Douglas Partners
Geotechnics / Environment / Groundwater

Integrated Practical Solutions

Report on
Preliminary (Contamination) Site Investigation

New Public School in Epping
86 Chelmsford Avenue, Epping

Prepared for
School Infrastructure NSW

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

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Douglas Partners Pty Ltd
ABN 75 053 980 117
www.douglaspartners.com.au
96 Hermitage Road
West Ryde NSW 2114
PO Box 472
West Ryde NSW 1685
Phone (02) 9809 0666

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1. Introduction

Douglas Partners Pty Ltd (DP) has been engaged by School Infrastructure NSW to complete this Preliminary (Contamination) Site Investigation (PSI) for the master plan and concept design for the proposed New Public School in Epping at 86 Chelmsford Avenue, Epping (the site). The site is shown on Drawing 1, Appendix A.

The investigation was undertaken in accordance with the Standard Form Agreement SINSW00650/20 dated 8 April 2020 and in accordance with DP's proposal SYD200258 dated 13 March 2020.

The objective of this PSI is to:

- Assess the potential for contamination at the site based on a review of available contamination information;
- Obtain an understanding of the preliminary contamination status of the site based on results from the soil sampling program; and
- Comment on the risk of contamination for the proposed development and provide recommendations on the need for further investigation and/ or management with regards to the proposed development (if required).

It is understood that the investigation is required to inform the design and planning of the precinct master plan. Specific details of development have not been confirmed at this stage.

A geotechnical investigation and hazardous building material survey were also conducted concurrently by DP and will be reported separately (DP Projects 99671.00 and 99671.02).

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

2. Background

2.1 Previous Reports

DP undertook a hazardous building material (HBM) survey concurrently with this PSI. The draft report[1] identified the presence / assumed presence of the following HBM in current site buildings / structures: asbestos (friable and non-friable), synthetic mineral fibres (SMF), lead paint, lead dust and polychlorinated biphenyls (PCB).

[1] DP, *Report on Hazardous Building Materials (HBM) Survey New Public School in Epping 86 Chelmsford Avenue, Epping NSW* (Project 99671.02.R.001.Rev2, dated April 2021) (DP, 2021)

The following previous report was provided after issue of the field investigation for this PSI and the first draft report for this PSI: Greencap *Preliminary Site Investigation TAFE NSW Epping Campus, Chelmsford Avenue, Epping NSW 2121* (Reference J154876, November 2018) (Greencap , 2018). The pertinent information in Greencap (2018) was generally already covered by this PSI, with the following additional information noted:

- "*There was no visual evidence of wastes being dumped on the site, however, it was observed that stockpiled soil sourced from the Ryde TAFE site was present on the site during inspection. Timber, steel and other unused materials were stored on bitumen hardstand towards the southern boundary of the site*";
- "*The storage of chemicals was observed in chemical storage rooms located towards the southern site boundary during the site walkover. Most chemical storage areas were empty and are no longer utilised. Chemicals observed were identified to be correctly bunded and no visible spills were identified during the site walkover*"; and
- Photographs of the site condition at the time of the inspection were included, with selected photographs provided as Figure 1, below.

Photo 11 – Appropriate bunding for fuel storage.

Photo 12 – Chemical storage cupboards.

Photo 21 – Maintenance shed.

Photo 23 – Electric pump shed.

Figure 1: Selected Photographs from Greencap (2018)

2.2 Proposed Development

It is understood that the proposed development will likely include construction of new low to medium rise (one to four storey) classrooms and school buildings, playing fields and grassed areas, hard surface open space and a carpark area. Some partial basement levels are feasible beneath the new buildings due to the site topography, especially in the western portion of the site. The project is at the planning stage, and as such specific details of the development had not been defined at the time of reporting.

3. Scope of Works

The PSI has been conducted in general accordance with the National Environment Protection Council (NEPC) *National Environment Protection (Assessment of Site Contamination) Measure* 1999 (amended 2013, NEPC 2013).

The scope for the PSI comprised:

- Review of the following site / history information records:
  - Regional geological, soil and hydrogeological mapping;
  - Acid sulfate soil and salinity risk maps;
  - Registered groundwater bores;
  - Historical aerial photographs;
  - Council records available under an informal application under the Government Information (Public Access) Act 2009 (GIPA Act);
  - NSW EPA databases held under the CLM and POEO Acts for the site and adjoining properties; and
  - SafeWork NSW Records for Hazardous Chemicals on Premise.
- A site walkover to determine current and recent land use and assess the potential for contaminating activities;
- Identification of Potential Areas of Environmental Concern (PAEC);
- Preparation of a Preliminary Conceptual Site Model (CSM) outlining potential contamination sources, transport pathways and receptors;
- Completion of a Dial-Before-You-Dig (DBYD) underground services records search, services scanning at proposed sample locations and obtaining coordinates of each location;
- Logging soils / rock and sampling from 16 locations comprising a mixture of test pits and boreholes using a backhoe, drill rig or hand tools. Locations were extended to depths of between 0.53 m to 7.2 m, with all test locations extended into natural soil / rock;
- Collection of soil samples from each test pit / borehole at regular intervals, changes in strata and where signs of potential contamination were observed;
- Screening of samples collected with a photo-ionisation detector (PID) to assess the likely presence or absence of volatile organic compounds (VOC);

- Laboratory analysis on selected soil samples from 15 of the 16 sample locations at a National Association of Testing Authorities (NATA) accredited laboratory for a combination the following common potential contaminants of concern and parameters:
  - Heavy metals - 16 samples;
  - Total Recoverable Hydrocarbons (TRH) - 16 samples;
  - Benzene, toluene, ethylbenzene, xylenes (BTEX) - 16 samples;
  - Polycyclic Aromatic Hydrocarbons (PAH) -16 samples;
  - Organochlorine pesticides (OCP) - 10 samples;
  - Organophosphorus pesticides (OPP) - 10 samples;
  - Polychlorinated biphenyls (PCB) - 10 samples;
  - Phenols - 10 samples;
  - Asbestos - 15 samples; and
  - CEC and pH - 3 samples.
- Update of the Conceptual Site Model; and
- Preparation of this report.

4. Site Information

Site Address	86 Chelmsford Avenue, Epping
Legal Description	Lot 1, Deposited Plan 582172
Area	20,700 m^2
Zoning	SP2 (Educational Establishment)
Local Council Area	City of Parramatta
Current Use	Vacant (former TAFE property)
Surrounding Uses	North - Residential East - Residential and commercial South - Residential and commercial West - Commercial and recreational open space

Figure 2: Site Location and Boundary

5. Environmental Setting

5.1 Topography

The regional topography slopes downwards to the south west as shown in Figure 3.

The site topography generally slopes downwards to the south west, with the north east portion of the site located on a locally elevated and relatively flat area (top of a ridge), as shown in Figure 4. Ground levels range from approximately RL 104 m to RL 116 m relative to Australian Height Datum (AHD).

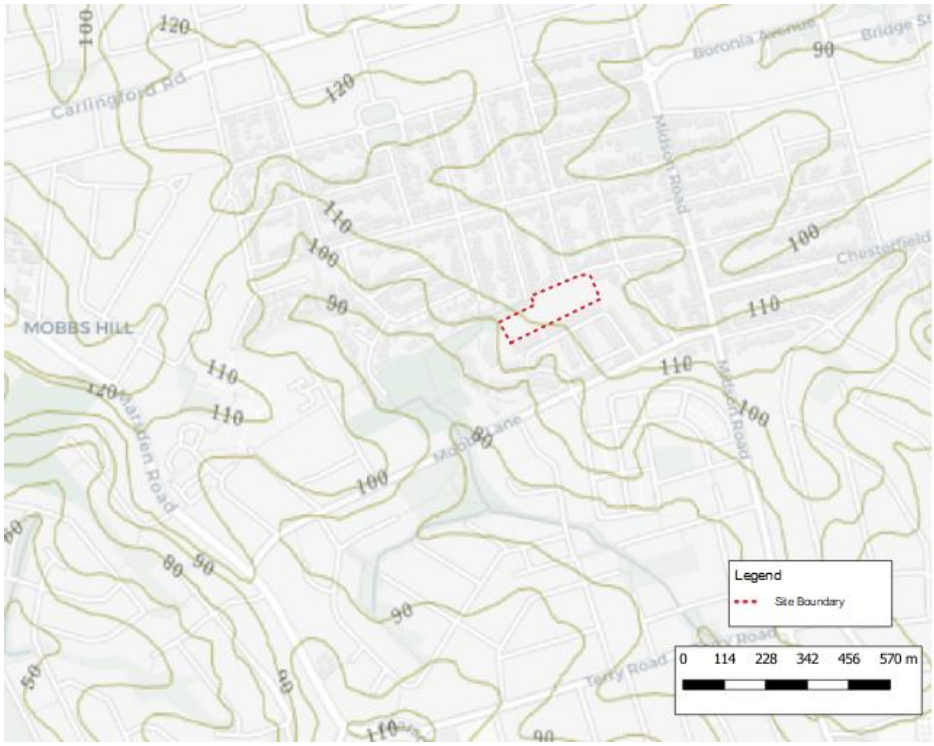


Figure 3: Regional topography around site with 10 m surface contours relative to AHD

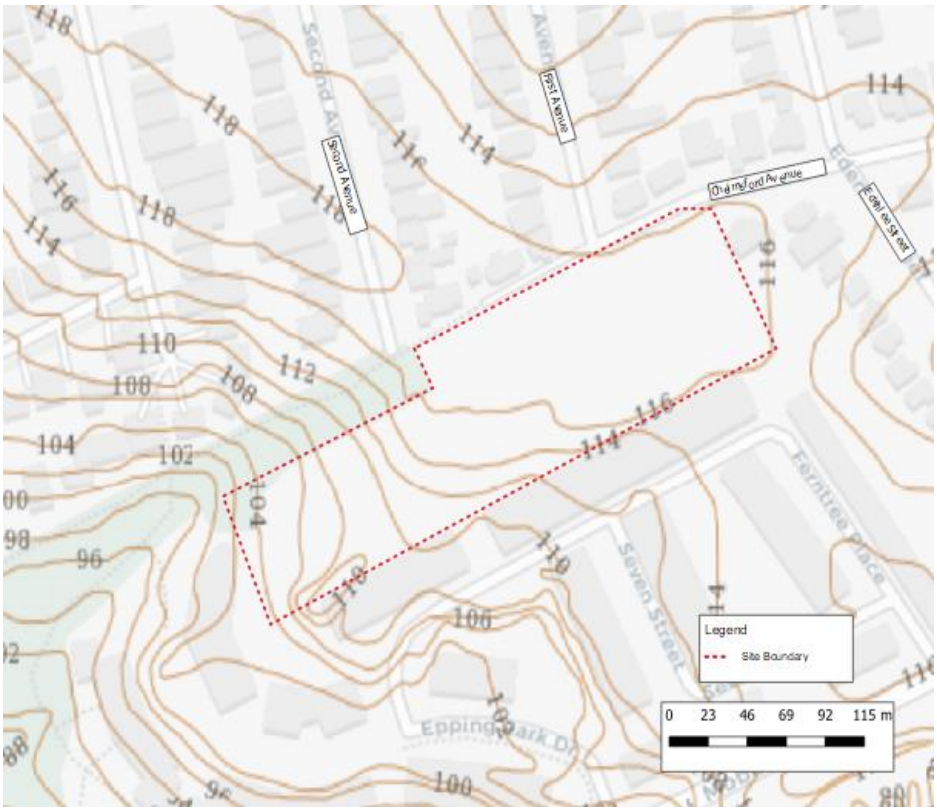


Figure 4: Site topography with 2 m surface contours relative to AHD

5.2 Site Geology and Soil Landscape

Published geological mapping (Section 16) indicates that the site is underlain by Bringelly Shale, which is the uppermost unit of the Wianamatta Group. Bringelly Shale typically comprises shale, carbonaceous claystone, laminite (finely interbedded sandstone and siltstone), fine to medium grained lithic sandstone, rare coal and tuff. A relatively thin layer of Minchinbury Sandstone, which is fine to medium-grained lithic sandstone, can be found between the Bringelly Shale and the Ashfield Shale. The Ashfield Shale, which is the lowermost unit of Wianamatta Group, typically comprises black to dark grey shale and laminite.

Published soil mapping (Section 16) indicates that the site is underlain by the Glenorie soil landscape group. The Glenorie soil landscape is an erosional soil landscape comprising a topography of undulating to rolling low hills on Wianamatta Group shales, with local relief of 50 m to 80 m and slope gradients of 5% to 20%. The soil landscape is typically represented by narrow ridges, hillcrests and valleys. Soils underlain by the Glenorie soils landscape are typically shallow to moderately deep on crests, moderately deep on upper slopes, and deep on lower slopes and drainage lines. These soils typically have a high soil erosion hazard, exhibit localised areas of impermeable highly plastic subsoil and are moderately reactive.

5.3 Acid Sulphate Soils

Published acid sulphate soils (ASS) risk mapping (Section 16) indicates that the site is in an area of low probability of ASS occurrence.

The nearest mapped area of high probability of ASS occurrence is adjacent to the Parramatta River, located 3.85 km south of the site.

5.4 Surface Water and Groundwater

An on-site water detention pond/ small dam was present in the west of the site. The closest identified creek is Terrys Creek approximately 200 m south-west site. Terrys Creek is a tributary of the Lane Cove River.

A search of the publicly available registered groundwater bore database (Section 16) indicated that there are 6 registered groundwater bores or groundwater bore clusters within a 2 km search radius of the site. These groundwater bores are summarised in Table 1.

Table 1: Summary of Available Information from Nearby Registered Groundwater Bores

Bore ID Authorised Purpose Completion Year Status	Location Relative to Site	Final Depth (m)	Standing Water Level (m bgl)
GW110661, 110662, 110663 and 114950 Monitoring bores	1.1 km north east	9.4 - 10	Not available
GW112773, 112772, 112771, 112770, 112769, 112769, 112768, 112767, 112766, 112765 Monitoring bores	1.42 km north east	3 - 4	2.0 - 2.5
GW110173 Test bore	1.3 km south	48	5.5
GW016125 Irrigation bore	1.25 km north	5.4	Not available
GW100435 Domestic bore	1.43 km north	24	7.0
GW112528, 112529, 112530 Monitoring bores	1.5 km north west	5	3.5 – 4.2

Groundwater measurements undertaken during a previous investigation by DP next to the site indicated varying groundwater levels. The nearest monitoring well to the site encountered groundwater at a depth of 5.9 m (RL 109.1 m AHD) below ground level.

Based on the location of the site on a ridgeline, intrusive investigation would be required to determine the groundwater flow direction and likely receiving surface water body. In addition, the former quarry / brickworks located approximately 400 m south-east of the site (refer to Section 6.4) may (or may have previously) impacted groundwater flow direction under the site.

Given the local geology (i.e., Bringelly Shale), the groundwater in the fractured rock aquifer beneath the site is anticipated to be highly saline. Accordingly, there would be no significant potential beneficial uses of the aquifer and yields are also anticipated to be very low.

5.5 Salinity

Regional mapping of salinity potential in Western Sydney was undertaken in 2002 by the former Department of Infrastructure, Planning and Natural Resources, now the NSW Office of Environment and Heritage (OEH). The map indicates that the site is located within an area of moderate salinity potential. Moderate and high salinity soils typically affect plant growth and can damage pavements and buildings.

6. Site History

6.1 Heritage Assessment

GML (2020)[2], comprising a heritage assessment report conducted for the masterplan, has been reviewed. The following potentially relevant information was obtained from this report:

- Land use at the site in 1800s may have included cattle grazing and orchards;
- A homestead was built circa 1898 and later became known as 'Camberwarra'. The homestead and associated estate included an orchard, fowl houses and stables. The site remained under this land use until circa 1955;
- Circa 1955 a larger property including the site was purchased by Amalgamated Television Services Pty Ltd, and a television studio was constructed to the south of the site;
- The homestead and outbuildings on the site were demolished between 1958 and 1961;
- In 1963 the site was purchased by the Crown for Carlingford East Public School. The school was not built, and the site remained vacant until 1974;
- In 1974/1975 the Carlingford Annex of the Technical College School of Horticulture, Ryde was constructed at the site. The Ryde School of Horticulture was established to provide practical training for horticulturalists, nurserymen and greenkeepers. Additions were made during the 1980s;
- Delivery of the horticulture courses at the site ceased at the end of 2010, although the Northern Sydney Institute continued to use the grounds for practical horticulture classes, field trips and laboratory work; and
- In 2019 the site was purchased by the Department of Education.

6.2 Historical Aerial Photography

Extracts of historical aerial photographs were obtained from land insight and resources for the years 1943, 1956, 1961, 1965, 1970, 1975, 1982, 1986, 1991, 1994, 2002, 2004, 2007, 2010, 2014 and 2020. The extracts extend to approximately 500 m or more around the site. Selected aerial photographs are included in Appendix B. A summary of key features observed for the site and surrounding land is presented in Table 2.

[2] GML Heritage *Epping South Public School Site (86 Chelmsford Avenue, Epping) Heritage Assessment* (Job 20-0115A, November 2020) (GML, 2020)

Table 2: Summary of Historical Aerial Photographs

Year	Site	Surrounding Land Use
1943	The site appears to have been partially developed. A large central building/ building complex was present in the eastern portion of the site, with several smaller buildings also present generally in the eastern portion of the site (consistent with Camberwarra homestead). An access road from Mobbs Lane and several internal roads were present. The western portion of the site appears to have been open space with scattered vegetation. The site appears to have been part of a larger property.	The surrounding land appears to have been partially developed with residential dwellings (mostly to the north and east) and partially undeveloped with some market garden lots, some agriculture / cropping appears to have been present immediately to the east of the site, with possible farmland and open space (mostly to the south and west). An industrial site with an irregular shape, probably a quarry, was present approximately 400 m south east of the site (considered to be consistent with the brickworks noted in Section 6.4). Two creek lines were present near the site, both with south west-north east alignment and flowing towards Terrys Creek. The upper reaches of one of the creeks extended at least to the western boundary of the site, and may have extended onto the site. The other creek was located approximately 70 m south of the site.
1956	Two smaller structure in the middle of the site appear to have been removed since the 1943 photograph, with an additional building/ shed constructed in the south western. Agriculture / cropping was present in the western portion of the site (part of a larger area of agriculture extending the west and south).	Agriculture / cropping was present to the west and south of the site. The previous agricultural land use directly to the east of the site had been developed as residential houses. Land to the north and further to the east appears to have undergone continued development with more residential buildings present. The land to the south of the site appears to have become increasingly vegetated since the 1943 photograph. The industrial site and adjoining quarry further to the south east of the site appears to have changed in shape / extended.
1961	The general layout appears to have been similar to the 1956 photograph. The structure in the south west of the site in the 1956 photograph was no longer present, and cropping does not appear to have been present in the western portion of the site. An area along the southern boundary of the eastern portion of the site appears to have been cleared and the ground disturbed as part of the	A large building (likely commercial or industrial) and carpark were built adjacent to the southern boundary of the site. The land to the west of the site appears to have become increasingly vegetated since the 1956 photograph. The quarry / brickworks to south east of the site appears to have further changed in shape/ extended.

Year	Site	Surrounding Land Use
	development of land immediately to the south of the site.	
1965	All the buildings had been removed since the 1961 photograph.	The surrounding land use appears to be generally similar to the 1961 photograph. The brickworks had changed shape / extended.
1970	The general site layout appears to have been similar to the 1965 photograph.	The surrounding land use appears to be generally similar to the 1961 photograph. The commercial or industrial building adjacent to the southern boundary of the site had been extended. The number of buildings on the brickworks appears to have decreased since the 1965 photograph.
1975	The photograph quality is poor, however, buildings / structures appear to have been present in the south east of the site.	The surrounding land use appears to be generally similar to the 1961 photograph.
1982	The quality of the photograph is poor, however, several buildings / structures appear to have been present on the site.	The surrounding land use appears to be generally similar to the 1961 photograph. New commercial / industrial style buildings had been constructed to the south of the site, associated with the pre-existing commercial/ industrial buildings in this area. The land west of the site appears to have undergone some landscaping and vegetation removal. The quality of the photograph is poor, however shapes consistent with the car park, tennis court, new road and possible satellite dishes observable in the 1986 photograph appear to have been present at the time of this photograph. The brickworks appears to have further increased in size and changed in shape.

Year	Site	Surrounding Land Use
1986	Structures consistent with four buildings and four green houses / sheds were present in the eastern portion of the site. A dark area to the west of the apparent green houses may have been garden beds. Some orange patches to the west of this appear to be consistent with small stockpiles of soil, One structure consistent with a green house was present in the west of the site. A paved parking lot and road had been built in the north and east portion of the site. Part of the west of the site appears to have been cleared and formed into garden beds.	The surrounding land use appears to be generally similar to the 1961 photograph with the exception of south of the site, where the commercial/ industrial style development had been extended to include a tennis court, additional car parking, and satellites dishes, and other ancillary structures. An image of a '7' can be seen on the ground.
1991	The general site layout appears to have been similar to the 1986 photograph, although the photograph quality is poor.	The surrounding land use appears to be generally similar to the 1986 photograph. Additional residential houses were constructed to the west of the site. The brickworks appears to have again increased in size and changed in shape.
1994	The dark area comprising possible garden beds in the 1986 photograph appears to have been extended. Plants were present in the garden beds in the west of the site.	The surrounding land use appears to be generally similar to the 1991 photograph.
2002	The general site layout appears to have been similar to the 1994 photograph	The surrounding land use appears to be generally similar to the 1991 photograph.
2004	The general site layout appears to have been similar to the 1994 photograph. Garden beds appear to have been present in the dark area comprising possible garden beds noted in the 1994 photograph.	The surrounding land use appears to be generally similar to the 1991 photograph. No signs of continuing operations were present at the brickworks, and some backfilling of the pit appears to have occurred.
2007	The general site layout appears to have been similar to the 1994 photograph.	The surrounding land use appears to be generally similar to the 1991 photograph. Backfilling of the brickworks appears to have continued, with part of the south of the former brickworks appearing to have been filled and streets constructed for future development.

Year	Site	Surrounding Land Use
2010	The general site layout appears to have been similar to the 1994 photograph.	The commercial or industrial building adjacent to the south boundary of the site had been demolished and redevelopment of the land appears to have been underway. Backfilling and re-development of the former brickworks appears to have continued, with buildings consistent with residential houses / town houses present in the south west of the former brickworks.
2014	The general site layout appears to have been similar to the 1994 photograph, however the western area of the site appears to have been overgrown, and the garden beds in the central area of the site did not have signs of cultivation.	The land adjacent to the southern boundary of the site underwent significant development since the 2010 photograph with multi-storey apartment buildings consistent with the site's current layout were built. Open space/ vegetated land that was seen south west of the site prior to the 2014 photograph were paved and covered by residential/ commercial buildings. The former brickworks was predominantly covered with residential houses town houses, although a central area still contained infrastructure associated with the brickworks operations.
2020	The garden beds and small structure on the west side of the site appear to have been removed.	Several additional curved-shaped multi-storey residential / commercial developments were constructed south west of the site.

6.3 Public Registers, Records and SafeWork NSW Search

EPA - Records of contaminated sites under Section 58 of the *Contaminated Land Management Act* 1997 (CLM Act) Notices	The results of a search of the public database indicated that the site was not listed as a contaminated site notified to the EPA. Additionally, there were no sites located within 500 m of the site notified as contaminated to the EPA [accessed 30/04/20].
EPA - Environmental protection licenses under Section 308 of the *Protection of the Environment Operations Act* 1997 (POEO Act) Licences	The results of a search of the public register indicated that there were no licensed activities recorded for the site. The search indicated there was one site located within 500 m of the site (Mobbs Lane) that has surrendered a licence pertaining to helicopter-related activity for the Channel 7 news network [accessed 30/04/20].
EPA - PFAS Investigation Program Licences	The results of a search of the EPA PFAS Investigation Program found no sites under investigation within 500 m of the site [accessed 30/04/20].
SafeWork NSW	A search of the SafeWork NSW database for the storage of hazardous chemicals was conducted for the address at 86 Chelmsford Avenue, Epping on 7 May 2020. The search did not locate any records pertaining the storage of hazardous chemicals on the site. A copy of the SafeWork NSW search results is included in Appendix C. It is noted that dangerous good storage signs were observed during the site walkover (see section 7).
Council Records	Council records were requested from the City of Parramatta through an informal application under the GIPA act. The search did not locate any property information pertaining to environmental, contamination or hazardous building material records at the site. A copy of the email from City of Parramatta is included in Appendix C.

6.4 Other Sources

An internet search found that the industrial site/ quarry located 400 m south east of the site (described in section 6.2) was a former brickworks site used to quarry and manufacture bricks and other terracotta elements between 1912 and 2001[3].

An internet search found that the TAFE NSW facility formerly operating at the site was to be relocated in 2011, however, that the site would continue to be used for horticulture delivery purposes[4].

[3] City of Parramatta Council, 19 Dec 2016, *Eastwood Brickyards – Eastwood, Parramatta Heritage Centre*, accessed 30/04/20, <http://arc.parracity.nsw.gov.au/blog/2016/12/19/eastwood-brickyards-eastwood/>.
[4] Parliament of New South Wales, 23 December 2010, *12931 – Epping TAFE on Chelmsford Avenue,* accessed 30/04/20, <https://www.parliament.nsw.gov.au/la/papers/Pages/qanda-tracking-details.aspx?pk=183522>.

The following information about the site was provided by Mr Adrian Spankie, a Hazardous Materials Specialist for TAFE Infrastructure NSW who has knowledge of the site's use as a TAFE (refer to Appendix C for full email text of below extracts):

- "*The Epping site was used by TAFE mainly for horticulture so there is the possibility of some minor spills and surface contamination although we were not aware of any major spills*"; and
- "*Ryde Horticulture continued to maintain the grounds at Epping Annex after classes ceased over 10 years ago. The only chemicals we kept on site are listed below. They were transported back to Ryde Campus before the property was divested. Chemical use was at a minimum - twice/yr weed spraying hard surfaces, gravels and edges:*
  - *20 L Glyphosphate; and*
  - *20 L Spray Seed herbicide*".

Review of the Safety Data Sheet for Spray Seed 250 Herbicide (V11, March 2017) identified the substance to contain paraquat dichloride and diquat dibromide.

Th site walkover (refer to Section 7) identified signage indicating the previous storage of oxidizing agent adjacent to one of the greenhouses. An internet search of use of oxidising agents in greenhouses[5] named the following common agents:

Oxidizer
Ozone (O_3)
Hydrogen peroxide (H_2O_2)
Hypochlorous acid (HOCl)
Hypobromous acid (HOBr)
Chlorine dioxide (ClO_2)

6.5 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 the photographs 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.

[5] https://www.greenhousemag.com/article/gm1111-plants-water-oxidation/

6.6 Summary of Site History

The following site history is inferred based on the information presented in the above sections.

The site appears to have been occupied by a large homestead with associated rural land uses (including orchards, fowl house and stables, and possibly cropping) between circa 1900 until circa 1961. Prior to this time cattle grazing and orchards were recorded in the region.

Buildings consistent with the current site layout were built circa 1975 and were used for teaching horticulture courses until 2011, initially as part of the Ryde School of Horticulture and later as part of a TAFE. Some continued use by the TAFE for teaching horticulture is understood to have continued after this time. Chemical storage and use by the TAFE is understood to have included, as a minimum, glyphosphate, Spray Seed herbicide (paraquat dichloride and diquat dibromide) and an unknown oxidising agent likely used in the greenhouses.

The two main potential off-site sources of contamination are the former commercial / industrial land uses immediately to the south of the site and the brickworks approximately 400 m south east of the site. Both of these areas have been redeveloped for residential apartment land use since 2010, based on the timing of the redevelopment any former contamination at the sites is likely to have been addressed/remediated for the redevelopment. This is considered to reduce the risk that unacceptable impacts from these uses are present at the site.

7. Site Walkover

A site walkover was undertaken by an environmental engineer on 23 April 2020. The general site topography was consistent with that described in Section 5.1. The general site layout appears to have remained unchanged from the 1970 aerial photograph. The following key site features pertinent to the PSI were observed (refer to photographs in Appendix E):

- Several single-storey brick buildings and masonry buildings, including with large roller doors suitable for oversize access (photographs 1 and 2);
- Several greenhouses and sheds (Photographs 5 to 32);
- Paved parking lots, roads, and footpaths between buildings (Photographs 3 and 4);
- Various product storage bins, with aggregate observed to be present in one of the bins (Photograph 5);
- One Besser Block shed and two metals sheds apparently used for storage of dangerous goods, chemicals and fertilisers were present in the south east of the site, near the southern boundary (Photographs 6 to 20). The sheds were on a built up areas with a retaining wall to their south (Photograph 12);
- The Besser Block shed had external signage for ‘Flammable Materials’ and ‘Flammable Liquid’ and cabinets consistent with previous fire extinguisher storage (Photograph 7);
- The Besser Block shed had wooden floorboards underlain by a concrete slab. An access point for the underfloor areas was observed, and the concrete slab had been removed at this access point. Dark staining was observed on the floor boards, and battery charging cables were recorded to be present (Photographs 8 to 10);

- The eastern metal ‘chemical store’ shed had external signage for ‘Flammable Materials’, ‘Flammable Liquid’ and instructions for mixing and spraying of ‘hazardous chemicals’ (Photographs 13 and 14);
- A small bunded area was observed to the east of the eastern metal ‘chemical store’ shed, adjacent to the signage for the mixing and using of spray ‘hazardous chemicals’ (Photograph 1);
- The eastern metal ‘chemical store’ shed had a concrete floor, with a plastic conduit placed vertically into the floor (Photograph 15);
- To the west of the western metal ‘chemical store’ shed a pit was observed, with a plastic container filled with a dark, oily liquid. A plastic conduit, consistent in size with that observed in the floor of the eastern metal shed, was observed to be entering the pit (Photographs 16 and 17);
- The western metal ‘chemical store’ shed was observed to have a concrete floor and wooden pallet-style storage areas. Bags of fertilisers (lawn food, organic life pellets, Banana Special, Boost Pellets and Blood and Bone) were observed (Photographs 18 and 19);
- Labels and signage recorded the former storage and use of ‘Roundup’ / ‘Glyphosate Green 360’ and ‘Spray Seed’ (Photograph 20);
- A concrete water tank and adjacent metal shed were present in the area of greenhouses. Signage indicated the shed had previously housed a pump (Photographs 21 and 22);
- One shed labelled as Oxidizing Agent was observed adjacent to one of the green houses (Photographs 23 and 24);
- A circular hole in the concrete slab was observed adjacent to the Oxidizing Agent Store (Photographs 25 and 26);
- Bag taped up labelled as Asbestos Waste on the ground surface near the Oxidizing Agent Store (Photograph 27);
- Garden beds and metal piping was observed in the greenhouses, including with signage ‘Danger Hot Pipes (Photographs 28 to 30);
- Several garden beds / covered areas. Dilapidated green houses were observed (Photographs 31 and 32);
- Overgrown vegetation (photographs 33 and 34) in the west of the site; and
- An on-site pond / small dam was present in the west of the site.

Neighbouring properties to the north and east were observed to contain low-rise residential dwellings. Neighbouring properties to the south and west were occupied by residential apartment buildings (Epping Park).

8. Potential Areas of Environmental Concern

From the site history review and the site inspection, it is considered that potential for contamination exists at the site. Potential areas of environmental concern (PAEC) have been identified and are summarised in Table 3.

The identified PAEC are not areas of confirmed contamination, rather they are areas where further assessment / investigation is considered to be required to determine the presence / absence of contamination.

Table 3: Summary of Identified Potential Areas of Environmental Concern

PAEC#	Description	Identified from	Comment
1	Former agricultural land use, possibly grazing and orchards	GML (2020) & historical aerial photographs	Potential for residual contamination generally considered to be low
2	Demolition / deterioration of former buildings	GML (2020) & historical aerial photographs	Possible hazardous building materials (such as asbestos, lead, SMF) may have contaminated soils. Impacts may have been spread over the site due to earthworks / levelling following demolition of structures.
3	Potential disturbed / levelled / filled ground	Historical aerial photographs	Potential for fill of unknown source / quality and spreading of localised areas of contamination over the site.
4	Former adjacent television studio	Historical aerial photographs, POEO Act search and internet search	The land directly south of the site was previously used as a television studio, with the site part of the television studio property. The television studio was down-gradient/ cross-gradient of the site, and contamination (if any) is likely to have been remediated during subsequent redevelopment for residential land use.
5	Former down-gradient/ cross-gradient brickworks	Historical aerial photographs, POEO Act search and internet search	A former brickworks / quarry site operated within 500 m of the site. The brickworks was down-gradient / cross-gradient of the site, and associated contamination is likely to have been remediated during subsequent redevelopment for residential land use.
6	Horticultural education land use	Various	Likely to have included the storage, mixing and use of pesticides and herbicides.
7	Dangerous Goods / Chemical Storage	Site walkover	Signs on buildings observed during the site walkover indicated the former storage of 'Oxidising Agent' and 'Flammable Material'. Indicators of chemical storage and use.

PAEC#	Description	Identified from	Comment
8	Deterioration of existing buildings. Bagged asbestos observed on ground	Site walkover & DP (2020)	Possible hazardous building materials (such as asbestos, lead, SMF) may have contaminated soils. Impacts most likely adjacent to existing structures.

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 is designed to provide the framework for identifying how a site became contaminated and how potential receptors may be exposed to contamination either in the present or the future *i.e.,* it enables an assessment of the potential source - pathway - receptor linkages.

Potential Sources

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

- S1: Contaminated soil - from PAEC 1 to 7 listed in Section 8;

  Contaminants of Potential Concern (COPC) include metals, total petroleum hydrocarbons (TPH), benzene, toluene, ethylbenzene, xylene (BTEX), polycyclic aromatic hydrocarbons (PAH), polychlorinated biphenyls (PCB), organochlorine pesticides (OCP), organophosphate pesticides (OPP), herbicides, fungicides, phenols, synthetic mineral fibres (SMF), asbestos and as yet unidentified Oxidising Agent.

- S2: Deterioration of existing buildings (PAEC 8 listed in Section 8);

  COPC include asbestos, SMF, lead (in paint) and PCB.

Potential Receptors

The following potential human receptors have been identified:

- R1: Future site users (public school);
- R2: Construction and maintenance workers;
- R3: Adjacent site users (residential, commercial, recreational open space);
- R4: Terrestrial ecology;
- R5: Surface water (Terrys Creek, fresh water body);
- R6: Groundwater; and
- R7: In-ground structures.

Potential Pathways

The following potential pathways have been identified:

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

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 sources and receptors are provided in Table 4.

