Study

The suitability of the Site for the proposed residential land use was assessed based on a comparison of the analytical results for all COPC with the adopted site assessment criteria (SAC) as detailed in Appendix K2 and discussed below.

The Site has an area of approximately 0.5 ha. EPA guidelines require a minimum of 13 sampling points for an area of 0.5 ha. Given the nature of the study, DP has adopted a total of 22 sampling points.

The main COPC are expected to be total recoverable hydrocarbons (TRH), benzene, toluene, ethyl benzene and xylene (BTEX), polycyclic aromatic hydrocarbons (PAH), heavy metals and asbestos. Other commonly found contaminants which may be present include phenols, organochlorine pesticides (OCP), organophosphate pesticides (OPP) and polychlorinated biphenyls (PCB).

The following specific decisions were considered as part of the DSI:

- Did field observation and analytical results identify potential contamination sources which were not included in the preliminary CSM?
- Were COPC present in soil at concentrations that pose a potential risk to identified receptors?
- Were COPC present in background areas of the Site at concentrations that are above expected background ranges?
- Does concentration of COPC in soil present a risk to groundwater beneath the Site?

- Is the data sufficient to make a decision regarding the abovementioned risks, the suitability of the Site for the proposed development, or are additional investigations required?
- Does contamination at the Site, if encountered, trigger the Duty to Report requirements under the CLM Act 1997?
- Are there any off-site migration issues that need to be considered?
- Is the data sufficient to enable the preparation of a Remediation Action Plan (RAP) and / or Environmental Management Plan (EMP) should the data suggest these are required?

K1.3 Identify Information Inputs

Inputs into the decisions are as follows:

- Review of regional geology, topography and hydrogeology information;
- Review of site history information;
- Completion of a site inspection
- A total of 22 test bores were drilled;
- The lithology of the Site as described in the test bore logs (Appendix H);
- Field and laboratory QA / QC data to assess the suitability of the environmental data for the DSI (Appendix L);
- All analysis was undertaken at a NATA accredited laboratory; and
- Laboratory reported concentrations of contaminants of concern were compared with the NEPC (2013) criteria as discussed in Section K2.

K1.4 Define the Study Boundaries

The Site is identified as Glenwood High School at Forman Avenue, Glenwood within the local government area of Blacktown City Council. The section of site assessed comprises approximately 0.5 hectares. The Site location and boundaries are shown on Drawing 1, Appendix B.

The investigation was undertaken to a maximum depth of 8.0 m below ground level (bgl) across the Site.

Field investigations were undertaken on 8 August 2020, 27 August 2020 and 31 August 2020 by a DP Geo-environmental Engineer.

K1.5 Develop the Analytical Approach (or decision rule)

The information obtained during the assessment was used to characterise the Site in terms of contamination issues and risk to human health and the environment. The decision rules used in characterising the site were as follows:

- The adopted SAC was the NSW Environment Protection Authority (EPA) endorsed criteria; and
- The contaminant concentrations in soil were compared to the adopted SAC to determine whether further investigation or remedial action was required.

Field and laboratory test results were considered useable for the assessment after evaluation against the following data quality indicators (DQIs):

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

The specific limits are outlined in the data QA / QC procedures and results (Appendix L).

K1.6 Specify the Performance or Acceptable Criteria

Decision errors for the respective COPC for fill and natural soils are:

1. Deciding that fill and natural soil at the Site exceeds the adopted SAC when they truly do not; and
2. Deciding that fill and natural soil at the Site is within the adopted SAC when they truly do not.

Decision errors for the DSI were minimised and measured by the following:

- The sampling regime targeted each stratum identified to account for site variability;
- Sample collection and handling techniques were in accordance with DP's *Field Procedures Manual*;
- Samples were prepared and analysed by a NATA-accredited laboratory with the acceptance limits for laboratory QA / QC parameters based on the laboratory reported acceptance limits and those stated in NEPC (2013);
- The analyte selection is based on the available site history, past site activities and site features. The potential for contaminants other than those proposed to be analysed is considered to be low;
- The SAC were adopted from established and NSW EPA endorsed guidelines. The SAC have risk probabilities already incorporated; and
- A NATA accredited laboratory using NATA endorsed methods are used to perform laboratory analysis. Where NATA endorsed methods are not used, the reasons are stated. The effect of using non-NATA methods on the decision making process are explained.

K1.7 Optimise the design for obtaining data

Sampling design and procedures that were implemented to optimise data collection for achieving the DQOs included the following;

- A NATA accredited laboratory using NATA endorsed methods were used to perform laboratory analysis;
- Additional soil samples were collected but kept 'on hold' pending details of initial analysis so that they could be analysed if further delineation was required; and
- Adequately experienced environmental scientists/engineers were chosen to conduct field work and sample analysis interpretation.

Appendix H – 2 - Site Assessment Criteria

The Site Assessment Criteria (SAC) applied in the current investigation are informed by the preliminary CSM which identified human and environmental receptors to potential contamination on the site (refer to Section 9). Analytical results are assessed (as a Tier 1 assessment) against the SAC comprising investigation and screening levels as per Schedule B1, *National Environment Protection (Assessment of Site Contamination) Measure* 1999, as amended 2013 (NEPC, 2013).

The investigation and screening levels applied in the current investigation comprise levels adopted for a generic residential land use scenario with accessible soils.