Table 4: Summary of Potentially Complete Exposure Pathways

Potential Source	Transport Pathway	Receptor
(S1) Contaminated soil (from PAEC 1 to 7 listed in Section 8) (S2) Deterioration of existing buildings (PAEC 8, listed in Section 8) COPC: metals, PAH, TPH, PCB, OCP, OPP, herbicides, fungicides, phenols, SMF, asbestos and as yet unidentified Oxidising Agent	(P1) Direct contact (P2) Ingestion and dermal contact	(R1) Future site users (R2) Construction and maintenance workers
	(P3) Inhalation of dust and/ or vapours	(R1) Future site users (R2) Construction and maintenance workers (R3) Adjacent site users
	(P4) Surface water run off (P6) Lateral migration of groundwater	(R5) Surface water
	(P5) Leaching and vertical migration into groundwater	(R6) Groundwater
	(P1) Direct contact	(R4) Terrestrial ecology
	(P1) Direct contact	(R7) In-ground structures

10. Field Work Methods

10.1 Data Quality Objectives and Project Quality Procedures

This PSI has been devised in general accordance with the seven-step Data Quality Objective (DQO) process which is provided in Appendix B, Schedule B2 of NEPC (2013). The DQO process is outlined as follows:

- State the problem;
- Identify the decision;

- Identify inputs into the decision;
- Define the boundary of the assessment;
- Develop a decision rule;
- Specify acceptable limits on decision errors; and
- Optimise the design for obtaining data.

Referenced sections for the respective DQOs listed above are provided in Appendix E.

10.2 Data Quality Indicators

The performance of the assessment in achieving the DQO was assessed through the application of data quality indicators (DQI) as defined by:

Precision:	A quantitative measure of the variability (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 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.

Further comments on the DQIs are presented in Appendix E.

10.3 Sampling Locations and Rationale

Field work was undertaken between the 4th and 7th of May 2020. The drill-rig drilled borehole locations targeted / the proposed building envelopes (taking into account site access) to provide data for both the geotechnical and contamination investigation. Test pit and hand auger locations were spread out broadly over the site to provide a reasonable (albeit preliminary) coverage of the soil profile and site contamination status in accessible areas. Test pits were the preferred method for contamination sampling as they expose more fill for inspection for asbestos, a COPC.

Based on a site area of approximately 2.1 ha, NSW EPA *Sampling Design Guidelines* 1995 recommends 31 sampling locations for a site with no known point sources for site characterisation purposes. As such, 16 sampling locations (with soils tested from 15 locations) were considered appropriate to provide a preliminary contamination assessment. Test pit and borehole locations are shown on Drawing 1, Appendix B.

10.4 Soil Sampling Procedure

Environmental sampling was performed with reference to standard operating procedures outlined in the DP *Field Procedures Manual*. Sampling data was recorded on borehole and test pit logs (Appendix F) and samples selected for laboratory analysis were recorded on DP chain-of-custody (COC) sheets (Appendix G). The general soil sampling procedure comprised:

- Collection of soil samples directly from the test pit bucket, auger or hand tools;
- Use of disposable sampling equipment including disposal nitrile gloves;
- Transfer of samples into laboratory-prepared glass jars and capping immediately with Teflon lined lids;
- Labelling of sampling containers with individual and unique identification, including project number, sample location and sample depth;
- Field screening of replicate soil samples collected in sealed plastic bags for VOC using a calibrated PID; and
- Placement of sample containers and bags into a cooled, insulated and sealed container for transport to the laboratory.

10.5 Analytical Rationale

The analytical scheme for soil samples was designed to obtain an indication of the potential presence and possible distribution of the COPC identified by the CSM, being metals, TRH, BTEX, PAH, OCP, OPP, PCB, phenols and asbestos. The other potential COPC (i.e., herbicides, fungicides, oxidation compound(s)) were not tested as further information on the chemical used on site was still being sought at the time of reporting.

Samples were selected based on location, field observations and field screening results, and included samples of fill and natural soil.

Envirolab Services Pty Ltd (Envirolab), accredited by NATA for the analysis undertaken, was employed to conduct the sample analysis. The laboratory is required to carry out in-house QC procedures. These are normally incorporated into every analytical run and include reagent blanks, spike recovery, surrogate recovery and duplicate samples. Eurofins Laboratory Services, accredited by NATA for the analysis undertaken, was employed to conduct inter-laboratory analysis. All laboratory results are included in the laboratory certificates in Appendix G.

10.6 Field Quality Assurance and Quality Control

The field QC procedures for sampling were undertaken in general accordance with Douglas Partners' *Field Procedures Manual* outlined in Section 10.4. Field replicates were recovered and analysed for a limited suite of contaminants by means of intra- and inter- laboratory analysis.

11. Site Assessment Criteria

The Site Assessment Criteria (SAC) applied in the current investigation were informed by the CSM which identified potential receptors of contamination (refer to Section 9). Analytical results were assessed (as a Tier 1 assessment) against the SAC comprising the investigation and screening levels of Schedule B1, National Environment Protection Council, *National Environment Protection Measure* 1999, as amended (NEPC, 2013). The NEPC guidelines are endorsed by the EPA under the *CLM Act* 1997.

The investigation levels, screening levels and management limits include consideration of, where relevant, the soil type and the depth of contamination. The investigation and screening levels are not intended to be used as clean up levels. Rather, they establish concentrations above which further appropriate investigation (e.g., Tier 2 assessment) should be undertaken. They are intentionally conservative and are based on a reasonable worst-case scenario.

The following generic SAC were adopted based on the proposed use as a public school:

- **HIL-A** - Residential with garden / accessible soil (includes primary schools);
- **HSL-A & B (vapour intrusion)** - Low - high density residential;
- **EIL and ESL** - Urban residential and public open space; and
- **Management Limits** - Residential, parkland and public open space.

11.1 Soils

11.1.1 Health Investigation and Screening Levels

The Health Investigation Levels (HIL) and Health Screening Levels (HSL) are scientifically-based, generic assessment criteria designed to be used in the first stage (Tier 1) of an assessment of potential human health risk from chronic exposure to contaminants.

HIL are applicable to assessing health risk arising via all relevant pathways of exposure for a range of metals and organic substances. The HIL are generic to all soil types and apply generally to a depth of 3 m below the surface.

HSL are applicable to selected petroleum compounds and fractions to assess the risk to human health via the inhalation pathway. HSL have been developed for different land uses, soil types and depths to contamination.

The adopted soil HIL and HSL for the potential contaminants of concern are presented, along with the laboratory results, in Tables G1 and G2, Appendix G. The HSL adopted are predicated on the inputs summarised in Table 5.

Table 5: Inputs to the Derivation of HSL

Variable	Input	Rationale
Potential exposure pathway	Soil vapour intrusion (inhalation)*	As provided in NEPC (2013)
Soil Type	Clay, silt, or sand (sample dependant)	Based on the soil profile encountered at the site

11.1.2 Ecological Investigation Levels

Ecological Investigation Levels (EIL) have been derived for selected metals and organic substances and are applicable for assessing risk to terrestrial ecosystems (NEPC, 2013). EIL depend on specific soil physiochemical properties and land use scenarios and generally apply to the top 2 m of soil, which corresponds to the root zone and habitation zone of many species. The EIL is determined for a contaminant based on the sum of the ambient background concentration (ABC) and an added contaminant limit (ACL). The ABC of a contaminant is the soil concentration in a specific locality that is the sum of naturally occurring background levels and the contaminants levels that have been introduced from diffuse or non-point sources (e.g., motor vehicle emissions). The ACL is the added concentration (above the ABC) of a contaminant above which further appropriate investigation and evaluation of the impact on ecological values is required.

The EIL is calculated using the following formula:

EIL = ABC + ACL

The ABC is determined through direct measurement at an appropriate reference site (preferred) or through the use of methods defined by *Trace element concentrations in soils from rural and urban areas of Australia*, Contaminated Sites monograph no. 4, South Australian Health Commission, Adelaide, Australia 1995 (Olszowy et al., 1995) or *Geochemical indices allow estimation of heavy metal background concentrations in soils*, Global Biogeochemical Cycles, vol. 18, GB1014, (Hamon, 2004). ACL is based on the soil characteristics of pH, CEC and clay content.

EIL (and ACLs where appropriate) have been derived in NEPC (2013) for only a short list of contaminants comprising arsenic, copper, chromium (III), DDT, naphthalene, nickel, lead and zinc. An *Interactive (Excel) Calculation Spreadsheet* may be used for calculating site-specific EIL for these contaminants, and has been provided in the ASC NEPM Toolbox available on the SCEW (Standing Council on Environment and Water) website (http://www.scew.gov.au/node/941).

The adopted EIL, derived using inhouse software based on the NEPC (2013) toolbox *Interactive (Excel) Calculation Spreadsheet,* are shown in the following Table 7, below (as well as in Tables G1 and G2, Appendix G) with the site specific data and assumptions used to determine the EIL provided in Table 6.

Table 6: Inputs to the Derivation of EIL

Variable	Input	Rationale
Level of Protection	80% (residential)	Based on NEPC (2013) recommendations for urban residential and public open space
Contaminant "age"	"aged" (>2 years)	Based on likely source of contamination being historic fill and land use.
Traffic volume	Low	Based on the site location away from main roads
pH	6.6	Based on the average of field results. Three samples were tested, and values ranged between 6.1 and 6.9.
CEC	11.3 cmol/kg	Based on the average of field results. Three samples were tested, and values ranged between 9 and 14. Given the low concentrations of contaminants and preliminary nature of the current investigation, an average was considered appropriate for the current investigation.
Clay content	1% to 50% (sample dependant)	Estimate based on the soil profile encountered at the site. This is considered to be a conservative estimate.
Organic Carbon content	1%	This is considered to be a conservative estimate given the lenses of organic matter observed in the boreholes.

Table 7: Ecological Investigation Levels (EIL) in mg/kg

Analyte		EIL Residential Open Space	Comments
Metals	Arsenic	100	Generic value
	Chromium III	190-690 [a]	Calculated value
	Copper	210 [b]	Calculated value
	Lead	1,100	Generic value
	Nickel	190 [c]	Calculated value
	Zinc	520 [b]	Calculated value
OCP	DDT	180	Generic value
PAH	Naphthalene	170	Generic value

Notes to Table 6:

[a] – EIL value based on clay content

[b] – EIL value based on pH and CEC

[c] – EIL value based on CEC

Ecological Screening Levels (ESL) are used to assess the risk of selected petroleum hydrocarbon compounds, BTEX and benzo(a)pyrene to terrestrial ecosystems. ESL apply to the top 2 m of the soil profile as for EIL.

ESL have been derived in NEPC (2013) for petroleum fractions F1 to F4 as well as BTEX and Benzo(a)pyrene. Site specific data and assumptions as summarised in Table 8 have been used to determine the ESL. The adopted ESL, from Table 1B (6), Schedule B1 of NEPC (2013) are shown in Table G1, Appendix G.

Table 8: Inputs to the Derivation of ESL

Variable	Input	Rationale
Depth of ESL application	Top 2 m of the soil profile	The top 2 m depth below ground level corresponds to the root zone and habitation zone of many species.
Land use	Urban residential and public open space	Based on most conservative of proposed land uses
Soil Texture	Coarse to fine (sample dependant)	Based on field observations

11.1.3 Management Limits for Petroleum Hydrocarbons

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.

Management Limits to avoid or minimise these potential effects have been adopted in NEPC (2013) as interim Tier 1 guidance. Management Limits have been derived in NEPC (2013) for the same four petroleum fractions as the HSL (F1 to F4). The adopted Management Limits, from Table 1B (7), Schedule B1 of NEPC (2013) are shown on Table 9. The following site specific data and assumptions have been used to determine the Management Limits:

- The Management Limits will apply to any depth within the soil profile;
- The Management Limits for residential, parkland and public open space apply; and
- The Management Limits for fine textured soils have been adopted based on the primarily silty clay and clay fill soil type encountered.

Table 9: Management Limits

Analyte		Management Limit (mg/kg)
TRH	$C_6 - C_{10}$ [F1] #	800
	$>C_{10}-C_{16}$ [F2] #	1 000
	$>C_{16}-C_{34}$ [F3]	3 500
	$>C_{34}-C_{40}$ [F4]	10 000

Note: #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.

11.2 Asbestos in Soil

A detailed assessment of asbestos in soil was not considered to be warranted at this stage. 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.

11.3 Waste Classification Criteria

To assess the waste classification of the material for off-site disposal purposes a preliminary waste classification assessment was undertaken in accordance with the six step process outlined in the NSW EPA *Waste Classification Guidelines 2014*. The soil results were assessed against the criteria outlined in Tables 1 and 2 of the guidelines.

With respect to the natural materials at the site, these were also assessed for their potential classification as Virgin Excavated Natural Material (VENM). In this regard the NSW EPA defines VENM as:

- *"natural material (such as clay, gravel, sand, soil or rock fines):*
- *that has been excavated or quarried from areas that are not contaminated with manufactured chemicals, or process residues, as a result of industrial, commercial, mining or agricultural activities; and*
- *that does not contain any sulfidic ores or soils or any other waste; and*
- *includes excavated natural material that meets such criteria for virgin excavated natural material as may be approved from time to time by a notice published in the NSW Government Gazette."*

For the purpose of providing screening criteria to compare laboratory results against for assessing VENM, DP have compared the results for the natural soils to the published background concentrations for metals and the laboratory limit of reporting for other contaminants.

12. Results

12.1 Field Work Results

Detailed descriptions of the conditions encountered in each of the boreholes are provided in the test pit and borehole logs in Appendix F.

Fill soils were encountered to depths of between 0.53 m and 1.65 m. The general stratum sequence encountered with increasing depth is as follows:

- ASPHALTIC CONCRETE and ROADBASE: to depths of between 0.08 m and 0.23 m (in road areas only); underlain by
- FILL: Fill was encountered within all boreholes to depths of between 0.53 m to 1.65 m. It included clayey gravel, clayey silt, silty clay and clayey sand with varying proportions of sand, rootlets, roots and ironstone, shale, igneous and sandstone gravel. Inclusions of ash and / or charcoal were observed in boreholes BH1 to BH3 and BH16. Inclusions of brick fragments, terracotta, fabric,

plastic and / or metal were also observed in the fill at test pits TP08, TP10, TP12 and TP14; underlain by

- RESIDUAL CLAY: medium to high plasticity, pale grey, pale brown, brown and red, with silt, sand and fine to coarse ironstone, sandstone and shale gravel, to depths of between 0.65 m and 1.65 m. TP11, TP12, TP13, TP14, BH5, BH6 and BH9 were terminated in residual clay. Residual clay was not recorded in BH16; underlain by
- SANDSTONE and / or SILTSTONE BEDROCK, encountered in BH1 to BH4, TP7, TP8, TP10, BH15 and BH16.

A slight hydrocarbon odour was recorded in fill in TP8 between 0.2 and 0.8 m bgl, and a sample from this material was analysed for TPH and BTEX. All PID readings were less than 2 ppm suggesting that the potential for volatile organic compounds at the test pit / borehole locations was low.

Potential asbestos containing materials (ACM) were not recorded in any boreholes. However, fragments of brick, terracotta, plastic and metal, which can be indicative of the presence of ACM, were recorded in TP08, TP10, TP12 and TP14.

No free groundwater was observed during auger drilling or test pit excavation. The use of drilling fluid at BH1, BH2, BH3 and BH4 prevented groundwater observations during coring. It is noted that all boreholes except for BH2 were immediately backfilled following drilling which precluded longer term monitoring of any groundwater levels that might be present. A groundwater monitoring well was installed in BH2 to a depth of 5.8 m bgl. Groundwater was measured in the monitoring well installed at BH2 at a depth of 5.2 m bgl (RL 112.4) on 8 May 2020. The water observed in the monitoring well is considered to be perched seepage rather than the regional groundwater table. The groundwater table is likely to be well below the bedrock surface. Seepage would be expected to occur near the rock surface and through joints or partings within the bedrock. Groundwater levels are affected by factors including weather conditions and vary with time.

12.2 Laboratory Results

Laboratory certificates and summary tables of laboratory results are provided in Appendix G.

13. Discussion of Laboratory Results

13.1 Site Suitability

Tables G1 and G2 in Appendix G present the laboratory soil results in comparison to the SAC.

Reported concentrations of BTEX, phenol, OCP, OPP, PCB and asbestos were below the laboratory practical quantitation limit (PQL) and the SAC. Reported concentrations of some metals, TRH and PAH were above the PQL but below the SAC.

TRH was recorded above the PQL in two samples, BH9/0.0-0.1 (790 mg/kg in the TRH>C16 to C40 range) and TP10/0.0-0.1 (110 mg/kg in the TRH >C16 to C34 range, only marginally above the PQL of 100 mg/kg). The sample with recorded slight petroleum odours (TP8/0.4-0.5) did not record TRH above the PQL. TRH can include a variety of organic compounds such as natural organic matter, petroleum and other hydrocarbon-based contaminants. A chromatogram was ordered for sample BH9/0.0-0.1 and is provided in Appendix G. It is considered that the chromatogram trace is potentially consistent with a potential petroleum compound or natural organic matter.

13.2 Preliminary Waste Classification

In order to assess the potential waste classification of soils which might be disposed of off-site as part of the proposed development, a preliminary waste classification of soils was undertaken.

The NSW EPA (2014) *Waste Classification Guidelines* contains a six step procedure for determining the type of waste and the waste classification. Part of the procedure, for materials not classified as special waste or pre-classified waste, is a comparison of analytical data initially against contaminant threshold (CT) values specific to a waste category. Alternatively, the data can be assessed against specific contaminant concentration (SCC) thresholds when used in conjunction with TCLP thresholds.

The CT values relevant to this preliminary waste classification are shown in the Table G3 (Appendix G).

The following Table 10 presents the results of the six-step procedure outlined in EPA (2014) for determining the type of waste and the waste classification. This process applies to the fill at the site.

Table 10: Six Step Classification

Step	Comments	Rationale
1. Is it special waste?	No	No asbestos-containing materials (ACM), coal tar, clinical or related waste, or waste tyres were observed in the boreholes. Asbestos was not detected by the analytical laboratory. It is noted that potential indicators of asbestos (ie building debris) was observed in the fill.
2. Is it liquid waste?	No	Materials composed of a soil matrix.
3. Is the waste “pre-classified”?	No	Fill and natural material did not fall into one of the pre-classified categories.
4. Does the Waste have hazardous waste characteristics	No	Waste not observed to/ or considered at risk to contain explosives, gases, flammable solids, oxidising agents, organic peroxides, toxic substances or corrosive substances, substances liable to spontaneous combustion.
5. Chemical Assessment	Conducted	Refer to Table G3 in Appendix G.
6. Is the Waste Putrescible?	No	All observed components of fill composed of materials pre-classified as non-putrescible (i.e., soil).

As shown in Table G3 (Appendix G), all contaminant concentrations for the analysed fill samples were within the CT1 thresholds for General Solid Waste with the exception of lead in TP7/0.4-0.5 m (and its replicate) and TP8/0.4-0.5 m. Results from these samples were within the CT2 thresholds. As such based on current results fill with the following preliminary classifications has been identified:

- General Solid Waste (GSW) (non-putrescible); and
- Restricted Solid Waste.

Further sampling and analysis, as recommended below, may find that all soil results are within the GSW thresholds when assessed in conjunction with toxicity characteristic leaching procedure (TCLP) testing (not undertaken herein).

With respect to the classification of the natural soils, the analysed sample reported values below the adopted Virgin Excavated Natural Material (VENM) screening values and no signs of contamination were recorded (i.e., odours, staining). As such the natural soils encountered within the depth of this investigation are considered to have a preliminary classification of **VENM.**

It is noted that the information provided in this section does not constitute a final waste classification for off-site disposal purposes. Should excavated soils require off-site disposal during development further testing and a final waste classification assessment, which takes into consideration the information in this report, must be undertaken.

14. Updated Conceptual Site Model

The intrusive investigations did not identify contamination above the SAC at the site, however, given the preliminary nature of the investigation, the presence of fill of unknown origin and the presence of potential indicators of contamination (brick fragments, terracotta, metal) it is considered that the COPC discussed above could be present at the site at locations / depths not tested. Therefore, the potential source - pathway - receptor linkages identified in Section 9 are considered to be applicable to the updated conceptual site model, shown in Table 11.

Table 11: Summary of Potentially Complete Exposure Pathways

Potential Source	Transport Pathway	Receptor
(S1) Contaminated soil (from PAEC 1 to 7 listed in Section 8) (S2) Deterioration of existing buildings (PAEC 8, listed in Section 8) COPC: metals, PAH, TPH, PCB, OCP, OPP, herbicides, fungicides, phenols, SMF, asbestos and as yet unidentified Oxidising Agent	(P1) Direct contact (P2) Ingestion and dermal contact	(R1) Future site users (R2) Construction and maintenance workers
	(P3) Inhalation of dust and/ or vapours	(R1) Future site users (R2) Construction and maintenance workers (R3) Adjacent site users
	(P4) Surface water run off (P6) Lateral migration of groundwater	(R5) Surface water
	(P5) Leaching and vertical migration into groundwater	(R6) Groundwater
	(P1) Direct contact	(R4) Terrestrial ecology
	(P1) Direct contact	(R7) In-ground structures

15. Conclusions and Recommendations

The available site history and observations are considered to provide a reasonable understanding of the historic land uses and possible sources of contamination. Identified sources of contamination and potential areas of environmental concern are identified in Section 8. In summary, these comprise previous agricultural and horticultural education uses (including use / possible use of flammable goods, oxidising agent, pesticides, herbicides and fungicides), former off-site commercial / industrial land uses, possible filling / levelling and hazardous building materials (asbestos, lead, PCB, SMF) from former and current buildings (and bagged at the ground surface).

Fill of unknown origin has been confirmed to be present at the site and was recorded to depths of between 0.53 m and 1.65 m bgl in the test pits / boreholes investigated for this PSI. Potential building debris, ash and charcoal were observed in one or more test location, and can be indicative of asbestos, PAH and metal contamination.

The laboratory results for the analysed samples / analytes were all within the SAC. No asbestos was recorded. The PSI identified the use of glyphosphate, paraquat dichloride, diquat dibromide and fertilisers at the site, along with unidentified flammable goods and oxidizing agent(s). It is considered that other herbicides and fungicides may also have been used at the site based on the previous land use, although there is not records of such use. Not all of the site history information was available at the time of intrusive sampling and laboratory analysis, and therefore not all of the potential contaminants of concern have been analysed in the samples, and this is considered to be a data gap in the current investigation.

An assessment of the preliminary waste classification is provided in Section 13.2.

No contamination of concern was recorded by the laboratory analysis in the current investigation, and the current results do not trigger a need for remediation to render the investigation area suitable for the proposed land use. However, it is considered that the site history and walkover indicate a potential for contamination to be present, and it is recommended that a Detailed Site (Contamination) Investigation (DSI) be conducted to provide a more thorough assessment of contamination, including for analytes not included herein, and to confirm the need or otherwise for remediation. The DSI should include groundwater investigation.

Based on the results presented herein it is considered that the site can be made suitable for the proposed new public school subject to the findings of the DSI and upon the implementation of any remedial measures that are deemed necessary based on the results of further testing.

For planning and budgeting purposes it is advised that fill at the site is considered to have a moderate risk of containing asbestos contamination.

16. References

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

DP, *Report on Hazardous Building Materials (HBM) Survey New Public School in Epping 86 Chelmsford Avenue, Epping NSW* (Project 99671.02.R.001.Rev2, dated April 2021) (DP, 2021)

Geological Survey of NSW Sydney, 1:100 000 Geology Sheet.

GML Heritage *Epping South Public School Site (86 Chelmsford Avenue, Epping) Heritage Assessment* (Job 20-0115A, November 2020) (GML, 2020);

Greencap *Preliminary Site Investigation TAFE NSW Epping Campus, Chelmsford Avenue, Epping NSW 2121* (Reference J154876, November 2018)

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 OEH (2011) Contaminated Sites: Guidelines for Consultants Reporting on Contaminated Sites.

Soil Conservation Service of NSW, Sydney 1:100 000 Sheet.

17. Limitations

Douglas Partners Pty Ltd (DP) has prepared this report for this project at New Public School in Epping, 86 Chelmsford Avenue, Epping under the Standard Form Agreement SINSW00650/20 dated 8 April 2020 and undertaken in accordance with Douglas Partners Pty Ltd (DP) proposal SYD200258 dated 13

March 2020. This report is provided for the exclusive use of School Infrastructure NSW for this project only and for the purposes as described in the report. It should not be used by or relied upon for other projects or purposes on the same or other site or by a third party. Any party so relying upon this report beyond its exclusive use and purpose as stated above, and without the express written consent of DP, does so entirely at its own risk and without recourse to DP for any loss or damage. In preparing this report DP has necessarily relied upon information provided by the client and/or their agents.
The results provided in the report are indicative of the sub-surface conditions on the site only at the specific sampling and/or testing locations, and then only to the depths investigated and at the time the work was carried out. Sub-surface conditions can change abruptly due to variable geological processes and also as a result of human influences. Such changes may occur after DP's field testing has been completed.

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

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

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

Asbestos has not been detected by observation or by laboratory analysis in filling materials at the test locations sampled and analysed. Building demolition materials (brick), were, however, located in previous below-ground filling, and these are considered as indicative of the possible presence of hazardous building materials (HBM), including asbestos. Hazardous building materials (including asbestos) have been identified in structures art the site (refer to DP project 99671.02 report) and a bag of assumed asbestos waste was observed at the ground surface.

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

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.

Appendix A

Notes About this Report

Site Drawing

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.

Locality Plan

LEGEND

- Rock-cored Borehole
- Augered Borehole
- Test Pit
- **W** Groundwater Monitoring Well
- Site Boundary
- A — A' Geotechnical Cross-section A-A'

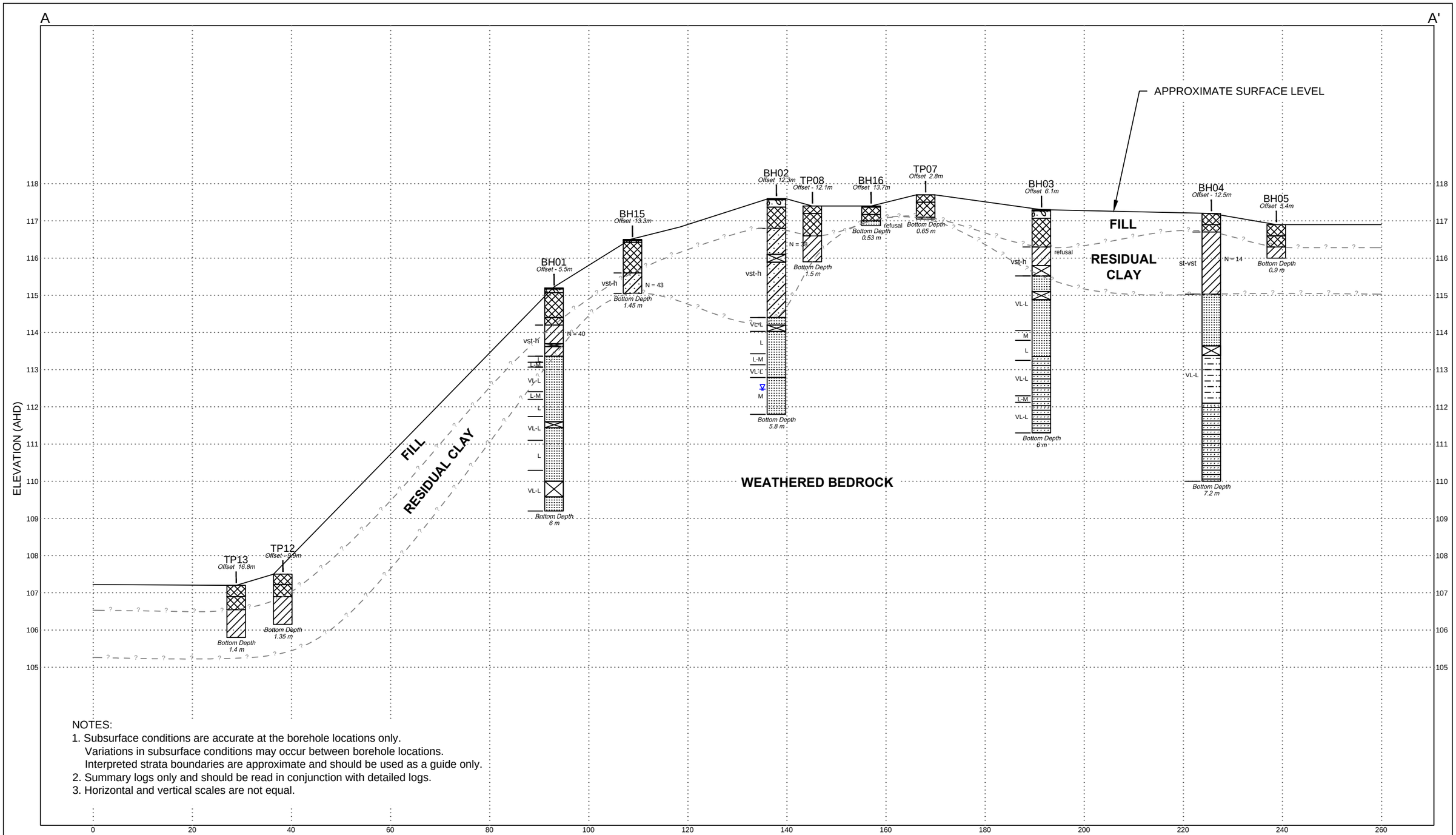
NOTE:
1: Base image from Nearmap.com (Dated 18.04.2020)
2: Borehole coordinates measured using a high-precision differential GPS

Douglas Partners
Geotechnics / Environment / Groundwater

CLIENT: School Infrastructure NSW		TITLE: **Site and Test Location Plan** **New Public School in Epping** **86 Chelmsford Avenue, Epping**
OFFICE: Sydney	DRAWN BY: IT	
SCALE: 1:1250 @ A3	DATE: 21.04.2021	

N

PROJECT No:	99671.00
DRAWING No:	1
REVISION:	1



NOTES:
1. Subsurface conditions are accurate at the borehole locations only.
   Variations in subsurface conditions may occur between borehole locations.
   Interpreted strata boundaries are approximate and should be used as a guide only.
2. Summary logs only and should be read in conjunction with detailed logs.
3. Horizontal and vertical scales are not equal.

LEGEND

- Core Loss
- Asphaltic Concrete
- Clay
- Clayey Sand
- Filling
- Laminite
- Roadbase
- Sandstone
- Sandy Clay
- Siltstone

ROCK STRENGTH
VL - Very Low
L - Low
M - Medium
H - High

SOIL CONSISTENCY
st - Stiff
vst - Very Stiff
h - Hard

TESTS / OTHER
N - Standard penetration test value
— ? — — - Interpreted geotechnical boundary
▽ - Water level

0 15
Horizontal Scale (metres)

Vertical Exaggeration = 7.5

Douglas Partners
Geotechnics / Environment / Groundwater

CLIENT: School Infrastructure NSW		TITLE: **Interpreted Geotechnical Cross-Section A-A'**	PROJECT No: 99671.00
OFFICE: Sydney	DRAWN BY: IT	**New Public School in Epping**	DRAWING No: 2
SCALE: 1:750 (H) 1:100 (V) @ A3	DATE: 28.05.2020	**86 Chelmsford Avenue, Epping**	REVISION: 1

Appendix B

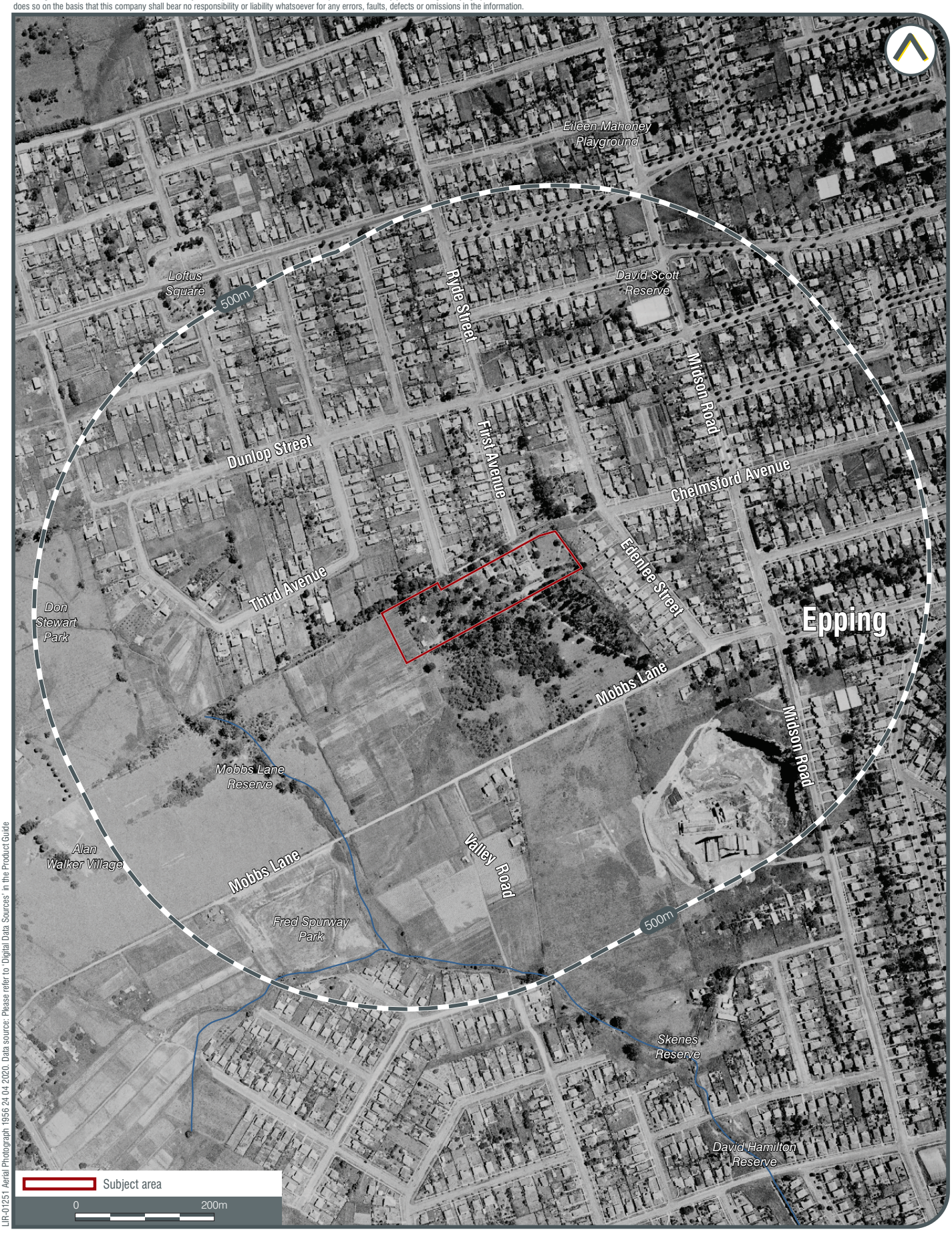
Historical Aerial Photographs

LIR-01251 Aerial Photograph 1943 24 04 2020. Data source: Please refer to 'Digital Data Sources' in the Product Guide

HISTORIC AERIAL PHOTOGRAPH - 1943

LAND INSIGHT & RESOURCES

MAP X

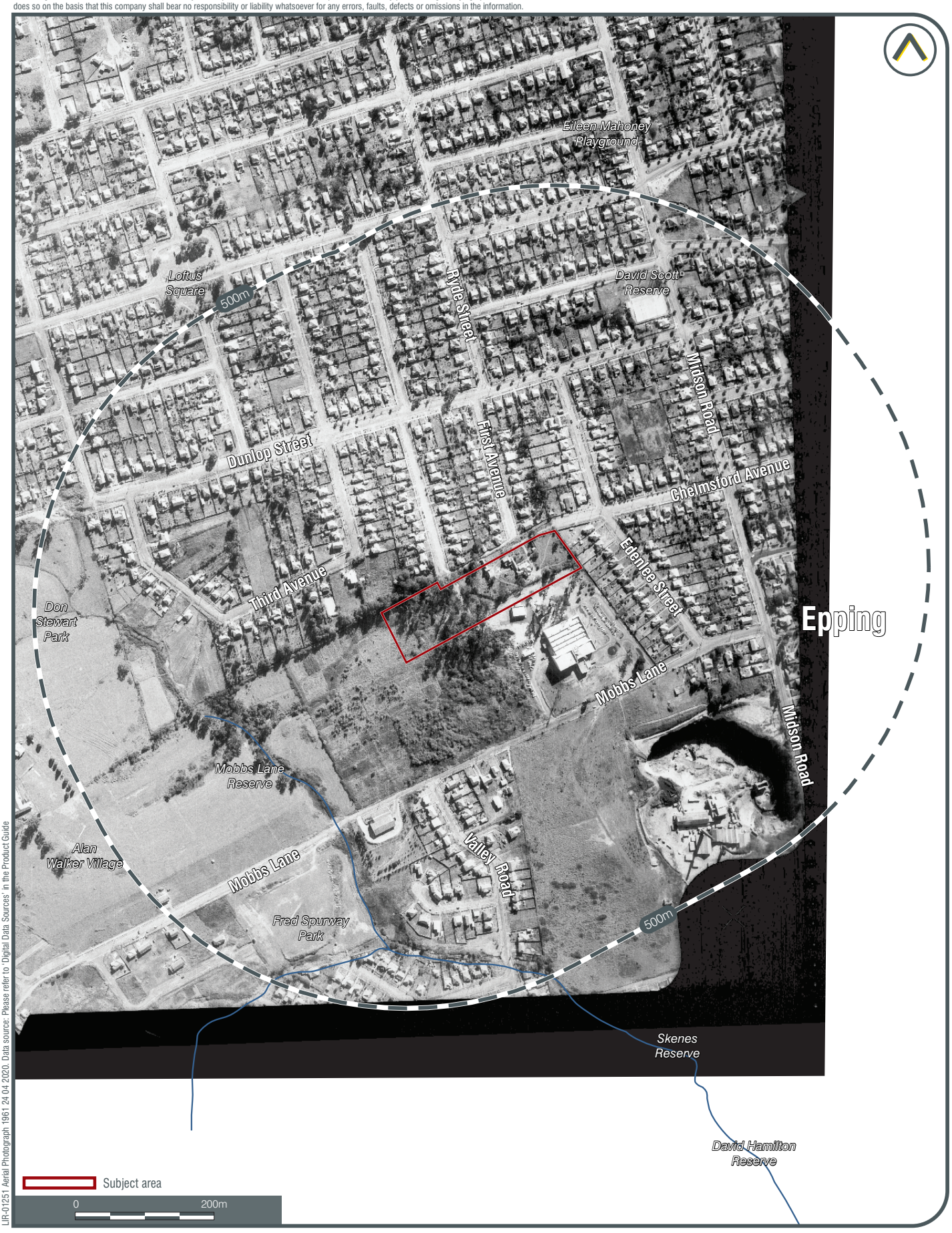


LIR-01251 Aerial Photograph 1956 24 04 2020. Data source: Please refer to 'Digital Data Sources' in the Product Guide

HISTORIC AERIAL PHOTOGRAPH - 1956

LAND INSIGHT & RESOURCES

MAP 2



LIR-01251 Aerial Photograph 1961 24 04 2020. Data source: Please refer to 'Digital Data Sources' in the Product Guide

HISTORIC AERIAL PHOTOGRAPH - 1961

LAND INSIGHT & RESOURCES

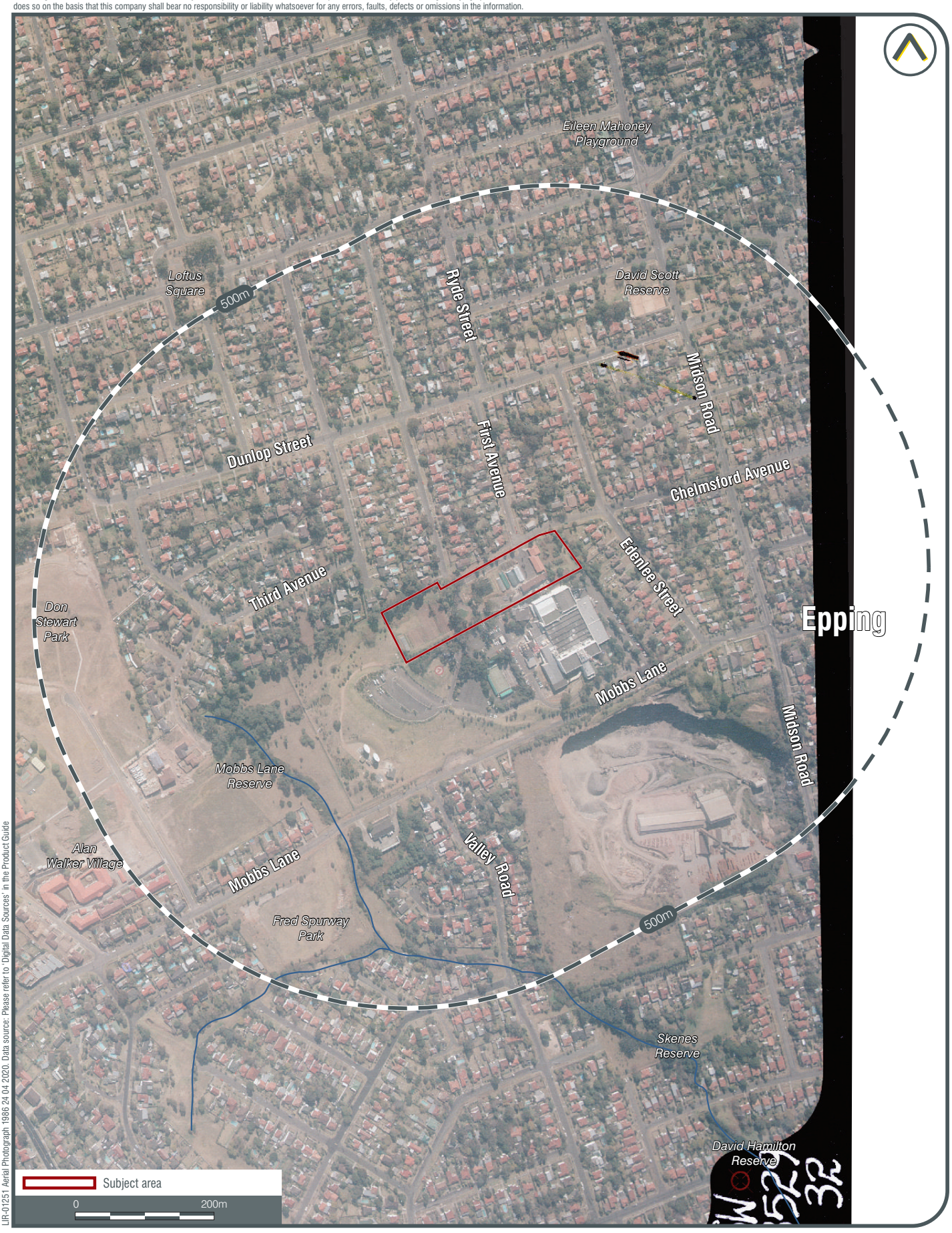
MAP 3

LIR-01251 Aerial Photograph 1965 24 04 2020. Data source: Please refer to 'Digital Data Sources' in the Product Guide

HISTORIC AERIAL PHOTOGRAPH - 1965

LAND INSIGHT & RESOURCES

MAP 4



LIR-01251 Aerial Photograph 1986 24 04 2020. Data source: Please refer to 'Digital Data Sources' in the Product Guide

HISTORIC AERIAL PHOTOGRAPH - 1986

LAND INSIGHT & RESOURCES

MAP 8

Appendix C

SafeWork NSW Records Search

Information Provided by TAFE

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: D20/112140

7 May 2020

Ms Alyssa Spencer
Douglas Partners
96-98 Hermitage Rd
WEST RYDE NSW 2114

Dear Ms Spencer

RE SITE: 86 Chelmsford Ave, Epping NSW 2121

I refer to your site search request received by SafeWork NSW on 4 May 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

From: Adrian Spankie <adrian.spankie2@tafensw.edu.au>
Sent: Wednesday, 27 May 2020 2:52 PM
To: Elise Watson
Cc: Nerilee Edwards; Kate Price; Lise Maddocks
Subject: RE: Epping South - Potential Contaminants - 86 Chelmsford
Attachments: Epping Campus - PSI.pdf

Hi Ellie,

The Epping site was used by TAFE mainly for horticulture so there is the possibility of some minor spills
and surface contamination although we were not aware of any major spills. That skills team is now
located at the Ryde campus. The attached PSI would give you more background on the former use of the
site.

If you need anything more than that please let me know.

Regards,

Adrian

Adrian Spankie
Hazardous Materials Specialist
TAFE Infrastructure NSW
T 0418 637 267
E Adrian.spankie2@tafensw.edu.au

TAFE NSW
Level 2, Building A, Mary Ann St, Ultimo NSW 2007
tafensw.edu.au

From: Adrian Spankie <adrian.spankie2@tafensw.edu.au>
Sent: Thursday, 28 May 2020 9:20 AM
To: Elise Watson
Cc: Nerilee Edwards; Kate Price; Lise Maddocks
Subject: RE: Epping South - Potential Contaminants - 86 Chelmsford

Follow Up Flag: Follow up
Flag Status: Flagged

Hi Elise,

Further to the communication yesterday I did ask the staff who were at Epping about the chemicals
stored there.

The response was:

Ryde Horticulture continued to maintain the grounds at Epping Annex after classes ceased over 10 years
ago.
The only chemicals we kept on site are listed below.
They were transported back to Ryde Campus before the property was divested.
Chemical use was at a minimum – twice/yr weed spraying hard surfaces, gravels and edges.

20 L Glyphosphate
20 L Spray Seed herbicide

Hope that helps,

Regards,

Adrian

Adrian Spankie
Hazardous Materials Specialist
TAFE Infrastructure NSW
T 0418 637 267
E Adrian.spankie2@tafensw.edu.au

TAFE NSW
Level 2, Building A, Mary Ann St, Ultimo NSW 2007
tafensw.edu.au

We respectfully acknowledge the traditional custodians of the Country on which we learn and work together,
and commit to building relationships, respect and opportunities with Aboriginal Peoples.

Appendix D

Site Photographs

Photograph: 1 Vacant buildings

Photograph: 2 Vacant buildings

Douglas Partners Geotechnics / Environment / Groundwater	**Site Photographs** **PSI (Contamination)** **New Public School in Epping**	PROJECT: 99657.01 PLATE No: 1 REV: 1
	CLIENT: School Infrastructure NSW	DATE: Apr 2021

Photograph: 3 Carpark in northeast part of site

Photograph: 4 Paved road and greenhouse in northeast part of site

Douglas Partners Geotechnics / Environment / Groundwater	**Site Photographs** **PSI (Contamination)** **New Public School in Epping**	PROJECT: 99657.01 PLATE No: 2 REV: 1
	CLIENT: School Infrastructure NSW	DATE: Apr 2021

Photograph: 5 Product Bins

Photograph: 6 Apparent Dangerous Goods/ Chemical Stores

Douglas Partners Geotechnics / Environment / Groundwater	**Site Photographs** **PSI (Contamination)** **New Public School in Epping**	PROJECT: 99657.01 PLATE No: 3 REV: 1
	CLIENT: School Infrastructure NSW	DATE: Apr 2021

Photograph: 7 Besser Block Shed labelled with Flammable Goods (Flammable Goods Store)

Photograph: 8 Besser Block Flammable Goods Store - indicators of battery storage and use and dark staining on floor boards

Douglas Partners Geotechnics / Environment / Groundwater	**Site Photographs**	PROJECT: 99657.01
	PSI (Contamination)	PLATE No: 4
	New Public School in Epping	REV: 1
	CLIENT: School Infrastructure NSW	DATE: Apr 2021

Photograph: 9 Besser Block Flammable Goods Store - wooden floor boards with some dark staining and corner of sub-floor access

Photograph: 10 Besser Block Flammable Goods Store - hatch in wooden floor with underlying concrete slab (with cut out)

Douglas Partners Geotechnics / Environment / Groundwater	**Site Photographs** **PSI (Contamination)** **New Public School in Epping**	PROJECT: 99657.01 PLATE No: 5 REV: 1
	CLIENT: School Infrastructure NSW	DATE: Apr 2021

Photograph: 11 Metal sheds apparently used for chemical stores, with adjacent possible bunded area.

Photograph: 12 Southern side of the chemical store metal sheds, showing retaining wall

Douglas Partners Geotechnics / Environment / Groundwater	**Site Photographs** **PSI (Contamination)** **New Public School in Epping**	PROJECT: 99657.01 PLATE No: 6 REV: 1
	CLIENT: School Infrastructure NSW	DATE: Apr 2021

Photograph: 13 Eastern chemical store metal shed, with Flammable Goods signage, with adjacent possible bunded area

Photograph: 14 Eastern chemical store metal shed signage

Douglas Partners Geotechnics / Environment / Groundwater	**Site Photographs**	PROJECT: 99657.01
	PSI (Contamination)	PLATE No: 7
	New Public School in Epping	REV: 1
	CLIENT: School Infrastructure NSW	DATE: Apr 2021

Photograph: 15 Eastern chemical store metal shed, concrete floor, with vertical conduit

Photograph: 16 Pit adjacent to western chemical store metal shed

Douglas Partners Geotechnics / Environment / Groundwater	**Site Photographs** **PSI (Contamination)** **New Public School in Epping**	PROJECT: 99657.01 PLATE No: 8 REV: 1
	CLIENT: School Infrastructure NSW	DATE: Apr 2021

Photograph: 17 Oily substance in plastic container in pit from previous photograph, possibly from conduit

Photograph: 18 Inside of western metal chemical store shed

Douglas Partners Geotechnics / Environment / Groundwater	**Site Photographs** **PSI (Contamination)** **New Public School in Epping**	PROJECT: 99657.01 PLATE No: 9 REV: 1
	CLIENT: School Infrastructure NSW	DATE: Apr 2021

Photograph: 19 Products identified in chemical good metal stores

Photograph: 20 Products identified in chemical good metal stores

Douglas Partners Geotechnics / Environment / Groundwater	**Site Photographs** **PSI (Contamination)** **New Public School in Epping**	PROJECT: 99657.01 PLATE No: 10 REV: 1
	CLIENT: School Infrastructure NSW	DATE: Apr 2021

Photograph: 21 Water tank and shed (formerly for pump equipment?)

Photograph: 22 Shed (formerly for pump equipment?)

Douglas Partners Geotechnics / Environment / Groundwater	**Site Photographs**	PROJECT: 99657.01
	PSI (Contamination)	PLATE No: 11
	New Public School in Epping	REV: 1
	CLIENT: School Infrastructure NSW	DATE: Apr 2021

Photograph: 23 Greenhouses with Oxidising Agent Store

Photograph: 24 Oxidising Agent Store

Douglas Partners Geotechnics / Environment / Groundwater	**Site Photographs** **PSI (Contamination)** **New Public School in Epping**	PROJECT: 99657.01 PLATE No: 12 REV: 1
	CLIENT: School Infrastructure NSW	DATE: Apr 2021

Photograph: 25 Circular hole in concrete near Oxidizing Agent Store

Photograph: 26 Circular hole in concrete near Oxidizing Agent Store

Douglas Partners Geotechnics / Environment / Groundwater	**Site Photographs** **PSI (Contamination)** **New Public School in Epping**	PROJECT: 99657.01 PLATE No: 13 REV: 1
	CLIENT: School Infrastructure NSW	DATE: Apr 2021

Photograph: 27 Bagged Asbestos near Oxidizing Agent Store

Photograph: 28 Inside of a green house

Douglas Partners Geotechnics / Environment / Groundwater	**Site Photographs** **PSI (Contamination)** **New Public School in Epping**	PROJECT: 99657.01 PLATE No: 14 REV: 1
	CLIENT: School Infrastructure NSW	DATE: Apr 2021

Photograph: 29 Pipes inside greenhouse

Photograph: 30 Pipes inside greenhouse

Douglas Partners Geotechnics / Environment / Groundwater	**Site Photographs**	PROJECT: 99657.01
	PSI (Contamination)	PLATE No: 15
	New Public School in Epping	REV: 1
	CLIENT: School Infrastructure NSW	DATE: Apr 2021

Photograph: 31 Former green house, shed and shaded area

Photograph: 32 shaded area

Douglas Partners Geotechnics / Environment / Groundwater	**Site Photographs** **PSI (Contamination)** **New Public School in Epping**	PROJECT: 99657.01 PLATE No: 16 REV: 1
	CLIENT: School Infrastructure NSW	DATE: Apr 2021

Photograph: 33 Topography sloping down to the southwest on west side of site

Photograph: 34 Overgrown vegetation in west of site

Douglas Partners Geotechnics / Environment / Groundwater	**Site Photographs** **PSI (Contamination)** **New Public School in Epping**	PROJECT: 99657.01 PLATE No: 17 REV: 1
	CLIENT: School Infrastructure NSW	DATE: Apr 2021

Appendix E

Data Quality Objectives, Data Quality Indicators

Quality Assurance and Quality Control

QA / QC PROCEDURES AND RESULTS

Q1. Data Quality Objectives

The contamination investigation was prepared with reference to 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:

- 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.

The DQOs have been addressed within the report as shown in Table Q1.

Table Q1: Data Quality Objectives

Data Quality Objective	Report Section where Addressed
State the Problem	S1 Introduction
Identify the Decision	S15 Conclusion and Recommendations
Identify Inputs to the Decision	S1 Introduction S4 Site Information S5 Environmental Setting S6 Site History S7 Site Walkover S8 Potential Areas of Environmental Concern S9 Preliminary Conceptual Model S11 Site Assessment Criteria S12 Results
Define the Boundary of the Assessment	S4 Site Information
Develop a Decision Rule	S11 Site Assessment Criteria
Specify Acceptable Limits on Decision Errors	Appendix E QA / QC Procedures and Results
Optimise the Design for Obtaining Data	S3 Scope of Works S10 Field Work Methods Appendix E QA / QC Procedures and Results

Q2. FIELD AND LABORATORY QUALITY CONTROL

Q2.1 Summary

The field and laboratory QC procedures and results are summarised in the following Table Q2. Reference should be made to the fieldwork and analysis procedures in Section 10 and the laboratory results certificates in Appendix G for further details.

Table Q2: Field and Laboratory QC

Item	Evaluation / Acceptance Criteria	Achievement
Analytical laboratories used	NATA accreditation	yes
Holding times	Various based on type of analysis	yes
Intra-laboratory replicates	5% of primary samples; <50% RPD (>5 x PQL)	yes[1]
Inter-laboratory replicates	5% of primary samples; <50% RPD (10-20 x PQL)	yes[1]
Trip Spikes	1 per sampling event; 60-140% recovery	yes
Trip Blanks	1 per sampling event; <PQL	yes
Matrix Spikes	1 per lab batch; 70-130% recovery (inorganics); 60-140% recovery (organics)	yes
Surrogate Spikes	All organics analysis; 70-130% recovery (inorganics); 60-140% recovery (organics)	yes
Control Samples	1 per lab batch; 70-130% recovery (inorganics); 60-140% recovery (organics)	yes

NOTE: 1 qualitative assessment of RPD results overall

Table Q3: Laboratory QC Results

Report No.	Lab Comment	DP Comment
ELS-240999	Asbestos: A portion of the supplied sample was sub-sampled for asbestos analysis according to. Envirolab procedures. We (ELS) cannot guarantee that this sub-sample is indicative of the entire sample. Envirolab recommends supplying 40-50g of sample in its own container. Note: Samples were sub-sampled from jars provided by the client.	No ACM or fibrous material observed in the field. As such sub-sampling in the laboratory is not considered to have a lower potential to find asbestos than sub-sampling in the field.

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

Q2.1.1 Intra- and Inter- Laboratory Replicates

Replicate samples were collected in the field as a measure of accuracy, precision and repeatability of the results.

Intra-laboratory replicates were analysed as an internal check of the reproducibility within the primary laboratory ELS and as a measure of consistency of sampling techniques. Inter-laboratory replicates were analysed as an external check of the reproducibility within a secondary laboratory (Eurofins Laboratory Services). The comparative results of analysis between the originals (TP7/0.4-0.5 m, TP10/0.0-0.1) and intra-laboratory and inter-laboratory replicates samples (BD1/AS/20200504, BD2/AS/20200504) are summarised in Table Q4.

Field replicate samples for soil were collected from the same location and an identical depth to the primary sample. Equal portions of the subject material were placed into the primary and replicate sampling jars and sealed. The sample was not homogenised so as to minimise the possible loss of volatiles. Replicate samples were labelled with a DP identification number, recorded on DP's bore logs, so as to conceal their relationship to their primary sample from the analytical laboratory.

A measure of the consistency of results is derived by the calculation of relative percentage differences (RPDs) for replicate samples. A RPD of +/- 30% is generally considered acceptable for inorganic analytes by the industry, although in general a wider RPD range (50%) may be acceptable for organic analytes. RPDs above the generally acceptable limits (if applicable) are shown in **bold** in Table Q4 below.

Note that, where both samples are below PQL the difference and RPD has been given as zero. Where one sample is reported below PQL, but a concentration is reported for the other, the PQL value has been used for calculation of the RPD for the less than PQL sample.

The calculated RPD values were within the acceptable range of ± 30 for inorganic analytes and ± 50% for organics with the with the exception of those in bold. However, this is not considered to be significant because: The typically low actual differences in the concentrations of the replicate pairs where some RPD exceedances occurred. High RPD values reflect the small differences between two small numbers;

- Replicate samples (soil) were taken from fill material that is heterogeneous in nature and the distribution of metals in soil are also generally non-homogenous;
- Soil replicates, rather than homogenised soil duplicates, were used to minimise the risk of possible volatile loss, hence greater variability can be expected; and
- All other QA / QC parameters met the DQIs.

Overall, the replicate comparisons indicate that the sampling techniques were generally consistent and repeatable.

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

Table Q4: RPD Results - Soil

Sample ID	Sample Type	Sampled Date	Metals								TRH				BTEX			
			Arsenic	Cadmium	Chromium (VI)	Copper	Lead	Mercury (inorganic)	Nickel	Zinc	TRH C6 - C10	TRH >C10-C16	F3 (>C16-C34)	F4 (>C34-C40)	Benzene	Toluene	Ethylbenzene	Total Xylenes
			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
BD1/AS/20200504	fill	04/05/2020	10	<0.4	17	23	140	<0.1	9	140	NT	NT	NT	NT	NT	NT	NT	NT
TP7/0.4-0.5	fill	04/05/2020	12	<0.4	15	23	190	<0.1	10	170	<25	<50	<100	<100	<0.2	<0.5	<1	<1
		Difference	2	0	2	0	50	0	1	30	-	-	-	-	-	-	-	-
		RPD	18%	0%	13%	0%	**30%**	0%	11%	19%	-	-	-	-	-	-	-	-
BD2/AS/20200504	fill	04/05/2020	12	<0.4	20	22	52	<0.1	17	57	<20	<50	<50	<100	<0.1	<0.1	<0.1	<0.3
TP10/0.4-0.5	fill	04/05/2020	8	<0.3	20	18	44	<0.1	13	52	<25	<50	<100	<100	<0.2	<0.1	<1	<1
		Difference	4	0	0	5	8	0	4	5	0	0	10	0	0	0	0	0
		RPD	**40%**	0%	0%	20%	17%	0%	27%	9%	0%	0%	10%	0%	0%	0%	0%	0%

Table Q4: RPD Results - Soil (continued)

Sample ID	Sample Type	Sampled Date	PAH				Phenol	OCP								OPP	PCB
			Naphthalene	Benzo(a)pyrene (BaP)	Benzo(a)pyrene TEQ	Total PAHs		DDT+DDE+DDD	Aldrin & Dieldrin	Total Chlordane	Total Endosulfan	Endrin	Heptachlor	HCB	Methoxychlor	Chlorpyriphos	Total PCB
			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
BD1/AS/20200504	fill	04/05/2020	<0.1	0.07	<0.5	0.64	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
TP7/0.4-0.5	fill	04/05/2020	<0.1	0.07	<0.5	0.69	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
		Difference	0	0	0	0.05	-	-	-	-	-	-	-	-	-	-	-
		RPD	0%	0%	0%	8%	-	-	-	-	-	-	-	-	-	-	-
BD2/AS/20200504	fill	04/05/2020	<0.5	<0.5	<0.5	<0.5	<20	<0.05	<0.1	<0.1	<0.1	<0.05	<0.05	<0.05	<0.2	<0.2	<0.5
TP10/0.4-0.5	fill	04/05/2020	<0.1	0.1	<0.5	0.1	<5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
		Difference	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		RPD	0%	**0%**	0%	**0%**	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

Q2.1.2 Trip (Field) Blank

The purpose of a trip blank is to assess the potential for transfer of contaminants into samples had occurred between the time of collection and analysis of the sample by the laboratory. Laboratory prepared soil field blanks were taken out to the field unopened, subjected to the same preservation methods as the field samples, then analysed for the purposes of determining whether transfer of contaminants into the blank sample had occurred prior to reaching the laboratory.

The concentrations of the analytes were all below laboratory detection limits, as summarised in Table Q5, indicating that significant cross contamination had not occurred during the course of the round trip from the site to the laboratory.

Table Q5: Trip Blank Results – Soils (mg/kg)

Sample Id	Benzene	Toluene	Ethylbenzene	Total Xylenes
TB/20200405	<0.2	<0.5	<1	<1

Q2.1.3 Trip Spike

The purpose of a trip spike is to assess the potential loss of volatile analytes that may have occurred between the time of collection and analysis of the sample by the laboratory.

For soils, laboratory preparation of the trip spike involved putting 1mL of BTEX (using a 1500ppm BTEX trip spike standard) into two jars which were cross referenced and labelled 'trip spike' and 'control'. Both jars were sealed. The trip spike was taken onto site and subject to the same jar storage and transfer as the field samples. The control stayed refrigerated in the laboratory. Following receipt of the trip spike and field samples, the trip spike and corresponding control are both analysed with results of the trip spike being expressed as the % difference from the control sample.

The generally acceptance limit for trip spikes is 60-140% in difference compared to the control or standard. The results recorded recoveries of between 81% and 86% as shown in Table Q6, below, indicating that the percentage loss for BTEX during the trip was minimal and therefore appropriate preservation techniques were employed.

Table Q6: Trip Spike Results – Soils (% Recovery)

Sample Id	Benzene	Toluene	Ethylbenzene	m+p-xylene	o-Xylene
TS/20200405	82	88	86	81	81

Q2.2 Field Instrument Calibration

The photoionisation detector (PID) fitted with a 11.7 volt lamp was calibrated with isobutylene gas. Calibration records of the instruments are presented in Appendix E.

Q3. Data Quality Indicators

The reliability of field procedures and analytical results was assessed against the following data quality indicators (DQIs):

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

The DQIs were assessed as outlined in the following Table Q7.

Table Q7: Data Quality Indicators

Data Quality Indicator	Method(s) of Achievement
Completeness	Selected target locations sampled; Preparation of test pit and borehole logs, sample location plan and chain of custody records; Laboratory sample receipt information received confirming receipt of samples intact and appropriateness of the chain of custody; Samples analysed for contaminants of potential concern (COPC) identified in the Conceptual Site Model (CSM) (subject to any data gaps noted in report); Completion of chain of custody (COC) documentation; NATA accredited laboratory results certificates provided by the laboratory; Satisfactory frequency and results for field and laboratory quality control (QC) samples as discussed in Section Q2.
Comparability	Using appropriate techniques for sample recovery, storage and transportation, which were the same for the duration of the project; Experienced sampler(s) used; Use of NATA registered laboratories, with test methods the same or similar between laboratories; Satisfactory results for field and laboratory QC samples.
Representativeness	Target media sampled; Sample numbers recovered and analysed are considered to be representative of the target media and complying with DQOs; Samples were extracted and analysed within holding times; Samples were analysed in accordance with the COC.

Data Quality Indicator	Method(s) of Achievement
Precision	Field staff followed standard operating procedures; Acceptable RPD between original samples and replicates; Satisfactory results for all other field and laboratory QC samples.
Accuracy	Field staff followed standard operating procedures; Satisfactory results for all field and laboratory QC samples.

Based on the above, it is considered that the DQIs have been complied with. As such, it is concluded that the field and laboratory test data obtained are reliable and useable for this assessment.

CALIBRATION RECORD

Project: Epping South Public School
Project Number: 99671.01

Calibrated Equipment
Model: 595-002219
Serial No.: PGM7350
DP Reference: PID3
Other: 10.6eV Lamp

Calibration
Date(s): 01/05/20
Operator(s): AS
Zero Gas: ambient air
Span Gas: isobutylene
Span Gas Concentration: 100
Response Factor: 1.0
Pre-calibration Reading 102.5 ppm
Post-calibration Reading 99.6

Approved: AS
Date: 01/05/20

Appendix F

Test Pit and Borehole Logs

BOREHOLE LOG

CLIENT: School Infrastructure NSW
PROJECT: New Public School in Epping
LOCATION: 86 Chelmsford Avenue, Epping

SURFACE LEVEL: 115.2 AHD
EASTING: 321189
NORTHING: 6260420
DIP/AZIMUTH: 90°/--

BORE No: BH01
PROJECT No: 99671.00
DATE: 6/5/2020
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
115	0.03	ASPHALTIC CONCRETE										
	0.13	ROADBASE: fine to medium igneous gravel							A/E			PID<1ppm
		FILL/Silty CLAY: low plasticity, dark grey and orange, with fine sand, trace fine to medium igneous, sandstone and ironstone gravel, w<PL, apparently moderately compacted							A/E			PID<1ppm
	0.8							Note: Unless otherwise stated, discontinuities are beddings dipping at 0-10°, planar and smooth to rough with a clay coating to 10mm or iron staining	A/E			PID=1ppm
114	1.0								S			10,17,23 N = 40
	1.58	FILL/Clayey SILT: low to medium plasticity, dark brown, trace charcoal, fine sand and fine shale gravel, w<PL, apparently moderately compacted						1.5m: CORE LOSS: 80mm				
	1.84											PL(A) = 0.3
113	2	CLAY CI-CH: medium to high plasticity, pale grey and orange, with fine to medium sand, silt, low to medium strength ironstone bands, w<PL, very stiff to hard, residual						2.22m: J70-90°, un, cly vn 2.25-2.41m: fg 2.53m: Cs, 40mm	C	96	12	PL(A) = 0.1
								2.85m: B0-10°, cbs, cly vn 2.97m: B30° 3.1m: J50-90°, un, ti				PL(A) = 0.3
112	3											
	3.6	SANDSTONE: fine to medium grained, brown, with siltstone fragments and clasts (possibly disturbed), very low to low strength, highly weathered, fractured,						3.6m: CORE LOSS: 160mm				PL(A) = 0.1
	3.76	Minchinbury Sandstone										
111	4	SANDSTONE: fine to medium grained, brown, very thinly bedded, very low to low strength, highly weathered, fractured, Minchinbury Sandstone						3.87m: B0-10°, cbs , cly vn 3.92m: Ds, 150mm 4.1m: B0-10°, cbs 4.14m: B30° 4.39m: B5°, cbs	C	78	25	PL(A) = 0.2
								4.91m: Ds, 90mm, cbs, cly co				
110	5							5.2m: CORE LOSS: 420mm				
	5.62											PL(A) = 0.1
								5.77m: Ds, 50mm, cbs, cly co 5.91m: B20°				
	6.0	Bore discontinued at 6.0m Target depth reached										
109	6											
108	7											
107	8											
106	9											

RIG: Scout 4 **DRILLER:** RKE **LOGGED:** IT **CASING:** HW to 1.5m, HQ to 1.5m

TYPE OF BORING: Solid flight auger (TC-bit) to 1.0m, rotary (water) to 1.5m, NMLC coring to 6.0m

WATER OBSERVATIONS: No free groundwater observed whilst augering

REMARKS: Location coordinates are in MGA94 Zone 56.