K2.1 Health Investigation and Screening Levels

The generic Health Investigation Levels (HILs) and Health Screening Levels (HSLs) are considered to be appropriate for the assessment of human health risk associated with contamination at the site. The adopted soil HILs and HSLs for the potential contaminants of concern are presented in Table K2, with inputs into their derivation shown in Table K1.

As shown in Table K2 the adopted HSLs are based on a potential vapour intrusion pathway, as identified in the CSM. Although the CSM also identifies a direct contact pathway as well as construction worker receptors, the corresponding HSLs are significantly higher than those for the vapour intrusion pathway and are therefore not drivers for further assessment and/or remediation. As such the direct contact and intrusive maintenance worker HSLs have not been listed.

Table K1: Inputs to the Derivation of HSLs

Variable	Input	Rationale
Potential exposure pathway	Inhalation of vapours	Potential exposure pathways
Soil Type	Silt	Dominant soil type in surface soils (see Test Bore Logs – Appendix H)
Depth to contamination	0 m to <1 m	Potential contamination sources likely to impact surface soils

Table K2: HIL and HSL in mg/kg Unless Otherwise Indicated

Contaminants		HIL- A	HSL- A & B
Metals	Arsenic	100	-
	Cadmium	20	-
	Chromium (VI)	100	-
	Copper	6000	-
	Lead	300	-
	Mercury (inorganic)	40	-
	Nickel	400	-
	Zinc	7400	-
PAH	Benzo(a)pyrene TEQ[1]	3	-
	Total PAH	300	-
	Naphthalene	-	4
TRH	C6 – C10 (less BTEX) [F1]	-	40
	>C10-C16 (less Naphthalene) [F2]	-	230
	>C16-C34 [F3]	-	-
	>C34-C40 [F4]	-	-
BTEX	Benzene	-	0.6
	Toluene	-	390
	Ethylbenzene	-	NL[3]
	Xylenes	-	95
OCP	Aldrin + Dieldrin	6	-
	Chlordane	50	-
	DDT+DDE+DDD	240	-
	Endosulfan	270	-
	Endrin	10	-
	Heptachlor	6	-
	HCB	10	-
	Methoxychlor	300	-
OPP	Chlorpyrifos	160	-
PCB [2]		1	-

Notes:

1 Sum of carcinogenic PAH

2 Non dioxin-like PCBs only.

3 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'.

K2.2 Ecological Investigation Levels

Ecological Investigation Levels (EILs) and Added Contaminant Limits (ACLs), where appropriate, have been derived in NEPC (2013) for only a short list of contaminants comprising As, Cu, Cr (III), DDT, naphthalene, Ni, Pb and Zn. The adopted EILs, derived using the *Interactive (Excel) Calculation Spreadsheet* (Standing Council on Environment and Water (SCEW) website (http://www.scew.gov.au/node/941)) are shown in the following Table H4, with inputs into their derivation shown on Table H3.

Table H3: Inputs to the Derivation of EILs

Variable	Input	Rationale
Age of contaminants	"Aged" (>2 years)	Given the potential sources of soil contamination are from historic use, the contamination is considered as "aged" (>2 years);
pH	4.4	34 selected samples were tested for pH as part of the SMP. The lowest pH value has been used as an initial screening. The pH value adopted is a pH of 4.4.
CEC	4.1 cmolc/kg	4 selected samples were tested for CEC as part of the SMP. The lowest CEC value has been used as an initial screening. The CEC value adopted is 4.1 cmolc/kg.
Clay content	10 %	Conservative value for initial screen
Traffic volumes	low	The Site is considered to be located within a low traffic area
State / Territory	New South Wales	-

Table H4: EIL in mg/kg

Analyte		EIL
Metals	Arsenic	100
	Copper	70
	Nickel	35
	Chromium III	410
	Lead	1100
	Zinc	170
PAH	Naphthalene	170
OCP	DDT	180

K2.3 Ecological Screening Levels

Ecological Screening Levels (ESLs) are used to assess the risk of selected petroleum hydrocarbon compounds, BTEX and benzo(a)pyrene to terrestrial ecosystems. The adopted ESLs, based on a fine soil type are shown in the following Table H5.

Table H5: ESL in mg/kg

Analyte		ESL[1]	Comments
TRH	C6 – C10 (less BTEX) [F1]	180*	All ESLs are low reliability apart from those marked with * which are moderate reliability
	>C10-C16 (less Naphthalene) [F2]	120*	
	>C16-C34 [F3]	1300	
	>C34-C40 [F4]	5600	
BTEX	Benzene	65	
	Toluene	105	
	Ethylbenzene	125	
	Xylenes	45	
PAH	Benzo(a)pyrene	0.7	

K2.4 Management Limits

In addition to appropriate consideration and application of the HSLs and ESLs, 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; and
- Effects on buried infrastructure e.g. penetration of, or damage to, in-ground services.

The adopted management limits, based on a fine soil type (Section 11.1), are shown in the following Table H5.

Table H5: Management Limits in mg/kg

Analyte		Management Limit
TRH	$C_6 – C_{10}$ (F1) #	800
	$>C_{10}$-C_{16} (F2) #	1000
	$>C_{16}$-C_{34} (F3)	3500
	$>C_{34}$-C_{40} (F4)	10 000

Separate management limits for BTEX and naphthalene are not available hence these have not been subtracted from the relevant fractions to obtain F1 and F2