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: 1 **PROJECT: New Public School in Epping** **May 2020**

1.50 – 6.00 m

BOREHOLE LOG

CLIENT: School Infrastructure NSW
PROJECT: New Public School in Epping
LOCATION: 86 Chelmsford Avenue, Epping

SURFACE LEVEL: 117.6 AHD
EASTING: 321220
NORTHING: 6260457
DIP/AZIMUTH: 90°/--

BORE No: BH02
PROJECT No: 99671.00
DATE: 6/5/2020
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)	Type	Core Rec. %	RQD %	Test Results & Comments
117	0.03	ASPHALTIC CONCRETE										
	0.23	ROADBASE: fine to medium igneous gravel							A/E			PID=1ppm
		FILL/Sandy CLAY: low to medium plasticity, dark grey and orange-brown, fine to medium sand, with fine to medium sandstone and shale gravel, trace charcoal and silt, w<PL, apparently moderately compacted						Note: Unless otherwise stated, discontinuities are beddings dipping at 0-10°, planar and smooth to rough with a clay coating to 10mm or iron staining	A/E B			PID<1ppm
	0.8								A/E			PID=1ppm
116	1								S			14,19,19 N = 38
	1.71	Sandy CLAY CI: medium plasticity, pale grey and orange, fine sand, with silt and low to medium strength ironstone bands, trace organic matter, w<PL, very stiff to hard, residual						1.5m: CORE LOSS: 210mm	C	89	0	
115	2											
	3											
	3.2	SANDSTONE: fine to medium grained, brown, very thinly bedded, with some clay bands, very low to low strength, highly weathered, fractured, Minchinbury Sandstone										
114	3.57							3.4m: CORE LOSS: 170mm				PL(A) = 0.2
	4							3.92m: Cs, 45mm 4.14m: fg, cly vn 4.21m: Cs, 20mm 4.25m: Cs, 20mm 4.56m: Cs, 20mm	C	93	67	PL(A) = 0.2 PL(A) = 0.3
113	4.81	SANDSTONE: fine to medium grained, brown, very thinly and indistinctly bedded, with some siltstone bands, medium strength, moderately weathered, slightly fractured, Minchinbury Sandstone						4.91m: Ds, 40mm				PL(A) = 0.6
	5					08-05-20		5.58m: J90°				PL(A) = 0.5
112	5.8	Bore discontinued at 5.8m Target depth reached										
	6											
111	7											
110	8											
109	9											
108												

RIG: Scout 4 **DRILLER:** RKE **LOGGED:** IT **CASING:** HW to 1.5m, HQ to 1.5m

TYPE OF BORING: Solid flight auger (TC-bit) to 1.0m, rotary (water) to 1.5m, NMLC coring to 5.8m

WATER OBSERVATIONS: No free groundwater observed whilst augering

REMARKS: Location coordinates are in MGA94 Zone 56. Groundwater monitoring well installed: blank PVC 0.0-0.7m, screen PVC 0.7-5.8m, bentonite 0.0-0.5m, gravel 0.5-5.8m, gatic cover at the surface.

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: 2 **PROJECT: New Public School in Epping** **May 2020**

1.50 – 5.80 m

BOREHOLE LOG

CLIENT: School Infrastructure NSW
PROJECT: New Public School in Epping
LOCATION: 86 Chelmsford Avenue, Epping

SURFACE LEVEL: 117.3 AHD
EASTING: 321270
NORTHING: 6260477
DIP/AZIMUTH: 90°/--

BORE No: BH03
PROJECT No: 99671.00
DATE: 5/5/2020
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)	Type	Core Rec. %	RQD %	Test Results & Comments
117.3	0.03	ASPHALTIC CONCRETE										
117.1	0.23	ROADBASE: fine to medium igneous gravel							A/E			PID<1ppm
		FILL/CLAY: medium to high plasticity, dark grey and orange-brown, trace ash, fine sand and fine to medium igneous, sandstone and ironstone gravel, w<PL, apparently well compacted						Note: Unless otherwise stated, discontinuities are beddings dipping at 0-10°, planar and smooth to rough with a clay coating to 10mm or iron staining	A/E			PID<1ppm
116.3	1.0	0.8m: pale grey and orange-brown							B			
									A/E			PID<1ppm 11,25/120,B refusal
									S			
								1.5m: CORE LOSS: 280mm				
115.5	1.78	CLAY CI-CH: medium to high plasticity, grey, with fine to medium sand and very low to low strength sandstone bands, trace organic material, w<PL, very stiff to hard, residual						2.0-2.17m: J80-90°, un	C	60	59	PL(A) = 0.2
	2.42							2.2m: CORE LOSS: 220mm	C	61	18	
		SANDSTONE: fine to medium grained, brown and pale grey, thinly bedded, very low to low strength, highly weathered, fractured, Minchinbury Sandstone						2.5m: Cs, 20mm 2.52-2.63m: J70-80°, un, cly vn 2.77m: Cs, 35mm 2.81-2.95m: fg	C	100	65	PL(A) = 0.3
114.3	3							3.18m: Ds, 70mm 3.37m: Cs, 20mm 3.45m: Cs, 60mm	C	100	52	PL(A) = 0.7
113.3	3.95	INTERLAMINATED SILTSTONE AND SANDSTONE: dark grey and orange-brown siltstone (70%) interlaminated with fine grained, pale grey and orange-brown sandstone (30%), very low to low strength, highly weathered, fractured to slightly fractured, Ashfield Shale						3.86m: Cs, 25mm 3.89-3.94m: J80-90°, un 4.12m: Cs, 20mm 4.44m: J45°, healed				PL(A) = 0.2
112.3	5							5.44m: Cs, 30mm 5.6m: J80-90°, cly vn	C	100	9	PL(A) = 0.1 PL(A) = 0.3
111.3	6							5.82-5.95m: J(x3)60-70°, cly vn 5.95m: Cs, 20mm				PL(A) = 0.1
	6.0	Bore discontinued at 6.0m Target depth reached										
110.3	7											
109.3	8											
108.3	9											

RIG: Scout 4 **DRILLER:** RKE **LOGGED:** IT **CASING:** HW to 1.5m, HQ to 1.5m

TYPE OF BORING: Solid flight auger (TC-bit) to 1.0m, rotary (water) to 1.5m, NMLC coring to 5.8m

WATER OBSERVATIONS: No free groundwater observed whilst augering

REMARKS: Location coordinates are in MGA94 Zone 56.

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: 3 **PROJECT: New Public School in Epping** **May 2020**

1.50 – 6.00 m

BOREHOLE LOG

CLIENT: School Infrastructure NSW
PROJECT: New Public School in Epping
LOCATION: 86 Chelmsford Avenue, Epping

SURFACE LEVEL: 117.2 AHD
EASTING: 321309
NORTHING: 6260477
DIP/AZIMUTH: 90°/--

BORE No: BH04
PROJECT No: 99671.00
DATE: 8/5/2020
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
117	0.3	FILL/Clayey SILT: low plasticity, dark brown, with fine sand, trace grass and rootlets, w<PL, apparently poorly compacted							A/E			PID=2ppm
	0.5	FILL/CLAY: medium plasticity, orange-brown, with silt, trace fine sand and fine ironstone gravel, w<PL, apparently well compacted							A/E U			PID<1ppm pp=450kPa
116	1	CLAY CH: high plasticity, pale grey and red-brown, with medium to high strength ironstone bands, w<PL, stiff to very stiff, residual						Note: Unless otherwise stated, discontinuities are beddings dipping at 0-10°, planar and smooth to rough with a clay coating to 10mm or iron staining	A/E S			PID<1ppm 4,5,9 N = 14
	2											
115	2.17	SANDSTONE: fine to medium grained, pale grey, indistinctly bedded, very low to low strength with some medium to high strength ironstone bands, highly weathered, fractured and slightly fractured, Minchinbury Sandstone							C	100	34	PL(A) = 0.3 PL(A) = 2.1
114	3							3.1m: Cs, 190mm				PL(A) = 0.1
								3.44m: Cs, 60mm				PL(A) = 0.3
	3.82							3.56m: CORE LOSS: 260mm				
113	4	SILTSTONE: pale grey, very low strength with some medium to high strength ironstone bands, highly weathered, fractured, Ashfield Shale						3.82-4.0m: fg, cly vn 4.08m: Cs, 170mm 4.25-4.33m: fg(x2)	C	81	0	PL(A) = 2.3
								4.6m: Cs, 200mm 4.78m: J80° 4.87m: Cs, 40mm 4.97m: Cs, 80mm 5.06m: Cs, 80mm				
112	5.1	INTERLAMINATED SILTSTONE AND SANDSTONE: dark grey siltstone (70%) interlaminated with fine grained, pale grey and orange-brown sandstone (30%), very low strength, highly weathered, fractured to slightly fractured, Ashfield Shale						5.38m: Cs, 30mm 5.44m: Cs, 40mm 5.65m: Cs, 160mm				PL(A) = 0.2
111	6							6.05m: Cs, 20mm	C	100	0	
								6.7-6.9m: J(x2)70-90°				
	7							7m: Cs, 60mm				
110	7.2	Bore discontinued at 7.2m Target depth reached						7.12m: Cs, 40mm				
	8											
109												
	9											
108												

RIG: Bobcat **DRILLER:** JE **LOGGED:** IT **CASING:** HW to 1.0m, HQ to 1.65m

TYPE OF BORING: Solid flight auger (TC-bit) to 1.0m, rotary (water) to 1.65m, NMLC coring to 7.2m

WATER OBSERVATIONS: No free groundwater observed whilst augering

REMARKS: Location coordinates are in MGA94 Zone 56.

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: 4 PROJECT: New Public School in Epping May 2020

1.65 – 6.00 m

BORE: 4 PROJECT: New Public School in Epping May 2020

6.00 – 7.20 m

BOREHOLE LOG

CLIENT: School Infrastructure NSW
PROJECT: New Public School in Epping
LOCATION: 86 Chelmsford Avenue, Epping

SURFACE LEVEL: 116.9 AHD
EASTING: 321312
NORTHING: 6260499
DIP/AZIMUTH: 90°/--

BORE No: BH05
PROJECT No: 99671.00
DATE: 4/5/2020
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
116.9	0.0	FILL/Clayey SILT: low plasticity, dark brown, trace fine sand and fine gravel, w<PL		E	0.0		PID<1 ppm		
					0.1				
	0.3	FILL/CLAY: medium plasticity, red, pale brown and dark grey, with silt, trace fine sand, fine gravel and rootlets, w~PL, possibly natural		E	0.3		PID<1 ppm		
					0.4				
	0.6								
	0.9	CLAY CI: medium plasticity, red and pale brown, trace silt and rootlets, w~PL		E	0.75		PID<1 ppm		
116	1	0.75m: pale grey, red and pale brown			0.9				1
		Bore discontinued at 0.9m							
		Target depth reached							
115	2								2
114	3								3
113	4								4
112	5								5
111	6								6
110	7								7
109	8								8
108	9								9
107									

RIG: Hand tools **DRILLER:** AS **LOGGED:** AS **CASING:** Uncased

TYPE OF BORING: Hand auger to 0.9m

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Location coordinates are in MGA94 Zone 56.

SAMPLING & IN SITU TESTING LEGEND

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

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BOREHOLE LOG

CLIENT: School Infrastructure NSW
PROJECT: New Public School in Epping
LOCATION: 86 Chelmsford Avenue, Epping

SURFACE LEVEL: 117.4 AHD
EASTING: 321296
NORTHING: 6260427
DIP/AZIMUTH: 90°/--

BORE No: BH06
PROJECT No: 99671.00
DATE: 4/5/2020
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
117	0.0	FILL/SAND: fine to coarse, brown, with silt and fine gravel, dry		E	0.0 - 0.1		PID<1ppm		
	0.4	FILL/CLAY: low to medium plasticity, brown and red, with silt and fine to medium sand, trace fine gravel, w~PL		E	0.4 - 0.5		PID=2 ppm		
	0.6	FILL/CLAY: medium plasticity, red, trace fine to medium sand, w~PL, apparently stiff, possibly natural		E	0.9 - 1.0		PID<1ppm		
116	1.25	CLAY CI-CH: medium to high plasticity, pale grey and red, trace fine sand and fine ironstone gravel, w~PL, apparently stiff		E	1.3 - 1.4		PID<1ppm		
	1.4	Bore discontinued at 1.4m Target depth reached							
115	2								
114	3								
113	4								
112	5								
111	6								
110	7								
109	8								
108	9								

RIG: Hand tools **DRILLER:** AS **LOGGED:** AS **CASING:** Uncased

TYPE OF BORING: Hand auger to 1.4m

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Location coordinates are in MGA94 Zone 56.

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

TEST PIT LOG

CLIENT: School Infrastructure NSW
PROJECT: New Public School in Epping
LOCATION: 86 Chelmsford Avenue, Epping

SURFACE LEVEL: 117.7 AHD
EASTING: 321251
NORTHING: 6260463

PIT No: TP07
PROJECT No: 99671.00
DATE: 4/5/2020
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per mm)
117	0.2	FILL/Clayey GRAVEL: medium, angular, brown, with silt and fine to medium sand, trace rootlets, dry to moist		E	0.0 0.1		PID<1ppm		
		FILL/Clayey SILT: low plasticity, brown and pale brown, trace fine to medium gravel, fine to medium sand and roots, w~PL		E*	0.4 0.5		PID<1ppm		
	0.6 0.65	Clayey SAND SC: fine to medium, pale brown, with fine to coarse sandstone gravel, dry, residual		E	0.6 0.65		PID<1ppm		
116	1	Pit discontinued at 0.65m Refusal on sandstone bedrock							1
115	2								2
114	3								3
113	4								4
112	5								5
111	6								6
110	7								7
109	8								8
108	9								9

RIG: 1.5T excavator (300mm wide bucket)

LOGGED: AS

SURVEY DATUM: MGA94 Zone 56

WATER OBSERVATIONS: No free groundwater observed

REMARKS: *Replicate sample BD1/AS/20200504 from 0.4-0.5m

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

SAMPLING & IN SITU TESTING LEGEND

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

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TEST PIT LOG

CLIENT: School Infrastructure NSW
PROJECT: New Public School in Epping
LOCATION: 86 Chelmsford Avenue, Epping

SURFACE LEVEL: 117.4 AHD
EASTING: 321238
NORTHING: 6260439

PIT No: TP08
PROJECT No: 99671.00
DATE: 4/5/2020
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per mm)
117	0.2	FILL/Clayey GRAVEL: medium, angular, brown, with silt and fine to medium sand, trace rootlets, dry to moist		E	0.0 0.1		PID<1ppm		
		FILL/Clayey SILT: low plasticity, brown and pale brown, trace fine to medium sand, roots, high plasticity clay nodules, medium gravel, terracotta and brick, w~PL, slight hydrocarbon odour		E	0.4 0.5		PID<1ppm		
116	0.8 1	CLAY CI: medium plasticity, pale grey, pale brown and red, with silt, trace fine gravel, w~PL		E	0.9 1.0		PID<1ppm		
	1.5	1.4m: with fine to coarse sandstone gravel		E	1.4 1.5		PID<1ppm		
115	2	Pit discontinued at 1.5m Refusal on sandstone bedrock							
114	3								
113	4								
112	5								
111	6								
110	7								
109	8								
108	9								

RIG: 1.5T excavator (300mm wide bucket)

LOGGED: AS

SURVEY DATUM: MGA94 Zone 56

WATER OBSERVATIONS: No free groundwater observed

REMARKS:

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

SAMPLING & IN SITU TESTING LEGEND

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

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BOREHOLE LOG

CLIENT: School Infrastructure NSW
PROJECT: New Public School in Epping
LOCATION: 86 Chelmsford Avenue, Epping

SURFACE LEVEL: 114.2 AHD
EASTING: 321223
NORTHING: 6260397
DIP/AZIMUTH: 90°/--

BORE No: BH09
PROJECT No: 99671.00
DATE: 4/5/2020
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
114	0.0	FILL/Clayey SILT: low plasticity, brown, with fine to medium sand, trace fine gravel and rootlets, w<PL		E	0.0 - 0.1		PID<1ppm		
				E	0.4 - 0.5		PID<1ppm		
	0.8	CLAY CI: medium plasticity, brown and pale brown, trace fine to medium sand and fine gravel, w<PL		E	0.9 - 1.0		PID<1ppm		
113	1	0.9m: pale grey and pale brown							
	1.3	Bore discontinued at 1.3m Target depth reached							
112	2								
111	3								
110	4								
109	5								
108	6								
107	7								
106	8								
105	9								

RIG: Hand tools **DRILLER:** AS **LOGGED:** AS **CASING:** Uncased
TYPE OF BORING: Hand auger to 1.3m
WATER OBSERVATIONS: No free groundwater observed
REMARKS: Location coordinates are in MGA94 Zone 56.

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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TEST PIT LOG

CLIENT: School Infrastructure NSW
PROJECT: New Public School in Epping
LOCATION: 86 Chelmsford Avenue, Epping

SURFACE LEVEL: 114.4 AHD
EASTING: 321196
NORTHING: 6260400

PIT No: TP10
PROJECT No: 99671.00
DATE: 4/5/2020
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per mm)
114	0.3	FILL/Clayey SILT: low plasticity, brown, trace fine to medium gravel, fine to medium sand, roots, fabric and terracotta, w<PL		E*	0.0 0.1		PID<1ppm		
				E	0.4 0.5		PID<1ppm		
	1	FILL/Silty CLAY: low to medium plasticity, brown, with fine to coarse sand, fine gravel and roots, w<PL, possibly natural		E	0.9 1.0		PID<1ppm		1
113	1.2	CLAY CI: medium plasticity, brown, with silt, fine to medium sand and fine to coarse sandstone gravel, w<PL		E	1.4 1.5		PID<1ppm		
	1.6	Pit discontinued at 1.6m Refusal on sandstone bedrock							
112	2								2
111	3								3
110	4								4
109	5								5
108	6								6
107	7								7
106	8								8
105	9								9

RIG: 1.5T excavator (300mm wide bucket)

LOGGED: AS

SURVEY DATUM: MGA94 Zone 56

WATER OBSERVATIONS: No free groundwater observed

REMARKS: *Replicate sample BD2/AS/20200504 from 0.0-0.1m

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

SAMPLING & IN SITU TESTING LEGEND

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

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TEST PIT LOG

CLIENT: School Infrastructure NSW
PROJECT: New Public School in Epping
LOCATION: 86 Chelmsford Avenue, Epping

SURFACE LEVEL: 110.3 AHD
EASTING: 321167
NORTHING: 6260382

PIT No: TP11
PROJECT No: 99671.00
DATE: 4/5/2020
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per mm)
110	0.3	FILL/Silty CLAY: low plasticity, dark brown, trace fine gravel, fine to medium sand and roots, w~PL		E	0.0 0.1		PID<1ppm		
		FILL/CLAY: medium plasticity, brown and pale brown, with silt, trace fine to medium sand and fine to medium gravel, w~PL, possibly natural		E	0.4 0.5		PID<1ppm		
109	0.9	CLAY CI-CH: medium to high plasticity, pale grey and pale brown, trace silt, fine to medium gravel, fine sand and rootlets, w~PL		E	0.9 1.0		PID<1ppm		
	1.4	Pit discontinued at 1.4m Target depth reached							

RIG: 1.5T excavator (300mm wide bucket)

LOGGED: AS

SURVEY DATUM: MGA94 Zone 56

WATER OBSERVATIONS: No free groundwater observed

REMARKS:

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

SAMPLING & IN SITU TESTING LEGEND

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

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TEST PIT LOG

CLIENT: School Infrastructure NSW
PROJECT: New Public School in Epping
LOCATION: 86 Chelmsford Avenue, Epping

SURFACE LEVEL: 107.5 AHD
EASTING: 321143
NORTHING: 6260390

PIT No: TP12
PROJECT No: 99671.00
DATE: 4/5/2020
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per mm)
107	0.28	FILL/Clayey SILT: low plasticity, brown, trace fine sand, fine gravel, rootlets and plastic fragments, w~PL		E*	0.0 0.1		PID<1ppm		
	0.6	FILL/CLAY: medium plasticity, pale grey and pale brown, trace fine sand, medium to coarse gravel and rootlets, w~PL, possibly natural		E	0.4 0.5		PID<1ppm		
106	1.35	CLAY CI-CH: medium to high plasticity, pale grey and pale brown, trace fine sand and fine to coarse shale gravel, w~PL 1.2m: with fine to coarse shale gravel		E	0.9 1.0		PID<1ppm		
		Pit discontinued at 1.35m Target depth reached							
105									
104									
103									
102									
101									
100									
99									
98									

Dynamic Penetrometer Test (blows per mm): 5, 10, 15, 20

RIG: 1.5T excavator (300mm wide bucket)

LOGGED: AS

SURVEY DATUM: MGA94 Zone 56

WATER OBSERVATIONS: No free groundwater observed

REMARKS: *Replicate sample BD3/AS/20200504 from 0.0-0.1m

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

SAMPLING & IN SITU TESTING LEGEND

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

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TEST PIT LOG

CLIENT: School Infrastructure NSW
PROJECT: New Public School in Epping
LOCATION: 86 Chelmsford Avenue, Epping

SURFACE LEVEL: 107.2 AHD
EASTING: 321122
NORTHING: 6260409

PIT No: TP13
PROJECT No: 99671.00
DATE: 4/5/2020
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per mm)
107	0.3	FILL/Clayey SILT: low plasticity, brown, trace fine to medium sand and rootlets, w~PL		E	0.0 0.1		PID<1ppm		
	0.65	FILL/CLAY: medium to high plasticity, pale grey, dark grey, brown, pale brown and red, trace fine to medium sand, fine gravel and rootlets, w~PL		E	0.4 0.5		PID<1ppm		
106	1	CLAY CI-CH: medium to high plasticity, pale grey and pale brown, trace fine sand and fine to medium shale gravel, w~PL		E	0.9 1.0		PID<1ppm		1
	1.4	Pit discontinued at 1.4m Target depth reached							
105	2								2
104	3								3
103	4								4
102	5								5
101	6								6
100	7								7
99	8								8
98	9								9

RIG: 1.5T excavator (300mm wide bucket)

LOGGED: AS

SURVEY DATUM: MGA94 Zone 56

WATER OBSERVATIONS: No free groundwater observed

REMARKS:

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

SAMPLING & IN SITU TESTING LEGEND

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

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TEST PIT LOG

CLIENT: School Infrastructure NSW
PROJECT: New Public School in Epping
LOCATION: 86 Chelmsford Avenue, Epping

SURFACE LEVEL: 104.7 AHD
EASTING: 321121
NORTHING: 6260350

PIT No: TP14
PROJECT No: 99671.00
DATE: 4/5/2020
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per mm)
104	0.0	FILL/Clayey SILT: low plasticity, brown, trace fine to medium sand, fine to coarse gravel, roots, metal fragment, w~PL		E	0.0 0.1		PID<1ppm		
	0.4	FILL/CLAY: medium plasticity, red and pale brown, with silt, trace fine sand, fine gravel and roots, w~PL, possibly natural		E	0.4 0.5		PID<1ppm		
	0.7	CLAY CI: medium plasticity, pale grey and pale brown, trace fine sand, fine to coarse shale gravel and rootlets, w<PLto w~PL		E	0.9		PID<1ppm		
103	1.2	Pit discontinued at 1.2m Target depth reached							
102									
101									
100									
99									
98									
97									
96									
95									

Dynamic Penetrometer Test (blows per mm): 5, 10, 15, 20

RIG: 1.5T excavator (300mm wide bucket)

LOGGED: AS

SURVEY DATUM: MGA94 Zone 56

WATER OBSERVATIONS: No free groundwater observed

REMARKS:

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

SAMPLING & IN SITU TESTING LEGEND

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

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BOREHOLE LOG

CLIENT: School Infrastructure NSW
PROJECT: New Public School in Epping
LOCATION: 86 Chelmsford Avenue, Epping

SURFACE LEVEL: 116.5 AHD
EASTING: 321194
NORTHING: 6260444
DIP/AZIMUTH: 90°/--

BORE No: BH15
PROJECT No: 99671.00
DATE: 6/5/2020
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
116	0.03	ASPHALTIC CONCRETE		A/E	0.1		PID<1ppm		
	0.08	ROADBASE: fine to medium igneous gravel			0.2				
		FILL/Silty CLAY: low plasticity, orange-brown, trace charcoal, fine sand and fine to medium ironstone gravel, w<PL, apparently moderately compacted		A/E	0.4		PID=1ppm		
					0.5				
	0.9			A/E	0.9		PID=1ppm		
115	1	Sandy CLAY CI: medium plasticity, red-brown and pale grey, fine to medium sand, with low to medium strength ironstone bands, trace organic material, w<PL, very stiff to hard, residual			1.0				
				S			13,15,28 N = 43		
	1.45	1.35m: extremely weathered sandstone			1.45				
		Bore discontinued at 1.45m							
114	2	Target depth reached							
113	3								
112	4								
111	5								
110	6								
109	7								
108	8								
107	9								

RIG: Scout 4 **DRILLER:** RKE **LOGGED:** IT **CASING:** Uncased

TYPE OF BORING: Solid flight auger (TC-bit) to 1.0m

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Location coordinates are in MGA94 Zone 56.

SAMPLING & IN SITU TESTING LEGEND

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

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Geotechnics / Environment / Groundwater

BOREHOLE LOG

CLIENT: School Infrastructure NSW
PROJECT: New Public School in Epping
LOCATION: 86 Chelmsford Avenue, Epping

SURFACE LEVEL: 117.4 AHD
EASTING: 321243
NORTHING: 6260471
DIP/AZIMUTH: 90°/--

BORE No: BH16
PROJECT No: 99671.00
DATE: 6/5/2020
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
117	0.03	ASPHALTIC CONCRETE							
	0.23	ROADBASE: fine to medium igneous gravel		A/E	0.25		PID<1ppm		
	0.4	FILL/Sandy CLAY: low to medium plasticity, dark grey and orange-brown, fine to medium sand, trace charcoal and fine to medium sandstone gravel, apparently moderately compacted		A/E	0.3		PID<1ppm		
	0.53	SANDSTONE: fine to medium grained, pale brown, very low strength with medium strength ironstone bands, Minchinbury Sandstone		S	0.4		25/30,B refusal		
		Bore discontinued at 0.53m Target depth reached			0.5 0.53				
116	1								
115	2								
114	3								
113	4								
112	5								
111	6								
110	7								
109	8								
108	9								

RIG: Scout 4 **DRILLER:** RKE **LOGGED:** IT **CASING:** Uncased
TYPE OF BORING: Solid flight auger (TC-bit) to 0.53m
WATER OBSERVATIONS: No free groundwater observed
REMARKS: Location coordinates are in MGA94 Zone 56.

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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Sampling Methods

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Sampling

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

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

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

Test Pits

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

Large Diameter Augers

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

Continuous Spiral Flight Augers

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

Non-core Rotary Drilling

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

Continuous Core Drilling

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

Standard Penetration Tests

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

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

The test results are reported in the following form.

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

  4,6,7
  N=13

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

  15, 30/40 mm

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

Dynamic Cone Penetrometer Tests / Perth Sand Penetrometer Tests

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

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

Description and Classification Methods

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

Soil Types

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

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

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

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

Definitions of grading terms used are:

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

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

In fine grained soils (>35% fines)

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

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

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

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

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

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

Soil Descriptions

Cohesive Soils

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

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

Cohesionless Soils

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

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

Soil Origin

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

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

Moisture Condition – Coarse Grained Soils

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

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

Moisture Condition – Fine Grained Soils

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

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

Rock Strength

Rock strength is defined by the Unconfined Compressive Strength and it refers to the strength of the rock substance and not the strength of the overall rock mass, which may be considerably weaker due to defects.

The Point Load Strength Index $Is_{(50)}$ is commonly used to provide an estimate of the rock strength and site specific correlations should be developed to allow UCS values to be determined. The point load strength test procedure is described by Australian Standard AS4133.4.1-2007. The terms used to describe rock strength are as follows:

Strength Term	Abbreviation	Unconfined Compressive Strength MPa	Point Load Index * $Is_{(50)}$ MPa
Very low	VL	0.6 - 2	0.03 - 0.1
Low	L	2 - 6	0.1 - 0.3
Medium	M	6 - 20	0.3 - 1.0
High	H	20 - 60	1 - 3
Very high	VH	60 - 200	3 - 10
Extremely high	EH	>200	>10

* Assumes a ratio of 20:1 for UCS to $Is_{(50)}$. It should be noted that the UCS to $Is_{(50)}$ ratio varies significantly for different rock types and specific ratios should be determined for each site.

Degree of Weathering

The degree of weathering of rock is classified as follows:

Term	Abbreviation	Description
Residual Soil	RS	Material is weathered to such an extent that it has soil properties. Mass structure and 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 material 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	No signs of decomposition or staining.
Note: If HW and MW cannot be differentiated use DW (see below)		
Distinctly weathered	DW	Rock strength usually changed by weathering. The rock may be highly discoloured, usually by iron staining. Porosity may be increased by leaching or may be decreased due to deposition of weathered products in pores.

Rock Descriptions

Degree of Fracturing

The following classification applies to the spacing of natural fractures in diamond drill cores. It includes bedding plane partings, joints and other defects, but excludes drilling breaks.

Term	Description
Fragmented	Fragments of <20 mm
Highly Fractured	Core lengths of 20-40 mm with occasional fragments
Fractured	Core lengths of 30-100 mm with occasional shorter and longer sections
Slightly Fractured	Core lengths of 300 mm or longer with occasional sections of 100-300 mm
Unbroken	Core contains very few fractures

Rock Quality Designation

The quality of the cored rock can be measured using the Rock Quality Designation (RQD) index, defined as:

$$\text{RQD \%} = \frac{\text{cumulative length of 'sound' core sections} \geq \text{100 mm long}}{\text{total drilled length of section being assessed}}$$

where 'sound' rock is assessed to be rock of low strength or stronger. The RQD applies only to natural fractures. If the core is broken by drilling or handling (i.e. drilling breaks) then the broken pieces are fitted back together and are not included in the calculation of RQD.

Stratification Spacing

For sedimentary rocks the following terms may be used to describe the spacing of bedding partings:

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

Symbols & Abbreviations

Introduction

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

Drilling or Excavation Methods

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

Water

▷	Water seep
▽	Water level

Sampling and Testing

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

Description of Defects in Rock

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

Defect Type

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

Orientation

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

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

Coating or Infilling Term

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

Coating Descriptor

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

Shape

cu	curved
ir	irregular
pl	planar
st	stepped
un	undulating

Roughness

po	polished
ro	rough
sl	slickensided
sm	smooth
vr	very rough

Other

fg	fragmented
bnd	band
qtz	quartz

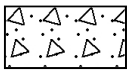
Symbols & Abbreviations

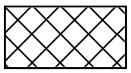
Graphic Symbols for Soil and Rock

General

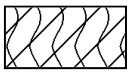

Asphalt

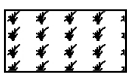

Road base

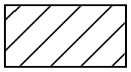

Concrete

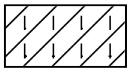

Filling

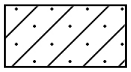
Soils


Topsoil

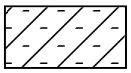

Peat

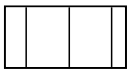

Clay

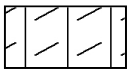

Silty clay

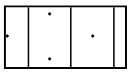

Sandy clay

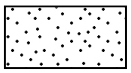

Gravelly clay

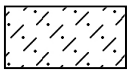

Shaly clay

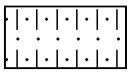

Silt


Clayey silt


Sandy silt

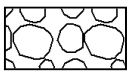

Sand

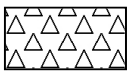

Clayey sand


Silty sand


Gravel

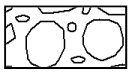

Sandy gravel


Cobbles, boulders

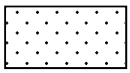

Talus

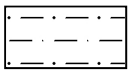
Sedimentary Rocks

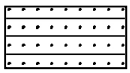

Boulder conglomerate

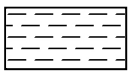

Conglomerate


Conglomeratic sandstone

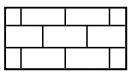

Sandstone


Siltstone

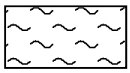

Laminite

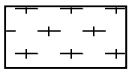

Mudstone, claystone, shale

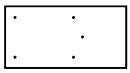

Coal


Limestone

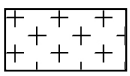
Metamorphic Rocks

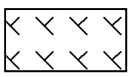

Slate, phyllite, schist

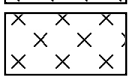

Gneiss

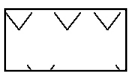

Quartzite

Igneous Rocks


Granite


Dolerite, basalt, andesite


Dacite, epidote


Tuff, breccia


Porphyry

Appendix G

Summary of Laboratory Results

Chain of Custody Documentation

and Laboratory Certificates of Analysis

Douglas Partners
Geotechnics / Environment / Groundwater

Table G1: Summary of Laboratory Results – Metals, TRH, BTEX, PAH, Phenol, PCB, Asbestos

			Metals								TRH						BTEX				PAH				Phenol		Asbestos
			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	Total PAHs	Phenol	Total PCB	Asbestos ID in soil >0.1g/kg
		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	0.05	5	0.1	-
Sample ID	Depth	Sample Date	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	-
BH01	0.4 - 0.5 m	06/05/2020	11 100 100	<0.4 20 NC	12 100 190	23 6000 210	28 300 1100	<0.1 40 NC	9 400 190	58 7400 520	<25 NC NC	<50 NC NC	<25 45 180	<50 110 120	<100 NC 300	<100 NC 2800	<0.2 0.5 50	<0.5 160 85	<1 55 70	<1 40 105	<1 3 170	<0.05 NC 0.7	<0.5 3 NC	<0.05 300 NC	NT 100 NC	NT 1 NC	NAD
BH02	0.9 - 1 m	06/05/2020	4 100 100	<0.4 20 NC	5 100 690	9 6000 210	9 300 1100	<0.1 40 NC	2 400 190	10 7400 520	<25 NC NC	<50 NC NC	<25 50 180	<50 280 120	<100 NC 1300	<100 NC 5600	<0.2 0.7 65	<0.5 480 105	<1 NL 125	<1 110 45	<1 5 170	<0.05 NC 0.7	<0.5 3 NC	<0.05 300 NC	NT 100 NC	NT 1 NC	NAD
BH03	0.25 - 0.3 m	06/05/2020	8 100 100	<0.4 20 NC	12 100 190	19 6000 210	15 300 1100	<0.1 40 NC	5 400 190	20 7400 520	<25 NC NC	<50 NC NC	<25 45 180	<50 110 120	<100 NC 300	<100 NC 2800	<0.2 0.5 50	<0.5 160 85	<1 55 70	<1 40 105	<1 3 170	<0.05 NC 0.7	<0.5 3 NC	<0.05 300 NC	NT 100 NC	NT 1 NC	NAD
BH04	0.4 - 0.5 m	06/05/2020	11 100 100	<0.4 20 NC	19 100 690	5 6000 210	9 300 1100	<0.1 40 NC	2 400 190	7 7400 520	<25 NC NC	<50 NC NC	<25 40 180	<50 230 120	<100 NC 1300	<100 NC 5600	<0.2 0.6 65	<0.5 390 105	<1 NL 125	<1 95 45	<1 4 170	<0.05 NC 0.7	<0.5 3 NC	<0.05 300 NC	<5 100 NC	<0.1 1 NC	NAD
BH05	0 - 0.1 m	04/05/2020	9 100 100	<0.4 20 NC	17 100 690	10 6000 210	30 300 1100	<0.1 40 NC	5 400 190	33 7400 520	<25 NC NC	<50 NC NC	<25 40 180	<50 230 120	<100 NC 1300	<100 NC 5600	<0.2 0.6 65	<0.5 390 105	<1 NL 125	<1 95 45	<1 4 170	<0.05 NC 0.7	<0.5 3 NC	0.1 300 NC	<5 100 NC	<0.1 1 NC	NAD
BH06	0.4 - 0.5 m	04/05/2020	11 100 100	<0.4 20 NC	25 100 690	14 6000 210	17 300 1100	<0.1 40 NC	15 400 190	21 7400 520	<25 NC NC	<50 NC NC	<25 50 180	<50 280 120	<100 NC 1300	<100 NC 5600	<0.2 0.7 65	<0.5 480 105	<1 NL 125	<1 110 45	<1 5 170	<0.05 NC 0.7	<0.5 3 NC	<0.05 300 NC	<5 100 NC	<0.1 1 NC	NAD
TP07	0.4 - 0.5 m	04/05/2020	12 100 100	<0.4 20 NC	15 100 690	23 6000 210	190 300 1100	<0.1 40 NC	10 400 190	170 7400 520	<25 NC NC	<50 NC NC	<25 40 180	<50 230 120	<100 NC 1300	<100 NC 5600	<0.2 0.6 65	<0.5 390 105	<1 NL 125	<1 95 45	<1 4 170	0.07 NC 0.7	<0.5 3 NC	0.69 300 NC	NT 100 NC	NT 1 NC	NAD
BD1/AS/20200504	0.4 - 0.5 m	04/05/2020	10 100 100	<0.4 20 NC	17 100 690	23 6000 210	140 300 1100	<0.1 40 NC	9 400 190	140 7400 520	NT NC NC	NT NC NC	NT 40 180	NT 230 120	NT NC 1300	NT NC 5600	NT 0.6 65	NT 390 105	NT NL 125	NT 95 45	<0.1 4 170	0.07 NC 0.7	<0.5 3 NC	0.64 300 NC	NT 100 NC	NT 1 NC	NT
TP08	0.4 - 0.5 m	04/05/2020	8 100 100	<0.4 20 NC	15 100 690	43 6000 210	160 300 1100	<0.1 40 NC	5 400 190	92 7400 520	<25 NC NC	<50 NC NC	<25 40 180	<50 230 120	<100 NC 1300	<100 NC 5600	<0.2 0.6 65	<0.5 390 105	<1 NL 125	<1 95 45	<1 4 170	0.06 NC 0.7	<0.5 3 NC	0.06 300 NC	<5 100 NC	<0.1 1 NC	NAD
TP08	0.9 - 1 m	04/05/2020	8 100 100	<0.4 20 NC	10 100 690	20 6000 210	14 300 1100	<0.1 40 NC	7 400 190	40 7400 520	<25 NC NC	<50 NC NC	<25 50 180	<50 280 120	<100 NC 1300	<100 NC 5600	<0.2 0.7 65	<0.5 480 105	<1 NL 125	<1 110 45	<1 5 170	<0.05 NC 0.7	<0.5 3 NC	<0.05 300 NC	NT 100 NC	NT 1 NC	NT
BH09	0 - 0.1 m	04/05/2020	6 100 100	0.7 20 NC	20 100 690	52 6000 210	100 300 1100	<0.1 40 NC	10 400 190	180 7400 520	<25 NC NC	<50 NC NC	<25 40 180	<50 230 120	460 NC 1300	330 NC 5600	<0.2 0.6 65	<0.5 390 105	<1 NL 125	<1 95 45	<1 4 170	<0.05 NC 0.7	<0.5 3 NC	<0.05 300 NC	<5 100 NC	<0.1 1 NC	NAD
TP10	0 - 0.1 m	04/05/2020	8 100 100	<0.4 20 NC	20 100 690	18 6000 210	44 300 1100	<0.1 40 NC	13 400 190	52 7400 520	<25 NC NC	<50 NC NC	<25 40 180	<50 230 120	110 NC 1300	<100 NC 5600	<0.2 0.6 65	<0.5 390 105	<1 NL 125	<1 95 45	<1 4 170	0.1 NC 0.7	<0.5 3 NC	0.1 300 NC	<5 100 NC	<0.1 1 NC	NAD
BD2/AS/20200504	0 - 0.1 m	04/05/2020	12 100 100	<0.4 20 NC	20 100 690	22 6000 210	52 300 1100	<0.1 40 NC	17 400 190	57 7400 520	<20 NC NC	<50 NC NC	<20 40 180	<50 230 120	<100 NC 1300	<100 NC 5600	<0.1 0.6 65	<0.1 390 105	<0.1 NL 125	<0.3 95 45	<0.5 4 170	<0.5 NC 0.7	<0.5 3 NC	<0.5 300 NC	<20 100 NC	<0.5 1 NC	NT
TP11	0.4 - 0.5 m	04/05/2020	12 100 100	<0.4 20 NC	10 100 690	28 6000 210	12 300 1100	<0.1 40 NC	9 400 190	72 7400 520	<25 NC NC	<50 NC NC	<25 50 180	<50 280 120	<100 NC 1300	<100 NC 5600	<0.2 0.7 65	<0.5 480 105	<1 NL 125	<1 110 45	<1 5 170	<0.05 NC 0.7	<0.5 3 NC	<0.05 300 NC	NT 100 NC	NT 1 NC	NAD
TP12	0 - 0.1 m	04/05/2020	11 100 100	<0.4 20 NC	10 100 690	23 6000 210	22 300 1100	<0.1 40 NC	10 400 190	59 7400 520	<25 NC NC	<50 NC NC	<25 40 180	<50 230 120	<100 NC 1300	<100 NC 5600	<0.2 0.6 65	<0.5 390 105	<1 NL 125	<1 95 45	<1 4 170	<0.05 NC 0.7	<0.5 3 NC	<0.05 300 NC	<5 100 NC	<0.1 1 NC	NAD
TP13	0.4 - 0.5 m	04/05/2020	13 100 100	<0.4 20 NC	12 100 690	29 6000 210	18 300 1100	<0.1 40 NC	9 400 190	57 7400 520	<25 NC NC	<50 NC NC	<25 50 180	<50 280 120	<100 NC 1300	<100 NC 5600	<0.2 0.7 65	<0.5 480 105	<1 NL 125	<1 110 45	<1 5 170	<0.05 NC 0.7	<0.5 3 NC	<0.05 300 NC	<5 100 NC	<0.1 1 NC	NAD
TP14	0 - 0.1 m	04/05/2020	5 100 100	<0.4 20 NC	9 100 690	23 6000 210	37 300 1100	<0.1 40 NC	5 400 190	74 7400 520	<25 NC NC	<50 NC NC	<25 40 180	<50 230 120	<100 NC 1300	<100 NC 5600	<0.2 0.6 65	<0.5 390 105	<1 NL 125	<1 95 45	<1 4 170	<0.05 NC 0.7	<0.5 3 NC	<0.05 300 NC	<5 100 NC	<0.1 1 NC	NAD
BH15	0.4 - 0.5 m	06/05/2020	9 100 100	<0.4 20 NC	10 100 190	18 6000 210	12 300 1100	<0.1 40 NC	5 400 190	23 7400 520	<25 NC NC	<50 NC NC	<25 45 180	<50 110 120	<100 NC 300	<100 NC 2800	<0.2 0.5 50	<0.5 160 85	<1 55 70	<1 40 105	<1 3 170	<0.05 NC 0.7	<0.5 3 NC	<0.05 300 NC	<5 100 NC	<0.1 1 NC	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

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 G2: Summary of Laboratory Results – OCP, OPP

			OCP																				OPP				
			DDT+DDE+DDD c	Aldrin & Dieldrin	Total Chlordane	Total Endosulfan	Endosulfan I	Endosulfan II	Endosulfan Sulphate	Endrin	Heptachlor	Hexachlorobenzene	Methoxychlor	alpha-BHC	beta-BHC	Bromophos-ethyl	Chlorpyriphos-methyl	delta-BHC	Diazinon	Dimethoate	Endrin Aldehyde	Lindane	Heptachlor Epoxide	Chlorpyriphos	Azinphos methyl (Guthion)	Ethion	Fenitrothion	Ronnel (fenchlorphos)
		PQL	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Sample ID	Depth	Sample Date	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
BH01	0.4 - 0.5 m	06/05/2020	NT 240 180	NT 6 NC	NT 50 NC	NT 270 NC	NT NC NC	NT NC NC	NT NC NC	NT 10 NC	NT 6 NC	<0.1 10 NC	<0.1 300 NC	NT NC NC	NT NC NC	NT NC NC	NT NC NC	NT NC NC	NT NC NC	NT NC NC	NT NC NC	NT NC NC	NT NC NC	<0.1 160 NC	NT NC NC	NT NC NC	NT NC NC	NT NC NC
BH02	0.9 - 1 m	06/05/2020	NT 240 180	NT 6 NC	NT 50 NC	NT 270 NC	NT NC NC	NT NC NC	NT NC NC	NT 10 NC	NT 6 NC	<0.1 10 NC	<0.1 300 NC	NT NC NC	NT NC NC	NT NC NC	NT NC NC	NT NC NC	NT NC NC	NT NC NC	NT NC NC	NT NC NC	NT NC NC	<0.1 160 NC	NT NC NC	NT NC NC	NT NC NC	NT NC NC
BH03	0.25 - 0.3 m	06/05/2020	NT 240 180	NT 6 NC	NT 50 NC	NT 270 NC	NT NC NC	NT NC NC	NT NC NC	NT 10 NC	NT 6 NC	<0.1 10 NC	<0.1 300 NC	NT NC NC	NT NC NC	NT NC NC	NT NC NC	NT NC NC	NT NC NC	NT NC NC	NT NC NC	NT NC NC	NT NC NC	<0.1 160 NC	NT NC NC	NT NC NC	NT NC NC	NT NC NC
BH04	0.4 - 0.5 m	06/05/2020	<0.1 240 180	<0.1 6 NC	<0.1 50 NC	<0.1 270 NC	<0.1 NC NC	<0.1 NC NC	<0.1 NC NC	<0.1 10 NC	<0.1 6 NC	<0.1 10 NC	<0.1 300 NC	<0.1 NC NC	<0.1 NC NC	<0.1 NC NC	<0.1 NC NC	<0.1 NC NC	<0.1 NC NC	<0.1 NC NC	<0.1 NC NC	<0.1 NC NC	<0.1 NC NC	<0.1 160 NC	<0.1 NC NC	<0.1 NC NC	<0.1 NC NC	<0.1 NC NC
BH05	0 - 0.1 m	04/05/2020	<0.1 240 180	<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 10 NC	<0.1 300 NC	<0.1 NC NC	<0.1 NC NC	<0.1 NC NC	<0.1 NC NC	<0.1 NC NC	<0.1 NC NC	<0.1 NC NC	<0.1 NC NC	<0.1 NC NC	<0.1 NC NC	<0.1 160 NC	<0.1 NC NC	<0.1 NC NC	<0.1 NC NC	<0.1 NC NC
BH06	0.4 - 0.5 m	04/05/2020	<0.1 240 180	<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 10 NC	<0.1 300 NC	<0.1 NC NC	<0.1 NC NC	<0.1 NC NC	<0.1 NC NC	<0.1 NC NC	<0.1 NC NC	<0.1 NC NC	<0.1 NC NC	<0.1 NC NC	<0.1 NC NC	<0.1 160 NC	<0.1 NC NC	<0.1 NC NC	<0.1 NC NC	<0.1 NC NC
TP07	0.4 - 0.5 m	04/05/2020	NT 240 180	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 10 NC	NT 300 NC	NT NC NC	NT NC NC	NT NC NC	NT NC NC	NT NC NC	NT NC NC	NT NC NC	NT NC NC	NT NC NC	NT NC NC	NT 160 NC	NT NC NC	NT NC NC	NT NC NC	NT NC NC
BD1/AS/20200504	0.4 - 0.5 m	04/05/2020	NT 240 180	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 10 NC	NT 300 NC	NT NC NC	NT NC NC	NT NC NC	NT NC NC	NT NC NC	NT NC NC	NT NC NC	NT NC NC	NT NC NC	NT NC NC	NT 160 NC	NT NC NC	NT NC NC	NT NC NC	NT NC NC
TP08	0.4 - 0.5 m	04/05/2020	<0.1 240 180	<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 10 NC	<0.1 300 NC	<0.1 NC NC	<0.1 NC NC	<0.1 NC NC	<0.1 NC NC	<0.1 NC NC	<0.1 NC NC	<0.1 NC NC	<0.1 NC NC	<0.1 NC NC	<0.1 NC NC	<0.1 160 NC	<0.1 NC NC	<0.1 NC NC	<0.1 NC NC	<0.1 NC NC
TP08	0.9 - 1 m	04/05/2020	NT 240 180	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 10 NC	NT 300 NC	NT NC NC	NT NC NC	NT NC NC	NT NC NC	NT NC NC	NT NC NC	NT NC NC	NT NC NC	NT NC NC	NT NC NC	NT 160 NC	NT NC NC	NT NC NC	NT NC NC	NT NC NC
BH09	0 - 0.1 m	04/05/2020	<0.1 240 180	<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 10 NC	<0.1 300 NC	<0.1 NC NC	<0.1 NC NC	<0.1 NC NC	<0.1 NC NC	<0.1 NC NC	<0.1 NC NC	<0.1 NC NC	<0.1 NC NC	<0.1 NC NC	<0.1 NC NC	<0.1 160 NC	<0.1 NC NC	<0.1 NC NC	<0.1 NC NC	<0.1 NC NC
TP10	0 - 0.1 m	04/05/2020	<0.1 240 180	<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 10 NC	<0.1 300 NC	<0.1 NC NC	<0.1 NC NC	<0.1 NC NC	<0.1 NC NC	<0.1 NC NC	<0.1 NC NC	<0.1 NC NC	<0.1 NC NC	<0.1 NC NC	<0.1 NC NC	<0.1 160 NC	<0.1 NC NC	<0.1 NC NC	<0.1 NC NC	<0.1 NC NC
BD2/AS/20200504	0 - 0.1 m	04/05/2020	<0.05 240 180	<0.1 6 NC	<0.1 50 NC	<0.1 270 NC	<0.05 NC NC	<0.05 NC NC	<0.05 NC NC	<0.05 10 NC	<0.05 6 NC	<0.05 10 NC	<0.2 300 NC	<0.05 NC NC	<0.05 NC NC	NT NC NC	<0.2 NC NC	<0.05 NC NC	<0.2 NC NC	<0.2 NC NC	<0.05 NC NC	<0.05 NC NC	<0.05 NC NC	<0.2 160 NC	<0.2 NC NC	<0.2 NC NC	<0.2 NC NC	<0.2 NC NC
TP11	0.4 - 0.5 m	04/05/2020	NT 240 180	NT 6 NC	NT 50 NC	NT 270 NC	NT NC NC	NT NC NC	NT NC NC	NT 10 NC	NT 6 NC	NT 10 NC	NT 300 NC	NT NC NC	NT NC NC	NT NC NC	NT NC NC	NT NC NC	NT NC NC	NT NC NC	NT NC NC	NT NC NC	NT NC NC	NT 160 NC	NT NC NC	NT NC NC	NT NC NC	NT NC NC
TP12	0 - 0.1 m	04/05/2020	<0.1 240 180	<0.1 6 NC	<0.1 50 NC	<0.1 270 NC	<0.1 NC NC	<0.1 NC NC	<0.1 NC NC	<0.1 10 NC	<0.1 6 NC	<0.1 10 NC	<0.1 300 NC	<0.1 NC NC	<0.1 NC NC	<0.1 NC NC	<0.1 NC NC	<0.1 NC NC	<0.1 NC NC	<0.1 NC NC	<0.1 NC NC	<0.1 NC NC	<0.1 NC NC	<0.1 160 NC	<0.1 NC NC	<0.1 NC NC	<0.1 NC NC	<0.1 NC NC
TP13	0.4 - 0.5 m	04/05/2020	<0.1 240 180	<0.1 6 NC	<0.1 50 NC	<0.1 270 NC	<0.1 NC NC	<0.1 NC NC	<0.1 NC NC	<0.1 10 NC	<0.1 6 NC	<0.1 10 NC	<0.1 300 NC	<0.1 NC NC	<0.1 NC NC	<0.1 NC NC	<0.1 NC NC	<0.1 NC NC	<0.1 NC NC	<0.1 NC NC	<0.1 NC NC	<0.1 NC NC	<0.1 NC NC	<0.1 160 NC	<0.1 NC NC	<0.1 NC NC	<0.1 NC NC	<0.1 NC NC
TP14	0 - 0.1 m	04/05/2020	<0.1 240 180	<0.1 6 NC	<0.1 50 NC	<0.1 270 NC	<0.1 NC NC	<0.1 NC NC	<0.1 NC NC	<0.1 10 NC	<0.1 6 NC	<0.1 10 NC	<0.1 300 NC	<0.1 NC NC	<0.1 NC NC	<0.1 NC NC	<0.1 NC NC	<0.1 NC NC	<0.1 NC NC	<0.1 NC NC	<0.1 NC NC	<0.1 NC NC	<0.1 NC NC	<0.1 160 NC	<0.1 NC NC	<0.1 NC NC	<0.1 NC NC	<0.1 NC NC
BH15	0.4 - 0.5 m	06/05/2020	<0.1 240 180	<0.1 6 NC	<0.1 50 NC	<0.1 270 NC	<0.1 NC NC	<0.1 NC NC	<0.1 NC NC	<0.1 10 NC	<0.1 6 NC	<0.1 10 NC	<0.1 300 NC	<0.1 NC NC	<0.1 NC NC	<0.1 NC NC	<0.1 NC NC	<0.1 NC NC	<0.1 NC NC	<0.1 NC NC	<0.1 NC NC	<0.1 NC NC	<0.1 NC NC	<0.1 160 NC	<0.1 NC NC	<0.1 NC NC	<0.1 NC NC	<0.1 NC NC

Lab result
HIL/HSL value EIL/ESL value

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

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

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

Notes:

HIL/HSL/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 G3: Summary of Laboratory Results – Metals, TRH, BTEX, PAH, Phenol, OCP, OPP, PCB, Asbestos

			Metals						TRH		BTEX					PAH		Phenol	OCP		OPP		PCB	Asbestos		
			Arsenic	Cadmium	Total Chromium	Lead	Mercury (inorganic)	Nickel	TRH C6 - C9	TRH C10-C36	Benzene	Toluene	Ethylbenzene	Xylenes (total)	Xylenes (m+p)	Benzo(a)pyrene (BaP)	Total PAHs	Phenol	Total Endosulfan	Total Analysed OCP	Chlorpyriphos	Total Analysed OPP	Total PCB	Asbestos ID in soil >0.1g/kg	Trace Analysis	Total Asbestos
		PQL	4	0.4	1	1	0.1	1	25	50	0.2	0.5	1	3	1	0.05	0.05	5	0.1	0.1	0.1	0.1	0.1			
Sample ID	Depth	Sample Date	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	-	-	-
BH01	0.4 - 0.5 m	06/05/2020	11	<0.4	12	28	<0.1	9	<25	<50	<0.2	<0.5	<1	<3	<1	<0.05	<0.05	NT	NT	NT	NT	NT	NT	NAD	NAD	NAD
BH02	0.9 - 1 m	06/05/2020	4	<0.4	5	9	<0.1	2	<25	<50	<0.2	<0.5	<1	<3	<1	<0.05	<0.05	NT	NT	NT	NT	NT	NT	NAD	NAD	NAD
BH03	0.25 - 0.3 m	06/05/2020	8	<0.4	12	15	<0.1	5	<25	<50	<0.2	<0.5	<1	<3	<1	<0.05	<0.05	NT	NT	NT	NT	NT	NT	NAD	NAD	NAD
BH04	0.4 - 0.5 m	06/05/2020	11	<0.4	19	9	<0.1	2	<25	<50	<0.2	<0.5	<1	<3	<1	<0.05	<0.05	<5	<0.1	<0.1	<0.1	<0.1	<0.1	NAD	NAD	NAD
BH05	0 - 0.1 m	04/05/2020	9	<0.4	17	30	<0.1	5	<25	<50	<0.2	<0.5	<1	<3	<1	<0.05	0.1	<5	<0.1	<0.1	<0.1	<0.1	<0.1	NAD	NAD	NAD
BH06	0.4 - 0.5 m	04/05/2020	11	<0.4	25	17	<0.1	15	<25	<50	<0.2	<0.5	<1	<3	<1	<0.05	<0.05	<5	<0.1	<0.1	<0.1	<0.1	<0.1	NAD	NAD	NAD
TP07	0.4 - 0.5 m	04/05/2020	12	<0.4	15	190	<0.1	10	<25	<50	<0.2	<0.5	<1	<3	<1	0.07	0.69	NT	NT	NT	NT	NT	NT	NAD	NAD	NAD
BD1/AS/20200504	0.4 - 0.5 m	04/05/2020	10	<0.4	17	140	<0.1	9	NT	NT	NT	NT	NT	NT	NT	0.07	0.64	NT	NT	NT	NT	NT	NT	NT	NT	NT
TP08	0.4 - 0.5 m	04/05/2020	8	<0.4	15	160	<0.1	5	<25	<50	<0.2	<0.5	<1	<3	<1	0.06	0.06	<5	<0.1	<0.1	<0.1	<0.1	<0.1	NAD	NAD	NAD
TP08	0.9 - 1 m	04/05/2020	8	<0.4	10	14	<0.1	7	<25	<50	<0.2	<0.5	<1	<3	<1	<0.05	<0.05	NT	NT	NT	NT	NT	NT	NT	NT	NT
BH09	0 - 0.1 m	04/05/2020	6	0.7	20	100	<0.1	10	<25	620	<0.2	<0.5	<1	<3	<1	<0.05	<0.05	<5	<0.1	<0.1	<0.1	<0.1	<0.1	NAD	NAD	NAD
TP10	0 - 0.1 m	04/05/2020	8	<0.4	20	44	<0.1	13	<25	120	<0.2	<0.5	<1	<3	<1	0.1	0.1	<5	<0.1	<0.1	<0.1	<0.1	<0.1	NAD	NAD	NAD
BD2/AS/20200504	0 - 0.1 m	04/05/2020	12	<0.4	20	52	<0.1	17	<20	<50	<0.1	<0.1	<0.1	<0.3	<0.1	<0.5	<0.5	<20	<0.05	<0.05	<0.2	<0.2	<0.5	NT	NT	NT
TP11	0.4 - 0.5 m	04/05/2020	12	<0.4	10	12	<0.1	9	<25	<50	<0.2	<0.5	<1	<3	<1	<0.05	<0.05	NT	NT	NT	NT	NT	NT	NAD	NAD	NAD
TP12	0 - 0.1 m	04/05/2020	11	<0.4	10	22	<0.1	10	<25	<50	<0.2	<0.5	<1	<3	<1	<0.05	<0.05	<5	<0.1	<0.1	<0.1	<0.1	<0.1	NAD	NAD	NAD
TP13	0.4 - 0.5 m	04/05/2020	13	<0.4	12	18	<0.1	9	<25	<50	<0.2	<0.5	<1	<3	<1	<0.05	<0.05	<5	<0.1	<0.1	<0.1	<0.1	<0.1	NAD	NAD	NAD
TP14	0 - 0.1 m	04/05/2020	5	<0.4	9	37	<0.1	5	<25	<50	<0.2	<0.5	<1	<3	<1	<0.05	<0.05	<5	<0.1	<0.1	<0.1	<0.1	<0.1	NAD	NAD	NAD
BH15	0.4 - 0.5 m	06/05/2020	9	<0.4	10	12	<0.1	5	<25	<50	<0.2	<0.5	<1	<3	<1	<0.05	<0.05	<5	<0.1	<0.1	<0.1	<0.1	<0.1	NAD	NAD	NAD
Waste Classification Criteria [f]																										
CT1			100	20	100	100	4	40	650	10000	10	288	600	1000	N/A	0.8	200	288	60	<50	4	4	<50	N/A	N/A	N/A
SCC1/TCLP1			500	100	1900	1500	50	1050	650	10000	18	518	1080	1800	N/A	10	200	518	108	<50	7.5	7.5	<50	N/A	N/A	N/A
CT2			400	80	400	400	16	160	2600	40000	40	1152	2400	4000	N/A	3.2	800	1152	240	<50	16	16	<50	N/A	N/A	N/A
SCC2/TCLP2			2000	400	7600	6000	200	4200	2600	40000	72	2073	4320	7200	N/A	23	800	2073	432	<50	30	30	<50	N/A	N/A	N/A
NEPC (1999) [h]			1-50	1	5-1000	2-200	0.03	1-517	N/A	500	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

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

NT = Not tested NC = No criteria AD = Asbestos detected NAD = No asbestos detected

Notes:

a	QA/QC replicate of sample listed directly below the primary sample
b	Total chromium used as initial screen for chromium(VI).
c	Total recoverable hydrocarbons (TRH) used as an initial screen for total petroleum hydrocarbons (TPH)
d	Criteria for scheduled chemicals used as an initial screen
e	Criteria for Chlorpyrifos used as initial screen
f	All criteria are in the same units as the reported results
h	NEPC (1999) National Environment Protection Measure (Assessment of Site Contamination) Schedule B1, Table 5-A, Background Ranges
PQL	Practical quantitation limit
CT1	NSW EPA, 2014, Waste Classification Guidelines Part 1; Classifying Waste, Maximum values of specific contaminant concentration (SCC) for classification without TCLP: General solid waste
SCC1	NSW EPA, 2014, Waste Classification Guidelines Part 1; Classifying Waste, Maximum values for leachable concentration (TCLP) and specific contaminant concentration (SCC) when used together: General solid waste
TCLP1	NSW EPA, 2014, Waste Classification Guidelines Part 1; Classifying Waste, Maximum values for leachable concentration (TCLP) and specific contaminant concentration (SCC) when used together: General solid waste
CT2	NSW EPA, 2014, Waste Classification Guidelines Part 1; Classifying Waste, Maximum values of specific contaminant concentration (SCC) for classification without TCLP: Restricted solid waste
SCC2	NSW EPA, 2014, Waste Classification Guidelines Part 1; Classifying Waste, Maximum values for leachable concentration (TCLP) and specific contaminant concentration (SCC) when used together: Restricted solid
TCLP2	NSW EPA, 2014, Waste Classification Guidelines Part 1; Classifying Waste, Maximum values for leachable concentration (TCLP) and specific contaminant concentration (SCC) when used together: Restricted solid

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

CERTIFICATE OF ANALYSIS 242263

Client Details

Client	Douglas Partners Pty Ltd
Attention	Nerilee Edwards
Address	96 Hermitage Rd, West Ryde, NSW, 2114

Sample Details

Your Reference	**99671.01, Epping South**
Number of Samples	14 SOIL
Date samples received	05/05/2020
Date completed instructions received	05/05/2020

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	12/05/2020
Date of Issue	12/05/2020

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

Results Approved By
Jaimie Loa-Kum-Cheung, Metals Supervisor
Josh Williams, Senior Chemist
Lucy Zhu, Asbestos Supervisor
Priya Samarawickrama, Senior Chemist
Ridwan Wijaya, Lab Team Leader

Authorised By

Nancy Zhang, Laboratory Manager

vTRH(C6-C10)/BTEXN in Soil						
Our Reference		242263-1	242263-2	242263-3	242263-4	242263-5
Your Reference	UNITS	HA05	HA06	TP7	TP8	TP8
Depth		0.0-0.1	0.4-0.5	0.4-0.5	0.4-0.5	0.9-1.0
Date Sampled		04/05/2020	04/05/2020	04/05/2020	04/05/2020	04/05/2020
Type of sample		SOIL	SOIL	SOIL	SOIL	SOIL
Date extracted	-	07/05/2020	07/05/2020	07/05/2020	07/05/2020	07/05/2020
Date analysed	-	10/05/2020	10/05/2020	10/05/2020	10/05/2020	10/05/2020
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	%	85	96	72	84	91

vTRH(C6-C10)/BTEXN in Soil						
Our Reference		242263-6	242263-7	242263-8	242263-9	242263-10
Your Reference	UNITS	HA09	TP10	TP11	TP12	TP13
Depth		0.0-0.1	0.0-0.1	0.4-0.5	0.0-0.1	0.4-0.5
Date Sampled		04/05/2020	04/05/2020	04/05/2020	04/05/2020	04/05/2020
Type of sample		SOIL	SOIL	SOIL	SOIL	SOIL
Date extracted	-	07/05/2020	07/05/2020	07/05/2020	07/05/2020	07/05/2020
Date analysed	-	10/05/2020	10/05/2020	10/05/2020	10/05/2020	10/05/2020
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	%	90	95	80	89	89

vTRH(C6-C10)/BTEXN in Soil				
Our Reference		242263-11	242263-13	242263-14
Your Reference	UNITS	TP14	TS/20200405	TB/20200405
Depth		0-0.1	-	-
Date Sampled		04/05/2020	04/05/2020	04/05/2020
Type of sample		SOIL	SOIL	SOIL
Date extracted	-	07/05/2020	07/05/2020	07/05/2020
Date analysed	-	10/05/2020	10/05/2020	11/05/2020
TRH C_6 - C_9	mg/kg	<25	[NA]	<25
TRH C_6 - C_{10}	mg/kg	<25	[NA]	<25
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	<25	[NA]	<25
Benzene	mg/kg	<0.2	82%	<0.2
Toluene	mg/kg	<0.5	88%	<0.5
Ethylbenzene	mg/kg	<1	86%	<1
m+p-xylene	mg/kg	<2	81%	<2
o-Xylene	mg/kg	<1	81%	<1
naphthalene	mg/kg	<1	[NA]	<1
Total +ve Xylenes	mg/kg	<3	[NA]	<3
Surrogate aaa-Trifluorotoluene	%	76	99	98

svTRH (C10-C40) in Soil						
Our Reference		242263-1	242263-2	242263-3	242263-4	242263-5
Your Reference	UNITS	HA05	HA06	TP7	TP8	TP8
Depth		0.0-0.1	0.4-0.5	0.4-0.5	0.4-0.5	0.9-1.0
Date Sampled		04/05/2020	04/05/2020	04/05/2020	04/05/2020	04/05/2020
Type of sample		SOIL	SOIL	SOIL	SOIL	SOIL
Date extracted	-	07/05/2020	07/05/2020	07/05/2020	07/05/2020	07/05/2020
Date analysed	-	07/05/2020	07/05/2020	07/05/2020	07/05/2020	07/05/2020
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	%	93	92	89	94	92

svTRH (C10-C40) in Soil						
Our Reference		242263-6	242263-7	242263-8	242263-9	242263-10
Your Reference	UNITS	HA09	TP10	TP11	TP12	TP13
Depth		0.0-0.1	0.0-0.1	0.4-0.5	0.0-0.1	0.4-0.5
Date Sampled		04/05/2020	04/05/2020	04/05/2020	04/05/2020	04/05/2020
Type of sample		SOIL	SOIL	SOIL	SOIL	SOIL
Date extracted	-	07/05/2020	07/05/2020	07/05/2020	07/05/2020	07/05/2020
Date analysed	-	07/05/2020	07/05/2020	07/05/2020	07/05/2020	07/05/2020
TRH C_{10} - C_{14}	mg/kg	<50	<50	<50	<50	<50
TRH C_{15} - C_{28}	mg/kg	190	<100	<100	<100	<100
TRH C_{29} - C_{36}	mg/kg	430	120	<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	460	110	<100	<100	<100
TRH >C_{34} -C_{40}	mg/kg	330	<100	<100	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	790	110	<50	<50	<50
Surrogate o-Terphenyl	%	112	101	94	85	93

svTRH (C10-C40) in Soil		
Our Reference		242263-11
Your Reference	UNITS	TP14
Depth		0-0.1
Date Sampled		04/05/2020
Type of sample		SOIL
Date extracted	-	07/05/2020
Date analysed	-	07/05/2020
TRH C_{10} - C_{14}	mg/kg	<50
TRH C_{15} - C_{28}	mg/kg	<100
TRH C_{29} - C_{36}	mg/kg	<100
TRH >C_{10} -C_{16}	mg/kg	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	mg/kg	<50
TRH >C_{16} -C_{34}	mg/kg	<100
TRH >C_{34} -C_{40}	mg/kg	<100
Total +ve TRH (>C10-C40)	mg/kg	<50
Surrogate o-Terphenyl	%	88

PAHs in Soil						
Our Reference		242263-1	242263-2	242263-3	242263-4	242263-5
Your Reference	UNITS	HA05	HA06	TP7	TP8	TP8
Depth		0.0-0.1	0.4-0.5	0.4-0.5	0.4-0.5	0.9-1.0
Date Sampled		04/05/2020	04/05/2020	04/05/2020	04/05/2020	04/05/2020
Type of sample		SOIL	SOIL	SOIL	SOIL	SOIL
Date extracted	-	07/05/2020	07/05/2020	07/05/2020	07/05/2020	07/05/2020
Date analysed	-	07/05/2020	07/05/2020	07/05/2020	07/05/2020	07/05/2020
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	0.3	<0.2	<0.2
Benzo(a)pyrene	mg/kg	<0.05	<0.05	0.07	0.06	<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	0.1	<0.05	0.69	0.06	<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	%	90	89	89	91	88

PAHs in Soil						
Our Reference		242263-6	242263-7	242263-8	242263-9	242263-10
Your Reference	UNITS	HA09	TP10	TP11	TP12	TP13
Depth		0.0-0.1	0.0-0.1	0.4-0.5	0.0-0.1	0.4-0.5
Date Sampled		04/05/2020	04/05/2020	04/05/2020	04/05/2020	04/05/2020
Type of sample		SOIL	SOIL	SOIL	SOIL	SOIL
Date extracted	-	07/05/2020	07/05/2020	07/05/2020	07/05/2020	07/05/2020
Date analysed	-	07/05/2020	07/05/2020	07/05/2020	07/05/2020	07/05/2020
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	0.1	<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	0.1	<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	%	93	89	90	92	90

PAHs in Soil			
Our Reference		242263-11	242263-12
Your Reference	UNITS	TP14	BD1/AS/20200504
Depth		0-0.1	-
Date Sampled		04/05/2020	04/05/2020
Type of sample		SOIL	SOIL
Date extracted	-	07/05/2020	07/05/2020
Date analysed	-	07/05/2020	07/05/2020
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	0.07
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	0.64
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	%	92	90

Organochlorine Pesticides in soil						
Our Reference		242263-1	242263-2	242263-4	242263-6	242263-7
Your Reference	UNITS	HA05	HA06	TP8	HA09	TP10
Depth		0.0-0.1	0.4-0.5	0.4-0.5	0.0-0.1	0.0-0.1
Date Sampled		04/05/2020	04/05/2020	04/05/2020	04/05/2020	04/05/2020
Type of sample		SOIL	SOIL	SOIL	SOIL	SOIL
Date extracted	-	07/05/2020	07/05/2020	07/05/2020	07/05/2020	07/05/2020
Date analysed	-	07/05/2020	07/05/2020	07/05/2020	07/05/2020	07/05/2020
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	%	94	92	89	99	94

Organochlorine Pesticides in soil				
Our Reference		242263-9	242263-10	242263-11
Your Reference	UNITS	TP12	TP13	TP14
Depth		0.0-0.1	0.4-0.5	0-0.1
Date Sampled		04/05/2020	04/05/2020	04/05/2020
Type of sample		SOIL	SOIL	SOIL
Date extracted	-	07/05/2020	07/05/2020	07/05/2020
Date analysed	-	07/05/2020	07/05/2020	07/05/2020
alpha-BHC	mg/kg	<0.1	<0.1	<0.1
HCB	mg/kg	<0.1	<0.1	<0.1
beta-BHC	mg/kg	<0.1	<0.1	<0.1
gamma-BHC	mg/kg	<0.1	<0.1	<0.1
Heptachlor	mg/kg	<0.1	<0.1	<0.1
delta-BHC	mg/kg	<0.1	<0.1	<0.1
Aldrin	mg/kg	<0.1	<0.1	<0.1
Heptachlor Epoxide	mg/kg	<0.1	<0.1	<0.1
gamma-Chlordane	mg/kg	<0.1	<0.1	<0.1
alpha-chlordane	mg/kg	<0.1	<0.1	<0.1
Endosulfan I	mg/kg	<0.1	<0.1	<0.1
pp-DDE	mg/kg	<0.1	<0.1	<0.1
Dieldrin	mg/kg	<0.1	<0.1	<0.1
Endrin	mg/kg	<0.1	<0.1	<0.1
Endosulfan II	mg/kg	<0.1	<0.1	<0.1
pp-DDD	mg/kg	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	<0.1	<0.1	<0.1
pp-DDT	mg/kg	<0.1	<0.1	<0.1
Endosulfan Sulphate	mg/kg	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	<0.1	<0.1	<0.1
Total +ve DDT+DDD+DDE	mg/kg	<0.1	<0.1	<0.1
Surrogate TCMX	%	96	92	94

Organophosphorus Pesticides in Soil						
Our Reference		242263-1	242263-2	242263-4	242263-6	242263-7
Your Reference	UNITS	HA05	HA06	TP8	HA09	TP10
Depth		0.0-0.1	0.4-0.5	0.4-0.5	0.0-0.1	0.0-0.1
Date Sampled		04/05/2020	04/05/2020	04/05/2020	04/05/2020	04/05/2020
Type of sample		SOIL	SOIL	SOIL	SOIL	SOIL
Date extracted	-	07/05/2020	07/05/2020	07/05/2020	07/05/2020	07/05/2020
Date analysed	-	07/05/2020	07/05/2020	07/05/2020	07/05/2020	07/05/2020
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	%	94	92	89	99	94

Organophosphorus Pesticides in Soil				
Our Reference		242263-9	242263-10	242263-11
Your Reference	UNITS	TP12	TP13	TP14
Depth		0.0-0.1	0.4-0.5	0-0.1
Date Sampled		04/05/2020	04/05/2020	04/05/2020
Type of sample		SOIL	SOIL	SOIL
Date extracted	-	07/05/2020	07/05/2020	07/05/2020
Date analysed	-	07/05/2020	07/05/2020	07/05/2020
Dichlorvos	mg/kg	<0.1	<0.1	<0.1
Dimethoate	mg/kg	<0.1	<0.1	<0.1
Diazinon	mg/kg	<0.1	<0.1	<0.1
Chlorpyriphos-methyl	mg/kg	<0.1	<0.1	<0.1
Ronnel	mg/kg	<0.1	<0.1	<0.1
Fenitrothion	mg/kg	<0.1	<0.1	<0.1
Malathion	mg/kg	<0.1	<0.1	<0.1
Chlorpyriphos	mg/kg	<0.1	<0.1	<0.1
Parathion	mg/kg	<0.1	<0.1	<0.1
Bromophos-ethyl	mg/kg	<0.1	<0.1	<0.1
Ethion	mg/kg	<0.1	<0.1	<0.1
Azinphos-methyl (Guthion)	mg/kg	<0.1	<0.1	<0.1
Surrogate TCMX	%	96	92	94

PCBs in Soil						
Our Reference		242263-1	242263-2	242263-4	242263-6	242263-7
Your Reference	UNITS	HA05	HA06	TP8	HA09	TP10
Depth		0.0-0.1	0.4-0.5	0.4-0.5	0.0-0.1	0.0-0.1
Date Sampled		04/05/2020	04/05/2020	04/05/2020	04/05/2020	04/05/2020
Type of sample		SOIL	SOIL	SOIL	SOIL	SOIL
Date extracted	-	07/05/2020	07/05/2020	07/05/2020	07/05/2020	07/05/2020
Date analysed	-	07/05/2020	07/05/2020	07/05/2020	07/05/2020	07/05/2020
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	%	94	92	89	99	94

PCBs in Soil				
Our Reference		242263-9	242263-10	242263-11
Your Reference	UNITS	TP12	TP13	TP14
Depth		0.0-0.1	0.4-0.5	0-0.1
Date Sampled		04/05/2020	04/05/2020	04/05/2020
Type of sample		SOIL	SOIL	SOIL
Date extracted	-	07/05/2020	07/05/2020	07/05/2020
Date analysed	-	07/05/2020	07/05/2020	07/05/2020
Aroclor 1016	mg/kg	<0.1	<0.1	<0.1
Aroclor 1221	mg/kg	<0.1	<0.1	<0.1
Aroclor 1232	mg/kg	<0.1	<0.1	<0.1
Aroclor 1242	mg/kg	<0.1	<0.1	<0.1
Aroclor 1248	mg/kg	<0.1	<0.1	<0.1
Aroclor 1254	mg/kg	<0.1	<0.1	<0.1
Aroclor 1260	mg/kg	<0.1	<0.1	<0.1
Total +ve PCBs (1016-1260)	mg/kg	<0.1	<0.1	<0.1
Surrogate TCMX	%	96	92	94

Acid Extractable metals in soil						
Our Reference		242263-1	242263-2	242263-3	242263-4	242263-5
Your Reference	UNITS	HA05	HA06	TP7	TP8	TP8
Depth		0.0-0.1	0.4-0.5	0.4-0.5	0.4-0.5	0.9-1.0
Date Sampled		04/05/2020	04/05/2020	04/05/2020	04/05/2020	04/05/2020
Type of sample		SOIL	SOIL	SOIL	SOIL	SOIL
Date prepared	-	07/05/2020	07/05/2020	07/05/2020	07/05/2020	07/05/2020
Date analysed	-	08/05/2020	08/05/2020	08/05/2020	08/05/2020	08/05/2020
Arsenic	mg/kg	9	11	12	8	8
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	17	25	15	15	10
Copper	mg/kg	10	14	23	43	20
Lead	mg/kg	30	17	190	160	14
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	5	15	10	5	7
Zinc	mg/kg	33	21	170	92	40

Acid Extractable metals in soil						
Our Reference		242263-6	242263-7	242263-8	242263-9	242263-10
Your Reference	UNITS	HA09	TP10	TP11	TP12	TP13
Depth		0.0-0.1	0.0-0.1	0.4-0.5	0.0-0.1	0.4-0.5
Date Sampled		04/05/2020	04/05/2020	04/05/2020	04/05/2020	04/05/2020
Type of sample		SOIL	SOIL	SOIL	SOIL	SOIL
Date prepared	-	07/05/2020	07/05/2020	07/05/2020	07/05/2020	07/05/2020
Date analysed	-	08/05/2020	08/05/2020	08/05/2020	08/05/2020	08/05/2020
Arsenic	mg/kg	6	8	12	11	13
Cadmium	mg/kg	0.7	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	20	20	10	10	12
Copper	mg/kg	52	18	28	23	29
Lead	mg/kg	100	44	12	22	18
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	10	13	9	10	9
Zinc	mg/kg	180	52	72	59	57

Acid Extractable metals in soil			
Our Reference		242263-11	242263-12
Your Reference	UNITS	TP14	BD1/AS/20200504
Depth		0-0.1	-
Date Sampled		04/05/2020	04/05/2020
Type of sample		SOIL	SOIL
Date prepared	-	07/05/2020	07/05/2020
Date analysed	-	08/05/2020	08/05/2020
Arsenic	mg/kg	5	10
Cadmium	mg/kg	<0.4	<0.4
Chromium	mg/kg	9	17
Copper	mg/kg	23	23
Lead	mg/kg	37	140
Mercury	mg/kg	<0.1	<0.1
Nickel	mg/kg	5	9
Zinc	mg/kg	74	140

Misc Soil - Inorg						
Our Reference		242263-1	242263-2	242263-4	242263-6	242263-7
Your Reference	UNITS	HA05	HA06	TP8	HA09	TP10
Depth		0.0-0.1	0.4-0.5	0.4-0.5	0.0-0.1	0.0-0.1
Date Sampled		04/05/2020	04/05/2020	04/05/2020	04/05/2020	04/05/2020
Type of sample		SOIL	SOIL	SOIL	SOIL	SOIL
Date prepared	-	07/05/2020	07/05/2020	07/05/2020	07/05/2020	07/05/2020
Date analysed	-	07/05/2020	07/05/2020	07/05/2020	07/05/2020	07/05/2020
Total Phenolics (as Phenol)	mg/kg	<5	<5	<5	<5	<5

Misc Soil - Inorg				
Our Reference		242263-9	242263-10	242263-11
Your Reference	UNITS	TP12	TP13	TP14
Depth		0.0-0.1	0.4-0.5	0-0.1
Date Sampled		04/05/2020	04/05/2020	04/05/2020
Type of sample		SOIL	SOIL	SOIL
Date prepared	-	07/05/2020	07/05/2020	07/05/2020
Date analysed	-	07/05/2020	07/05/2020	07/05/2020
Total Phenolics (as Phenol)	mg/kg	<5	<5	<5

Moisture						
Our Reference		242263-1	242263-2	242263-3	242263-4	242263-5
Your Reference	UNITS	HA05	HA06	TP7	TP8	TP8
Depth		0.0-0.1	0.4-0.5	0.4-0.5	0.4-0.5	0.9-1.0
Date Sampled		04/05/2020	04/05/2020	04/05/2020	04/05/2020	04/05/2020
Type of sample		SOIL	SOIL	SOIL	SOIL	SOIL
Date prepared	-	07/05/2020	07/05/2020	07/05/2020	07/05/2020	07/05/2020
Date analysed	-	08/05/2020	08/05/2020	08/05/2020	08/05/2020	08/05/2020
Moisture	%	19	20	19	17	15

Moisture						
Our Reference		242263-6	242263-7	242263-8	242263-9	242263-10
Your Reference	UNITS	HA09	TP10	TP11	TP12	TP13
Depth		0.0-0.1	0.0-0.1	0.4-0.5	0.0-0.1	0.4-0.5
Date Sampled		04/05/2020	04/05/2020	04/05/2020	04/05/2020	04/05/2020
Type of sample		SOIL	SOIL	SOIL	SOIL	SOIL
Date prepared	-	07/05/2020	07/05/2020	07/05/2020	07/05/2020	07/05/2020
Date analysed	-	08/05/2020	08/05/2020	08/05/2020	08/05/2020	08/05/2020
Moisture	%	30	17	16	17	24

Moisture			
Our Reference		242263-11	242263-12
Your Reference	UNITS	TP14	BD1/AS/20200504
Depth		0-0.1	-
Date Sampled		04/05/2020	04/05/2020
Type of sample		SOIL	SOIL
Date prepared	-	07/05/2020	07/05/2020
Date analysed	-	08/05/2020	08/05/2020
Moisture	%	11	19

Asbestos ID - soils						
Our Reference		242263-1	242263-2	242263-3	242263-4	242263-6
Your Reference	UNITS	HA05	HA06	TP7	TP8	HA09
Depth		0.0-0.1	0.4-0.5	0.4-0.5	0.4-0.5	0.0-0.1
Date Sampled		04/05/2020	04/05/2020	04/05/2020	04/05/2020	04/05/2020
Type of sample		SOIL	SOIL	SOIL	SOIL	SOIL
Date analysed	-	07/05/2020	07/05/2020	07/05/2020	07/05/2020	07/05/2020
Sample mass tested	g	Approx. 25g	Approx. 55g	Approx. 35g	Approx. 40g	Approx. 15g
Sample Description	-	Brown clayey soil & rocks	Red clayey soil & rocks	Brown clayey soil & rocks	Brown clayey soil & rocks	Brown clayey soil & rocks
Asbestos ID in soil	-	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	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
Asbestos comments	-	NO	NO	NO	NO	NO
Trace Analysis	-	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected

Asbestos ID - soils						
Our Reference		242263-7	242263-8	242263-9	242263-10	242263-11
Your Reference	UNITS	TP10	TP11	TP12	TP13	TP14
Depth		0.0-0.1	0.4-0.5	0.0-0.1	0.4-0.5	0-0.1
Date Sampled		04/05/2020	04/05/2020	04/05/2020	04/05/2020	04/05/2020
Type of sample		SOIL	SOIL	SOIL	SOIL	SOIL
Date analysed	-	07/05/2020	07/05/2020	07/05/2020	07/05/2020	07/05/2020
Sample mass tested	g	Approx. 35g	Approx. 40g	Approx. 30g	Approx. 35g	Approx. 30g
Sample Description	-	Brown clayey soil & rocks	Brown clayey soil & rocks	Brown clayey soil & rocks	Brown clayey soil & rocks	Brown clayey soil & rocks
Asbestos ID in soil	-	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	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
Asbestos comments	-	NO	NO	NO	NO	NO
Trace Analysis	-	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected

Misc Inorg - Soil				
Our Reference		242263-4	242263-8	242263-10
Your Reference	UNITS	TP8	TP11	TP13
Depth		0.4-0.5	0.4-0.5	0.4-0.5
Date Sampled		04/05/2020	04/05/2020	04/05/2020
Type of sample		SOIL	SOIL	SOIL
Date prepared	-	08/05/2020	08/05/2020	08/05/2020
Date analysed	-	08/05/2020	08/05/2020	08/05/2020
pH 1:5 soil:water	pH Units	6.9	6.9	6.1

CEC				
Our Reference		242263-4	242263-8	242263-10
Your Reference	UNITS	TP8	TP11	TP13
Depth		0.4-0.5	0.4-0.5	0.4-0.5
Date Sampled		04/05/2020	04/05/2020	04/05/2020
Type of sample		SOIL	SOIL	SOIL
Date prepared	-	11/05/2020	11/05/2020	11/05/2020
Date analysed	-	11/05/2020	11/05/2020	11/05/2020
Exchangeable Ca	meq/100g	8.4	11	5.1
Exchangeable K	meq/100g	0.2	0.6	0.1
Exchangeable Mg	meq/100g	1.9	2.5	3.7
Exchangeable Na	meq/100g	<0.1	<0.1	<0.1
Cation Exchange Capacity	meq/100g	11	14	9.0

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-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.
Metals-020	Determination of various metals by ICP-AES.
Metals-020	Determination of exchangeable cations and cation exchange capacity in soils using 1M Ammonium Chloride exchange and ICP-AES analytical finish.
Metals-021	Determination of Mercury by Cold Vapour AAS.
Org-020	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis.
Org-020	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis. Note, the Total +ve TRH PQL is reflective of the lowest individual PQL and is therefore "Total +ve TRH" is simply a sum of the positive individual TRH fractions (>C10-C40).
Org-021	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-ECD.
Org-021	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-ECD. Note, the Total +ve PCBs PQL is reflective of the lowest individual PQL and is therefore" Total +ve PCBs" is simply a sum of the positive individual PCBs.
Org-022	Determination of VOCs sampled onto coconut shell charcoal sorbent tubes, that can be desorbed using carbon disulphide, and analysed by GC-MS.
Org-022/025	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS/GC-MSMS.

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

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-5	242263-2
Date extracted	-			07/05/2020	1	07/05/2020	07/05/2020		07/05/2020	07/05/2020
Date analysed	-			11/05/2020	1	10/05/2020	10/05/2020		10/05/2020	10/05/2020
TRH C_6 - C_9	mg/kg	25	Org-023	<25	1	<25	<25	0	93	108
TRH C_6 - C_{10}	mg/kg	25	Org-023	<25	1	<25	<25	0	93	108
Benzene	mg/kg	0.2	Org-023	<0.2	1	<0.2	<0.2	0	104	106
Toluene	mg/kg	0.5	Org-023	<0.5	1	<0.5	<0.5	0	92	117
Ethylbenzene	mg/kg	1	Org-023	<1	1	<1	<1	0	84	100
m+p-xylene	mg/kg	2	Org-023	<2	1	<2	<2	0	93	108
o-Xylene	mg/kg	1	Org-023	<1	1	<1	<1	0	87	105
naphthalene	mg/kg	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
Surrogate aaa-Trifluorotoluene	%		Org-023	96	1	85	94	10	95	99

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	11	07/05/2020	07/05/2020		[NT]	[NT]
Date analysed	-			[NT]	11	10/05/2020	10/05/2020		[NT]	[NT]
TRH C_6 - C_9	mg/kg	25	Org-023	[NT]	11	<25	<25	0	[NT]	[NT]
TRH C_6 - C_{10}	mg/kg	25	Org-023	[NT]	11	<25	<25	0	[NT]	[NT]
Benzene	mg/kg	0.2	Org-023	[NT]	11	<0.2	<0.2	0	[NT]	[NT]
Toluene	mg/kg	0.5	Org-023	[NT]	11	<0.5	<0.5	0	[NT]	[NT]
Ethylbenzene	mg/kg	1	Org-023	[NT]	11	<1	<1	0	[NT]	[NT]
m+p-xylene	mg/kg	2	Org-023	[NT]	11	<2	<2	0	[NT]	[NT]
o-Xylene	mg/kg	1	Org-023	[NT]	11	<1	<1	0	[NT]	[NT]
naphthalene	mg/kg	1	Org-023	[NT]	11	<1	<1	0	[NT]	[NT]
Surrogate aaa-Trifluorotoluene	%		Org-023	[NT]	11	76	84	10	[NT]	[NT]

QUALITY CONTROL: svTRH (C10-C40) in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-5	242263-2
Date extracted	-			07/05/2020	1	07/05/2020	07/05/2020		07/05/2020	07/05/2020
Date analysed	-			07/05/2020	1	07/05/2020	07/05/2020		07/05/2020	07/05/2020
TRH C_{10} - C_{14}	mg/kg	50	Org-020	<50	1	<50	<50	0	105	99
TRH C_{15} - C_{28}	mg/kg	100	Org-020	<100	1	<100	<100	0	79	70
TRH C_{29} - C_{36}	mg/kg	100	Org-020	<100	1	<100	<100	0	92	97
TRH >C_{10} -C_{16}	mg/kg	50	Org-020	<50	1	<50	<50	0	105	99
TRH >C_{16} -C_{34}	mg/kg	100	Org-020	<100	1	<100	<100	0	79	70
TRH >C_{34} -C_{40}	mg/kg	100	Org-020	<100	1	<100	<100	0	92	97
Surrogate o-Terphenyl	%		Org-020	87	1	93	100	7	113	92

QUALITY CONTROL: svTRH (C10-C40) in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	11	07/05/2020	07/05/2020		[NT]	[NT]
Date analysed	-			[NT]	11	07/05/2020	07/05/2020		[NT]	[NT]
TRH C_{10} - C_{14}	mg/kg	50	Org-020	[NT]	11	<50	<50	0	[NT]	[NT]
TRH C_{15} - C_{28}	mg/kg	100	Org-020	[NT]	11	<100	<100	0	[NT]	[NT]
TRH C_{29} - C_{36}	mg/kg	100	Org-020	[NT]	11	<100	<100	0	[NT]	[NT]
TRH >C_{10} -C_{16}	mg/kg	50	Org-020	[NT]	11	<50	<50	0	[NT]	[NT]
TRH >C_{16} -C_{34}	mg/kg	100	Org-020	[NT]	11	<100	100	0	[NT]	[NT]
TRH >C_{34} -C_{40}	mg/kg	100	Org-020	[NT]	11	<100	<100	0	[NT]	[NT]
Surrogate o-Terphenyl	%		Org-020	[NT]	11	88	90	2	[NT]	[NT]

QUALITY CONTROL: PAHs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-5	242263-2
Date extracted	-			07/05/2020	1	07/05/2020	07/05/2020		07/05/2020	07/05/2020
Date analysed	-			07/05/2020	1	07/05/2020	07/05/2020		07/05/2020	07/05/2020
Naphthalene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	92	90
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	[NT]	[NT]
Fluorene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	90	90
Phenanthrene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	104	102
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	94	90
Pyrene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	0.1	0	94	94
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	82	82
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	98	100
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	93	1	90	88	2	88	85

QUALITY CONTROL: PAHs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	11	07/05/2020	07/05/2020		[NT]	[NT]
Date analysed	-			[NT]	11	07/05/2020	07/05/2020		[NT]	[NT]
Naphthalene	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Acenaphthylene	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Acenaphthene	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Fluorene	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Phenanthrene	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Anthracene	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Fluoranthene	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Pyrene	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Benzo(a)anthracene	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Chrysene	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Benzo(b,j+k)fluoranthene	mg/kg	0.2	Org-022/025	[NT]	11	<0.2	<0.2	0	[NT]	[NT]
Benzo(a)pyrene	mg/kg	0.05	Org-022/025	[NT]	11	<0.05	<0.05	0	[NT]	[NT]
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-022/025	[NT]	11	92	87	6	[NT]	[NT]

QUALITY CONTROL: Organochlorine Pesticides in soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-5	242263-2
Date extracted	-			07/05/2020	1	07/05/2020	07/05/2020		07/05/2020	07/05/2020
Date analysed	-			07/05/2020	1	07/05/2020	07/05/2020		07/05/2020	07/05/2020
alpha-BHC	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	104	106
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	102	102
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	110	112
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	96	104
Heptachlor Epoxide	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	102	104
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	96	96
Dieldrin	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	110	112
Endrin	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	102	106
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	76	78
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	104	104
Methoxychlor	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-022/025	99	1	94	93	1	96	92

QUALITY CONTROL: Organochlorine Pesticides in soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	11	07/05/2020	07/05/2020		[NT]	[NT]
Date analysed	-			[NT]	11	07/05/2020	07/05/2020		[NT]	[NT]
alpha-BHC	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
HCB	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
beta-BHC	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
gamma-BHC	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Heptachlor	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
delta-BHC	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Aldrin	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Heptachlor Epoxide	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
gamma-Chlordane	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
alpha-chlordane	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Endosulfan I	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
pp-DDE	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Dieldrin	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Endrin	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	0.1	0	[NT]	[NT]
Endosulfan II	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
pp-DDD	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Endrin Aldehyde	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
pp-DDT	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Endosulfan Sulphate	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Methoxychlor	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-022/025	[NT]	11	94	92	2	[NT]	[NT]

QUALITY CONTROL: Organophosphorus Pesticides in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-5	242263-2
Date extracted	-			07/05/2020	1	07/05/2020	07/05/2020		07/05/2020	07/05/2020
Date analysed	-			07/05/2020	1	07/05/2020	07/05/2020		07/05/2020	07/05/2020
Dichlorvos	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	102	98
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	118	116
Fenitrothion	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	116	118
Malathion	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	87	94
Chlorpyriphos	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	124	122
Parathion	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	72	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	122	122
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	99	1	94	93	1	96	92

QUALITY CONTROL: Organophosphorus Pesticides in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	11	07/05/2020	07/05/2020		[NT]	[NT]
Date analysed	-			[NT]	11	07/05/2020	07/05/2020		[NT]	[NT]
Dichlorvos	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Dimethoate	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Diazinon	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Chlorpyriphos-methyl	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Ronnel	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Fenitrothion	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Malathion	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Chlorpyriphos	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Parathion	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Bromophos-ethyl	mg/kg	0.1	Org-022	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Ethion	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Azinphos-methyl (Guthion)	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-022/025	[NT]	11	94	92	2	[NT]	[NT]

QUALITY CONTROL: PCBs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-5	242263-2
Date extracted	-			07/05/2020	1	07/05/2020	07/05/2020		07/05/2020	07/05/2020
Date analysed	-			07/05/2020	1	07/05/2020	07/05/2020		07/05/2020	07/05/2020
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	102	98
Aroclor 1260	mg/kg	0.1	Org-021	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-021	99	1	94	93	1	96	92

QUALITY CONTROL: PCBs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	11	07/05/2020	07/05/2020		[NT]	[NT]
Date analysed	-			[NT]	11	07/05/2020	07/05/2020		[NT]	[NT]
Aroclor 1016	mg/kg	0.1	Org-021	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1221	mg/kg	0.1	Org-021	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1232	mg/kg	0.1	Org-021	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1242	mg/kg	0.1	Org-021	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1248	mg/kg	0.1	Org-021	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1254	mg/kg	0.1	Org-021	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1260	mg/kg	0.1	Org-021	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-021	[NT]	11	94	92	2	[NT]	[NT]

QUALITY CONTROL: Acid Extractable metals in soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-5	242263-2
Date prepared	-			07/05/2020	1	07/05/2020	07/05/2020		07/05/2020	07/05/2020
Date analysed	-			08/05/2020	1	08/05/2020	08/05/2020		08/05/2020	08/05/2020
Arsenic	mg/kg	4	Metals-020	<4	1	9	8	12	118	86
Cadmium	mg/kg	0.4	Metals-020	<0.4	1	<0.4	<0.4	0	119	88
Chromium	mg/kg	1	Metals-020	<1	1	17	17	0	113	98
Copper	mg/kg	1	Metals-020	<1	1	10	10	0	113	106
Lead	mg/kg	1	Metals-020	<1	1	30	29	3	115	86
Mercury	mg/kg	0.1	Metals-021	<0.1	1	<0.1	<0.1	0	100	95
Nickel	mg/kg	1	Metals-020	<1	1	5	7	33	116	89
Zinc	mg/kg	1	Metals-020	<1	1	33	34	3	119	86

QUALITY CONTROL: Acid Extractable metals in soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date prepared	-			[NT]	11	07/05/2020	07/05/2020		[NT]	[NT]
Date analysed	-			[NT]	11	08/05/2020	08/05/2020		[NT]	[NT]
Arsenic	mg/kg	4	Metals-020	[NT]	11	5	7	33	[NT]	[NT]
Cadmium	mg/kg	0.4	Metals-020	[NT]	11	<0.4	<0.4	0	[NT]	[NT]
Chromium	mg/kg	1	Metals-020	[NT]	11	9	11	20	[NT]	[NT]
Copper	mg/kg	1	Metals-020	[NT]	11	23	26	12	[NT]	[NT]
Lead	mg/kg	1	Metals-020	[NT]	11	37	38	3	[NT]	[NT]
Mercury	mg/kg	0.1	Metals-021	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Nickel	mg/kg	1	Metals-020	[NT]	11	5	5	0	[NT]	[NT]
Zinc	mg/kg	1	Metals-020	[NT]	11	74	73	1	[NT]	[NT]

QUALITY CONTROL: Misc Soil - Inorg						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	242263-2
Date prepared	-			07/05/2020	1	07/05/2020	07/05/2020		07/05/2020	07/05/2020
Date analysed	-			07/05/2020	1	07/05/2020	07/05/2020		07/05/2020	07/05/2020
Total Phenolics (as Phenol)	mg/kg	5	Inorg-031	<5	1	<5	<5	0	102	112

QUALITY CONTROL: Misc Inorg - Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date prepared	-			08/05/2020	[NT]	[NT]	[NT]	[NT]	08/05/2020	[NT]
Date analysed	-			08/05/2020	[NT]	[NT]	[NT]	[NT]	08/05/2020	[NT]
pH 1:5 soil:water	pH Units		Inorg-001	[NT]	[NT]	[NT]	[NT]	[NT]	103	[NT]

QUALITY CONTROL: CEC						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date prepared	-			11/05/2020	4	11/05/2020	11/05/2020		11/05/2020	[NT]
Date analysed	-			11/05/2020	4	11/05/2020	11/05/2020		11/05/2020	[NT]
Exchangeable Ca	meq/100g	0.1	Metals-020	<0.1	4	8.4	8.8	5	106	[NT]
Exchangeable K	meq/100g	0.1	Metals-020	<0.1	4	0.2	0.2	0	102	[NT]
Exchangeable Mg	meq/100g	0.1	Metals-020	<0.1	4	1.9	1.9	0	105	[NT]
Exchangeable Na	meq/100g	0.1	Metals-020	<0.1	4	<0.1	<0.1	0	94	[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 volume was provided for asbestos analysis. A portion of the supplied sample was sub-sampled according to Envirolab procedures. We cannot guarantee that this sub-sample is indicative of the entire sample. Envirolab recommends supplying 40-50g (50mL) of sample in its own container as per AS4964-2004.
Note: Samples were sub-sampled from bags provided by the client.

Douglas Partners
Geotechnics / Environment / Groundwater

CHAIN OF CUSTODY DESPATCH SHEET

Project No:	99671.01	**Suburb:**	Epping South	**To:**	EnviroLab
Project Name:	Proposed Development DSI & RAP	**Order Number**			12 Ashley Street, Chatswood 2067
Project Manager:	Nerilee Edwards	**Sampler:**	AS	**Attn:**	Aileen Hie
Emails:	Nerilee.Edwards@douglaspartners.com.au	Alyssa.Spencer@douglaspartners.com.au		**Phone:**	(02) 9910 6200
Date Required:	Same day ☐ 24 hours ☐ 48 hours ☐ 72 hours ☐ Standard ☒			**Email:**	Ahie@envirolab.com.au
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 3a	pH	CEC	Combo 3	8 HM	PAH	BTEX		Notes/preservation
HA05/0.0-0.1	1	04/05/20	S	G	X									
HA06/0.4-0.5	2	04/05/20	S	G	X									
TP7/0.4-0.5	3	04/05/20	S	G		X								
TP8/0.4-0.5	4	04/05/20	S	G	X		X	X						
TP8/0.9-1.0	5	04/05/20	S	G					X					
HA09/0.0-0.1	6	04/05/20	S	G	X									
TP10/0.0-0.1	7	04/05/20	S	G	X									
TP11/0.4-0.5	8	04/05/20	S	G		X	X	X						
TP12/0.0-0.1	9	04/05/20	S	G	X									
TP13/0.4-0.5	10	04/05/20	S	G	X		X	X						
TP14/0-0.1	11	04/05/20	S	G	X									
BD1/AS/20200504	12	04/05/20	S	G						X	X			
TS/20200405	13	04/05/20	S	G								X		
TB/20200405	14	04/05/20	S	G								X		
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: 242263
Date Received: 5/5/20
Time Received: 11:30
Received by: SZ
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: 15 **Relinquished by:** AS **Transported to laboratory by:** Courier
Send Results to: Douglas Partners Pty Ltd **Address** **Phone:** **Fax:**

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
Attention	Nerilee Edwards

Sample Login Details

Your reference	99671.01, Epping South
Envirolab Reference	242263
Date Sample Received	05/05/2020
Date Instructions Received	05/05/2020
Date Results Expected to be Reported	12/05/2020

Sample Condition

Samples received in appropriate condition for analysis	Yes
No. of Samples Provided	14 SOIL
Turnaround Time Requested	Standard
Temperature on Receipt (°C)	12.7
Cooling Method	Ice
Sampling Date Provided	YES

Comments

Nil

Please direct any queries to:

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

Analysis Underway, details on the following page:

Envirolab Services Pty Ltd
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	CEC
HA05-0.0-0.1	✓	✓	✓	✓	✓	✓	✓	✓	✓		
HA06-0.4-0.5	✓	✓	✓	✓	✓	✓	✓	✓	✓		
TP7-0.4-0.5	✓	✓	✓				✓		✓		
TP8-0.4-0.5	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
TP8-0.9-1.0	✓	✓	✓				✓				
HA09-0.0-0.1	✓	✓	✓	✓	✓	✓	✓	✓	✓		
TP10-0.0-0.1	✓	✓	✓	✓	✓	✓	✓	✓	✓		
TP11-0.4-0.5	✓	✓	✓				✓		✓	✓	✓
TP12-0.0-0.1	✓	✓	✓	✓	✓	✓	✓	✓	✓		
TP13-0.4-0.5	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
TP14-0-0.1	✓	✓	✓	✓	✓	✓	✓	✓	✓		
BD1/AS/20200504			✓				✓				
TS/20200405	✓										
TB/20200405	✓										

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

Additional Info

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

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

CERTIFICATE OF ANALYSIS 242550

Client Details

Client	Douglas Partners Pty Ltd
Attention	Nerilee Edwards, Alyssa Spencer
Address	96 Hermitage Rd, West Ryde, NSW, 2114

Sample Details

Your Reference	**99671.01, Epping South**
Number of Samples	5 SOIL
Date samples received	08/05/2020
Date completed instructions received	08/05/2020

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	15/05/2020
Date of Issue	15/05/2020

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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
Loren Bardwell, Senior Chemist
Lucy Zhu, Asbestos Supervisor
Ridwan Wijaya, Lab Team Leader
Steven Luong, Organics Supervisor

Authorised By

Nancy Zhang, Laboratory Manager

vTRH(C6-C10)/BTEXN in Soil						
Our Reference		242550-1	242550-2	242550-3	242550-4	242550-5
Your Reference	UNITS	1	2	3	4	15
Depth		0.4-0.5	0.9-1	0.25-0.3	0.4-0.5	0.4-0.5
Date Sampled		06/05/2020	06/05/2020	06/05/2020	06/05/2020	06/05/2020
Type of sample		SOIL	SOIL	SOIL	SOIL	SOIL
Date extracted	-	12/05/2020	12/05/2020	12/05/2020	12/05/2020	12/05/2020
Date analysed	-	12/05/2020	12/05/2020	12/05/2020	12/05/2020	12/05/2020
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	%	103	112	82	94	105

svTRH (C10-C40) in Soil						
Our Reference		242550-1	242550-2	242550-3	242550-4	242550-5
Your Reference	UNITS	1	2	3	4	15
Depth		0.4-0.5	0.9-1	0.25-0.3	0.4-0.5	0.4-0.5
Date Sampled		06/05/2020	06/05/2020	06/05/2020	06/05/2020	06/05/2020
Type of sample		SOIL	SOIL	SOIL	SOIL	SOIL
Date extracted	-	12/05/2020	12/05/2020	12/05/2020	12/05/2020	12/05/2020
Date analysed	-	13/05/2020	13/05/2020	13/05/2020	13/05/2020	13/05/2020
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	%	105	100	105	88	89

PAHs in Soil						
Our Reference		242550-1	242550-2	242550-3	242550-4	242550-5
Your Reference	UNITS	1	2	3	4	15
Depth		0.4-0.5	0.9-1	0.25-0.3	0.4-0.5	0.4-0.5
Date Sampled		06/05/2020	06/05/2020	06/05/2020	06/05/2020	06/05/2020
Type of sample		SOIL	SOIL	SOIL	SOIL	SOIL
Date extracted	-	12/05/2020	12/05/2020	12/05/2020	12/05/2020	12/05/2020
Date analysed	-	13/05/2020	13/05/2020	13/05/2020	13/05/2020	13/05/2020
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	%	90	91	92	93	88

Organochlorine Pesticides in soil			
Our Reference		242550-4	242550-5
Your Reference	UNITS	4	15
Depth		0.4-0.5	0.4-0.5
Date Sampled		06/05/2020	06/05/2020
Type of sample		SOIL	SOIL
Date extracted	-	12/05/2020	12/05/2020
Date analysed	-	13/05/2020	13/05/2020
alpha-BHC	mg/kg	<0.1	<0.1
HCB	mg/kg	<0.1	<0.1
beta-BHC	mg/kg	<0.1	<0.1
gamma-BHC	mg/kg	<0.1	<0.1
Heptachlor	mg/kg	<0.1	<0.1
delta-BHC	mg/kg	<0.1	<0.1
Aldrin	mg/kg	<0.1	<0.1
Heptachlor Epoxide	mg/kg	<0.1	<0.1
gamma-Chlordane	mg/kg	<0.1	<0.1
alpha-chlordane	mg/kg	<0.1	<0.1
Endosulfan I	mg/kg	<0.1	<0.1
pp-DDE	mg/kg	<0.1	<0.1
Dieldrin	mg/kg	<0.1	<0.1
Endrin	mg/kg	<0.1	<0.1
Endosulfan II	mg/kg	<0.1	<0.1
pp-DDD	mg/kg	<0.1	<0.1
Endrin Aldehyde	mg/kg	<0.1	<0.1
pp-DDT	mg/kg	<0.1	<0.1
Endosulfan Sulphate	mg/kg	<0.1	<0.1
Methoxychlor	mg/kg	<0.1	<0.1
Total +ve DDT+DDD+DDE	mg/kg	<0.1	<0.1
Surrogate TCMX	%	91	87

Organophosphorus Pesticides in Soil			
Our Reference		242550-4	242550-5
Your Reference	UNITS	4	15
Depth		0.4-0.5	0.4-0.5
Date Sampled		06/05/2020	06/05/2020
Type of sample		SOIL	SOIL
Date extracted	-	12/05/2020	12/05/2020
Date analysed	-	13/05/2020	13/05/2020
Dichlorvos	mg/kg	<0.1	<0.1
Dimethoate	mg/kg	<0.1	<0.1
Diazinon	mg/kg	<0.1	<0.1
Chlorpyriphos-methyl	mg/kg	<0.1	<0.1
Ronnel	mg/kg	<0.1	<0.1
Fenitrothion	mg/kg	<0.1	<0.1
Malathion	mg/kg	<0.1	<0.1
Chlorpyriphos	mg/kg	<0.1	<0.1
Parathion	mg/kg	<0.1	<0.1
Bromophos-ethyl	mg/kg	<0.1	<0.1
Ethion	mg/kg	<0.1	<0.1
Azinphos-methyl (Guthion)	mg/kg	<0.1	<0.1
Surrogate TCMX	%	91	87

PCBs in Soil			
Our Reference		242550-4	242550-5
Your Reference	UNITS	4	15
Depth		0.4-0.5	0.4-0.5
Date Sampled		06/05/2020	06/05/2020
Type of sample		SOIL	SOIL
Date extracted	-	12/05/2020	12/05/2020
Date analysed	-	13/05/2020	13/05/2020
Aroclor 1016	mg/kg	<0.1	<0.1
Aroclor 1221	mg/kg	<0.1	<0.1
Aroclor 1232	mg/kg	<0.1	<0.1
Aroclor 1242	mg/kg	<0.1	<0.1
Aroclor 1248	mg/kg	<0.1	<0.1
Aroclor 1254	mg/kg	<0.1	<0.1
Aroclor 1260	mg/kg	<0.1	<0.1
Total +ve PCBs (1016-1260)	mg/kg	<0.1	<0.1
Surrogate TCMX	%	91	87

Acid Extractable metals in soil						
Our Reference		242550-1	242550-2	242550-3	242550-4	242550-5
Your Reference	UNITS	1	2	3	4	15
Depth		0.4-0.5	0.9-1	0.25-0.3	0.4-0.5	0.4-0.5
Date Sampled		06/05/2020	06/05/2020	06/05/2020	06/05/2020	06/05/2020
Type of sample		SOIL	SOIL	SOIL	SOIL	SOIL
Date prepared	-	12/05/2020	12/05/2020	12/05/2020	12/05/2020	12/05/2020
Date analysed	-	12/05/2020	12/05/2020	12/05/2020	12/05/2020	12/05/2020
Arsenic	mg/kg	11	4	8	11	9
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	12	5	12	19	10
Copper	mg/kg	23	9	19	5	18
Lead	mg/kg	28	9	15	9	12
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	9	2	5	2	5
Zinc	mg/kg	58	10	20	7	23

Misc Soil - Inorg			
Our Reference		242550-4	242550-5
Your Reference	UNITS	4	15
Depth		0.4-0.5	0.4-0.5
Date Sampled		06/05/2020	06/05/2020
Type of sample		SOIL	SOIL
Date prepared	-	12/05/2020	12/05/2020
Date analysed	-	12/05/2020	12/05/2020
Total Phenolics (as Phenol)	mg/kg	<5	<5

Moisture						
Our Reference		242550-1	242550-2	242550-3	242550-4	242550-5
Your Reference	UNITS	1	2	3	4	15
Depth		0.4-0.5	0.9-1	0.25-0.3	0.4-0.5	0.4-0.5
Date Sampled		06/05/2020	06/05/2020	06/05/2020	06/05/2020	06/05/2020
Type of sample		SOIL	SOIL	SOIL	SOIL	SOIL
Date prepared	-	12/05/2020	12/05/2020	12/05/2020	12/05/2020	12/05/2020
Date analysed	-	13/05/2020	13/05/2020	13/05/2020	13/05/2020	13/05/2020
Moisture	%	14	22	17	17	12

Asbestos ID - soils						
Our Reference		242550-1	242550-2	242550-3	242550-4	242550-5
Your Reference	UNITS	1	2	3	4	15
Depth		0.4-0.5	0.9-1	0.25-0.3	0.4-0.5	0.4-0.5
Date Sampled		06/05/2020	06/05/2020	06/05/2020	06/05/2020	06/05/2020
Type of sample		SOIL	SOIL	SOIL	SOIL	SOIL
Date analysed	-	13/05/2020	13/05/2020	13/05/2020	13/05/2020	13/05/2020
Sample mass tested	g	Approx. 30g	Approx. 25g	Approx. 30g	Approx. 30g	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
Asbestos comments	-	NO	NO	NO	NO	NO
Trace Analysis	-	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected

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-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.
Metals-020	Determination of various metals by ICP-AES.
Metals-021	Determination of Mercury by Cold Vapour AAS.
Org-020	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis.
Org-020	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis. Note, the Total +ve TRH PQL is reflective of the lowest individual PQL and is therefore "Total +ve TRH" is simply a sum of the positive individual TRH fractions (>C10-C40).
Org-021	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-ECD.
Org-021	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-ECD. Note, the Total +ve PCBs PQL is reflective of the lowest individual PQL and is therefore" Total +ve PCBs" is simply a sum of the positive individual PCBs.
Org-022	Determination of VOCs sampled onto coconut shell charcoal sorbent tubes, that can be desorbed using carbon disulphide, and analysed by GC-MS.
Org-022/025	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS/GC-MSMS.
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.

Method ID	Methodology Summary
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	[NT]
Date extracted	-			12/05/2020	[NT]	[NT]	[NT]	[NT]	12/05/2020	[NT]
Date analysed	-			12/05/2020	[NT]	[NT]	[NT]	[NT]	12/05/2020	[NT]
TRH C_6 - C_9	mg/kg	25	Org-023	<25	[NT]	[NT]	[NT]	[NT]	80	[NT]
TRH C_6 - C_{10}	mg/kg	25	Org-023	<25	[NT]	[NT]	[NT]	[NT]	80	[NT]
Benzene	mg/kg	0.2	Org-023	<0.2	[NT]	[NT]	[NT]	[NT]	80	[NT]
Toluene	mg/kg	0.5	Org-023	<0.5	[NT]	[NT]	[NT]	[NT]	87	[NT]
Ethylbenzene	mg/kg	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	79	[NT]
m+p-xylene	mg/kg	2	Org-023	<2	[NT]	[NT]	[NT]	[NT]	76	[NT]
o-Xylene	mg/kg	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	72	[NT]
naphthalene	mg/kg	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate aaa-Trifluorotoluene	%		Org-023	94	[NT]	[NT]	[NT]	[NT]	103	[NT]

QUALITY CONTROL: svTRH (C10-C40) in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-2	[NT]
Date extracted	-			12/05/2020	[NT]	[NT]	[NT]	[NT]	12/05/2020	[NT]
Date analysed	-			12/05/2020	[NT]	[NT]	[NT]	[NT]	12/05/2020	[NT]
TRH C_{10} - C_{14}	mg/kg	50	Org-020	<50	[NT]	[NT]	[NT]	[NT]	99	[NT]
TRH C_{15} - C_{28}	mg/kg	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	93	[NT]
TRH C_{29} - C_{36}	mg/kg	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	92	[NT]
TRH >C_{10} -C_{16}	mg/kg	50	Org-020	<50	[NT]	[NT]	[NT]	[NT]	99	[NT]
TRH >C_{16} -C_{34}	mg/kg	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	93	[NT]
TRH >C_{34} -C_{40}	mg/kg	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	92	[NT]
Surrogate o-Terphenyl	%		Org-020	87	[NT]	[NT]	[NT]	[NT]	138	[NT]

QUALITY CONTROL: PAHs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-2	[NT]
Date extracted	-			12/05/2020	[NT]	[NT]	[NT]	[NT]	12/05/2020	[NT]
Date analysed	-			13/05/2020	[NT]	[NT]	[NT]	[NT]	13/05/2020	[NT]
Naphthalene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	98	[NT]
Acenaphthylene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Acenaphthene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Fluorene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	96	[NT]
Phenanthrene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	110	[NT]
Anthracene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Fluoranthene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	102	[NT]
Pyrene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	104	[NT]
Benzo(a)anthracene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Chrysene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	86	[NT]
Benzo(b,j+k)fluoranthene	mg/kg	0.2	Org-022/025	<0.2	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Benzo(a)pyrene	mg/kg	0.05	Org-022/025	<0.05	[NT]	[NT]	[NT]	[NT]	102	[NT]
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-022/025	94	[NT]	[NT]	[NT]	[NT]	92	[NT]

QUALITY CONTROL: Organochlorine Pesticides in soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-2	[NT]
Date extracted	-			12/05/2020	[NT]	[NT]	[NT]	[NT]	12/05/2020	[NT]
Date analysed	-			13/05/2020	[NT]	[NT]	[NT]	[NT]	13/05/2020	[NT]
alpha-BHC	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	100	[NT]
HCB	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
beta-BHC	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	102	[NT]
gamma-BHC	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Heptachlor	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	84	[NT]
delta-BHC	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Aldrin	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	112	[NT]
Heptachlor Epoxide	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	110	[NT]
gamma-Chlordane	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
alpha-chlordane	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Endosulfan I	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
pp-DDE	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	110	[NT]
Dieldrin	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	118	[NT]
Endrin	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	100	[NT]
Endosulfan II	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
pp-DDD	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	78	[NT]
Endrin Aldehyde	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
pp-DDT	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Endosulfan Sulphate	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	76	[NT]
Methoxychlor	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate TCMX	%		Org-022/025	96	[NT]	[NT]	[NT]	[NT]	95	[NT]

QUALITY CONTROL: Organophosphorus Pesticides in Soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-2	[NT]
Date extracted	-			12/05/2020	[NT]	[NT]	[NT]	[NT]	12/05/2020	[NT]
Date analysed	-			13/05/2020	[NT]	[NT]	[NT]	[NT]	13/05/2020	[NT]
Dichlorvos	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	82	[NT]
Dimethoate	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Diazinon	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Chlorpyriphos-methyl	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Ronnel	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	98	[NT]
Fenitrothion	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	90	[NT]
Malathion	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	84	[NT]
Chlorpyriphos	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	104	[NT]
Parathion	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	84	[NT]
Bromophos-ethyl	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Ethion	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	108	[NT]
Azinphos-methyl (Guthion)	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate TCMX	%		Org-022/025	96	[NT]	[NT]	[NT]	[NT]	95	[NT]

QUALITY CONTROL: PCBs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-2	[NT]
Date extracted	-			12/05/2020	[NT]	[NT]	[NT]	[NT]	12/05/2020	[NT]
Date analysed	-			13/05/2020	[NT]	[NT]	[NT]	[NT]	13/05/2020	[NT]
Aroclor 1016	mg/kg	0.1	Org-021	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Aroclor 1221	mg/kg	0.1	Org-021	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Aroclor 1232	mg/kg	0.1	Org-021	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Aroclor 1242	mg/kg	0.1	Org-021	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Aroclor 1248	mg/kg	0.1	Org-021	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Aroclor 1254	mg/kg	0.1	Org-021	<0.1	[NT]	[NT]	[NT]	[NT]	102	[NT]
Aroclor 1260	mg/kg	0.1	Org-021	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate TCMX	%		Org-021	96	[NT]	[NT]	[NT]	[NT]	95	[NT]

QUALITY CONTROL: Acid Extractable metals in soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-2	[NT]
Date prepared	-			12/05/2020	[NT]	[NT]	[NT]	[NT]	12/05/2020	[NT]
Date analysed	-			12/05/2020	[NT]	[NT]	[NT]	[NT]	12/05/2020	[NT]
Arsenic	mg/kg	4	Metals-020	<4	[NT]	[NT]	[NT]	[NT]	108	[NT]
Cadmium	mg/kg	0.4	Metals-020	<0.4	[NT]	[NT]	[NT]	[NT]	105	[NT]
Chromium	mg/kg	1	Metals-020	<1	[NT]	[NT]	[NT]	[NT]	105	[NT]
Copper	mg/kg	1	Metals-020	<1	[NT]	[NT]	[NT]	[NT]	105	[NT]
Lead	mg/kg	1	Metals-020	<1	[NT]	[NT]	[NT]	[NT]	108	[NT]
Mercury	mg/kg	0.1	Metals-021	<0.1	[NT]	[NT]	[NT]	[NT]	102	[NT]
Nickel	mg/kg	1	Metals-020	<1	[NT]	[NT]	[NT]	[NT]	108	[NT]
Zinc	mg/kg	1	Metals-020	<1	[NT]	[NT]	[NT]	[NT]	114	[NT]

QUALITY CONTROL: Misc Soil - Inorg					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-2	[NT]
Date prepared	-			12/05/2020	[NT]	[NT]	[NT]	[NT]	12/05/2020	[NT]
Date analysed	-			12/05/2020	[NT]	[NT]	[NT]	[NT]	12/05/2020	[NT]
Total Phenolics (as Phenol)	mg/kg	5	Inorg-031	<5	[NT]	[NT]	[NT]	[NT]	101	[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: 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 requested for asbestos testing were sub-sampled from jars provided by the client.

Douglas Partners
Geotechnics | Environment | Groundwater

CHAIN OF CUSTODY DESPATCH SHEET

Project No:	99671.01	**Suburb:**	Epping South	**To:**	EnviroLab
Project Name:		**Order Number**			12 Ashley Street, Chatswood 2067
Project Manager:	Nerilee Edwards	**Sampler:**	IT	**Attn:**	Aileen Hie
Emails:	Nerilee.Edwards@douglaspartners.com.au	Alyssa.Spencer@douglaspartners.com.au		**Phone:**	(02) 9910 6200
Date Required:	Same day ☐ 24 hours ☐ 48 hours ☐ 72 hours ☐ Standard ☒			**Email:**	Ahie@envirolab.com.au
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 3a	pH	CEC	Combo 3	8 HM	PAH	BTEX		Notes/preservation
1/0.4-0.5	1	06/05/20	S	G		X								
2/0.9-1	2	06/05/20	S	G		X								
3/0.25-0.3	3	05/05/20	S	G		X								
4/0.4-0.5	4	08/05/20	S	G	X									
15/0.4-0.5	5	06/05/20	S	G	X									
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: 292550
Date Received: 8/5/20
Time Received: 1615
Received by:
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:** **Transported to laboratory by:**

Send Results to: Douglas Partners Pty Ltd **Address:** **Phone:** **Fax:**

Recd by: [illegible] 8/5/20

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
Attention	Nerilee Edwards, Alyssa Spencer

Sample Login Details

Your reference	99671.01, Epping South
Envirolab Reference	242550
Date Sample Received	08/05/2020
Date Instructions Received	08/05/2020
Date Results Expected to be Reported	15/05/2020

Sample Condition

Samples received in appropriate condition for analysis	Yes
No. of Samples Provided	5 SOIL
Turnaround Time Requested	Standard
Temperature on Receipt (°C)	11.2
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
1-0.4-0.5	✓	✓	✓				✓		✓
2-0.9-1	✓	✓	✓				✓		✓
3-0.25-0.3	✓	✓	✓				✓		✓
4-0.4-0.5	✓	✓	✓	✓	✓	✓	✓	✓	✓
15-0.4-0.5	✓	✓	✓	✓	✓	✓	✓	✓	✓

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.

eurofins | Environment Testing

ABN – 50 005 085 521 web : www.eurofins.com.au e.mail : EnviroSales@eurofins.com

Australia

Melbourne
6 Monterey Road
Dandenong South VIC 3175
Phone : +61 3 8564 5000
NATA # 1261
Site # 1254 & 14271

Sydney
Unit F3, Building F
16 Mars Road
Lane Cove West NSW 2066
Phone : +61 2 9900 8400
NATA # 1261 Site # 18217

Brisbane
1/21 Smallwood Place
Murarrie QLD 4172
Phone : +61 7 3902 4600
NATA # 1261 Site # 20794

Perth
2/91 Leach Highway
Kewdale WA 6105
Phone : +61 8 9251 9600
NATA # 1261
Site # 23736

New Zealand

Auckland
35 O'Rorke Road
Penrose, Auckland 1061
Phone : +64 9 526 45 51
IANZ # 1327

Christchurch
43 Detroit Drive
Rolleston, Christchurch 7675
Phone : 0800 856 450
IANZ # 1290

Company Name: Douglas Partners (Syd)
Address: 96 Hermitage Road
West Ryde
NSW 2114

Project Name:
Project ID: 99671.01

Order No.:
Report #: 717726
Phone: 02 9809 0666
Fax:

Received: May 6, 2020 1:00 PM
Due: May 13, 2020
Priority: 5 Day
Contact Name: Nerilee Edwards

Eurofins Analytical Services Manager : Ursula Long

Sample Detail						Organochlorine Pesticides	Organophosphorus Pesticides	Polychlorinated Biphenyls	Phenols (IWRG 621)	Moisture Set	Eurofins | mgt Suite B7
Melbourne Laboratory - NATA Site # 1254 & 14271											
Sydney Laboratory - NATA Site # 18217						X	X	X	X	X	X
Brisbane Laboratory - NATA Site # 20794											
Perth Laboratory - NATA Site # 23736											
External Laboratory											
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**						
1	BD2/AS/20200504	May 04, 2020		Soil	S20-My07154	X	X	X	X	X	X
Test Counts						1	1	1	1	1	1

eurofins | Environment Testing

Melbourne
6 Monterey Road
Dandenong South Vic 3175
Phone : +61 3 8564 5000
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Unit F3, Building F
16 Mars Road
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Phone : +61 7 3902 4600
NATA # 1261 Site # 20794

Perth
2/91 Leach Highway
Kewdale WA 6105
Phone : +61 8 9251 9600
NATA # 1261 Site # 23736

ABN – 50 005 085 521 e.mail : EnviroSales@eurofins.com web : www.eurofins.com.au

Sample Receipt Advice

Company name:	**Douglas Partners (Syd)**
Contact name:	Nerilee Edwards
Project ID:	99671.01
COC number:	Not provided
Turn around time:	5 Day
Date/Time received:	May 6, 2020 1:00 PM
Eurofins reference:	**717726**

Sample information

☑ A detailed list of analytes logged into our LIMS, is included in the attached summary table.

☑ All samples have been received as described on the above COC.

☑ COC has been completed correctly.

☒ Attempt to chill was evident.

☑ Appropriately preserved sample containers have been used.

☑ All samples were received in good condition.

☑ Samples have been provided with adequate time to commence analysis in accordance with the relevant holding times.

☑ Appropriate sample containers have been used.

☒ Split sample sent to requested external lab.

☒ Some samples have been subcontracted.

N/A Custody Seals intact (if used).

Contact notes

If you have any questions with respect to these samples please contact:

Ursula Long on Phone : or by e.mail: UrsulaLong@eurofins.com

Results will be delivered electronically via e.mail to Nerilee Edwards - nerilee.edwards@douglaspartners.com.au.

Douglas Partners (Syd)
96 Hermitage Road
West Ryde
NSW 2114

NATA Accredited
Accreditation Number 1261
Site Number 18217

Accredited for compliance with ISO/IEC 17025 – Testing
The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.

Attention: **Nerilee Edwards**

Report **717726-S**
Project name
Project ID 99671.01
Received Date May 06, 2020

Client Sample ID			**BD2/AS/20200504**
Sample Matrix			**Soil**
Eurofins Sample No.			**S20-My07154**
Date Sampled			**May 04, 2020**
Test/Reference	LOR	Unit	
Total Recoverable Hydrocarbons - 1999 NEPM Fractions			
TRH C6-C9	20	mg/kg	< 20
TRH C10-C14	20	mg/kg	< 20
TRH C15-C28	50	mg/kg	< 50
TRH C29-C36	50	mg/kg	< 50
TRH C10-C36 (Total)	50	mg/kg	< 50
BTEX			
Benzene	0.1	mg/kg	< 0.1
Toluene	0.1	mg/kg	< 0.1
Ethylbenzene	0.1	mg/kg	< 0.1
m&p-Xylenes	0.2	mg/kg	< 0.2
o-Xylene	0.1	mg/kg	< 0.1
Xylenes - Total*	0.3	mg/kg	< 0.3
4-Bromofluorobenzene (surr.)	1	%	76
Total Recoverable Hydrocarbons - 2013 NEPM Fractions			
Naphthalene[N02]	0.5	mg/kg	< 0.5
TRH C6-C10	20	mg/kg	< 20
TRH C6-C10 less BTEX (F1)[N04]	20	mg/kg	< 20
TRH >C10-C16	50	mg/kg	< 50
TRH >C10-C16 less Naphthalene (F2)[N01]	50	mg/kg	< 50
TRH >C16-C34	100	mg/kg	< 100
TRH >C34-C40	100	mg/kg	< 100
TRH >C10-C40 (total)*	100	mg/kg	< 100
Polycyclic Aromatic Hydrocarbons			
Benzo(a)pyrene TEQ (lower bound) *	0.5	mg/kg	< 0.5
Benzo(a)pyrene TEQ (medium bound) *	0.5	mg/kg	0.6
Benzo(a)pyrene TEQ (upper bound) *	0.5	mg/kg	1.2
Acenaphthene	0.5	mg/kg	< 0.5
Acenaphthylene	0.5	mg/kg	< 0.5
Anthracene	0.5	mg/kg	< 0.5
Benz(a)anthracene	0.5	mg/kg	< 0.5
Benzo(a)pyrene	0.5	mg/kg	< 0.5
Benzo(b&j)fluoranthene[N07]	0.5	mg/kg	< 0.5
Benzo(g.h.i)perylene	0.5	mg/kg	< 0.5
Benzo(k)fluoranthene	0.5	mg/kg	< 0.5
Chrysene	0.5	mg/kg	< 0.5

Client Sample ID			BD2/AS/20200504
Sample Matrix			**Soil**
Eurofins Sample No.			**S20-My07154**
Date Sampled			**May 04, 2020**
Test/Reference	LOR	Unit	
Polycyclic Aromatic Hydrocarbons			
Dibenz(a.h)anthracene	0.5	mg/kg	< 0.5
Fluoranthene	0.5	mg/kg	< 0.5
Fluorene	0.5	mg/kg	< 0.5
Indeno(1.2.3-cd)pyrene	0.5	mg/kg	< 0.5
Naphthalene	0.5	mg/kg	< 0.5
Phenanthrene	0.5	mg/kg	< 0.5
Pyrene	0.5	mg/kg	< 0.5
Total PAH*	0.5	mg/kg	< 0.5
2-Fluorobiphenyl (surr.)	1	%	103
p-Terphenyl-d14 (surr.)	1	%	115
Organochlorine Pesticides			
Chlordanes - Total	0.1	mg/kg	< 0.1
4.4'-DDD	0.05	mg/kg	< 0.05
4.4'-DDE	0.05	mg/kg	< 0.05
4.4'-DDT	0.05	mg/kg	< 0.05
a-BHC	0.05	mg/kg	< 0.05
Aldrin	0.05	mg/kg	< 0.05
b-BHC	0.05	mg/kg	< 0.05
d-BHC	0.05	mg/kg	< 0.05
Dieldrin	0.05	mg/kg	< 0.05
Endosulfan I	0.05	mg/kg	< 0.05
Endosulfan II	0.05	mg/kg	< 0.05
Endosulfan sulphate	0.05	mg/kg	< 0.05
Endrin	0.05	mg/kg	< 0.05
Endrin aldehyde	0.05	mg/kg	< 0.05
Endrin ketone	0.05	mg/kg	< 0.05
g-BHC (Lindane)	0.05	mg/kg	< 0.05
Heptachlor	0.05	mg/kg	< 0.05
Heptachlor epoxide	0.05	mg/kg	< 0.05
Hexachlorobenzene	0.05	mg/kg	< 0.05
Methoxychlor	0.2	mg/kg	< 0.2
Toxaphene	1	mg/kg	< 1
Aldrin and Dieldrin (Total)*	0.05	mg/kg	< 0.05
DDT + DDE + DDD (Total)*	0.05	mg/kg	< 0.05
Vic EPA IWRG 621 OCP (Total)*	0.1	mg/kg	< 0.2
Vic EPA IWRG 621 Other OCP (Total)*	0.1	mg/kg	< 0.2
Dibutylchlorendate (surr.)	1	%	73
Tetrachloro-m-xylene (surr.)	1	%	100
Organophosphorus Pesticides			
Azinphos-methyl	0.2	mg/kg	< 0.2
Bolstar	0.2	mg/kg	< 0.2
Chlorfenvinphos	0.2	mg/kg	< 0.2
Chlorpyrifos	0.2	mg/kg	< 0.2
Chlorpyrifos-methyl	0.2	mg/kg	< 0.2
Coumaphos	2	mg/kg	< 2
Demeton-S	0.2	mg/kg	< 0.2
Demeton-O	0.2	mg/kg	< 0.2
Diazinon	0.2	mg/kg	< 0.2
Dichlorvos	0.2	mg/kg	< 0.2

Client Sample ID			BD2/AS/20200504
Sample Matrix			**Soil**
Eurofins Sample No.			**S20-My07154**
Date Sampled			**May 04, 2020**
Test/Reference	LOR	Unit	
Organophosphorus Pesticides			
Dimethoate	0.2	mg/kg	< 0.2
Disulfoton	0.2	mg/kg	< 0.2
EPN	0.2	mg/kg	< 0.2
Ethion	0.2	mg/kg	< 0.2
Ethoprop	0.2	mg/kg	< 0.2
Ethyl parathion	0.2	mg/kg	< 0.2
Fenitrothion	0.2	mg/kg	< 0.2
Fensulfothion	0.2	mg/kg	< 0.2
Fenthion	0.2	mg/kg	< 0.2
Malathion	0.2	mg/kg	< 0.2
Merphos	0.2	mg/kg	< 0.2
Methyl parathion	0.2	mg/kg	< 0.2
Mevinphos	0.2	mg/kg	< 0.2
Monocrotophos	2	mg/kg	< 2
Naled	0.2	mg/kg	< 0.2
Omethoate	2	mg/kg	< 2
Phorate	0.2	mg/kg	< 0.2
Pirimiphos-methyl	0.2	mg/kg	< 0.2
Pyrazophos	0.2	mg/kg	< 0.2
Ronnel	0.2	mg/kg	< 0.2
Terbufos	0.2	mg/kg	< 0.2
Tetrachlorvinphos	0.2	mg/kg	< 0.2
Tokuthion	0.2	mg/kg	< 0.2
Trichloronate	0.2	mg/kg	< 0.2
Triphenylphosphate (surr.)	1	%	100
Polychlorinated Biphenyls			
Aroclor-1016	0.5	mg/kg	< 0.5
Aroclor-1221	0.1	mg/kg	< 0.1
Aroclor-1232	0.5	mg/kg	< 0.5
Aroclor-1242	0.5	mg/kg	< 0.5
Aroclor-1248	0.5	mg/kg	< 0.5
Aroclor-1254	0.5	mg/kg	< 0.5
Aroclor-1260	0.5	mg/kg	< 0.5
Total PCB*	0.5	mg/kg	< 0.5
Dibutylchlorendate (surr.)	1	%	73
Tetrachloro-m-xylene (surr.)	1	%	100
Phenols (Halogenated)			
2-Chlorophenol	0.5	mg/kg	< 0.5
2.4-Dichlorophenol	0.5	mg/kg	< 0.5
2.4.5-Trichlorophenol	1	mg/kg	< 1
2.4.6-Trichlorophenol	1	mg/kg	< 1
2.6-Dichlorophenol	0.5	mg/kg	< 0.5
4-Chloro-3-methylphenol	1	mg/kg	< 1
Pentachlorophenol	1	mg/kg	< 1
Tetrachlorophenols - Total	10	mg/kg	< 10
Total Halogenated Phenol*	1	mg/kg	< 1

Client Sample ID			BD2/AS/20200504
Sample Matrix			**Soil**
Eurofins Sample No.			**S20-My07154**
Date Sampled			**May 04, 2020**
Test/Reference	LOR	Unit	
Phenols (non-Halogenated)			
2-Cyclohexyl-4.6-dinitrophenol	20	mg/kg	< 20
2-Methyl-4.6-dinitrophenol	5	mg/kg	< 5
2-Methylphenol (o-Cresol)	0.2	mg/kg	< 0.2
2-Nitrophenol	1	mg/kg	< 1
2.4-Dimethylphenol	0.5	mg/kg	< 0.5
2.4-Dinitrophenol	5	mg/kg	< 5
3&4-Methylphenol (m&p-Cresol)	0.4	mg/kg	< 0.4
4-Nitrophenol	5	mg/kg	< 5
Dinoseb	20	mg/kg	< 20
Phenol	0.5	mg/kg	< 0.5
Total Non-Halogenated Phenol*	20	mg/kg	< 20
Phenol-d6 (surr.)	1	%	88
Heavy Metals			
Arsenic	2	mg/kg	12
Cadmium	0.4	mg/kg	< 0.4
Chromium	5	mg/kg	20
Copper	5	mg/kg	22
Lead	5	mg/kg	52
Mercury	0.1	mg/kg	< 0.1
Nickel	5	mg/kg	17
Zinc	5	mg/kg	57
% Moisture	1	%	15

Sample History

Where samples are submitted/analysed over several days, the last date of extraction and analysis is reported.
A recent review of our LIMS has resulted in the correction or clarification of some method identifications. Due to this, some of the method reference information on reports has changed. However, no substantive change has been made to our laboratory methods, and as such there is no change in the validity of current or previous results.

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
Total Recoverable Hydrocarbons - 1999 NEPM Fractions	Sydney	May 12, 2020	14 Days
- Method: LTM-ORG-2010 TRH C6-C40			
BTEX	Sydney	May 12, 2020	14 Days
- Method: LTM-ORG-2010 TRH C6-C40			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Sydney	May 12, 2020	14 Days
- Method: LTM-ORG-2010 TRH C6-C40			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Sydney	May 12, 2020	
- Method: LTM-ORG-2010 TRH C6-C40			
Polycyclic Aromatic Hydrocarbons	Sydney	May 12, 2020	14 Days
- Method: LTM-ORG-2130 PAH and Phenols in Soil and Water			
Metals M8	Sydney	May 12, 2020	180 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
Organochlorine Pesticides	Sydney	May 12, 2020	14 Days
- Method: LTM-ORG-2220 OCP & PCB in Soil and Water			
Organophosphorus Pesticides	Sydney	May 12, 2020	14 Days
- Method: LTM-ORG-2200 Organophosphorus Pesticides by GC-MS			
Polychlorinated Biphenyls	Sydney	May 12, 2020	28 Days
- Method: LTM-ORG-2220 OCP & PCB in Soil and Water			
Phenols (Halogenated)	Sydney	May 12, 2020	14 Days
- Method: LTM-ORG-2130 PAH and Phenols in Soil and Water			
Phenols (non-Halogenated)	Sydney	May 12, 2020	14 Days
- Method: LTM-ORG-2130 PAH and Phenols in Soil and Water			
% Moisture	Sydney	May 06, 2020	14 Days
- Method: LTM-GEN-7080 Moisture			

eurofins | Environment Testing

ABN – 50 005 085 521 web : www.eurofins.com.au e.mail : EnviroSales@eurofins.com

Australia

Melbourne
6 Monterey Road
Dandenong South VIC 3175
Phone : +61 3 8564 5000
NATA # 1261
Site # 1254 & 14271

Sydney
Unit F3, Building F
16 Mars Road
Lane Cove West NSW 2066
Phone : +61 2 9900 8400
NATA # 1261 Site # 18217

Brisbane
1/21 Smallwood Place
Murarrie QLD 4172
Phone : +61 7 3902 4600
NATA # 1261 Site # 20794

Perth
2/91 Leach Highway
Kewdale WA 6105
Phone : +61 8 9251 9600
NATA # 1261
Site # 23736

New Zealand

Auckland
35 O'Rorke Road
Penrose, Auckland 1061
Phone : +64 9 526 45 51
IANZ # 1327

Christchurch
43 Detroit Drive
Rolleston, Christchurch 7675
Phone : 0800 856 450
IANZ # 1290

Company Name: Douglas Partners (Syd)
Address: 96 Hermitage Road
West Ryde
NSW 2114

Project Name:
Project ID: 99671.01

Order No.:
Report #: 717726
Phone: 02 9809 0666
Fax:

Received: May 6, 2020 1:00 PM
Due: May 13, 2020
Priority: 5 Day
Contact Name: Nerilee Edwards

Eurofins Analytical Services Manager : Ursula Long

Sample Detail						Organochlorine Pesticides	Organophosphorus Pesticides	Polychlorinated Biphenyls	Phenols (IWRG 621)	Moisture Set	Eurofins | mgt Suite B7
Melbourne Laboratory - NATA Site # 1254 & 14271											
Sydney Laboratory - NATA Site # 18217						X	X	X	X	X	X
Brisbane Laboratory - NATA Site # 20794											
Perth Laboratory - NATA Site # 23736											
External Laboratory											
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**						
1	BD2/AS/20200504	May 04, 2020		Soil	S20-My07154	X	X	X	X	X	X
Test Counts						1	1	1	1	1	1

Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples follows guidelines delineated in the National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended May 2013 and are included in this QC report where applicable. Additional QC data may be available on request.
2. All soil/sediment/solid results are reported on a dry basis, unless otherwise stated.
3. All biota/food results are reported on a wet weight basis on the edible portion, unless otherwise stated.
4. Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
5. Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds.
6. SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
7. Samples were analysed on an 'as received' basis.
8. Information identified on this report with blue colour, indicates data provided by customer, that may have an impact on the results.
9. This report replaces any interim results previously issued.

Holding Times

Please refer to 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours prior to sample receipt deadlines as stated on the SRA.

If the Laboratory did not receive the information in the required timeframe, and regardless of any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

For VOCs containing vinyl chloride, styrene and 2-chloroethyl vinyl ether the holding time is 7 days however for all other VOCs such as BTEX or C6-10 TRH then the holding time is 14 days.

****NOTE:** pH duplicates are reported as a range NOT as RPD

Units

mg/kg: milligrams per kilogram
mg/L: milligrams per litre
ug/L: micrograms per litre
ppm: Parts per million
ppb: Parts per billion
%: Percentage
org/100mL: Organisms per 100 millilitres
NTU: Nephelometric Turbidity Units
MPN/100mL: Most Probable Number of organisms per 100 millilitres

Terms

Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
LOR	Limit of Reporting.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
LCS	Laboratory Control Sample - reported as percent recovery.
CRM	Certified Reference Material - reported as percent recovery.
Method Blank	In the case of solid samples these are performed on laboratory certified clean sands and in the case of water samples these are performed on de-ionised water.
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
USEPA	United States Environmental Protection Agency
APHA	American Public Health Association
TCLP	Toxicity Characteristic Leaching Procedure
COC	Chain of Custody
SRA	Sample Receipt Advice
QSM	US Department of Defense Quality Systems Manual Version 5.3
CP	Client Parent - QC was performed on samples pertaining to this report
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within.
TEQ	Toxic Equivalency Quotient

QC - Acceptance Criteria

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is 30% however the following acceptance guidelines are equally applicable:

Results <10 times the LOR : No Limit

Results between 10-20 times the LOR : RPD must lie between 0-50%

Results >20 times the LOR : RPD must lie between 0-30%

Surrogate Recoveries: Recoveries must lie between 20-130% Phenols & 50-150% PFASs

PFAS field samples that contain surrogate recoveries in excess of the QC limit designated in QSM 5.3 where no positive PFAS results have been reported have been reviewed and no data was affected.

WA DWER (n=10): PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

QC Data General Comments

1. Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
3. Organochlorine Pesticide analysis - where reporting LCS data, Toxaphene & Chlordane are not added to the LCS.
4. Organochlorine Pesticide analysis - where reporting Spike data, Toxaphene is not added to the Spike.
5. Total Recoverable Hydrocarbons - where reporting Spike & LCS data, a single spike of commercial Hydrocarbon products in the range of C12-C30 is added and it's Total Recovery is reported in the C10-C14 cell of the Report.
6. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling.Therefore laboratory analysis is unlikely to be completed within holding time. Analysis will begin as soon as possible after sample receipt.
7. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of Recovery the term "INT" appears against that analyte.
8. Polychlorinated Biphenyls are spiked only using Aroclor 1260 in Matrix Spikes and LCS.
9. For Matrix Spikes and LCS results a dash " -" in the report means that the specific analyte was not added to the QC sample.
10. Duplicate RPDs are calculated from raw analytical data thus it is possible to have two sets of data.

Quality Control Results

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank							
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	mg/kg	< 0.5			0.5	Pass	
Acenaphthylene	mg/kg	< 0.5			0.5	Pass	
Anthracene	mg/kg	< 0.5			0.5	Pass	
Benz(a)anthracene	mg/kg	< 0.5			0.5	Pass	
Benzo(a)pyrene	mg/kg	< 0.5			0.5	Pass	
Benzo(b&j)fluoranthene	mg/kg	< 0.5			0.5	Pass	
Benzo(g.h.i)perylene	mg/kg	< 0.5			0.5	Pass	
Benzo(k)fluoranthene	mg/kg	< 0.5			0.5	Pass	
Chrysene	mg/kg	< 0.5			0.5	Pass	
Dibenz(a.h)anthracene	mg/kg	< 0.5			0.5	Pass	
Fluoranthene	mg/kg	< 0.5			0.5	Pass	
Fluorene	mg/kg	< 0.5			0.5	Pass	
Indeno(1.2.3-cd)pyrene	mg/kg	< 0.5			0.5	Pass	
Naphthalene	mg/kg	< 0.5			0.5	Pass	
Phenanthrene	mg/kg	< 0.5			0.5	Pass	
Pyrene	mg/kg	< 0.5			0.5	Pass	
Method Blank							
Organochlorine Pesticides							
Chlordanes - Total	mg/kg	< 0.1			0.1	Pass	
4.4'-DDD	mg/kg	< 0.05			0.05	Pass	
4.4'-DDE	mg/kg	< 0.05			0.05	Pass	
4.4'-DDT	mg/kg	< 0.05			0.05	Pass	
a-BHC	mg/kg	< 0.05			0.05	Pass	
Aldrin	mg/kg	< 0.05			0.05	Pass	
b-BHC	mg/kg	< 0.05			0.05	Pass	
d-BHC	mg/kg	< 0.05			0.05	Pass	
Dieldrin	mg/kg	< 0.05			0.05	Pass	
Endosulfan I	mg/kg	< 0.05			0.05	Pass	
Endosulfan II	mg/kg	< 0.05			0.05	Pass	
Endosulfan sulphate	mg/kg	< 0.05			0.05	Pass	
Endrin	mg/kg	< 0.05			0.05	Pass	
Endrin aldehyde	mg/kg	< 0.05			0.05	Pass	
Endrin ketone	mg/kg	< 0.05			0.05	Pass	
g-BHC (Lindane)	mg/kg	< 0.05			0.05	Pass	
Heptachlor	mg/kg	< 0.05			0.05	Pass	
Heptachlor epoxide	mg/kg	< 0.05			0.05	Pass	
Hexachlorobenzene	mg/kg	< 0.05			0.05	Pass	
Methoxychlor	mg/kg	< 0.2			0.2	Pass	
Toxaphene	mg/kg	< 1			1	Pass	
Method Blank							
Organophosphorus Pesticides							
Azinphos-methyl	mg/kg	< 0.2			0.2	Pass	
Bolstar	mg/kg	< 0.2			0.2	Pass	
Chlorfenvinphos	mg/kg	< 0.2			0.2	Pass	
Chlorpyrifos	mg/kg	< 0.2			0.2	Pass	
Chlorpyrifos-methyl	mg/kg	< 0.2			0.2	Pass	
Coumaphos	mg/kg	< 2			2	Pass	
Demeton-S	mg/kg	< 0.2			0.2	Pass	
Demeton-O	mg/kg	< 0.2			0.2	Pass	
Diazinon	mg/kg	< 0.2			0.2	Pass	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Dichlorvos	mg/kg	< 0.2			0.2	Pass	
Dimethoate	mg/kg	< 0.2			0.2	Pass	
Disulfoton	mg/kg	< 0.2			0.2	Pass	
EPN	mg/kg	< 0.2			0.2	Pass	
Ethion	mg/kg	< 0.2			0.2	Pass	
Ethoprop	mg/kg	< 0.2			0.2	Pass	
Ethyl parathion	mg/kg	< 0.2			0.2	Pass	
Fenitrothion	mg/kg	< 0.2			0.2	Pass	
Fensulfothion	mg/kg	< 0.2			0.2	Pass	
Fenthion	mg/kg	< 0.2			0.2	Pass	
Malathion	mg/kg	< 0.2			0.2	Pass	
Merphos	mg/kg	< 0.2			0.2	Pass	
Methyl parathion	mg/kg	< 0.2			0.2	Pass	
Mevinphos	mg/kg	< 0.2			0.2	Pass	
Monocrotophos	mg/kg	< 2			2	Pass	
Naled	mg/kg	< 0.2			0.2	Pass	
Omethoate	mg/kg	< 2			2	Pass	
Phorate	mg/kg	< 0.2			0.2	Pass	
Pirimiphos-methyl	mg/kg	< 0.2			0.2	Pass	
Pyrazophos	mg/kg	< 0.2			0.2	Pass	
Ronnel	mg/kg	< 0.2			0.2	Pass	
Terbufos	mg/kg	< 0.2			0.2	Pass	
Tetrachlorvinphos	mg/kg	< 0.2			0.2	Pass	
Tokuthion	mg/kg	< 0.2			0.2	Pass	
Trichloronate	mg/kg	< 0.2			0.2	Pass	
Method Blank							
Polychlorinated Biphenyls							
Aroclor-1016	mg/kg	< 0.5			0.5	Pass	
Aroclor-1221	mg/kg	< 0.1			0.1	Pass	
Aroclor-1232	mg/kg	< 0.5			0.5	Pass	
Aroclor-1242	mg/kg	< 0.5			0.5	Pass	
Aroclor-1248	mg/kg	< 0.5			0.5	Pass	
Aroclor-1254	mg/kg	< 0.5			0.5	Pass	
Aroclor-1260	mg/kg	< 0.5			0.5	Pass	
Total PCB*	mg/kg	< 0.5			0.5	Pass	
Method Blank							
Phenols (Halogenated)							
2-Chlorophenol	mg/kg	< 0.5			0.5	Pass	
2.4-Dichlorophenol	mg/kg	< 0.5			0.5	Pass	
2.4.5-Trichlorophenol	mg/kg	< 1			1	Pass	
2.4.6-Trichlorophenol	mg/kg	< 1			1	Pass	
2.6-Dichlorophenol	mg/kg	< 0.5			0.5	Pass	
4-Chloro-3-methylphenol	mg/kg	< 1			1	Pass	
Pentachlorophenol	mg/kg	< 1			1	Pass	
Tetrachlorophenols - Total	mg/kg	< 10			10	Pass	
Method Blank							
Phenols (non-Halogenated)							
2-Cyclohexyl-4.6-dinitrophenol	mg/kg	< 20			20	Pass	
2-Methyl-4.6-dinitrophenol	mg/kg	< 5			5	Pass	
2-Methylphenol (o-Cresol)	mg/kg	< 0.2			0.2	Pass	
2-Nitrophenol	mg/kg	< 1			1	Pass	
2.4-Dimethylphenol	mg/kg	< 0.5			0.5	Pass	
2.4-Dinitrophenol	mg/kg	< 5			5	Pass	
3&4-Methylphenol (m&p-Cresol)	mg/kg	< 0.4			0.4	Pass	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
4-Nitrophenol	mg/kg	< 5			5	Pass	
Dinoseb	mg/kg	< 20			20	Pass	
Phenol	mg/kg	< 0.5			0.5	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons - 1999 NEPM Fractions							
TRH C6-C9	%	99			70-130	Pass	
TRH C10-C14	%	77			70-130	Pass	
LCS - % Recovery							
BTEX							
Benzene	%	89			70-130	Pass	
Toluene	%	105			70-130	Pass	
Ethylbenzene	%	110			70-130	Pass	
m&p-Xylenes	%	110			70-130	Pass	
o-Xylene	%	110			70-130	Pass	
Xylenes - Total*	%	110			70-130	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons - 2013 NEPM Fractions							
Naphthalene	%	103			70-130	Pass	
TRH C6-C10	%	100			70-130	Pass	
TRH >C10-C16	%	80			70-130	Pass	
LCS - % Recovery							
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	%	104			70-130	Pass	
Acenaphthylene	%	100			70-130	Pass	
Anthracene	%	94			70-130	Pass	
Benz(a)anthracene	%	92			70-130	Pass	
Benzo(a)pyrene	%	90			70-130	Pass	
Benzo(b&j)fluoranthene	%	93			70-130	Pass	
Benzo(g.h.i)perylene	%	92			70-130	Pass	
Benzo(k)fluoranthene	%	98			70-130	Pass	
Chrysene	%	96			70-130	Pass	
Dibenz(a.h)anthracene	%	89			70-130	Pass	
Fluoranthene	%	93			70-130	Pass	
Fluorene	%	102			70-130	Pass	
Indeno(1.2.3-cd)pyrene	%	94			70-130	Pass	
Naphthalene	%	100			70-130	Pass	
Phenanthrene	%	96			70-130	Pass	
Pyrene	%	91			70-130	Pass	
LCS - % Recovery							
Organochlorine Pesticides							
Chlordanes - Total	%	128			70-130	Pass	
4.4'-DDD	%	123			70-130	Pass	
4.4'-DDE	%	115			70-130	Pass	
4.4'-DDT	%	114			70-130	Pass	
a-BHC	%	118			70-130	Pass	
Aldrin	%	110			70-130	Pass	
b-BHC	%	120			70-130	Pass	
d-BHC	%	128			70-130	Pass	
Dieldrin	%	123			70-130	Pass	
Endosulfan I	%	127			70-130	Pass	
Endosulfan II	%	130			70-130	Pass	
Endosulfan sulphate	%	125			70-130	Pass	
Endrin	%	118			70-130	Pass	
Endrin aldehyde	%	130			70-130	Pass	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Endrin ketone	%	129			70-130	Pass	
g-BHC (Lindane)	%	125			70-130	Pass	
Heptachlor	%	126			70-130	Pass	
Heptachlor epoxide	%	129			70-130	Pass	
Hexachlorobenzene	%	128			70-130	Pass	
Methoxychlor	%	116			70-130	Pass	
LCS - % Recovery							
Organophosphorus Pesticides							
Diazinon	%	99			70-130	Pass	
Dimethoate	%	102			70-130	Pass	
Ethion	%	85			70-130	Pass	
Fenitrothion	%	105			70-130	Pass	
Methyl parathion	%	104			70-130	Pass	
Mevinphos	%	103			70-130	Pass	
LCS - % Recovery							
Polychlorinated Biphenyls							
Aroclor-1016	%	97			70-130	Pass	
Aroclor-1260	%	90			70-130	Pass	
LCS - % Recovery							
Phenols (Halogenated)							
2-Chlorophenol	%	92			30-130	Pass	
2.4-Dichlorophenol	%	94			30-130	Pass	
2.4.5-Trichlorophenol	%	99			30-130	Pass	
2.4.6-Trichlorophenol	%	99			30-130	Pass	
2.6-Dichlorophenol	%	97			30-130	Pass	
4-Chloro-3-methylphenol	%	103			30-130	Pass	
Pentachlorophenol	%	95			30-130	Pass	
Tetrachlorophenols - Total	%	93			30-130	Pass	
LCS - % Recovery							
Phenols (non-Halogenated)							
2-Cyclohexyl-4.6-dinitrophenol	%	83			30-130	Pass	
2-Methyl-4.6-dinitrophenol	%	98			30-130	Pass	
2-Methylphenol (o-Cresol)	%	104			30-130	Pass	
2-Nitrophenol	%	98			30-130	Pass	
2.4-Dimethylphenol	%	98			30-130	Pass	
2.4-Dinitrophenol	%	101			30-130	Pass	
3&4-Methylphenol (m&p-Cresol)	%	111			30-130	Pass	
4-Nitrophenol	%	92			30-130	Pass	
Dinoseb	%	99			30-130	Pass	
Phenol	%	99			30-130	Pass	
LCS - % Recovery							
Heavy Metals							
Arsenic	%	87			70-130	Pass	
Cadmium	%	92			70-130	Pass	
Chromium	%	90			70-130	Pass	
Copper	%	92			70-130	Pass	
Lead	%	95			70-130	Pass	
Mercury	%	93			70-130	Pass	
Nickel	%	95			70-130	Pass	
Zinc	%	89			70-130	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Spike - % Recovery									
Total Recoverable Hydrocarbons - 1999 NEPM Fractions				Result 1					
TRH C6-C9	S20-My10318	NCP	%	92			70-130	Pass	
TRH C10-C14	S20-My08753	NCP	%	82			70-130	Pass	
Spike - % Recovery									
BTEX				Result 1					
Benzene	S20-My10318	NCP	%	87			70-130	Pass	
Toluene	S20-My10318	NCP	%	94			70-130	Pass	
Ethylbenzene	S20-My10318	NCP	%	101			70-130	Pass	
m&p-Xylenes	S20-My10318	NCP	%	101			70-130	Pass	
o-Xylene	S20-My10318	NCP	%	102			70-130	Pass	
Xylenes - Total*	S20-My10318	NCP	%	101			70-130	Pass	
Spike - % Recovery									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1					
Naphthalene	S20-My10318	NCP	%	113			70-130	Pass	
TRH C6-C10	S20-My10318	NCP	%	93			70-130	Pass	
TRH >C10-C16	S20-My08753	NCP	%	84			70-130	Pass	
Spike - % Recovery									
Heavy Metals				Result 1					
Arsenic	S20-My10821	NCP	%	97			70-130	Pass	
Cadmium	S20-My10821	NCP	%	95			70-130	Pass	
Chromium	S20-My10821	NCP	%	105			70-130	Pass	
Copper	S20-My10821	NCP	%	90			70-130	Pass	
Lead	S20-My10821	NCP	%	98			70-130	Pass	
Mercury	S20-My10821	NCP	%	98			70-130	Pass	
Nickel	S20-My10821	NCP	%	93			70-130	Pass	
Zinc	S20-My10821	NCP	%	86			70-130	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Duplicate									
Total Recoverable Hydrocarbons - 1999 NEPM Fractions				Result 1	Result 2	RPD			
TRH C6-C9	S20-My10316	NCP	mg/kg	< 20	< 20	<1	30%	Pass	
TRH C10-C14	S20-My10318	NCP	mg/kg	< 20	< 20	<1	30%	Pass	
TRH C15-C28	S20-My10318	NCP	mg/kg	< 50	< 50	<1	30%	Pass	
TRH C29-C36	S20-My10318	NCP	mg/kg	< 50	< 50	<1	30%	Pass	
Duplicate									
BTEX				Result 1	Result 2	RPD			
Benzene	S20-My10316	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Toluene	S20-My10316	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Ethylbenzene	S20-My10316	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
m&p-Xylenes	S20-My10316	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
o-Xylene	S20-My10316	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Xylenes - Total*	S20-My10316	NCP	mg/kg	< 0.3	< 0.3	<1	30%	Pass	
Duplicate									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1	Result 2	RPD			
Naphthalene	S20-My10316	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
TRH C6-C10	S20-My10316	NCP	mg/kg	< 20	< 20	<1	30%	Pass	
TRH >C10-C16	S20-My10318	NCP	mg/kg	< 50	< 50	<1	30%	Pass	
TRH >C16-C34	S20-My10318	NCP	mg/kg	< 100	< 100	<1	30%	Pass	
TRH >C34-C40	S20-My10318	NCP	mg/kg	< 100	< 100	<1	30%	Pass	

Duplicate									
Polycyclic Aromatic Hydrocarbons				Result 1	Result 2	RPD			
Acenaphthene	S20-My08619	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Acenaphthylene	S20-My08619	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Anthracene	S20-My08619	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benz(a)anthracene	S20-My08619	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(a)pyrene	S20-My08619	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(b&j)fluoranthene	S20-My08619	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(g.h.i)perylene	S20-My08619	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(k)fluoranthene	S20-My08619	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Chrysene	S20-My08619	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Dibenz(a.h)anthracene	S20-My08619	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Fluoranthene	S20-My08619	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Fluorene	S20-My08619	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Indeno(1.2.3-cd)pyrene	S20-My08619	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Naphthalene	S20-My08619	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Phenanthrene	S20-My08619	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Pyrene	S20-My08619	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Duplicate									
Organochlorine Pesticides				Result 1	Result 2	RPD			
Chlordanes - Total	S20-My08619	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
4.4'-DDD	S20-My08619	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
4.4'-DDE	S20-My08619	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
4.4'-DDT	S20-My08619	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
a-BHC	S20-My08619	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Aldrin	S20-My08619	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
b-BHC	S20-My08619	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
d-BHC	S20-My08619	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Dieldrin	S20-My08619	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Endosulfan I	S20-My08619	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Endosulfan II	S20-My08619	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Endosulfan sulphate	S20-My08619	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Endrin	S20-My08619	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Endrin aldehyde	S20-My08619	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Endrin ketone	S20-My08619	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
g-BHC (Lindane)	S20-My08619	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Heptachlor	S20-My08619	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Heptachlor epoxide	S20-My08619	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Hexachlorobenzene	S20-My08619	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Methoxychlor	S20-My08619	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Duplicate									
Organophosphorus Pesticides				Result 1	Result 2	RPD			
Azinphos-methyl	S20-My08619	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Bolstar	S20-My08619	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Chlorfenvinphos	S20-My08619	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Chlorpyrifos	S20-My08619	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Chlorpyrifos-methyl	S20-My08619	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Coumaphos	S20-My08619	NCP	mg/kg	< 2	< 2	<1	30%	Pass	
Demeton-S	S20-My08619	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Demeton-O	S20-My08619	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Diazinon	S20-My08619	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Dichlorvos	S20-My08619	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Dimethoate	S20-My08619	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Disulfoton	S20-My08619	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
EPN	S20-My08619	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Ethion	S20-My08619	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	

Duplicate									
Organophosphorus Pesticides				Result 1	Result 2	RPD			
Ethoprop	S20-My08619	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Ethyl parathion	S20-My08619	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Fenitrothion	S20-My08619	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Fensulfothion	S20-My08619	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Fenthion	S20-My08619	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Malathion	S20-My08619	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Merphos	S20-My08619	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Methyl parathion	S20-My08619	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Mevinphos	S20-My08619	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Monocrotophos	S20-My08619	NCP	mg/kg	< 2	< 2	<1	30%	Pass	
Naled	S20-My08619	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Omethoate	S20-My08619	NCP	mg/kg	< 2	< 2	<1	30%	Pass	
Phorate	S20-My08619	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Pirimiphos-methyl	S20-My08619	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Pyrazophos	S20-My08619	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Ronnel	S20-My08619	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Terbufos	S20-My08619	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Tetrachlorvinphos	S20-My08619	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Tokuthion	S20-My08619	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Trichloronate	S20-My08619	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Duplicate									
Polychlorinated Biphenyls				Result 1	Result 2	RPD			
Aroclor-1016	S20-My08619	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Aroclor-1221	S20-My08619	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Aroclor-1232	S20-My08619	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Aroclor-1242	S20-My08619	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Aroclor-1248	S20-My08619	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Aroclor-1254	S20-My08619	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Aroclor-1260	S20-My08619	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Total PCB*	S20-My08619	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Duplicate									
Phenols (Halogenated)				Result 1	Result 2	RPD			
2-Chlorophenol	S20-My08619	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
2.4-Dichlorophenol	S20-My08619	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
2.4.5-Trichlorophenol	S20-My08619	NCP	mg/kg	< 1	< 1	<1	30%	Pass	
2.4.6-Trichlorophenol	S20-My08619	NCP	mg/kg	< 1	< 1	<1	30%	Pass	
2.6-Dichlorophenol	S20-My08619	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
4-Chloro-3-methylphenol	S20-My08619	NCP	mg/kg	< 1	< 1	<1	30%	Pass	
Pentachlorophenol	S20-My08619	NCP	mg/kg	< 1	< 1	<1	30%	Pass	
Tetrachlorophenols - Total	S20-My08619	NCP	mg/kg	< 10	< 10	<1	30%	Pass	
Duplicate									
Phenols (non-Halogenated)				Result 1	Result 2	RPD			
2-Cyclohexyl-4.6-dinitrophenol	S20-My08619	NCP	mg/kg	< 20	< 20	<1	30%	Pass	
2-Methyl-4.6-dinitrophenol	S20-My08619	NCP	mg/kg	< 5	< 5	<1	30%	Pass	
2-Methylphenol (o-Cresol)	S20-My08619	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
2-Nitrophenol	S20-My08619	NCP	mg/kg	< 1	< 1	<1	30%	Pass	
2.4-Dimethylphenol	S20-My08619	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
2.4-Dinitrophenol	S20-My08619	NCP	mg/kg	< 5	< 5	<1	30%	Pass	
3&4-Methylphenol (m&p-Cresol)	S20-My08619	NCP	mg/kg	< 0.4	< 0.4	<1	30%	Pass	
4-Nitrophenol	S20-My08619	NCP	mg/kg	< 5	< 5	<1	30%	Pass	
Dinoseb	S20-My08619	NCP	mg/kg	< 20	< 20	<1	30%	Pass	
Phenol	S20-My08619	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	

Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Arsenic	S20-My08645	NCP	mg/kg	2.6	3.1	19	30%	Pass	
Cadmium	S20-My08645	NCP	mg/kg	< 0.4	< 0.4	<1	30%	Pass	
Chromium	S20-My08645	NCP	mg/kg	13	14	13	30%	Pass	
Copper	S20-My08645	NCP	mg/kg	6.5	7.3	11	30%	Pass	
Lead	S20-My08645	NCP	mg/kg	11	15	34	30%	Fail	Q15
Mercury	S20-My08645	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Nickel	S20-My08645	NCP	mg/kg	8.8	8.8	1.0	30%	Pass	
Zinc	S20-My08645	NCP	mg/kg	21	27	25	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
% Moisture	S20-My07045	NCP	%	16	17	2.0	30%	Pass	

Comments

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	No
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Qualifier Codes/Comments

Code	Description
N01	F2 is determined by arithmetically subtracting the "naphthalene" value from the ">C10-C16" value. The naphthalene value used in this calculation is obtained from volatiles (Purge & Trap analysis).
N02	Where we have reported both volatile (P&T GCMS) and semivolatile (GCMS) naphthalene data, results may not be identical. Provided correct sample handling protocols have been followed, any observed differences in results are likely to be due to procedural differences within each methodology. Results determined by both techniques have passed all QAQC acceptance criteria, and are entirely technically valid.
N04	F1 is determined by arithmetically subtracting the "Total BTEX" value from the "C6-C10" value. The "Total BTEX" value is obtained by summing the concentrations of BTEX analytes. The "C6-C10" value is obtained by quantitating against a standard of mixed aromatic/aliphatic analytes.
N07	Please note:- These two PAH isomers closely co-elute using the most contemporary analytical methods and both the reported concentration (and the TEQ) apply specifically to the total of the two co-eluting PAHs
Q15	The RPD reported passes Eurofins Environment Testing's QC - Acceptance Criteria as defined in the Internal Quality Control Review and Glossary page of this report.

Authorised By

Ursula Long	Analytical Services Manager
Andrew Sullivan	Senior Analyst-Organic (NSW)
Gabriele Cordero	Senior Analyst-Metal (NSW)

Glenn Jackson

General Manager

Final report - this Report replaces any previously issued Report

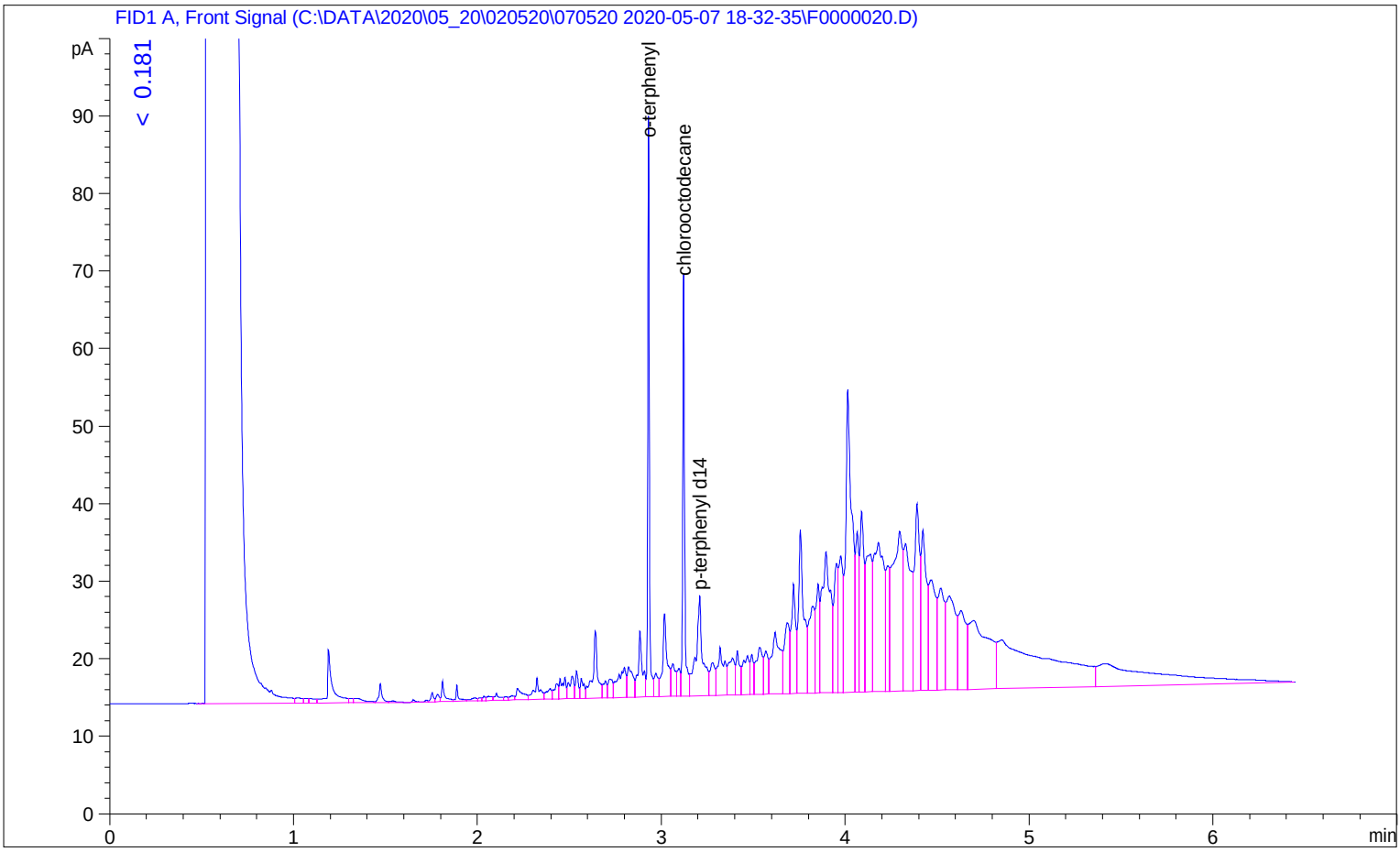
- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request or please click here.

Data File C:\DATA\2020\05_20\020520\070520 2020-05-07 18-32-35\F0000020.D
Sample Name: s242263-6

```
==========================================================================
Acq. Operator   : SYSTEM                          Seq. Line :  20
Sample Operator : SYSTEM
Acq. Instrument : GC_7                             Location :   20  (F)
Injection Date  : 07/05/2020 9:44:56 PM                 Inj :   1
                                                  Inj Volume : 1 µl
Acq. Method     : C:\DATA\2020\05_20\020520\070520 2020-05-07 18-32-35\TRH_FAST_RACER.M
Last changed    : 28/04/2020 4:42:33 PM by SYSTEM
Analysis Method : C:\METHODS\2020\05_20\070520-F-processing.M
Last changed    : 08/05/2020 10:51:12 AM by SYSTEM
                  (modified after loading) (Current integration events modified)
Method Info     : FAST TPH WITH 15M HP5 COLUMNS
```




```
==========================================================================
                    External Standard Report
==========================================================================

Sorted By             :      Signal
Calib. Data Modified  :      08/05/2020 10:39:20 AM
Multiplier            :      1.0000
Dilution              :      1.0000
Do not use Multiplier & Dilution Factor with ISTDs

Signal 1: FID1 A, Front Signal

RetTime  Type     Area     Amt/Area    Amount    Grp   Name
 [min]          [pA*s]                 [mg/L]
-------|------|----------|----------|----------|--|-----------------
  2.931 VV    I   46.69994 2.40276e-1   11.22090    o-terphenyl
  3.122 VV        40.72866 2.99421e-1   12.19503    chlorooctodecane
```

Data File C:\DATA\2020\05_20\020520\070520 2020-05-07 18-32-35\F0000020.D
Sample Name: s242263-6

RetTime [min]	Type	Area [pA*s]	Amt/Area	Amount [mg/L]	Grp	Name
3.208	VV	I 32.96689	9.48674e-2	3.12748		p-terphenyl d14

Totals : 26.54341

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Summed Peaks Report

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Signal 1: FID1 A, Front Signal

Signal 1: FID1 A, Front Signal

Name	Start Time [min]	End Time [min]	Total Area [pA*s]	Amount [mg/L]
TRH C10-C14	1.400	2.430	29.98589	7.7048
NEPM >C10-C16	1.770	2.660	61.65711	15.8427
TRH C15-C28	2.431	3.720	243.31415	62.2836
NEPM >C16-C34	2.661	4.100	585.79716	149.9524
TRH C29-C36	3.721	4.220	473.27637	142.2863
NEPM >C34-C40	4.110	4.440	361.46942	108.6725

Totals : 486.7422

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Final Summed Peaks Report

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Signal 1: FID1 A, Front Signal

Name	Total Area [pA*s]	Amount [mg/L]
TRH C10-C14	29.98589	7.7048
NEPM >C10-C16	61.65711	15.8427
TRH C15-C28	243.31415	62.2836
NEPM >C16-C34	585.79716	149.9524
TRH C29-C36	473.27637	142.2863
NEPM >C34-C40	361.46942	108.6725
o-terphenyl	46.69994	11.2209
chlorooctodecan	40.72866	12.1950
p-terphenyl d14	32.96689	3.1275

Totals : 513.2856

*** End of Report ***